Abstracts of Technical Sections
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NOTE: Abstracts of posters follow abstracts of podium presentations by section.

SECTION A. Zoology
Only Morning at 9:00 a.m.
Saturday, April 28, 1990
035 Medical Sciences
Dr. Clyde Barbour, Presiding

9:00 AXONAL IMPULSE PROPAGATION AT GEOMETRICAL STEP-CACHNGES. M. Goldfinger and D.F. Miller. Departments of Physiology & Biophysics and Mathematics & Statistics, College of Science & Mathematics, Wright State University, Dayton, OH 45401-0927.

The Hodgkin-Huxley and 1-dimensional cable equations were used to study impulse propagation at a step-change in axonal diameter. First-order differential equations were integrated with trapezoidal or 4th-order Runge-Kutta methods. The second-order derivative (d^2I/dt^2) was integrated with a finite-difference approximation over small Δt (1 μs). The passive analytical solution for uniform-diameter fibers was well-reconstructed. For a step-increase in diameter (1 to 2 μm), axial conduction velocity changed triplybasically (increase, decrease, increase); the latter phase corresponded to conduction velocity in a uniform 2-μm-diameter fiber. For a step decrease in diameter, the converse obtained. Axial changes in inward net membrane current paralleled changes in axial conduction velocity. Neither increased Δx values nor diameter averaging at the step altered these results. With step-increase, as the duration of the temporal integration interval was increased from 0.05 to 0.25 μs, impulse amplitude and axonal conduction velocity decreased progressively before and up to the step-change.

9:15 INSECT COLD TOLERANCE: INFLUENCE OF ICE NUCLEATING ACTIVE BACTERIA. Janet M. Strong-Quandt, Richard E. Lee, and Marcia H. Lee Departments of Zoology and Microbiology, Miami University, Oxford, Ohio 45056

Although the impact of ice nucleating active (INA) bacteria in promoting frost injury in plants is established, the effect of these bacteria on overwintering insects is little known. Investigations by our laboratory of V. Paps and R. H. Lee on ice nucleating bacteria lead to the discovery of a new species in the genus Novibacillus. Cold-tolerance studies were conducted on a number of species of insects as they relate to species specific bacterial flora. Three of the tested species, Platyburnus leucopus, Leptopsocus leucopus and Platyburnus leucopus, did not show a significant difference in cold tolerance when reared in the presence or absence of any of the tested INA bacteria. However, two other species, Platyburnus leucopus and Platyburnus leucopus, showed significant differences in cold tolerance when reared in the presence or absence of any of the tested INA bacteria. These results suggest that the presence or absence of INA bacteria may be a major factor in the cold-hardening of freeze-tolerant insects.

9:30 MARINE GASTROTRICHS FROM FLORIDA. Wayne A. Evans, Department of Zoology, Ohio University, Athens, OH 45701

Marine gastrotrichs are small (50 to 3500 μm), strap- or tentacle-shaped acelomates that live interstitially in littoral and sublittoral sandy sediments. Gastrotrichs locomote by gliding on ventrally located cilia and possess adhesive tubes by which they attach themselves to the substratum. During November, 1989, sediment samples were taken from sandy beaches at three locations in Florida: Ohio Key, Bahia Honda Key, and Vero Beach. The Bahia Honda and Vero Beach sites also included sublittoral samples. Gastrotrichs were extracted from the sediments by narcotization with 7% MgCl2 followed by multiple decantations with seawater. Animals were located under a dissecting microscope at 40X, then transferred to slides for viewing under differential contrast optics. Thousand species in six families belonging to both orders of gastrotrichs (Chaetognatha and Macrognatha) were identified: Aspidogaster papillosus, Chaetognatha is, and Xenotrichia caroli. We comprehended: Acanthogaster acanthogaster, Cephalodasys pacificus, Dolichodasys dolichodasys, Macrognatha caput, Megagasteria sterrei, Parataeniumella dolhin, Peracanthodasys bairdi, P. bairdi, P. papii, and Turbanella ambronensis. The family Macrognatha was identified: M. sterrei represents the first report of the genus Megagasteria from North America.

9:45 DEMOGRAPHY AND HABITAT USE OF PEROMYSCUS LEUCOPUS IN THE ABSENCE OF COMPETITIVE HABITAT ON SOUTH BASS ISLAND, OTTAWA COUNTY, OHIO. Gregory K. Aldrich, Dept. of Biological Sciences, Bowling Green State University, Bowling Green, OH 43403

Peromyscus leucopus, the white-footed mouse is a common inhabitant of woodlands on the Ohio mainland and must compete with other small mammals for available resources. With the exception of squirrels, the white-footed mouse is the only naturally occurring small mammal to inhabit South Bass Island. If white-footed mice are restricted to woodland habitat because of interspecific competition with Myotis pennsylvaniaicus and Peromyscus maniculatus bairdi, then white-footed mice should occupy field sites in their absence. A population of white-footed mice was trapped in different habitats every two to three weeks over a period of 8 months (April-November 1989). The mice were rear-marked and their status, pelage, and weight recorded. Habitat data were analyzed according to species composition and habitat structure. The number of habitat dimensions from the original habitat data were reduced using principal components analysis (PCA) and new variables were derived to describe the habitat. Three of the habitats, a cedar woods, an old orchard, and an old field had relatively high densities, a wandering habit and a new field were nearly devoid of mice. The old field had a lower density and was characterized by less woody structure than the woods or the orchard. Density of mice was highly correlated with vertical habitat structure (i.e., trees and shrubs). The white-footed mouse, in the absence of competitors, appears to be restricted to habitats containing vertical structure and does not appear to be occupying habitats different from mainland populations.

10:00 SEASONAL SURVIVORSHIP AND ITS EFFECTS ON LONGEVITY IN A POPULATION OF WHITE-FOOTED MICE (PEROMYSCUS LEUCOPUS). Matthew M. White and A. I. Korytko. Department of Biological Sciences, Bowling Green State University, Bowling Green, OH 43403-0212.

Most Peromyscus leucopus populations in temperate zones have a bimodal breeding pattern with peaks in the spring and fall and a mid-summer decline. Seasonal differences in survivorship are common throughout the geographic range and may correspond to changes in either climate or population density. Little is known about the effects of this environmental survival on longevity and reproductive success of mice born during the spring and fall. Using demographic data from a population of P. leucopus from Carter Woods, an isolated woodland in northern Ohio, we estimated mortality rates for spring- and fall-born animals during a 7 year period. To determine if there was a behavioral or phenotypic difference between long-lived mice and the rest of the population, we selected all of the mice that lived longer than 1 year and compared their home range size, weight, and number of litters with a sample from the rest of the population. Adult males were more biased in the spring and early summer, but the spring-born animals had a significantly higher mortality rate for fall-born animals than spring-born animals. The probability of living longer than one year was greater for fall-born females than spring-born females but the same for fall- and spring-born males. Home range size and weight were not affected by long or short life. Long-lived females had significantly more litters per lifetime than other females; the rate of reproduction was not affected by season of birth or life. The observed differences in sex ratio are mostly likely an adaptive response to high fall mortality and the higher probability of low life for fall-born females than spring-born females.


The genomic DNAs of eleven species, representing the five genera of North American percids are characterized using data from thermal denaturation assays. This technique involves measuring the melting temperature of DNA and increasing the temperature incrementally. Base composition is estimated as a function of melting temperature and expressed as Tm values in °C. Tm values range between 88.3 and 41.2. Significant variation is observed among members of the superfamilies Percidae. Absorbance profiles are generated for each species and distinct GC-rich regions are identified within the genomes of S. vitreum and some Etheostoma. Compositional heterogeneity and asymmetry values are calculated from absorbance profile data. These give an indication of the distribution of
base pairs within the genome. Patterns of variation in all genomic characters differed among the genera surveyed. Members of the speciose genus Entodisma showed relatively little variation, whereas the comparatively depauperate genus Stizostedion exhibited significant variation.

10:30 THE DIVERSITY OF AMPHIBIANS AND REPTILES: SPECIES ASSOCIATED WITH THE HARTWELL MORAINE IN SOUTHWESTERN OHIO. Jeffrey C. Davis and Paul J. Krusling. Northeast High School, 10761 Pippin Road, Cincinnati, Ohio 45237.

Seventeen amphibian species, including six salamanders and seven frogs and toads, were reported from an area approximating 500 acres in north central Hamilton County and south central Butler County, Ohio. Two Lizard, four turtles, and seven snake species represent the reptile diversity from the study area. Species diversity is probably related to the variety of habitats associated with the Hartwell Moraine.

SECTION A. Zoology

Only Afternoon & Business Meeting
at 1:30 p.m.
Saturday, April 28, 1990

035 Medical Sciences
Dr. Miles Coburn, Presiding

2:00 TRANSIENT TRANSLATIONAL-TRANSLATIONAL CONTROL OF ECDYSONE 20-MONOXYGENASE ACTIVITY IN THE TOBACCO HORNWORM MANDUCA Sexta. Daniel P. Koghs, Joan C. Crooks and Paul J. Ruhl, Department of Biological Sciences, Bowling Green State University, Bowling Green, OH 43403.

Ecdysone 20-monoxygenase is the cytochrome P-450 dependent steroid hydroxylase responsible for the conversion of the insect molting hormone ecdysone to its more physiologically active metabolite 20-hydroxyecdysone. Using a radiomay's technique in combination with classical endocrinological techniques, we examined the factors which may regulate the 50-fold increase in midgut ecdysone 20-monoxygenase activity which occurs during larval-pupal development in Manduca sexta. Ecdysone, 20-hydroxyecdysone, or the ecdysone agonist RH 5849 (1,2-dibenzoyl-1-ferf-butylhydrazine) were all found to elicit the 50-fold increase in midgut ecdysone 20-monoxygenase activity when injected into competent head or thoracic ligated animals. By contrast, cholesterol and phenobarbital (an inducer of b and e forms of cytochrome P-450) were found to elicit the 50-fold increase in midgut ecdysone 20-monooxygenase activity when injected into adult cricket (Teleogryllus commodus) and cockroach (Periplaneta americana) treated with the ecdysterone agonist RH 5849 (1,2-dibenzoyl-1-ferf-butylhydrazine). These results indicate that the regulation of midgut ecdysone 20-monoxygenase activity is independent of the insect molting hormone ecdysone and that the regulation of this enzyme is mediated by an endocrine system which may be involved in regulating the activity of the insect molting hormone ecdysone.

2:15 POSSIBLE DIURNAL VARIATIONS IN KIDNEY FUNCTION OF SONG SPARROWS (MELOSPIZA MELODIA). Elizabeth Rothschild, Department of Biological Sciences, Wright State University, Dayton, OH 45435.

We infused polyethylene glycol (PEG) intraperitoneally, via osmotic micro-pumps, to measure kidney function in unrestrained song sparrows (avg. weight 19.2 g). We noted high drinking rates for song sparrows (13.0 ml day^-1). Midday collections of plasma and urine, and 24 hour PEG excretion rates, resulted in an overall GFR of 12.0 ml hr^-1 and an average UFR of 459.5 ml h^-1. Our results indicated variation through the day in PEG excretion rates within individual birds. This may be due to variations in GFR or to sequestering of water in the intestine. Preliminary results, including measurements of diurnal fluctuations in plasma PEG levels, suggest that both mechanisms play a role.

2:30 CHRONIC WATER RESTRICTION ENHANCES THIRST AND RENAL WATER ABSORPTION IN BOBWIIITES (COLINUS VERGINIANUS). David L. Goldstein, Dept of Biological Sciences, Wright State Univ., Dayton, OH 45435

Bobwhites were raised from hatching either with chronically restricted water (saving to 2/3 ad lib drinking rates; DEH) or unlimited water (HYD). Upon reaching adulthood, DEH birds were tested during chronic restriction, during rehydration, and then during short-term water restriction. HYD birds were tested while hydrated, then water restricted, then rehydrated. Kidney function was evaluated by infusion of polyethylene glycol (PEG) from implanted osmotic pumps. DEH birds (during chronic water restriction) had elevated plasma osmolalities (ave. 374 mmol/kg) and hematocrits (ave. 0.42) and reduced glomerular filtration rates, GFR (23.6 ml/h); comparable values for hydrated HYD birds were 349 mmol/kg, 0.35, and 46.5 ml/h. On their first day of free access to water, DEH birds drank copiously (ave. 47, max. 80, ml) gained mass (17 g), reduced plasma osmolality (to 365 mmol/kg) and hematocrit (to 0.37), and increased GFR (to 33.0 ml/h). During water restriction of HYD birds, plasma osmolality rose somewhat (to 360 mmol/kg) and GFR was reduced (20.5 ml/h); upon rehydration, these birds drank substantially less (23.6 ml/h) and gained less mass (5.1 g) than DEH birds, though they had similar changes in plasma osmolality. Maximum U/P ratios of PEG during short term water restriction were higher in DEH than in HYD (21 birds), indicating enhanced tubule water reabsorption in the former group. urine osmolality did not differ between the groups (635 vs. 602 mmol/kg). Compared with short-term dehydration, chronic water restriction appears to stimulate thirst and enhance some aspect of kidney function.

2:45 FAT BODY CHANGES AFTER UNILATERAL CASTRATION IN THE NEWT (NOTOPHTHALUS VIREDESCENS). C. J. V. Smith and L. L. Baranowski-Smith. Department of Biology, The University of Toledo, Toledo, OH 43606

Fat bodies have been shown to play a role in testis maintenance as fat body removal results in significant testicular degeneration (Adams and Ras, 1929). An attempt was made to determine if the presence of the testis has an influence on the fat body. This study was conducted at four different times spaced throughout the year. Male newts were unilaterally castrated and maintained under controlled conditions of temperature and light for 3-4 weeks. They were then sacrificed and the body, testis, body length, testis weight, and fat body weights determined. The data obtained were compared to a control group kept under similar conditions. During the month of July, when there is typically a large increase in fat body weight, the fat bodies of the normally a large increase in fat body weight, the fat bodies of the unilaterally castrated animals showed a substantial increase over the control animals. Both the fat body on the side of the remaining gonad and that on the other side increased by about the same amount. The possible reasons for this and other observations are discussed.

3:00 CHANGES IN GONADS AND FAT BODIES OF THE ADULT RED-SPOOTED NEWT (NOTOPHTHALUS VIREDESCENS) THROUGHOUT THE YEAR. T. Araki and C. J. V. Smith. Department of Biology, The University of Toledo, Toledo, OH 43606.

In the present study, body weight, body length, scapit- vent length, and gonadal weight of a population of adult red-spotted newts from Tennessee have been compared with previously published data from populations in Massachusetts (Adams, 1933). In addition, fat body weights were determined. In males the mean ovary weight was greatest in April (15.30% of body weight [BWT]) and smallest during August (0.53% BWT). The results also showed that the smallest testes weight was found in May (0.05% BWT) and the greatest testes weight in August (5.52% BWT) corresponding to a high level of spermatogenesis. Fat body weight in the female was smallest in March (0.25% BWT), when the ovaries were large (14.50% BWT) and reached maximum size (10.25% BWT) during August when the ovaries were smallest (0.55% BWT). The inverse relationship between the fat body and ovary weights indicated that these structures may be intimately associated with vireflogenesia. In the male fat bodies were smallest (0.39% BWT) during the spring breeding season, (April) when testes were mature and large (1.00% BWT). The largest fat bodies were found in August (5.80% BWT) when the testes were undergoing development for the following year's reproduction. This finding indicated that fat bodies might be nutritional support for testes development.

SECTION A. Zoology

Poster Session at 9:00 a.m.
Saturday, April 28, 1990

Lobby Physical Education Bldg.
Board A  # 9:00 a.m.

**EFFECTS OF MELATONIN ON BLOOD ADIPOSE TISSUE AND TESTICULAR FUNCTION IN DEER MICE (PEROMYSCUS MANICULATUS).** D.A. Freeman, J. Marcelino and J.H. Blank, Dept. Biological Sciences, Kent State University, Kent, OH 44242.

Short photoperiods evoke testicular regression in about 30% of laboratory populations of deer mice, while about 25% of all males exhibit normal testis function. This phenotypic difference is known to have a genetic component. In the present experiment, we tested whether this difference results from differential neuronal sensitivity to melatonin or to a difference in pineal gland function. We also extended our analysis to the effects of short days on brown fat function. Melatonin was administered to mice with each short day phenotype, and testicular and brown fat function evaluated. Melatonin failed to elicit changes in function of either tissue, suggesting a role of short days on long-term changes. Melatonin mimicked the effects of short days on testis and brown fat function in long day controls. Our results support the hypothesis that individual variation in gonadal and brown fat function following short day exposure results from differential sensitivity of each phenotype to melatonin at a post-pineal site of action, presumably the hypothalamus.

Board B  # 9:00 a.m.

**AQUATIC INSECT DISTRIBUTION IN A SPRING-FED FIELD DRAINAGE SYSTEM IN HARRIS COUNTY, OHIO.** Bonnie Burger and Eric V. Nelson, Department of Biological Sciences, Ohio Northern University, Ada, Ohio 45801.

Aquatic Insects colonizing a quarter-mile section of a 10-year old channelized drainage channel (Range 9-E, Township 5-S, Section 28, Roundhead Quadrangle, Carroll County, Ohio) were surveyed from March 1988 to September 1988. Six collecting stations were located along a warm water ditch, a spring-fed ditch and a drainage channel connecting the two ditches to the Upper Scioto River. Eighty-eight percent of the insect species collected were downstream from the confluence of the cold and warm water habitats in a channel with a heavy growth of Nasturtium officinale and Lemna sp. Corixidae (Hemiptera) made up forty-two percent of the insects collected. Corixidae populations increased significantly during the summer, when they covered about half of the channel. Corixidae species, particularly Empheleidae, probably colonized the ditch at the same time as N. officinale. The nearest source of N. officinale is the Mad River area of Logan County and Champaign County.

Board C  # 9:00 a.m.

**GROWTH AND REPRODUCTION OF THE ISOPOD LIRCEUS IN THE SPRING OF 1989.** Bonnie Burger and Eric V. Nelson, Department of Biological Sciences, Wright State University, Dayton, OH 45402.

Growth and reproduction of a population of Lirceus in Big Beaver Creek was monitored from December, 1988 until Spring, 1990. The 1989 year-class was studied throughout its life cycle. Reproduction occurred early in the spring. Most females had produced their broods by the end of April. The smallest ovigerous female was 6.7 mm. brood size was proportional to female size; the mean brood size was 87 eggs. Males were larger than females and ranged in size from 3.0 to 3.2 mm. Thirty females were collected from specialized habitats. Georhopaladus luteicornis was collected from wet peaty soil on the margin of Flatiron Lake Bog and Metriocnemus knabi was collected from pitcher plants in Brown's Lake Bog. This is the first Neartic record for Georhopaladus luteicornis.

Board D  # 9:00 a.m.

**EVALUATION OF A NEW TOOL FOR TICK REMOVAL.** M.N. Lazar, G.R. Needham, Entomology Laboratory, Department of Biological Sciences, Ohio Northern University, Ada, OH 45801.

Ticks are vectors of Lyme disease and Rocky Mountain Spotted Fever to man and animals. A key measure to prevent transmission of tick-borne diseases is the immediate removal of the tick from the host. If the tick is damaged or its mouthparts broken, an infection may result. Instruments of Speiden, Inc. have engineered a forcep-like device, "The Tick Solution", which is an improvement over tweezers or folk methods. Our objective was to test if the recommended procedure for this tool left the bodies and mouthparts of lone-star ticks, *Amblyomma americanum*, intact. This species was chosen because it is one of the most difficult to remove due to lengthy mouthparts and a deep vertical deposition of attachment cement.

Three rabbits were each infested with *Amblyomma americanum* larvae, nymphs, adult males and females. Ticks were removed using the manufacturer's instructions for the tick-removal tool after one day. A group of females was allowed to remain to engorge until near repletion. Mouthparts and the tick body were examined for damage immediately after removal and at 24-hour intervals after the procedure. In general, we found "The Tick Solution" performed as described by the manufacturer. Twisting the tick off was an effective means of removal.

Board E  # 9:00 a.m.

**THE USE OF GEOGRAPHIC INFORMATION SYSTEMS FOR DEVELOPMENT OF MANAGEMENT PLANS FOR RARE AND ENDANGERED SPECIES.** J.R. Stritholt, Center for Mapping and Department of Botany, The Ohio State University, Columbus, Ohio 43210.

In recent years, Geographic Information Systems (GIS) have become increasingly popular as tools for management of large data bases involving both physical attributes of the land, including elevation, soil type, drainage patterns, and socioeconomic attributes, such as land use patterns. As such data bases are expanded to include parks, wild lands and undeveloped land, attributes such as current vegetation patterns, potential or presettlement vegetation patterns,
We compare the estimates of biomass and productivity from the regression analysis were then mapped onto a high assumption of no anisotropy for its validity. Predictions a predictive equation for aboveground biomass and productivity of each plant group by multiple regression with study area of approximately 100 ha. We used two approaches Ohio State University, Columbus, OH 43210.

To test this, 1 yr old sugar maple seedlings were fumigated ozone in sugar maple. experiments designed to test this will be presented. We alterning carbon allocation, any of which could result in a predisposing factor for sugar maple decline, at least for parts of the range. We hypothesized that ozone could act as a predisposing factor for sugar maple decline for some populations or in some geographical locations, by reducing net carbon gain and carbohydrate reserves or by altering carbon allocation, any of which could result in reduced growth and vigor of sugar maple seedlings and trees. To test this, 1 yr old sugar maple seedlings were fumigated in open-top chambers with charcoal filtered air, ambient ozone, or ambient ozone + 15%. Exposure to these ozone levels for five months did not significantly affect leaf area production, biomass, root:shoot ratio, or photosynthetic rate, all potential indicators of short-term ozone damage. Ozone may reduce levels of carbohydrate storage in roots, or alter transport of photosynthate from leaves to roots, thus increasing overwintering mortality and/or reducing growth. Results of tracer experiments designed to test this will be presented. We also speculate on the role of genetic diversity and genotype in determining geographic patterns of susceptibility to ozone in sugar maple.

We compare the estimates of biomass and productivity generated by the two approaches and discuss the implications for long-term undergrowth management.

The initial phase of the development of a model for unugulate carrying capacity for the 30000 ha of "pseudo-prairie" vegetation on the reclaimed strip-mined land of the International Center for the Preservation of Wild Animals in Muskingham County involved the sampling of aboveground biomass and productivity of grasses and legumes within a study area of approximately 100 ha. We used two approaches to extrapolate the data generated along three 300 m transects to the larger study area. First, on the assumption of no significant anisotropy along the elevation and aspect gradients we sampled, we utilized a modified Kriging analysis to determine the spatial scale of variation in biomass, and to interpolate biomass values with estimated variance between actual sample points. Second, we developed a predictive equation for aboveground biomass and productivity of each plant group by multiple regression with elevation, aspect, slope angle, and soil age as independent variables. This approach does not depend on the assumption of no anisotropy for its validity. Predictions from the regression analysis were then mapped onto a high resolution contour map for comparison with the Kriged map.

In field and laboratory experiments, a marsh soil seed bank was found to contain approximately 21,000 purple loosestrife seeds/m². There was no difference in density between spring (pre-germination) and summer (post-germination) seedlings, indicating that the seed bank is persistent over that time period. Seedbank begins in the two-week period from 12 October to 25 October but is very low until late January/early February, the start of a 6 to 8 week period during which most of the seeds are released. The seeds are released into the environment when temperature are generally below 15°C, the reported threshold temperature for germination. We sampled the seeds sampled during autumn and winter exhibited some enhancement of germination by storage under cool moist conditions, and this effect was most pronounced for seeds gathered in the earlier part of the seed dispersal period. I performed a laboratory simulation of the ability of purple loosestrife to become established on marsh soil after floating in water. The

The personate flowers of Pedicularis are grouped by Li into four types, viz. solitary flowers with teeth on the upper lip, toothless without teeth, bazed with a short corolla tube, and bazed with a long tube. Studies on the pollination of the first 3 types in North America, and Japan indicate that species in the genus Pedicularis are pollinated by bumblebees (Bombus Latr.) foraging for nectar and/or pollen on the nectariferous first 2 types and vibrating pollen from the nectarless second type. At least 11 species of the third type are restricted to mainland Asia, revealed that flowers of Pedicularis punctata, with a 15.7 mm mean tube length, are nectarless and pollinated almost exclusively by the worker castes of 2 Bombus species that vibrate pollen while the stigmas, directed by the curved bees, contact residual pollen in the insects' cervical crevice. Analysis of 333 corolla pollen loads from Pedicularis pollinators indicated a fidelity in pollen foraging on Pedicularis ranging from 32% in a mixed plant community to 66% in a virtually uniform Pedicularis population. More laboratory to determine the function of the long, nectarless corolla tube in Asiatic species which may reach a length of 10cm. Nectariferous long tubes may provide functioning activities at present no evidence for such adaptation is reported.

The allelopathic effects of species in the genus Brassica (Cruciferae) have been attributed to the mustard oil glucosinolates which they produce in large quantities, which upon hydrolysis produce compounds with strong antibiotic properties. To determine whether Brassica napus can actually exude sufficient amounts of glucosinolates or their breakdown products into their rhizosphere to inhibit neighboring plants, we established wild type S, and low-glucosinolate producing mutants at high and low levels of both available P and S. Wild type plants grew faster than mutants during the early portion of the growth period, and plants given high S were significantly larger aboveground than low S plants. The overall differences in growth between genotypes disappeared by the end of the experiment, though plants given high S were found to be larger overall. Genotype and S availability interacted such that there were no differences between genotypes at high S, whereas low-glucosinolate mutants outgrew wild type plants at low S. This may reflect the larger need for S for the production of glucosinolates by the wild type plants. Glucosinolates exuded into the soil and analyzed by gas chromatography; relationships between growth, genotype, S availability, and exudation rates will be discussed.

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Acicarpa tribuloides Juss. (Calyceraceae) is native to Southern Brazil, Uruguay, Paraguay, and Northeastern Argentina where it commonly inhabits grasslands, deltas, river banks, sandy ravines, and cultivated fields. Species of A. tribuloides have also been collected in the United States. Recent herbarium study indicate the A. tribuloides occasionally appeared in ballast dump sites in New Jersey, Pennsylvania, North Carolina, and Louisiana. Small region in southern Florida that A. tribuloides was naturalized in Northern Florida. Small's account is apparently based on a single specimen collected by A. H. Curtiss in 1885. No specimens of A. tribuloides after 1883 are known. Recent floristic inventories of the Florida panhandle have failed to locate a single population. Acicarpa tribuloides appears to be a well-adapted weed in South Florida based on its potential adaptive, multiple adaptations for dispersal, and ability to invade disturbed habitats and cultivated fields. This weed annual has apparently never been naturalized in the United States. Founders probably encountered climatic and edaphic barriers, lacked the ability to scatter seeds or reproduce vegetatively, or failed to compete with native or naturalized individuals.

Clibadium L. is a Neotropical genus of approximately 40 species distributed throughout Central America and northern South America. Species of the genus have allopatric distributions in different tropical habitats from sea level to 3,000 m. New neotropical chromosome counts are reported from 86 populations from Mexico to Ecuador representing 14 species of Clibadium. All counts are n = 16 with a few fragments or B chromosomes observed sporadically in some populations. One population, suspected on morphological grounds to contain Clibadium. The uniformity of chromosome number within Clibadium correlates with largely allopatric distributional patterns of the species, especially close relatives within the same section. The site for Thuidium allenii (collected in 1936) is now agricultural land. This report is the first for the occurrence of Tetrodontium brownianum in southeastern Ohio, southern Indiana, south-central and eastern Kentucky, and northern Tennessee, where it commonly occurs on moist, shaded ceilings of sandstone shelter caves associated with hemlock/hardwood forests. This rare species was previously known to occur only as far south as the south shore of Lake Superior in Michigan, and upstate New York.

Argentina where it commonly inhabits grasslands, deltas, river banks, sandy ravines, and cultivated fields. Species of A. tribuloides have also been collected in the United States. Recent herbarium study indicate the A. tribuloides occasionally appeared in ballast dump sites in New Jersey, Pennsylvania, North Carolina, and Louisiana. Small region in southern Florida that A. tribuloides was naturalized in Northern Florida. Small's account is apparently based on a single specimen collected by A. H. Curtiss in 1885. No specimens of A. tribuloides after 1883 are known. Recent floristic inventories of the Florida panhandle have failed to locate a single population. Acicarpa tribuloides appears to be a well-adapted weed in South Florida based on its potential adaptive, multiple adaptations for dispersal, and ability to invade disturbed habitats and cultivated fields. This weed annual has apparently never been naturalized in the United States. Founders probably encountered climatic and edaphic barriers, lacked the ability to scatter seeds or reproduce vegetatively, or failed to compete with native or naturalized individuals.
seeds in both Europe and North America, contrary to the statement by Cook (1987) who wrote that seeds were not pro-
duced in North American plants. Under various treatments, seeds kept in water at 25°C, followed by cold treatment, had the highest percent germination (63%, 73%). Three growth forms are described, one terrestrial, one in shallow water, and one submersed. Field transplant experiments with North American plants have demonstrated that the non-flowering submersed form can be converted to a flowering mudflat form; flowering terrestrial plants can be transformed into non-flowering submersed species.

4:00 GENERIC DELIMITATIONS OF ARALIA
(ARALIACEAE). Jun Wen, Department of Botany, Ohio State University, Columbus, Ohio 43210.

Aralia L. is a genus showing a high degree of morphological diversity. It has a disjunct distribution between eastern and southeastern Asia and North America. It was once a catch-all genus in Araliaceae. At present, its generic limit is still controversial, especially in relation with Coudenbergia, Megalopanax, Pentapanax, and Epilobodendron. The 5-locular ovary of Aralia is usually regarded as the most important differentiating character of this genus. However, this feature also occurs in Coudenbergia and Pentapanax. Thus, the homology of this character state will be discussed in this study based on evidence from fruit anatomy. Cladistic analyses have been utilized to help delimit Aralia based on morphological and anatomical characters.

4:15 A PRELIMINARY INVESTIGATION OF CHLOROPHYLL DNA AND ISOSYZME DIVERSITY IN PEDICULARIS (SCROPHULARIACEAE). Bruce W. Robart, Department of Botany, The Ohio State University, 1735 Neil Avenue, Columbus, Ohio 43210.

Over 600 species are recognized in the genus Pediculurus. Although corolla characters have been used to determine phylogeny, the corollas of Pediculurus have coevolved with the available pollinators and have specific specificities. This has resulted in divergence of form for closely related species and convergence of form for more distantly related species. Stylar characters are considered to be less variable and more conservative than floral characters; therefore, the use of leaf form and phyllotaxy for phylogenetic groupings of Pediculurus has been emphasized. Within each of these groups, the corolla is thought to have evolved independently along parallel lines from archaic short-tubed and toothed or toothless forms to derivative long-tubed and beaked forms. However, there may have been as much adaptive response of leaf form to variable habitats as has occurred in the form of the corolla.

At the present time restriction site analysis of cpDNA is being used to construct a phylogeny for ten species of Pediculurus from North America. In addition, isozyme analysis is also being used to determine the amount and probable mode of divergence of the taxonomic varieties of F. praecox, a known monophyletic group. Preliminary data from each of these areas will be presented.

4:30 PHYNETIC ANALYSIS OF FRUIT CHARACTERS OF THE GENUS MULINUM PERS. (MULINAE, HYDROCOTYLOIDEAE, APIACEAE). James C. Zech. The Ohio State University, Botany Dept., 1735 Neil Ave., Columbus, Ohio 43210-1293.

Historically, characters of the fruit have been considered critical for the identification of Apiaceae taxa. As part of the revision of the genus Mulinum, characters of the fruit were examined to determine the significance of these characters within the genus and whether fruit characters alone differentiate futile species. A total of twenty-three species of Mulinum were studied using standard phenetic analysis. Results indicate the potential of fruit character data for the delimitation of species as well as intrageneric taxa. Characters of the fruit support the placement of previously described Mulinum taxa within the genus Azorella and also several previously predicted species affinities. In addition, these data provide means to separate previously predicted equivalent taxa and reconfirm the homology of characters of the fruit within the family Apiaceae.

4:45 PHYNETIC ANALYSIS OF THE ARALIA ELATA COMPLEX (ARALIACEAE) IN EASTERN ASIA. G. Tao, J. Wen, J.J. Parlow and T.P. Stuessy, U.S. National Museum, Department of Botany, The Ohio State University, Columbus, Ohio 43210.

The Aralia elata complex is one of the most variable and widely distributed groups within Aralia. It occurs in 21 provinces of China as well as in Japan, Korea and eastern U.S.S.R. Because of the complex pattern of variation and wide geographical distribution, more than 10 "species" have been described historically within this complex. Field and herbarium studies have suggested that variation among these "species" is continuous and that they need to be reevaluated critically. In this year's study, phenetic analyses using both vegetative and reproductive characters have been utilized to help recognize discontinuities within this complex. Morphological patterns correspond with large-scale geographical distributions to recommend recognition of several varieties within a single variable species.

SECTION B. Plant Sciences

Second Afternoon at 2:00 p.m.

Saturday, April 28, 1990

105 Biological Sciences

2:00 THE IMPORTANCE OF EPIDERMAL AND CORTICAL TISSUES IN GRAVITROPISM OF PRIMARY ROOTS OF ZEA MAYS. Maimon, E., and R. Moore. Wright State University, Department of Biological Sciences, Dayton, OH 45435.

The objective of this research was to determine the role of the epidermis and cortex in root gravitropism. We studied this by surgically removing (i.e., girdling) these tissues from primary roots of Zea mays. We found that only part of the girdled roots were gravitropically --- that part which was apical to the girdle. However, filling the girdle with a mudlike-like substance induced curvature basal to the girdle and, thus, a normal gravitropic response. Stripping the epidermis and outer 2 to 3 layers of cortex from one side of primary roots of Zea mays induces strong curvature towards the cut, irrespective of the root's orientation to gravity. This effect is not due to desiccation, since treated roots submerged in water also curve towards their cut surface. Curvature towards the cut stops when the cut surface is coated with a hydrophobic mudlike-like substance. Together these results infer that the epidermis and cortex play an important role in root gravitropism.

2:15 LEAF DEVELOPMENT IN PEPPEROMIA COLUMELLA. Christensen-Dean, G., and R. Moore. Wright State University, Department of Biological Sciences, Dayton, OH 45435.

Leaf development was quantitatively analyzed in Pepperomia columella, a succulent, window plant native to the deserts of South America. The relative volumes of chloroplasts and window tissues per leaf were calculated. Young leaves consist of approximately 71.2% chlorenchyma and 11.5% window tissue. At leaf maturity, the percentages are approximately 20.4% and 58.4%, respectively. Thus, the data suggest that the first developmental priority is photosynthesis, and not water storage.

2:30 TISSUE PARTITIONING DURING LEAF DEVELOPMENT IN Frichtia fulcegra (MELASTOMATACEAE). A "WINDOW PLANT". Moore, R., and R. Langenkamp. Wright State University, Department of Biological Sciences, Dayton, OH 45435, USA.

Young (i.e., 5-mm-long) leaves of the window-plant Frichtia fulcegra (Meliastrumaceae) allocate approximately 21% of their volume to window tissue, 4% to chlorenchyma, and 29% to window tissue. By the time leaves are 25 mm in length, the relative volumes of epidermis and chlorenchyma decrease to approximately 7 and 27%, respectively. During the same period, the relative volume of window tissue more than doubles, increasing from 29 to 66%. The relative volumes of epidermis, window, and chlorenchyma tissues do not change. Leaf length increases from 25 to 57 mm. These results indicate that early stages of leaf development in F. fulcegra involve preferential reallocations of volume to different tissues, whereas
Root caps of primary roots of *Zea mays* cv. *Kysse* secrete large amounts of mucilage and touch the root all along the root apex. These roots are strongly graviresponsive. Primary roots of *Z. mays* cv. Ageotropic are nonresponsive to gravity. Their caps secrete negligible amounts of mucilage and touch the root only at the extreme apex of the root along the calyptrogen. These roots become graviresponsive when their tips are coated with mucilage or mucilage-like materials. Peripheral cells of root caps of roots of *Z. mays* cv. *Kysse* contain many dictyosomes associated with vesicles that migrate to and fuse with the plasmalemma. Root-cap cells of primary (i.e., nongravi-responsive) roots of *Z. mays* cv. Ageotropic have distended dictyosomal cisternae filled with an electron-dense, granular material. Large vesicles full of this material populate the cells and do not fuse with the plasmalemma. Taken together, these results suggest that nonresponsive- primacy of roots of *Z. mays* cv. Ageotropic results from the lack of apoplastic continuity between the root and the periphery of the root cap. This is a result of negligible secretion of mucilaginous cells along the edge of the root cap which, in turn, appears to be due to the malfunctioning of dictyosomes in these cells.

**DEFECTIVE SECRETION OF MUCILAGE IS THE CELLULAR BASIS FOR AGRAVITROPISM IN PRIMARY ROOTS OF *ZE A MAYS* CV. AGEOTROPIC.**

Jeffrey M. Osborn and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

Mesozyic seed ferns from Antarctica: morphology and ultrastructure of *In Situ Corystosperm Pollen*

Jeffrey M. Osborn and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

Corystosperm pollen sacs and associated in situ pollen grains of Early-Middle Triassic age are described from silicified plant material collected in the central Transantarctic Mountains of Antarctica, using combined light, scanning, and transmission electron microscopy. Pollen sacs are elliptic, unicellular, and possess characteristic secretory cells within the wall. Both mature microsporangia, each with a single epidermal layer and completely dissociated pollen grains, and immature microsporangia, each with an outer epidermal layer, inner tapetal membrane and tightly aggregated pollen, have been isolated from the matrix. Pollen grains are monosulcate, bisaccate, and bilaterally symmetrical with lateral attachment of large, crescent-shaped sulci. The spore wall is relatively thick and homogenous within any region, thinner and less well defined near the distal sulcus, and exhibits plicate surface ornamentation. The sulcus is relatively broad and flanked longitudinally by the threads at the sites of saccus attachment. Sacci possess distinct endoereticulations and are also found distally inclined. These results indicate that leaves and tissues of *E. pulchra* are asymmetric and develop polarly. These results are discussed relative to corresponding studies of cellular size and leaf structure.

**METAZOIC SEED FERNS FROM ANTARCTICA: MORPHOLOGY AND ULTRASTRUCTURE OF IN SITU CORYSTOSPERM POLLEN**

Jeffrey M. Osborn and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

2:45

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Jeffrey M. Osborn and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

3:00

THE EFFECTS OF CYTOCHALASIN ON ROOT GRAVIRESPONSIVENESS AND CYTOARCHITECTURE OF *ZEA MAYS*.

Lain Miller and Hardy Moore. Department of Biological Sciences, Wright State University, Dayton, OH 45435.

Primary roots of *Zea mays* whose root caps were treated with cytochalasin D (20 μg ml−1) for 2 h continue to grow but are nonresponsive to gravity. Peripheral cells of cap of treated roots contain many dictyosomes-derived vesicles that neither move to nor fuse with the plasmalemma. Root-cap cells of primary (i.e., nongravi-responsive) roots of *Z. mays* cv. Ageotropic have distended dictyosomal cisternae filled with an electron-dense, granular material. Large vesicles full of this material populate the cells and do not fuse with the plasmalemma. Taken together, these results suggest that nonresponsive-primacy of roots of *Z. mays* cv. Ageotropic results from the lack of apoplastic continuity between the root and the periphery of the root cap. This is a result of negligible secretion of mucilaginous cells along the edge of the root cap which, in turn, appears to be due to the malfunctioning of dictyosomes in these cells.

**MESOZOIC SEED FERNS FROM ANTARCTICA: MORPHOLOGY AND ULTRASTRUCTURE OF IN SITU CORYSTOSPERM POLLEN**

Jeffrey M. Osborn and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

3:30

Mesozyic seed ferns from Antarctica: morphology and ultrastructure of *In situ Corystosperm Pollen*

Jeffrey M. Osborn and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

Corystosperm pollen sacs and associated in situ pollen grains of Early-Middle Triassic age are described from silicified plant material collected in the central Transantarctic Mountains of Antarctica, using combined light, scanning, and transmission electron microscopy. Pollen sacs are elliptic, unicellular, and possess characteristic secretory cells within the wall. Both mature microsporangia, each with a single epidermal layer and completely dissociated pollen grains, and immature microsporangia, each with an outer epidermal layer, inner tapetal membrane and tightly aggregated pollen, have been isolated from the matrix. Pollen grains are monosulcate, bisaccate, and bilaterally symmetrical with lateral attachment of large, crescent-shaped sulci. The spore wall is relatively thick and homogenous within any region, thinner and less well defined near the distal sulcus, and exhibits plicate surface ornamentation. The sulcus is relatively broad and flanked longitudinally by the threads at the sites of saccus attachment. Sacci possess distinct endoereticulations and are also found distally inclined. Comparisons are made with similar *spora dis perse* pollen grains from the same Antarctic rocks as well as other corystosperm pollen grains previously described from non-Antarctic localities.

**THE EFFECTS OF CYTOCHALASIN ON ROOT GRAVIRESPONSIVENESS AND CYTOARCHITECTURE OF *ZEA MAYS***

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**MESOZOIC SEED FERNS FROM ANTARCTICA: MORPHOLOGY AND ULTRASTRUCTURE OF IN SITU CORYSTOSPERM POLLEN**

Jeffrey M. Osborn and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.
SECTION B. Plant Sciences  
Poster Session at 9:00 a.m.  
Saturday, April 28, 1990  
Lobby Physical Education Bldg.

Board H  
EXPOSURE OF RED SPRUCE NEEDLES TO ELEVATED LEVELS OF OZONE AND AUXIN AFFECTS RESPONSE OF SPRUCE BUDWORM LARVAE  
USDA For. Serv. and Agric. Res. Serv., 359 Main Rd.,  
Delaware, OH 43015

Picea rubens Sarg. needles exposed to 15 ppm ozone and pH 4.2 or 3.0 rain were presented to 2nd-instar spruce budworm larvae, Choristoneura fumiferana (Clem.,) in a Y-type wind-tunnel apparatus. Larvae responded negatively to ozone plus acid rain treated needles. Scanning electron microscopy showed altered epistemal wax structure. Plant water potential readings suggested a reduction in transpirational water loss via stomatal closure.

Board I  
EFFECTS OF GRAZING BY COLLEMBOLA, COMPETITION, AND RELATIVE GERMINATION TIME ON GROWTH OF TWO OLD-FIELD PLANT SPECIES. Kathleen K. Harris and R.E.J. Boerner, Department of Botany, The Ohio State University, Columbus, OH 43210.

These experiments were designed to evaluate the effects of grazing by collembola on VAM mycorrhizal and relative germination date on growth of Panicum virgatum (a mycorrhizal perennial grass) and on competition between Panicum and Brassica nigra (a non-mycorrhizal annual). In the absence of competition, grazing by collembola did not affect total Panicum growth, though it did lower the root:shoot ratio; collembolan grazing had no significant effect on competition between Brassica and Panicum seedlings. To evaluate the importance of relative germination date, we compared the effect on Panicum growth of competition from Brassica seedlings of the same age as the Panicum (simultaneous germination) to competition from Brassica seedlings which germinated three weeks into the eight week competition period (offset germination). Competition from “simultaneous” Brassica reduced Panicum growth approximately 3X as much as “offset” Brassica. The root:shoot ratio of Panicum plants given “simultaneous” competition was 2X that of control or those given “offset” competition. Effects of collembola grazing, competition, and relative germination time on N and P uptake will also be discussed.

Board J  
EFFECTS OF SHOOT INVERSION ON THE DGT MUTANT TOMATO  
Liang Shi and Morris L.  
Ohio State University, Columbus, OH 43210.

The effects of shoot inversion on ethylene production and elongation of the inverted stem were investigated in the diageotropic (dgt) mutant tomato and its isogenic wild type. The growth of the dgt shoot is horizontal. This anomalous habit can be corrected by exposure to ethylene. The question has been raised as to whether this lesion is in ethylene synthesis capacity or in the ethylene receptor (for auxin-induced ethylene production). Our objective here has been to determine whether shoot inversion-induced ethylene production and retardation of stem elongation which may be caused by ethylene are normal (i.e. comparable to that of the wild type VFN8). The results have shown that shoot inversion for periods of 24 to 72 hr retarded the elongation of the inverted dgt shoot. Treatment with 0.5 mM AgNO3 (an ethylene action inhibitor) partially reversed this retarding effect of inversion. The suggestion of ethylene production and some inhibition of elongation in the dgt mutants may be due to the presence of endogenous inhibitors such as indole ethylene. Determinations have and will be made on ethylene production following shoot inversion. We hope to report on these soon.

Board K  
PURIFICATION AND LOCALIZATION OF ENZYMES OF STARCH DEGRADATION IN SUGAR BEET LEAVES  
Bin Li, Jerome C. Servaites, and Donald R. Geiger, Department of Biology, University of Dayton, Dayton, OH 45409-0001.

Sugar beet (Beta vulgaris L) leaves exhibit high starch phosphorolytic and hydrolytic activities, but the bulk of these activities are extrachloroplastic. Quantitative subcellular localization of starch degrading enzymes showed that only about 20% of starch phosphorolytic and 30% of starch hydrolytic activities were associated with the chloroplast fraction. Starch phosphorylase, endoamylase, starch debranching enzyme and exoamylase were observed both inside and outside the chloroplast. Multiple forms of extrachloroplastic endoamylase and exoamylase were found. One of extrachloroplastic endoamylase was partially purified and its properties were studied and compared with that of chloroplast endoamylase. Starch debranching enzyme was placed unambiguously to homogeneity. The purified enzyme is a monomer with a molecular weight about 105 KD. It has the maximum activity with pullunan as its substrate, but also has lower activities with soluble starch and amylopectin. Optimum pH was at 6.0. Some other characteristics of the purified enzyme such as subcellular localization, activation and inhibition by a number of factors were also investigated.

Board M  
DOWNWARD AUXIN TRANSPORT POLARITY ACROSS GRAVISTIMULATED ROOTS IN CATYON DEPENDENT ENZYMES  
Carol J. Oravec, Notre Dame College of Ohio, 4545 College Rd., Cleveland, OH 44121.

A readily available source of pH indicators is found in flowers of various colors. It has long been known that these pigments, when extracted with ethanol, can change color in various pH solutions. Ethanol extraction of the yellow and red mum yielded a similar yellow color. In acidic solutions the yellow mums turn green, whereas the red mum pigment turned orange. The pKa for both the yellow and red mum extracts, as found by ultraviolet absorption spectroscopy. The visible absorption spectra of these two samples shows an absorption peak at 455 nm for the yellow m mum extract and a peak at 440 nm for the red mum extract. HPLC separation and infrared spectra indicate that the pigments are similar in their chemical structure. However, the yellow mum pigment has an extra FTIR peak at 2300 cm-1, indicating a triple bond, possibly a nitrile. The NMR spectra also shows the yellow mum pigment to have 1 extra functional group near 1 ppm. Chemical identification of the extrachromatic compounds should be possible by mass spectroscopy. This research was initiated as a prototype study for a future undergraduate project. Any flower's extractable pigment can be used and its properties identified by the student. Miscibility in various solvents and color changes at various pHs is easily done with little equipment. A UV/VIS spectrophotometer is used for pH determination.
IS THERE A SYMBIOTIC RELATIONSHIP BETWEEN THE ARTS AND THE GEOSCIENCES?

9:00

Z. B. McKenzie and L. M. Gaertner, Dept. of Geology and Metageology, The Ohio State University, Columbus, Ohio 43210-1398.

The objective and rational geosciences interpret the world in a different way than the subjective, irrational and emotional arts; however, both disciplines improve our understanding of the environment. Interaction between the disciplines is growing and will be mutually beneficial. The arts impact the geosciences by improving the education of students and the public, offering new ideas, promoting the value of the geosciences to the public, and the techniques (and in some cases the availability of data) of research. An understanding of the geosciences improves the quality, meaning, and enjoyment of an artistic product including art, music, literature/poetry, and cinema/video. In addition to providing inspiration for the arts, the physical environment also provides many of the materials used in the arts; indeed, in some cases the materials, processes, and forms of the earth are considered to be art.

Metageology has been used to describe this realm where the arts and geosciences interact. Landscape architects also draw on metageology in designing landforms.

GEOL OGY OF THE INTERNATIONAL CENTER FOR THE PRESERVATION OF WILD ANIMALS (ICPWA), MUSKINGUM COUNTY, OHIO. P. Catanariti, W. True, E. Law and J. Rovach, Geology Department, Marietta College, New Concord, Ohio 43762.

The International Center for the Preservation of Wild Animals (ICPWA), located in Muskingum County on reclaimed surface-mined land donated by Ohio Power Company, is a 9,154-acre preserve for endangered species. The Center's primary functions are preservation, research, and education.

Detailed geologic studies of the rocks exposed within and near the preserve were undertaken by us in an attempt to determine the stratigraphy and environments of deposition of the Pennsylvania strata that comprise the local bedrock.

The results of our studies will be presented in the ICPWA in the form of an interpretive educational exhibit/panel that we anticipate visitors to the Center will find to be helpful in furthering their understanding of the geologic setting and history of the area and in the appreciation of some of the natural features that they may encounter there.

SECTION C. Geology

First Morning at 9:00 a.m.

Saturday, April 28, 1990

132 Oelman

James Noel, Presiding

THE EFFECTS OF ROOT CAP PLASMOYSIS/REHYDRATION ON GRAVITOCURVATURE AND GRAVITY-INDUCED ASYMMETRIC AUXIN DISTRIBUTION.

L.M. Young, I.K. Bapp and K.L. Evans, Department of Biological Sciences, Ohio Northern University, Ada, OH 45810 and Department of Botany, The Ohio State University, Columbus, OH 43210.

Because studies with maize roots indicate a strong correlation between gravitropic curvature and asymmetric auxin redistribution across the root cap (Young and Evans, 1986, Plant Physiol. 86:67), to test this relationship further and to obtain indirect information on potential pathways of auxin movement across the cap (apoplastic or symplastic), we examined the effects of transient root cap plasmoysis on curvature and H-IAA redistribution across the caps of gravituated roots. Prior to gravistimulation, root caps were plasmolyzed using either 0.5 M or 1.0 M mannitol for 30 min and then rehydrated. Gravit curvature of roots treated with 0.5 M mannitol lagged slightly behind control curvature while the curvature of roots treated with 1.0 M mannitol was severely retarded. Asymmetric movement of H-IAA was strongest in controls, slightly weaker in roots treated with 0.5 M mannitol and sharply reduced in roots treated with 1.9 M mannitol. These results are consistent with the hypothesis that asymmetric auxin redistribution across the cap is a key factor in gravitropism.

SHALLOW GEOPHYSICAL INVESTIGATION OF SANDY HOOK, SAN SALVADOR ISLAND, BAHAMAS.

9:30

Frederick R. Voner, Dept. of Geology, Marietta College, Marietta, OH 45750.

Sandy Hook is a late Holocene carbonate sand plain located on the southeastern end of San Salvador Island, Bahamas. The strand plain consists of a series of skeletal sand ridges, underlain by Pleistocene carbonate rock. Little is known about the nature of this type of sand body. Strata in the form near and in ancient eolian deposits. As part of a larger study of Sandy Hook, a number of geophysical methods were applied to test their usefulness in the description of the environment and to characterize the thickness of the sand body, fluids contained within the sand body, and the upper contact of the underlying Pleistocene rock. Seismic refraction and reflection were employed to provide seismic velocity data and depth information. Resistivity was used to model electrical properties and infer porosity with depth. Groundpenetrating radar was attempted to interpret shallow stratigraphy using the electrical properties of the subsurface. Preliminary data suggests an approximate depth of two meters to the water table and eight meters to the Pleistocene at Sandy Hook.

10:00

SEISMIC ANISOTROPY INVESTIGATION OF CARBONATE FRACTURE ZONES. Stephanie A. Clason, Paul J. Wolfe, Wright State University, Department of Geological Sciences, Dayton, Ohio 45435.

Gravity studies in Morrow County, Ohio showed there was a positive correlation between gravity highs and eolian features on the Knox Unconformity. A geological model that fits the results is for the gravity lows to represent solutioning valleys, caused by dewatering of shales overlying the Knox and fracturing of the Upper Silurian to Lower Devonian shale units above the Knox. The purpose of the study was to determine the feasibility of using seismic anisotropy to image compressional waves and horizontally polarized shear waves. A site was chosen in Marion County, Ohio where approximately 30 feet of glacial till directly overlies the carbonate bedrock. Data were collected along four lines oriented north-northwest, west-southwest using a twelve channel seismograph with varying offsets and two meter geophone spacing. Wave arrival times and amplitudes were examined for evidence of fracturing. Detection of fracturing in the shallow bedrock could prove to be a means of determining deep structure.
hydraulic conductivity ellipse and consequently flow is also
horizontal. The eigenvector associated with the major principal
axis of the hydraulic conductivity ellipse is co-linear with the
principal direction of the hydraulic gradient vector.

Initial efforts have been directed toward preliminary characteriza-
tion of the hydraulic setting of both the saturated and unsaturated
zones as well as the groundwater flow system. Major initial
activities included drilling, geophysical surveys and test pits
to establish critical soils, surface and hydrogeologic
parameters. The results have produced a conceptual model of the
hydraulic setting of both the saturated and unsaturated zones as well
as the location of the hydraulic gradient vector. This model
provides a basis for the development of a comprehensive longitudinal
program. Sycamore Farm is a demonstration farm managed by the
Montgomery County Soil and Water Conservation District and
owned by the Ohio Department of Natural Resources. Its setting
is typical of many similar farms in the glaciated terrain of the
midwest and research results should be applicable widely.

A two-phase exploration program has been initiated and the first
phase was completed this year resulting in the definition of four
hydrostratigraphic units. This first phase consisted of an
exploration/characterization program to delimit the physical-chemical
environment of the farm. Initial activities included drilling, geophysical
surveys and test pits to establish critical soils, surface and
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soil to solution ratios and the 1, 2, 3, 5, 7 day treatment time were used. The solution was composed of dechlorinated tap water and phenol. Activated sludge of various concentrations was added in soils for treatment and a predetermined concentration of phenol was used in this experiment. Results showed that the loam, silt loam, and silty-clay loam appeared to be quite effective in removing phenol from solution with a phenol removal efficiency of up to 70%. Results indicated that addition of activated sludge to the soil enhanced biological oxidation of phenol.

Unused or abandoned water wells pose a serious environmental threat to our drinking water supplies. These wells should be properly sealed to avoid aquifer degradation. Wells that no longer serve a purpose should be properly sealed, whether they be an abandoned well, a replaced well, or an unneeded monitor or test well. Reasons for sealing these wells include: 1) the prevention of surface contaminants from entering an aquifer; 2) the prevention of intermixing of water between aquifers; 3) the restoration of the aquifer to its original condition as rapidly as possible; and 4) the reporting of location and procedures used to the Ohio Department of Natural Resources, Ohio EPA, or your local county health department.

HYDROGEOLOGIC IRREGULARITIES IN THE CARBONATE BEDROCK OF NORTHWEST OHIO: THREE CASE STUDIES. James Raab. Ohio Dept. of Natural Resources, Division of Water, 1939 Fountain Sq., Columbus, Oh, 43224.

Ground-water investigations conducted by the Division of Water in the carbonate areas of Northwest Ohio resulted in various observations. The City of Fremont’s well field is located in a ground-water discharge area at the base of Limestone Ridge. Long term pumping of 1 mgd from two wells resulted in a radius of influence less than 1 mile. The drilling and pumping test of two water wells for the City of Van Wert resulted in yields of 150 and 500 gpm. Both wells were drilled through the entire Silurian System. Major dewatering of the upper carbonate aquifer occurred. After 24 hours of pumping, the radius of influence had extended 1 mile from the pumping well. The pumping test of a well near Kalida, Ohio resulted in the differential drawdown in observation wells. After 7 days of pumping, water levels had declined 2.5 ft. in a well 1980 ft. south of the pumping well and 7.73 ft. in a well located 2000 ft. west-southwest. Because of these irregularities, the use of aerial photography and landsat imagery, careful logging of wells, and the use of caliper logs or down-hole camera are strongly recommended in all carbonate aquifer investigations.

SECTION C. Geology

Only Afternoon & Business Meeting at 1:30 p.m.
Saturday, April 28, 1990
132 Oelmann

Mike Angle, Presiding

PROPERLY SEALING UNUSED WELLS. Douglas J. Barber, Ohio Dept. of Natural Resources, Division of Water, Ground Water Resources Section, 1939 Fountain Sq., Columbus, Ohio 43224.

Unused or abandoned water wells pose a serious environmental threat to our drinking water supplies. These wells should be properly sealed to avoid aquifer degradation. Wells that no longer serve a purpose should be properly sealed, whether they be an abandoned well, a replaced well, or an unneeded monitor or test well. Reasons for sealing these wells include: 1) the prevention of surface contaminants from entering an aquifer; 2) the prevention of intermixing of water between aquifers; 3) the restoration of the aquifer to its original condition as rapidly as possible; and 4) the reporting of location and procedures used to the Ohio Department of Natural Resources, Ohio EPA, or your local county health department.

COAL MINING METHODS IN OHIO DURING THE LAST 160 YEARS. Harris, Ann C., Department of Geology, Youngstown State University, 410 Wick Avenue, Youngstown, OH 44555.

In order to predict the stability of an abandoned mine one must know and understand how the mining was done. From the 1830's until sometime in the 1960's the "room and pillar" method was used. The "longwall method" was used commonly in the large commercial mines.

Originally the miners were equipped with pick axes, hammers, tamping and scraper, and Wedge shaped tampers. Later, the miners were equipped with other powered tools which were replaced by equipment powered by electricity.

The major changes in mining occurred with the invention of the mechanical rotary cutters used in the longwall method of mining. The coal is then loaded into a conveyer from which it is transported to a conveyor to the surface.
conceal up. Hypometric integrals range from 0.45 to 0.65 and reflect the influence of baselevel not basin material. Another suggests that stream development occurred or occurred during the late glacial whereas those north of the morainic complex formed in response to headward erosion by an ancestor of the lower Cuyahoga River graded to Early Lake Erie.

Two Wisconsinan and two Illinoian Tills in Franklin, Ohio. Richard F. Goldwalt, 1200 E. Dublin-Granville Road, Suite 550, Columbus, Ohio 43231

Exposed until 1950 by Two Mile Creek in northwest Hamilton City at the "dead end" of Lagonda Street was a 40-foot section of four glacial tills; the lower two separated by varves, the middle two by thick Glaesena paleosol, and the upper two by organic-rich silt on thin gravel. The upper three tills are covered by 7 to 60 inches of loess. This cut was deepened by Jere Fenneman before 1916, discovered by Durrell, and thoroughly examined in 1959-60 by an Ohio State soils and geology team.

The upper rolling surface with walkable loess and Russell soil, and the 35-37 sand-silt-clay till, agrees with Gooding & Stewart's "Shelbyville" (Woodfordian) till. A spruce log 17 inches above the base of the top till is 18C dated at 12,000 to 11,000 B.P. This agrees well with Lowell's and others' dates in Hartwell terminal moraine of Miami lobe. The till break below it has juvenile accretion soil with horizontal carbonaceous streaks and a few freshwater mullous streaks. It represents a short withdrawal of Wisconsinan ice, maybe "Connersville." Thus the second advance did not reach Wisconsinan terminal moraine.

The bottom two tills are Illinoian. Their similarity and the limited (100') varves between them suggest a short deepwater break.

How Many Years to Make Old Western-Ohio Landfill? J. Fourier, Geology Dept., Bowling Green State University, Bowling Green, Ohio 43403

There are approximately 12 end moraines in western Ohio, formed during the retreat of the Wisconsinan glacier. Their formation must have been relatively fast, since the glacial deposits show a sharp break point dating this first Wisconsinan phase 12,000 to 11,000 years B.P. Their formation must have been relatively fast, since the limited (100') varves between them suggest a short period of no more than 100 years or more than 1000 years B.P. This suggests that the Wisconsinan ice front moved southward at a rate of 100-150 feet per year.

The base of the Wisconsinan ice front must have been at the southern end of Lake Erie, which was 200 feet lower than the present level. During the Wisconsinan Glacial maximum, the Ohio River flowed northward into the Great Lakes, which were much larger than they are today. The Ohio River was then called the "Ancient Ohio River." The Wisconsinan Ice Sheet, which covered much of the eastern United States, reached its maximum extent around 18,000 years ago and retreated southward over the next 10,000 years. The retreat was marked by several readvance events, each separated by periods of relative stability.

3:30 SYMBIOTIC ASSOCIATION OF CRINOIDS, PLATYCIDERID GASTROPODS, AND CORNULLITES IN THE UPPER OBDOWICIAN (CINCINNATIAN) OF THE CINCINNATI BASIN, OHIO

Stephen H. Felton, 5678 Biscayne Ave, Cincinnati, Ohio 45248 and Robert W. Morris, Dept of Geology, Wittenberg University, Springfield, Ohio 45501

The presence of the crinoid Glyptocrinus on the Cincinnati sandfloor created a new substrate niche for exploitation by platycerid gastropods and associated organisms, notably Cornulites. The platycerids having become established in a cephalophagic mode on the crinoid tegmen, became a substrate restricting habitat primarily to a "clypeus" in the later stages. The silt break below the crinoid Glyptocrinus was an "ancient" surface of deposition for the site. The stratigraphy has been correlated with Dr. Jane Forsyth's work for Knox County.

3:45 SILURIAN CENTERVILLE FORMATION OF OHIO. Mark A. Kieffner and Steven W. Middle, Department of Geosciences, The Ohio State University at Lima, Lima, Ohio 45804 and Department of Geology and Mineralogy, The Ohio State University, Columbus, Ohio 43210

The base of the Brassfield Formation, or Belfast Member if present, is generally shown to mark the base of the Silurian System in Ohio. However, the location of the base of the Belfast Member remains a matter of dispute among geologists. The base of the formation is marked by a significant increase in the abundance of planktonic foraminifera and other marine microfossils, indicating a change in the marine environment.

4:00 PALEOSOL DEVELOPMENT IN THE MISSISSIPPIAN MAXVILLE LIMESTONE, EASTERN OHIO. C. M. C. Carney, C., Department of Geological Sciences, Wright State University, Dayton, Ohio 45435 and Boardman, N.R., Geology Department, Miami University, Oxford, Ohio 45056

The Maxville Limestone is exposed along a discontinuous outcrop belt trending from southwest to southeast in eastern Ohio. The outcrop belt parallels the shoreline of a shallow sea that transgressed into the central Appalachian basin during the Late Mississippian time. The Maxville is comprised of a laminated dolomite characteristic of tidal flat sedimentation overlain by shallow-water, restricted environment deposits consisting of packstone and nannofossil wackestones and oolitic packstone and grainstone deposits. The upper part of the tidal-flat dolomite is commonly
breechement, containing cements of dolomitized mudstone. Its contact with overlying rocks is irregular and varies from flat to undulating with depressions of up to 0.5 meters. Teepees, complex fractures filled with coarse calcite cement, elotted peloidal micrite, circumgranular cracked grains, laminar micritic coatings or rims on grains, and floating grains were all common in the area of subaerial exposure and soil development. The presence of these paleosol indicates that transgression was not continuous, but was perhaps punctuated by sea-level fluctuations permitting the exposure surface (paleosol) to develop. Similar features in the Bahamas are recognized and require only about 100,000 years to develop.

4:15

CONTROLS OF FLUVIAL SANDSTONES IN THE DUNKARD BASIN, WESTERN SOUTHERN PENNSYLVANIA. "P. A. Baldwin, Jr., Dept. of Geological Sciences, Wright State University, Dayton, Ohio, 45435.

The coastal plain, on which Upper Pennsylvanian sandstones were deposited, prograded into a sea-lake separated from the larger mid-continental sea. Thus, the base level of these channels was isolated from eustatic changes. Climate during this 10 m.y. interval was also stable. The evenness of channel properties, therefore, most likely reflects the influence of intrabasinal controls.

Quantitative reconstructions of bankfull geometry and hydraulics indicate that channels were of moderate sinuosity (0.3-1.6). Allocation of channel axes were two distinct sizes (averages width 70 m and 150 m). Smaller channels show a consistent hydraulic geometry with an overall increase in discharge through the studied interval. This decrease may reflect lower subsidence rates as the locus of sedimentation prograded beyond the northernmost reach of the Ohio River. These channels occur only in the uppermost Wyneburg Formation. The increase in channel size and discharge is not accompanied by an increase in channel slope and is therefore not the result of regression of the fluvial surface. The superposition of channel sizes can be attributed to the progradation of the upper fluvial-deltaic plain, with a single trunk flow over the lower fluvial-deltaic plain where flow was divided among two or more distributary channels.

4:30


Trees can stabilize shallow soil on naturally wooded hillsides in Cincinnati, but the extent to which trees may enhance slope stability in heavily polluted areas in the city has not been determined. The effectiveness of a species in enhancing soil strength is dependent upon its capacity to reduce soil moisture and its roots' strength and distribution. Three pollution-tolerant species, black locust, golden raintree, and white ash, were selected for a study of their relative effectiveness in enhancing the strength of silty-clay soil on hillside bordering a busy thoroughfare plagued with landslides. Trees are selected on the silty-clay soil. Rows of 36 saplings of each species were planted using three soil treatments to determine the effects of deep mulch and root growth. A greenhouse study, run concurrently with the field study, measured the reduction of soil moisture by the three selected species using soil volumetric and psychrometers. Preliminary studies of the depth and extent of roots measured from the field study, and the reduction of soil moisture within and between the three species suggest that black locust may be most effective in enhancing the stability of shallow soil on hillside in heavily polluted urban areas in southeastern Ohio.

4:45

COMPARISON OF THE GEOLOGIC CONSTRAINTS ON ENVIRONMENTAL CONTAMINATION FROM TWO DOE URBAN FACILITIES IN SOUTHERN OHIO. A. Dwight Baldwin, Jr., Geology Department, Miami University, Oxford, Ohio 45056.

The Portsmouth Gaseous Diffusion Plant (PGDP) and the Feed Materials Production Center (FMPC) at Fernald, OH, were built in the early 1950's to satisfy U.S. needs for both enriched and depleted uranium. The degree of environmental pollution from plant construction and operation reflects differences in regional geology and perception of plant operators concerning associated environmental hazards. Site selection for the uranium enrichment plant near Portsmouth, OH was based partially on the proximity of ample ground-water in the outwash aquifer of the Scioto River and 37 m elevation above the Scioto River floodplain. The low hydraulic conductivity of the Pleistocene/Pleistocene sediments (facing a former Teays-Valley tributary in which the plant is located) has assured that the equilibration of VOCs, uranium and technicium contaminants have not moved offsite.

The same geologic factors that dictated the location of the PGDP were important in locating the FMPC at Fernald, OH. The plant produces milled and extruded metallic uranium for breeder fuel in DOE facilities. Unlike the PGDP, the FMPC sits on a Pleistocene river terrace and overlies a productive aquifer, resulting in extensive uranium and other industrial contamination of the Miami River aquifer.

SECTION D. Medical Sciences

First Morning at 9:00 a.m.
Saturday, April 28, 1990
041 University Center
Dan Ely, Presiding

9:00

ENHANCEMENT OF TWENTY FOUR HOUR ISOLATED HEART TREATMENT WITH AN IRON CHELAT0R. Kath Duni, Ely, and Helen Richter* Departments of Biology *Chemistry. The University of Akron, Akron, OH 44325.

During in vitro heart preservation and repertusion irreversible tissue damage caused by reactive oxygen intermediates, such as, the superoxide anion, hydrogen peroxide, and the hydroxyl free radical may occur. Prevention of hydroxyl radical production and the related oxidative damage of repertusion ischemic tissue by scavenging and/or reducing the importance in maintaining the tissue integrity and heart function. We have assessed whether the addition of deferoxamine mesylate (DFR) to the warm ischemia solution inhibited scavenged free radicals during twenty-four hour heart preservation and repertusion. The Langendorf isolated rat heart preparation was used and control hearts were compared to those preserved with DFR after 24 hours. The DFR increased cardiac performance as indicated by 22% lower diastolic pressure (p<.05) and 24% higher contractility (p<.05) compared to controls. The DFR group actually had 90% of its original systolic pressure after 24 hours. Lipid peroxidation measured as malone dialdehyde (MDA) and cellular damage as indicated by creatine kinase releases were both decreased in the DFR group (p<.01, p<.01, respectively). In conclusion, DFR preserved left ventricular function, cell membrane integrity and reduced lipid peroxidation which suggests the mechanism of action is primarily through free radical removal.

9:15

THE USE OF CHIMERAS AS A TECHNIQUE TO STUDY A Y CHROMOSOME LOCUS IN SHR HYPERTENSION. Schaus, S. and M.E. Turner, Department of Biology, The University of Akron, Akron, Ohio 44325-3908.

Y chromosome loci are difficult to analyze, due to their unique pattern of inheritance. We have developed a method to study these loci using gynandromorphs (chimeras). In the SHR model of hypertension a Y chromosome gene is involved, and this Y chromosome has been crossed into a WY (normotensive) background. Male: female chimera are produced to study this hypertensive Y chromosome. Eight cell stage embryos are removed from oviducts and the zona pellucida removed. Two embryos are fused in phytohemaglutinin and incubated overnight in vitro. The fused embryos are injected with tissue culture cells to create a pseudogonad female and carried to term. Resulting offspring are tested using a Y chromosome DNA marker to determine those offspring with both male and female cells. The correlation of male tissue with hypertension will allow those tissues where the Y chromosome locus is active to be discovered.

9:30

T confuse FOUR HOUR MONITORING OF BEHAVIOR, RENAL AND MESENTERIC BLOOD FLOW IN SPONTANEOUSLY HYPERTENSIVE RATS ON HIGH SODIUM AND CONTROL DIETS. Jacqueline Novak and Dan Ely, Department of Biology, The University of Akron, Akron, OH 44325.

The objectives of this study were: 1) to monitor blood flow over a twenty-four hour period and to determine if a high sodium diet (3%) produced greater stress induced reductions in renal and mesenteric blood flow; 2) to determine if a high sodium diet (3%) produced greater stress induced reductions in renal and mesenteric blood flow; and 3) to determine if stress induced reductions in renal and mesenteric blood flow were detected in spontaneously hypertensive rats after 8 weeks as compared to those on a control diet (0.3% sodium). Blood flow was measured by ultrasound Doppler technique before and after acute mental stress and over a 24 hour period. There were similar reductions in both renal and mesenteric blood flow (40%) responses to stress regardless of diet. The rats on the high sodium diet had higher systolic blood pressures (5%) and significantly greater increases in plasma norepinephrine (10%) compared to the controls. Twenty-four hour blood flow recordings showed that behaviors such as grooming and standing caused significant increases.
A high sodium (Na) diet (3% Na) and chronic social stress accentuates hypertension in the SHR. The mechanism of action is not fluid volume expansion but appears to involve the sympathetic nervous system. The objective of this study was to determine the role of the central nervous system sympathetic outflow and B-adrenergic receptors in SHR sodium stress-accelerated hypertension in the SHR. The following groups of male SHR's (11 wks of age) were studied for 14 weeks with drugs administered in the drinking water (2% solution): control group on a normal Na diet, (0.3% Na); high Na group (3% Na); high Na+ clonidine (centrally blocks sympathetic outflow); high Na+ propranolol (peripheral beta blocker); and high Na+ reserpine (central and peripheral noradrenaline depletions). Blood pressure (BP) was measured weekly by the tail cuff method and after 7 weeks each group was placed in a large population cage with 8 rats to induce territorial stress. The controls at 25 weeks of age had an BP of 190mmHg as compared to the high Na B.P. = 2215mmHg (DO1); the propranolol B.P. = 2150mmHg (p<0.01); the reserpine B.P. = 2000mmHg (n.s) and the clonidine B.P. = 1850mmHg (n.s.). The data supports the concept that central nervous system sympathetic outflow is required for sodium-stress accelerated hypertension in the SHR, but beta adrenergic effects were not involved.

MEDIAL COLLATERAL LIGAMENT INJURIES IN FOOTBALL: A STUDY OF ACUTE, VIRGIN MEDIAL COLLATERAL LIGAMENT INJURIES IN FOOTBALL: MEDICAL COLLABORATIVE LIGAMENT INJURIES 70 STRUCTURALLY SOUND KNEES Sean E. Apke, Nelson J. Moore, and Owen J. Keller Ohio Northern University, Department of Biological Sciences, Ada, OH 45810

The study determined the incidence, mechanisms, and conditions causing acute, virgin medial collateral ligament (MCL) sprains at structurally sound knees. Such knees had no past history of soft tissue injury. Data were collected from the Ohio Northern University Football Team during the 1987 and 1988 seasons. Data consisted of player position, class rank, method of injury, area of point tenderness along the MCL, severity of injury, turf type, weather conditions, physician referral, and the strength of the quadriceps and hamstring muscles based upon a pre-injury Cybex evaluation. The incidence of acute, virgin MCL sprains at ONU was fairly high, 17 of 250 players. Nineteen of the 17 injuries were first degree sprains. The junior class had the highest incidence of 11.1% for sustaining an MCL injury. Results showed that there was no significant relationship between strength or weakness of the quadriceps and hamstring muscles and injury. Six players were known to have good to excellent leg strength before injury. The mechanism causing 65% or 11 of acute MCL injuries was due to the lateral aspect of the knee, and the position most injured in this way was the offensive lineman who had 5 injuries. All 17 injuries occurred on a dry, natural turf.

PARENTAL ATTITUDES REGARDING NEOBIRTH RESEARCH Marcil Niell and R.E. McClead, Depts. of Nursing and Pediatrics, Children's Hospital, 700 Children's Drive, Columbus, OH 43205

The purpose of this study was to determine the attitudes of parents regarding the purpose, importance, and appropriateness of neonatal research. A questionnaire was mailed to 155 mothers of infants hospitalized in a Level III neonatal intensive care unit. Mothers: Seventy five (49%) of the questionnaires were returned. Respondents were: married (77.1%), white (87%), college graduates (88.6%), and primigravida (82.9%). To help their baby (68.4%), and to get the very best care (82.9%). Speculate that parents are more likely to consent to prenatal research if their child is directly benefit from the research.

LITERATURE AND INTERVIEW BASED COMPARISON OF AIDS IN NORTHEASTERN OH-WESTERN PA WITH SAN FRANCISCO

S. Brown and M. Rudzik, Department of Biology, Westminster College, New Wilmington, PA 16172

The two areas were compared on the basis of cases, which were broken down by risk group and age. Also compared were anti HIV-1 treatment, both standard and experimental, as well as ease of acquiring medical attention and the general nature of organizations to help those infected. Information sources included public health officials, health care workers and AIDS case managers.

Official reports showed approximately 7400 AIDS cases for San Francisco and approximately 70 in the five OH and PA counties. These numbers are underestimated. For adults, and AZT with inactivated gamma globulin for pediatrics, are standard treatments. The new drug DDI is also prevalent.

Regional attitudes have hindered organizations and restricted housing in the OH-PA area, but through law and education, this is gradually changing. San Francisco saw AIDS peak in the mid 80's from those thought to be infected in the late 70's. The virus was thought to be transmitted to the OH-PA area by those infected in the early 80's with a peak expected in the late 80's or early 90's.

SECTION D. Medical Sciences

Second Morning at 9:00 a.m.

Saturday, April 28, 1990

043 University Center

Jere Boyer, Presiding

PHARMACOLOGICAL RESPONSIVENESS OF WINTER DEPRESSION: MODIFIED DMI, DILISAVER, VALERIE, DELMEDICO, ANJED QUADRI. Department of Psychiatry, The Ohio State University, 473 W 12th Avenue, Columbus, OH 43210-1228

Winter depression was demonstrated to respond excellently to tranylcypromine during the winter of 1988-89. The responsiveness of this syndrome to desipramine was assessed during the winter of 1989-90. Patients with winter depression (WD) were offered treatment with desipramine (DMI). Subjects typically reported > 10 consecutive winters of MD with spontaneous recovery in between the end of March and early June. The daily dose of DMI was increased to 200 mg/day over 4 to 8 days if tolerated. A plasma DMI level was obtained 7 to 10 days after reaching a constant dose. DMI was effective (mean reduction in symptoms > 75%) but produces more side-effects than tranylcypromine. Recovery was defined as attainment of a modified HRSD score of < 5. This scale measures weight gain, hypersomnia and increased appetite. Response occurs over a two- to four-week period. The rate of response to DMI was better than that experienced by subjects treated with tranylcypromine (23 days, m = 16). Demographic and outcome data of subjects treated with DMI will be presented and contrasted with those of subjects treated with tranylcypromine.

ASSOCIATED PSYCHOPHARMATOLOGY IN WINTER DEPRESSION. Valerie DelMedico, Anjed Quadri, Steven C. Dilsaver. Department of Psychiatry, The Ohio State University, 473 W 12th Avenue, Columbus, OH 43210-1228

Eighteen (16) women and 4 men ranging in age from 24 to 57 years met either National Institute of Mental Health or DSM-III R criteria for winter depression. Three (3) patients had bipolar disorder. Nearly 70 percent of the subjects met the DSM-III R criteria. Subjects were treated with DMI. All patients reported unrelenting pain with the onset of winter depression. Six (6) patients had headaches, two gastrointestinal pain alone for which they received the diagnosis of irritable bowel syndrome, a gastrointestinal pain and chest pain, and individual patients had chronic back and knee pain, arthralgias, and pain in the heels diagnosed by an orthopedic surgeon as due to "bone spurs." All patients with chronic pain treated with an antidepressant experienced complete relief. Three (3) patients had recurrent panic attacks. Two (2) patients exhibited bulimic behavior while depressed. Two (2) patients had exhibited bulimic behavior in the past not linked to the seasons. These patients had not been bulimic for > 3 years prior to treatment for winter depression. These data imply that winter depression is associated with forms of psychopathology not previously linked to it in the literature.
### SECTION D. Medical Sciences

**Only Afternoon & Business Meeting**

**at 1:30 p.m. Saturday, April 28, 1990**

**041 University Center**

**Lise Meserve, Presiding**

**2:00**

**PCB AND ESTROUS CYCILITY IN FEMALE RATS.** Lise A. Meserve, Joyce Yeasting, Monica Meserve, Department of Biological Sciences, Bowling Green State University, Bowling Green, OH 43403-0212.

Ingestion of polychlorinated biphenyl (PCB) has been shown to depress thyroid status and alter adrenal steroid production in adult rodents. Additionally, reproductive capabilities of experimental rodents fed this polychlorinated biphenyl have been found to be compromised. These findings prompted the present study to determine whether PCB ingestion altered estrous cyclicity or circulating levels of estradiol and progesterone in seasonally mature female rats. Normal cyclicity was established by performing vaginal smears on 12 female rats through at least two complete estrous cycles. Six control rats were continued on standard lab mash and six experimental animals were fed the diet to which 250 ppm of the PCB mixture Aroclor 1254 had been added. The experimental diet was fed for a minimum of 14 days, and both control and experimental rats were decapitated when the vaginal cytology was indicative of estrus. Estrous cycle of control animals averaged 4.5 days in length (range 3.0-6.0 days) and 5.1 days (range 3.0-6.8 days) for PCB-fed rats. While mean estradiol levels did not differ significantly (control 5.87 pg/ml; PCB 6.47 pg/ml), values obtained for PCB fed rats demonstrated greater variability. These results can be interpreted to suggest that two weeks of PCB ingestion causes only subtle modification of estrous cyclicity.

Acknowledgement: Thanks are due Phyllis Lake of ICN for provision of RIA kits.

**2:15**

**THE EFFECT OF ANTI-THYROXINE ANTI-SERUM ON CIRCULATING LEVELS OF THYROID HORMONES IN FIFTEEN DAY OLD RATS.** David E. Albert and Lee A. Meserve, Department of Biological Sciences, Bowling Green State University, Bowling Green, OH 43403-0212.

Autoimmune thyroiditis results clinically when antibodies against thyroid products alter thyroid status. However, experimental examination of this problem has not been reported. In the present study the effects of anti-thyroid anti-serum injection on thyroid status in neonatal rats were studied. This was accomplished by administering the anti-serum to rat pups on the second and fourth days of age by intraperitoneal injection. Blood was withdrawn from the femoral vein on days 2, 4, 6, 8, and 10, after which the rats were killed by decapitation and thyroid glands were removed and assayed for levels of circulating hormones. Thyroid stimulating hormone (TSH), thyroxine (T4) and triiodothyronine (T3) levels were determined by radioimmunoassay at the time the pups were fifteen days old. Interpretation of results was based on significance levels established by Student's t-test. Six control rats and six experimental rats were used. The experimental diet was fed for a minimum of 14 days, and both control and experimental rats were decapitated when the vaginal cytology was indicative of estrus. Estrous cycle of control animals averaged 4.5 days in length (range 3.0-6.0 days) and 5.1 days (range 3.0-6.8 days) for PCB-fed rats. While mean estradiol levels did not differ significantly (control 5.87 pg/ml; PCB 6.47 pg/ml), values obtained for PCB fed rats demonstrated greater variability. These results can be interpreted to suggest that two weeks of PCB ingestion causes only subtle modification of estrous cyclicity.

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**2:30**

**MODULATORY EFFECTS OF VASOPRESSIN ON THE AUTONOMIC NERVOUS SYSTEM IN STRESSFUL CONDITIONS.** Linda M. Capelli, Cyrilla H. Widesman, and Helen K. Murphy, University of Nevada, Las Vegas, NV 89154.

This research examined the modulatory effects of vasopressin on the autonomic nervous system (ANS) in vasopressin-deficient Brattleboro rats (2) and long shots rats (1a) under normal and stressful conditions. The activity of the ANS was evaluated on the basis of heart rate and gastric ulceration. Four groups of animals were studied. Group 1 served as controls for the entire project, 21 and 22 rats were subjected to 24 hour nonstress conditions. In Groups 2-4, the experimental paradigm was 7 days of nonstressful and 3 days of stressful conditions. The external stimulus was a period of 24 hours in a cage with 23 hours of darkness. Group 2 consisted of 21 and 22 rats that had been surgically bilaterally vagotomized or sham-vagotomized. Group 3 consisted of 21 and 22 rats that received injections of vasopressin or an equivalent volume of peanut oil (vehicle). This group was utilized to study the activity...
of the AKR strain DI rats receiving replacement vasopressin therapy. Marked changes in heart rate, body weight, food and water intake, survival time, presence or absence of gastric ulceration were evident in the specific groups. Vasopressin replacement significantly ameliorated deficits noted in DI rats subjected to the stress of food restriction.

2:45
THE EFFECTS OF VASOPRESSIN ON MATERNAL BEHAVIOR IN THE RAT. Ida A. Friedman, Cyrilla H. Wideman, and Helen N. Murphy, John Carroll University, Cleveland, Ohio 44118.

Maternal behavior in the rat consists of a number of integrated activities concerned with the birth, maintenance, nutrition and protection of the young. In the rat and altricial species, the young are physically and behaviorally immature. The normal maternal behavior patterns exhibited by the rat are essential for the young’s survival. The spontaneous appearance of maternal responsiveness seems to be initiated by hormonal changes that occur prior to parturition. The effect of vasopressin, a polypeptide hormone synthesized in the anterior hypothalamus, was studied as to its effect on the maternal behavior of the rat at the time of parturition and for three weeks postpartum. Nest building, pup retrieving, nursing, time on the nest, pup survival, and pup growth were evaluated in primiparous Long-Evans (LE) rats, vasopressin-deficient Brattleboro (DI) rats, DI rats injected with vasopressin (DIFV), and DI rats injected with peanut oil. All of the rats built nests, retrieved pups, and nursed pups similarly. The LE and DIFV mothers spent considerably more time on the nest and their pups had a significantly higher percent of weight gain. These results indicate that although vasopressin may not affect spontaneous initiation of maternal behavior, it does play a role in the maternal-infant relationship.

3:00
THE EFFECTS OF VASOPRESSIN ON ACTIVITY STRESS. Michael J. Leslile, Helen N. Murphy, and Cyrilla H. Wideman, John Carroll University, Cleveland, Ohio 44118.

The hormone vasopressin was studied with respect to its central effects on activity stress and subsequent self-starvation, as well as its peripheral effects on water consumption and utilization. This study was conducted by comparing normal Long-Evans (LE) rats to Brattleboro (DI) rats which, because of a genetic mutation, are incapable of producing hypothalamic vasopressin. All rats were housed individually and isolated from one another throughout the experiment. Animals were divided into the following groups: 1) ad-lib access to food and water (DI-AL and LE-AL), 2) ad-lib access to food and 1 hour access to food (DI-FR and LE-FR), 3) ad-lib access to water, 1 hour access to food (DI-Fl and LE-Fl), 4) ad-lib access to water, 1 hour access to food, and daily injections of vasopressin (DI-VP), and 5) ad-lib access to water, 1 hour access to food, and daily injections of vasopressin (DI-VF). Vasopressin was significantly lower in groups LE-Fl and DI-Fl than in the groups DI-FR and DI-VP. However, further research is needed on the role the hormone plays in activity stress and subsequent self-starvation in animals. These results indicate that vasopressin can control peripheral disorders in DI animals, but due to its inability to cross the blood-brain barrier, may not affect centrally mediated behaviors.

3:15
SUGRONETIC ALTERATIONS OF SUCROSE CONSUMPTION IN NORMAL AND VASOPRESSIN-DEFICIENT RATS. Stephen A. Archausk, Cyrilla H. Wideman, and Helen N. Murphy, John Carroll University, Cleveland, Ohio 44118.

The Brattleboro rat (DI) is a mutant form of the Long-Evans strain (LE) and lacks the gene necessary to synthesize vasopressin. The purpose of this experiment was to determine if LE and DI rats have a different preference when simultaneously offered water, sucrose, and salt. Groups 2-6 were subjected to two conditions: i) ad-lib access to food and water (DI-AL and LE-AL), 3) ad-lib access to water, 1 hour access to food (DI-FR and LE-FR), 4) ad-lib access to water, 1 hour access to food, and daily injections of vasopressin (DI-VP), and 5) ad-lib access to water, 1 hour access to food, and daily injections of vasopressin (DI-VF). The results suggest an interaction between vasopressin and the neurotransmitter, serotonin, which plays a key role in the carbohydrate preference of an animal.

3:30
THE EFFECTS OF VASOPRESSIN ON SALT PREFERENCE IN RATS. Colleen M. Keahe, Cyrilla H. Wideman, and Helen N. Murphy, John Carroll University, Cleveland, Ohio 44118.

The absence of vasopressin, as found in the genetic mutation of the Brattleboro rat (DI), has helped to identify regulating mechanisms of the hormone through comparisons done with the normal parent strain, the Long-Evans rat (LE). In this experiment, the intake of water was measured against the intake of 0.9% sodium chloride to determine if there was a significant preference among groups. Four subject groups were used: 1) LE rats, 2) non-injected LE rats, 3) rats injected with vasopressin, and 4) DI rats injected with the vehicle. A habituation period of ad-lib access to food, water, and saline solution took place for 7 days. This was followed by an experimental period of 9 days with a 23-hour food restriction period and ad-lib access to both the water and saline solution. The LE rats were not found to have a significant preference for the intake of water or saline solution during the habituation, but did significantly prefer the saline solution during the experimental period. The un.injected DI rats and the vehicle injected DI rats preferred water during the habituation period and preference for saline during the experimental period. The vasopressin injected DI rats did not have a preference for water or saline during either period.

3:45
NAPHTHALOCYANINE DERIVATIVES AS PHOTOSENSITIZERS FOR TUMOR THERAPY. R.H. Zuk(1,2), B. Ribter(2), W. Fod(2), M.E. Kenney(2), M.A.J. Rodgers(1,2) & M.S. Kramer-Birnbaum(1).

(1)Research Department, St. Vincent Medical Center, 2213 Cherry St., Toledo, OH 43608; (2)Center for Photochemical Sciences, Bowling Green State University, Bowling Green, OH; (3)Department of Chemistry, Case Western Reserve University, Cleveland, OH.

Bio(iso-isobutyl octadecacylisoxy) silicon 2,3 napthalocyanine (iso-BOsINIC) has been synthesized with a high degree of purity. Due to its strong optical absorbance near 770 nm (ε = 5 x 10^6 M^-1 cm^-1), it is being studied for potential use in photodynamic therapy of tumors. isoBOsINIC is stable in solutions kept either under laboratory lighting condition or even with intense illumination, for up to 4 hours. Pharmacokinetic studies were carried out in controls and in rats carrying transplantable FANFT (N-[4-(5-nitro-2-furyl)- 2-thiazolyl] formamide) induced urothelial tumors: utilizing solvent extraction and HPLC on silica columns, serum clearance and tissue distribution of the drug was achieved. At an injected dose of 0.50 mg/kg body weight, the ratio of dosed tumor to dosed non-targeted tissues was 110 to 440, while non-tumor tissues was maximal 24 h after injection. Photodestruction of this tumor by illumination with laser light may therefore be most effective at this post-injection time.

Supported by grants from NIH CA-46281 and the F. M. Douglass Foundation.

4:00

The toxicant PIXA causes major changes of rat liver lipids. To model the basis for the changes we studied carnitine acyltransferase(CA), acyl-CoA synthetase(AS), and acyl-CoA oxidase(AS) from rat liver. 1) Lauroyl-CoA was a better CA substrate than palmitoyl-CoA/activity ratio, 1.99-.22). Palmitoyl and lauroyl transfer to carnitine was activated by 2-4 µM PIXA. The PIXA effect on palmitoyl transfer (75-106) was larger than that on lauroyl transfer(35-126). Kinetics were complicated and suggested that PIXA caused CA on maximally until substrate concentration equal to acyl-CoA level used. 2) Study of AO used palmitoyl- and lauroyl-CoA. Lauroyl-CoA was the better substrate/activity ratio, 1.52-.33. PIXA inhibited both palmitoyl and lauroyl-CoA oxidation from 36 to 440 and 110 to 440 µM respectively. Inhibition of C-18 acyl-CoA oxidation was competitive(Ki = 313±51 µM). We could not determine K with lauroyl-CoA. However, data supportors and a K with that with C-12 acyl-CoA. 3) With AS, laurate and palmitate were equivalent substrates. 110-440 µM PIXA inhibited both activities similarly. Both enzymes are compatible to those with nonrat enzymes already tested.(This effort was supported by AFOSR Minigrant S49620-88-C-0053).
An extensive literature survey was conducted to study the effects of maternal cocaine use on human fetal development. The study revealed that infants exposed to cocaine in utero are at a higher risk of fetal death or non-exposed infants. Cocaine infants at birth were reported to weigh as little as 2600 g, and have gestational ages as early as 33 weeks. Genitourinary tract malformations, such as hydronephrosis, have been observed in cocaine infants. Neonates have been found to exhibit temporary irregular electroencephalograms. The defects found might be explained by the postulate that the vasoconstrictive action of cocaine reduces uterine blood flow and fetal oxygenation such as have been demonstrated in the sheep model. Cocaine-exposed infants have been shown to display irregular post-natal psychological behavior.

Further research into other higher socioeconomic status will be necessary to confirm these findings.

### EFFECTS OF MATER NIAL CRACK/COCaine USE ON HUMAN FETAL DEVELOPMENT: A LITERATURE REVIEW

Karen O. Wilson and Bonnie L. Lanvermeyer. Department of Biology, Denison University, Granville, Ohio 43022

An extensive literature survey was conducted to study the effects of maternal cocaine use on human fetal development. The study revealed that infants exposed to cocaine in utero are at a higher risk of fetal death or non-exposed infants. Cocaine infants at birth were reported to weigh as little as 2600 g, and have gestational ages as early as 33 weeks. Genitourinary tract malformations, such as hydronephrosis, have been observed in cocaine infants. Neonates have been found to exhibit temporary irregular electroencephalograms. The defects found might be explained by the postulate that the vasoconstrictive action of cocaine reduces uterine blood flow and fetal oxygenation such as have been demonstrated in the sheep model. Cocaine-exposed infants have been shown to display irregular post-natal psychological behavior. Further research into other higher socioeconomic status will be necessary to confirm these findings.

### SECTION D. Medical Sciences

**Poster Session at 3:30 p.m.**

**Saturday, April 28, 1990**

**Lobby Physical Education Bldg.**

#### Board P

**INDUCED NAUSEA AND VOMITING.** Richard E. Stark.

Nausea and vomiting are among the most common and debilitating side effects of cancer chemotherapy. These side effects can cause patients to refuse potentially effective regimens or in some cases the dosages used in these regimens must be reduced below efficacious levels. Precisely how cytotoxic drugs cause emesis has not been determined. Cytotoxic drugs are known to increase levels of somatostatin (5-HT) in non-nausea producing rats by raising release of neuropeptides from enterochromaffin cells. Recent evidence has suggested the possible involvement of a 5-HT receptor subtype (designated 5-HT3) in the mechanism of chemotherapy-induced emesis. Metoclopramide (MCL), a dopamine antagonist which possesses weak 5-HT, antagonist activity, is known to effectively reduce vomiting caused by chemotherapy, while other more potent and selective dopamine antagonists such as domperidone and haloperidol are ineffective against such emesis. Moreover, ADR-S1, a compound which is more potent than MCL in antagonizing 5-HT, receptors both in vitro and in vivo but which lacks dopamine antagonist properties, may be involved in the mechanism of chemotherapy-induced vomiting, although it remains to be determined if the specific receptor populations which could be responsible for such emesis are located in the brain, the periphery, or both.

**Board P**

**EFFECT OF FETAL STRIATAL TRANSPLANTS ON THE PERMEABILITY OF THE BLOOD-BRAIN BARRIER IN ADULT RAT STRIATUM.**

K.J. Bertram, S.Y. Lu, L.K. Mannix, A.B. Norman, and P.R. Sanberg. Dept. of Psychiatry and Physiology, University of Cincinnati, College of Medicine, Cincinnati, OH 45267.

The break down of the blood-brain barrier (BBB) may complicate the use of fetal tissue transplants in the treatment of neurological disorders. To determine the integrity of the BBB following tissue transplantation, unilateral 16-17 day fetal striatal transplants (1-1.3mm³) were placed stereotaxically into the striatum of male Sprague-Dawley rats (200-250g). Transplanted operated rats received equivalent amounts of Ringer's solution. BBB permeability to phospholine iodide, an acetylcholinesterase inhibitor which normally does not cross the BBB, was examined at one and four weeks post transplantation. Results of the rats from each treatment group were injected with phospholine iodide (65ug/kg.i.m.) 30 minutes prior to cardiac perfusion. Brains were sectioned (40um) on a microtome and stained for cresyl violet and acetylcholinesterase. In a control experiment, phospholine iodide (65ug/kg.i.m.) was injected unilaterally into the striatum of normal adult rats 30 minutes prior to perfusion. There was a marked inhibition of acetylcholinesterase in the transplant. The generation of systemically administered phospholine iodide into host striatal tissue was detected in rats which received transplants or sham operations. It was concluded that the BBB is not permeable to phospholine iodide via the fetal striatal transplant indicating that the BBB is intact.
Clinically, as drug delivery devices. The objective of this study was to investigate the capability of compressed cylindrical capsules of these polymers to deliver testosterone and progesterone. A total of 20 capsules were fabricated for each polymer by compressing the powder at 900 kg compression load. The reservoir of each experimental capsule was loaded with 20 or 40 mg of either testosterone or progesterone. Total amount of steroid released from each capsule in the release media was measured spectrophotometrically. Results of this investigation showed that: (1) PCL cylindrical capsules released steroids in a sustained manner but in higher amounts than PLA capsules, (2) the release rate of testosterone was higher than the release rate of progesterone from both polymeric systems. It is apparent that both physicochemical properties of the polymer and molecular structure of the steroids played a role in the release of steroids from the PCL and PLA capsules.

Board D  BIOMECHANICAL PROPERTIES OF THE GUT IN COPPER DEFICIENT RATS. Keith A. Crist & Augusta Askari. Department of Surgery, Medical College of Ohio, Toledo, OH 43699

Copper deficiency is known to result in reduced collagen crosslinking. Here we have evaluated effects of copper deficiency during growth on biomechanical properties of the gut in 11 wk old rats. Mean weight of Sprague-Dawley rats (50+9 g) were fed ad lib a copper deficient (0.6 ug/g) or adequate (6 ug/g) diet for 8 wk. Copper deficiency was evaluated at termination of the experiment by copper deficient rats had lower final body weights than controls (284+7 g vs 310+17 g). Following euthanization, samples of descending colon and jejunum were removed for determination of breaking strength and elastic stiffness by means of a specially constructed tensiometer. Breaking strength was greater for colon than jejunum (1.64±0.06 N vs .42±0.04 N); elastic stiffness was greater for jejunum than colon (1.21±0.04 N vs .88±.06 N) across dietary treatments. There was no significant effect due to copper deficiency on either parameter. Development of bowel strength appears insensitive to copper deficiency during this phase of growth in the rat.

The Effects of a Copper-Deficient Diet on Enzyme Activities in Rat Auditory Structures. William B. Farms, Donald A. Godfrey, and Augusta Askari. Departments of Otolaryngology and Surgery, Medical College of Ohio, Toledo, OH 43699-0008.

Weaning male Sprague-Dawley rats were fed a copper-deficient diet ad libitum for eight weeks. This resulted in noticeable effects on the activities of four enzymes in the cochlea, cochlear nucleus (CN), or inferior colliculus (IC). Enzymes studied included two enzymes of energy metabolism, malate dehydrogenase (MDH) and lactate dehydrogenase (LDH), and two enzymes of neurotransmitter metabolism, acetylcholine esterase (AChE) and choline acetyltransferase (ChAT). Copper-deficient rats had lower final body weights than controls (284+7 g vs 310+17 g). Following euthanization, samples of descending colon and jejunum were removed for determination of breaking strength and elastic stiffness by means of a specially constructed tensiometer. Breaking strength was greater for colon than jejunum (1.64±0.06 N vs .42±0.04 N); elastic stiffness was greater for jejunum than colon (1.21±0.04 N vs .88±.06 N) across dietary treatments. There was no significant effect due to copper deficiency on either parameter. Development of bowel strength appears insensitive to copper deficiency during this phase of growth in the rat.

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The authors hypothesized that chronic phase-advance (morning) and phase-delay (evening) bright-artificial-light (BAL) treatment would differentially alter the sensitivity of rat brain α1 receptors. Change in the hypothermic response to the α1 agonist clonidine was measured using an intraperitoneally implanted telemetric thermometer. Treatment with BAL during either the regular photoperiod or phase advance portion of the PRG increased the thermic response to clonidine in 228 (p < 0.02, df=12) and 218 (p < 0.05, df=9), respectively. In contrast, treatment during the phase-delay portion of the PRG blunted the thermic response to clonidine in 218 (p < 0.02, df=11). The presynaptic α1 receptor is an autoreceptor. Reduced sensitivity to clonidine is consistent with the possibility that BAL treatment induces increased release of norepinephrine. Treatment with TCAs, MAOIs, Li2, and ECT also blunts physiological responsiveness to clonidine. The data suggest that some but not all procedures for the administration of BAL subordinates α1 autoreceptors. The physiological variables used in this study may be useful to study antidepressant treatment with BAL alters the sensitivity of subjects with winter depression to a presynaptic α1 agonist.

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measured the effect of BAL on hQ binding parameters in healthy rats from the striatum and hippocampus. Contrary to our predictions, there was no effect on density of QB binding sites. Striatal and hippocampal hQ in the control group (standard vivarium conditions) were 848.6 ± 1708 (fetal/protein SEM) and 2899.2 ± 393, respectively. K_c values were 65.8 ± 30.4 (pmol ± SEM) and 24.98 ± 2.85 in the respective regions. The rats treated with BAL from 6 AM to 6 PM for 7 days had mean values of 7957.38 ± 1280 and 945 ± 395 in the striatum and hippocampus. K_c values for the BAL group were 37.72 ± 8.72 and 23.05 ± 30.3, respectively. The values are not significantly different. Alternatively means for the effect of hyperalgesic mechanisms will be discussed.

Board E

LITHIUM CAN WORSEN WINTER DEPRESSION. Valerio DeMedico, Steven C. Dilsaver. Department of Psychiatry, The Ohio State University, 473 W. 12th Avenue, Columbus, Ohio 43210-1228

Lithium phase delays biological rhythms in microorganisms, laboratory animals, and man. We have observed that the treatment of bipolar subjects with lithium can exacerbate dysphoria, phase delay the time of arising, and prolong the duration of nocturnal sleep in two bipolar I subjects (followed for 9 and 19 winters, respectively). Both patients learned that if they discontinued lithium in the fall that their mood, sleep disturbance, cognitive function, and energy level improved. The most dramatic and quantifiable change was in the duration of nocturnal sleep. Each patient experienced an increase in the duration of nocturnal sleep from 7 to 14 hours. The changes in the sleep-wake cycles of these patients strongly suggest that lithium worsens their episodes of winter depression. One subject had been severely depressed for 7 consecutive winters before it was discovered that his condition is greatly improved by stopping lithium. However, he experienced severe initial, and terminal insomnia in the spring unless lithium is restarted. These observations suggest that a worsening of the occurrence of winter depression in bipolar I patients might be managed by discontinuing lithium and restarting it early in the spring. The case histories of these patients will be presented.

Board J

TRANYLCYPROMINE WITHDRAWAL PHENOMENA. Mark T. Halle, Steven C. Dilsaver. Department of Psychiatry, The Ohio State University, 473 W. 12th Avenue, Columbus, Ohio 43210-1228.

The effects of withdrawing tranylcypromine was systematically studied in 18 adult patients who were being treated with 20 to 160 mg daily. The withdrawal of tranylcypromine produces anxiolytic and decreased mood, agitation, fatigue, nausea, headaches, cognitive slowing, and impairment of concentration and memory. The rate of withdrawal appears to be a critical variable. The severe anxiety and agitation produced by the abrupt withdrawal of tranylcypromine responds to benzodiazepines. The literature indicates that the withdrawal of tranylcypromine can also produce delirium and paranoia characterized by auditory and visual hallucinations and paranoid delusions. These dire effects were not observed in our patients. Tranylcypromine withdrawal symptoms can nonetheless be incapacitating. However, even the more severe withdrawal states respond to a benzodiazepine. A hypomanic patient became hypomanic when tranylcypromine was discontinued. She experienced relief of anxiety within an hour by taking a 200 mg dose of oral carbamazepine. Patients tend to do well when tranylcypromine is discontinued at a rate of 10 mg/week. Case vignettes of patients having severe withdrawal symptomatology and their management will be presented.

Board C

ANTIDEPRESSANT WITHDRAWAL PHENOMENA: A PROSPECTIVE STUDY. Alfonso Cacchetti-Nelli, Luigi Barzamini, Angelo Ger, Marco Guarozzi, Carlo Naggini, *Steven C. Dilsaver. Department of Psychiatry, The Ohio State University, 473 W. 12th Avenue, Columbus, Ohio 43210-1228.

The withdrawal of tricyclic antidepressants (TCAs) reportedly produces four syndromes: (1) nausea and decreased appetite occasionally accompanied by anxiety, (2) insomnia, (3) parkinsonism or akathisia, and (4) hypomania. Ten (10) patients (mean age ± SD = 50 ± 8.6 years) hospitalized at the University of Pisa (Clinica Psychiatrica I) were subjected to the abrupt withdrawal of these antidepressants. Operationally defined syndromes were observed in addition to less commonly reported phenomena such as cardiac arrhythmia. Two patients became hypomanic. Six patients spontaneously reported the development of worsening of symptoms previously reported to be associated with the withdrawal of TCAs. Patient diagnoses, Hamilton Rating Scale for depression scores across specific withdrawal symptoms reported, and results of rater and observer-completed scores of EPS dysfunction derived by the examination of videorecordings will be presented.

*Supported by Air Force Contract F3165-86-C-2720 through SCREE

ANTICONVULSANTS: AN EFFECTIVE TREATMENT FOR MANIA. Mark T. Halle, Steven C. Dilsaver, Edith DelMedico, Steven C. Dilsaver. Department of Psychiatry, The Ohio State University, 473 W. 12th Avenue, Columbus, OH 43210-1228

Antipsychotic agents and lithium are routinely used in the acute and chronic management of manic patients. The former agents are causally linked to the development of a disabling disorder of movement when administered chronically. Carbamazepine (Tegretol®) and sodium valproic acid (Depakene®) are used in the treatment of complex-partial seizures. Both agents are useful in the management of manic patients. A consecutive series of 8 severely manic patients were treated with a combination of an anticonvulsant and lithium. Olanzapine (Klonopin®) was used to treat agitation and insomnia in the first week of treatment. The combination of these drugs either completely or greatly lessened or eliminated the use an antipsychotic agent. All patients tolerated this mode of management well, and those who were previously treated with antipsychotic agents expressed a preference for this non-conventional treatment. The presentation of patients and their progress will be described.

SECTION E. Physics & Astronomy

Only Afternoon at 3:30 p.m.

Saturday, April 28, 1990

140 Health Sciences

Dr. James C. Tong, Presiding

A REEXAMINATION OF INVERSE SQUARE LAWS

3:30

Steven R. Lampman

6577 Maplewood Dr. #301

Warfield Heights, Ohio 44124

The concept of an inverse square law, which forms a historical basis for unifying gravity and electricity, can be modified to describe the same qualitative phenomena as Einstein's general theory of relativity. Quantum considerations of field interactions in a central force field also lead to the differential relation:

$$(\vec{E})(\vec{dr}) = (\vec{P})(\vec{dr}) \cdot n$$

which is used to demonstrate the unattainability of inverse square laws. Consequences of this result include photon rest mass, precession of gravitational orbits, the nonexistence of magnetic monopoles, and perhaps the dissipation of photons.

3:45

"MEASURING DRIFT VELOCITIES IN ARGON, NITROGEN AND ARGON-NITROGEN MIXTURES ASSOCIATED BY A MICRO COMPUTER" by Douglas M. Abner and Merrill L. Andrews, Physics Dept., Wright State University, Dayton, OH 45435.

A micro computer, custom electronic circuits and a system of programs to aid the researcher in planning, collecting, and analyzing electron drift velocity data in plasmas will be discussed. A mathematical error analysis to estimate drift velocity and its independent variable electric field to number density (E/n) will be examined. Data will be presented for electron drift velocity in argon, nitrogen and both 1% and 10% nitrogen-argon mixtures in the E/n range of 0.01 to 15.0 Townsend (1 Td=10⁻¹⁷ Volt cm). Error estimates of E/n and drift velocity will be given. The nitrogen-argon data demonstrates negative differential conductivity (NDC) where the electron drift velocity decreases with increasing electric field.

*Supported by Air Force Contract F3165-86-C-2720 through SCREE

"ANALYSIS OF A PROTOTYPE PLASMA CONFINEMENT CHAMBER WITH EXTERNAL MICROWAVE-PERMANENT MAGNET COUPLES SYSTEM FOR POSSIBLE APPLI-

ATION TO LARGE AREA THIN DIAMOND FILM DEPOSITION" by Steve Adems and Merrill L. Andrews, Physics Dept., Wright State University, Dayton, OH 45435.
Electron swarm parameters, such as drift velocity, in multi-component gas mixtures are important in the study of electron collection processes and in the design of plasma switches and gas-filled detectors. The drift velocity of an electron swarm in pure xenon gas was measured for xenon gas mixtures, containing 0.1%, 1%, and 10% nitrogen additive, in a pulsed-Toulouse drift tube in order to determine the feasibility of using such a mixture as a detector gas. The digitized signal analysis was performed using a DEC-PC/XT using software developed in Fauscett's lab. A microprocessor controlled, land-based, scattered light telescope has been developed. By changing the orientation of a collimator with respect to the sun and by indexing different filters between the collimator and the silicon photodiode detector, this device may be employed to characterize the distribution of scattered light and to demonstrate negative differential conductivity (NDC). The detector for the swarm-generated transient current was a current-integrating (charge) preamplifier, which introduced the amplified signal to the transient digitizer. The amount of nitrogen contaminant necessary to perturb the electron drift velocity in pure xenon is quantified and the suitability of xenon-nitrogen mixtures for use in particle detectors is discussed.

Supported by Air Force Contract F33615-86-C-2720 through SCEEE

4:45 "A MICROPROCESSOR CONTROLLED SCATTERED LIGHT TELESCOPE" by Ronald Ball and Harvey Hanson, Wright State University, Physics Dept., 248 Fawcett, Dayton, OH 45435.

A microprocessor controlled, land-based, scattered light telescope has been developed. By changing the orientation of a collimator with respect to the sun and by indexing different filters between the collimator and the silicon photodiode detector, this device may be employed to characterize the distribution of scattered light and make comparative measurements of intensity at several wavelengths. Signatures of this scattered light can also be used in specific areas to determine the presence of various atmospheric aerosol, gas, and vapor constituents. This battery powered device has been designed to facilitate the collection of such data over extended periods of time in remote locations. A prototype will be displayed and the design, fabrication, preliminary characterization and future plans for the system described.

Supported by Air Force Contract F33615-86-C-2720 through SCEEE

4:45 "A MONTE CARLO SIMULATION OF ELECTRON DRIFT LIMITED BY COLLISIONS IN GAS MIXTURES USING THE NULL COLLISION METHOD" by David G. Ramos and Merrill L. Andrews, Physics Dept., Wright State University, Dayton, OH 45435.

A Monte Carlo simulation using the null collision method is explored as an alternative to expansion solutions of the Boltzmann transport equation for determining electron swarm parameters. The efficiency of the null collision method depends on the amount of the null collisions, which can be reduced by selecting a transition energy that divides the energy range of interest into two or more regions such that a different total cross section is used in each of the regions. A detailed study reveals that the energy distribution function is extremely susceptible to developing jump discontinuities or spikes when more than one null cross section is used unless the updating techniques are carefully rained. It is possible to minimize the number of null collisions, therefore maximizing the efficiency of the simulation, by selecting the appropriate transition energy. The calculated drift velocities are in excellent agreement with new experimental data in xenon-nitrogen mixtures.

Supported by Air Force Contract F33615-86-C-2720 through SCEEE

SECTION E. Physics & Astronomy
Poster Session at 9:00 a.m. Saturday, April 28, 1990
Lobby Physical Education Bldg.

SECTION F. Geography
Only Morning at 9:00 a.m. Saturday, April 28, 1990
070 Rike
David Stevens, Presiding

9:00 PATTERNS OF MORTALITY IN THE LORAIN TORNADO OF 1924. Thomas W. Schmidlin, Kent State University, Kent, Ohio 44242.

The deadliest tornado in Ohio history struck Sandusky and Lorain at 5:20 P.M. on Saturday, June 28, 1924. Initial press reports indicated that over 300 died but the final death toll was 78. The tornado struck hardest at Lorain, sweeping along the lakefront and into the downtown without warning. Two hundred businesses and 500 homes were destroyed. The median age of the persons killed was 22 years, 18% were under the age of 10, 9% were 65 and older, 55% were male, and 97% were males. The collapse of the beach, 7 children died in the collapsed State Beach, 7 children died in the collapsed State Theater, and 11 died in other commercial establishments. Compared to patterns of mortality in modern Ohio tornadoes, the Lorain tornado killed fewer children and elderly, fewer died in cars, and more died in commercial buildings.

9:15 SPATIAL VARIABILITY OF SUMMER RAINFALL IN CUYAHOGA COUNTY, OHIO. Timothy G. McKee, Geography Department Kent State University, Kent, Ohio 44242.

Daily and monthly rainfall totals and the number of days with heavy rainfall were examined for 24 rain gauges over a period of 11 years. This unusually dense network of gauges (one gauge/19 sq. miles) covers a wide variety of land uses and elevations ranging from 600 to 1250 feet within 25 km of Lake Erie. Average June monthly rainfall had a normal frequency distribution and ranged from 2.58 to 4.09 inches. An F-test showed the hypothesis of equal June rainfall among the 24 gauges could be rejected (F = 0.06). Effects of urbanization, elevation, and Lake Erie on rainfall in the county were analyzed for applications in urban climatology, storm drainage design, and flood control.

9:30 EFFECTS OF URBAN BUILDING STRUCTURE ON NET SOLAR AND LONG-WAVE RADIATION. John Mauk and Mike Kelley. Department of Geography, Kent State University, Kent, Ohio 44242.

The urban climate has been found to differ from the rural climate. These differences have been attributed, in part, to the physical characteristics of the urban environment, most notably urban structure and street canyon. This study examines the effects of various types of urban buildings on solar and net radiation levels in Kent, Ohio. Solar and net radiation readings were taken at three different building types and an open control site during late fall and winter. Results indicate that urban geometry does influence radiation levels around the buildings. The late afternoon and nocturnal surface temperatures adjacent to the highest structure are greatest, contributing to higher nighttime air temperatures.
present the dynamics of pre-Columbian Ohio in a spatial perspective. Concepts commonly used by historical geographers such as cultural region, cultural diffusion, cultural ecology, cultural integration, and cultural landscape are also appropriate themes for Ohio's prehistoric geography. Understanding the Mound Builders, for example, with their monumental architecture, domestication, social classes, and long-distance trade integrated within a spatial framework: religious cults diffused from the more highly developed societies of Mexico up the Mississippi and Ohio River valleys and were superimposed on the local cultures. Even urban planning and settlements exhibited the expert of a single local resource resulted in Ohio.

SECTION F. Geography

Only Afternoon & Business Meeting
at 1:30 p.m. Saturday, April 28, 1990
070 Rike

Thomas W. Schmidlin, Presiding

2:00
STRUCTURAL VARIATION IN URBAN, SUBURBAN, AND RURAL ECONOMIC RESTRUCTURING

Jerold R. Thomas, 220th S. Williams, Paulding, Ohio 45879

In the past decade the social sciences have witnessed a flourishing of literature on economic restructuring. This document has been more recently broadened to that which almost exclusively focuses on urban areas, as can be seen with the often interchangeable usage of economic restructuring with urban restructuring. While the literature has shown that urban restructuring has taken place on a national, state, and urban level, there has been little attention paid to the rural areas. This has produced an important void, as manufacturing is a major center of employment in most northwestern Ohio rural counties. Furthermore, rural areas are less diversified, and are therefore severely handicapped in a restructuring that draws upon alternative services, many of which are specialized and available only in urban areas. Urban restructuring is taking place in urban areas and not in rural areas, will the rural areas become more modernized and left behind? Can any difference be ascertained between rural and urban areas based upon their economic structure? These questions are the focus of the paper.

2:15

In this paper we examine the changing employment and demographic characteristics of Indiana between 1970 and 1980, with particular reference to changes in the location of employment and population. We then assess the theoretical impact of economic restructuring on the location decisions of firms and people to determine its effect on locational inconsistencies in the labor market; known as the spatial mismatch. Although the spatial mismatch has been examined regionally and for large metropolitan areas there has not been an empirical investigation of the mismatch at the local scale. This research investigates the existence of the mismatch in Indiana localities and concludes that the spatial mismatch exists even at the smallest scale of the urban system.

2:30
SPATIAL ANALYSIS OF THE BLACK BUSINESS PATTERNS IN SELECTED LARGE SMSA'S OF THE UNITED STATES

Angélique Martin and Charles B. Monroe, Department of Geography, The University of Akron, Akron, OH 44325-5005.

Blacks in American business are not represented in proportion to their number in population. This paper is an analysis of patterns of black owned businesses in selected large SMSA's in the United States. Using SIC codes to classify employment by business sectors, spatial patterns of black ownership are examined. Black business patterns are investigated through comparing the number of Blacks in industry sectors to their proportion in the population. The findings of
the study show that the larger the Black population, the larger the number of Black-owned business. Also, the data reveal that Blacks are generally more underrepresented in manufacturing than in other business sectors.

CHINA AND THE ECONOMIC FUTURE OF HONG KONG

Stephen S. Chang, Department of Geography, Bowling Green State University, Bowling Green, Ohio 43403

Hong Kong will be returned to China in 1997 in accordance with the Sino-British agreement. In spite of the apprehensions people have about their futures under Chinese rule, economically Hong Kong is increasingly integrated with China, especially the southern part.

There is a growing economic relationship between China and Hong Kong. In the future, this will increase and with it Hong Kong's dependence on China for its economic well-being. This paper intends to put forth the idea that, political confidence aside, the future economic prosperity of Hong Kong is very much reliant upon the Chinese hinterland. The growing importance of the service economy is because of its function to provide for the needs of the hinterland. The reason for this thesis will be explored and discussed.

EMPIRICAL IDENTIFICATION OF KEY SECTORS IN THE SRI LANKAN ECONOMY by H. Kumari Navaratne, Richard W. Janson, Department of Geography, Kent State University, Kent, Ohio 44242-0011.

In the context of the national economic development literature the notion of key or critical sectors has become an accepted component of development strategy.

This paper is an attempt to determine the sectors with the highest potential for structural change using the Sri Lankan input-out put table for 1981. A criterion for sector appraisal is based on the Leontief static input out-put inverse matrix.

The paper takes the intensity of interindustrial linkages as an indicator of sectors ability to spread growth impulses to its economic environment. Backward and forward linkages are calculated; in addition, spread effects are computed via the inverse matrix. Using linkages key sectors are identified and correlation analysis are performed to show the various linkages present among various types of macro-multipliers.

These empirical results provide insights to policy makers for allocation of scarce resources to maximize the output and income effects linkages and spreads in the economy.

A SURVEY BASED ON BUILDING CONDITIONS

IN POLAND, 1988 by Dr. Anna Achmatowicz Otok, Kent State University, Kent, Ohio 44240, Dr. Ashok Dutty and Angelique Martin, The University of Akron, Akron, Ohio 44325-5005.

Poland is a socialist country with cultural influences formed by countries with which it shares boundaries. The study is concerned with building conditions in Poland. It is a unique study, the first of its kind, based on findings from a survey done by Warsaw University and funded by the Polish Government. The study was conducted by students in Poland, using a technique to assess building conditions. Students were paired in different regions for the survey. A total of 36 villages and 21 cities picked at random, were examined over the entire country; 1,790 sample buildings were surveyed. Frequency counts and these tabulations and Pearson's Correlation were used. Results reveal that 60% of the buildings in Poland were in the sound category, 25% deficient and 15% substandard. Regional differences occurred in the conditions of buildings. For Poland as a whole, 51.2% of the buildings have brick foundations, while 18% are built of concrete and 11% of stone. Regional differentiations shows that 50% of buildings in the Austrian-influence region have brick foundations, while 36% of the structures in the Russian-influence region have concrete foundations.

3:45 A SPATIAL ANALYSIS OF THE MIGRANTS TO A CENTRAL CITY SLUM IN CALCUTTA by Dr. Ashok Dutty, Anupa Nukhopadhyay, The University of Akron, Akron, Ohio 44325-5005.

India is a developing country and its cities are attraction points. In the case of Calcutta, rural-urban migration has been a strong factor in the increase in population of the city. Most of the slum dwellers migrated as a result of a strong regional "push factors." Indicators of stepwise migration was noticed within the city. The slum dwellers migrated from less favorable slums to a relatively more favorable slum. These slums are predominantly Hindu-speaking people, who are very social among their clan groups because they form the minority population in the city. In the process of settlement the non-Bengali and linguistic groups tend to segregate in particular slums. An early concentration of Hindi speaking people, Tanga, attracted kin and village acquaintances of early settlers for later settlement. The study showed that 53% of the total households in the slum area are backward and that 18.8% from different parts of Kent Bengal and Uttar Pradesh; the number of migrants increased with increase in distance. That is, for up to a distance of 300 mile, the number of migrants increased with increase in distance from Calcutta.

THE SPREAD OF PERESTROIKA IN LATIN AMERICA

Thomas D. Anderson, Department of Geography, Bowling Green State University, Bowling Green, Ohio, 43403.

Under the leadership of Mikhail Gorbachew, efforts at perestroika have transformed greatly the economic and political conditions in Poland. It is a unique study, the first of its kind, based on findings from a survey done by Warsaw University and funded by the Polish Government. The study was conducted by students in Poland, using a technique to assess building conditions. Students were paired in different regions for the survey. A total of 36 villages and 21 cities picked at random, were examined over the entire country; 1,790 sample buildings were surveyed. Frequency counts and these tabulations and Pearson's Correlation were used. Results reveal that 60% of the buildings in Poland were in the sound category, 25% deficient and 15% substandard. Regional differences occurred in the conditions of buildings. For Poland as a whole, 51.2% of the buildings have brick foundations, while 18% are built of concrete and 11% of stone. Regional differentiations shows that 50% of buildings in the Austrian-influence region have brick foundations, while 36% of the structures in the Russian-influence region have concrete foundations.


Much has been written about the African and his religion. Unfortunately, most of the literature is negative and derogatory. Africans are regarded as men without beliefs, whose lives are dominated by superstitions.

The purpose of this paper is to examine the widely held tenet that the African was void of a belief in the Supreme Being before the coming of the Europeans. We will discuss the spatial consistency in the belief of the Supreme God in African traditional religion.

Peoples in West, Central, Southern and East Africa are examined in order to substantiate the existence of a belief in the Supreme Being throughout Africa. A sample will be taken from those tribes for which there is a wide availability of literature. This sample has been chosen to be a representation of the population of each region.

The paper will relate theories of creation, and pious practices through prayers, songs and proverbs by a group from each of the four regions.
A RE-EXAMINATION OF THE SPECTROPHOTOMETRIC METHOD OF ARSENIC DETERMINATION.

James Y. Tong, Department of Chemistry, Ohio University, Athens, Ohio 45701-2979

The spectrophotometric method of arsenic determination utilizing the color complex formed between arsine and silver diethyldithiocarbamate in pyridine solutions was re-examined to obtain a better understanding of the method and to optimize the conditions. Some of the variables examined were the concentration and the volume of the silver diethyldithiocarbamate solution, the temperature, the arsenic concentration, the reaction time, and the time between the completion of the reaction and the spectrophotometric measurements. The generally recommended concentration of silver diethyldithiocarbamate could not be much increased and was adequate for the method. Increasing the volume of the silver diethyldithiocarbamate solution would increase the amount of arsine recovered at the expense of decreased sensitivity. Lower temperatures during the spectrophotometric measurement are desirable as the stability of the colored species decreases as temperature increases. Qualitatively, if the color complex is a 1:1 complex of arsine and silver diethyldithiocarbamate, it would have an estimated formation constant greater than one thousand.

CHLOROISOTHIOCYANATOQUINOLINES AS AMINE DERIVATIZING AGENTS. Stanley C. Bernstein & Kristen Leckrone. Department of Chemistry, Antioch College, Yellow Springs, Ohio 45381

Two new chloroisothiocyanatoquinolines, 1 and 2, were synthesized. They react readily with a-butyamine in acetonitrile to give the expected derivatives, 3 and 4; and the secondary amine, di-n-propylamine reacts with 1 to produce 5. The UV spectra of the derivatives at a variety of pHs were determined. In this way the pKa for the first protonation of the isothiocyanates, 1 and 2, were measured under basic conditions to study the possibility of interference of the reaction order. The present study is a re-examination of the spectrophotometric measurement to obtain a better understanding of the method and to optimize the conditions.

ARSENIC(III) REACTION. Suzanne K. Lunsford and Barbara J. Barker. Department of Chemistry, Xavier University, Cincinnati, Ohio 45207.

Many analytical methods for determining trace quantities of iodide have been developed and reported in the literature. The principle reaction of interest has been the iodide-catalyzed reaction of cerium(IV) and arsenic(III) to form an acido-aqueous solution:

\[ \text{Ce}^{(IV)} + \text{As}^{(III)} \rightarrow \text{Ce}^{(III)} + \text{As}^{(V)} \]

Within the many studies there has been uncertainty about the exact relationship between iodide concentration and reaction rate. The fundamental kinetics data combined with the applied analytical procedures revealed inconsistent findings in the determination of the reaction order. The present study is a re-examination of the conflicting published literature.


A procedure for determining tributyltin chloride (TBTCl) in seawater, in trace amounts, has been developed. The multi-step procedure involves: a) liquid-solid extraction of TBTCl from 200 ml of water using C-18, 25 mm silica unsheathed Teflon extraction disks; b) elution of the analyte with acidified ethyl acetate, pH 4.5; c) on-column injection of 2 l of the disk extract; d) separation on a 30 m DB-5 fused silica capillary column; and e) electron capture detection. The procedure allows combined sampling, extraction, and preconcentration in the rigid, thereby eliminating most contamination and handling problems related to sample collection. On-column injection is an attractive alternative to splitless injection gas chromatography because analytical signal fluctuations as a result of analyte thermal decomposition appears to be minimized.

The combination of liquid-solid extraction and gas chromatographic separation meets the Agency's general method criteria: a) rapid procedure, b) inexpensive, and c) selective for the organotin of interest.

TRIALS AND TRIBULATIONS OF DEVELOPMENT OF A NON-TRADITIONAL PROGRAM IN AN UNLIKELY ACADEMIC SETTING. Henry N. Smith, Ph.D., Central State University, Wilberforce, Ohio, 45384

Introducing a new, innovative, untied curriculum...
into an academic environment with an historical reputation of providing training in fundamental traditional areas was a necessary requirement, but presented a series of critical and often unanticipated challenges. Development of the highly unconventional water resources management degree program at Central State University presented problems from within and without for support, funding, recognition and even basic approval. Marketing of the program to students, faculty, funding sources, potential employers and others necessitated utilization of strategies never used before at the University. Accommodating this program with its unique requirements has often required the modification of longstanding policies and practices. Partly as a result of the program, the University’s enrollment and the student body were undergoing significant changes. The national and international success being enjoyed by this program and to the University in turn has served to justify the trauma of introducing this radical program to the world. The methodology developed in this program may be used as a model by other small institutions with limited resources. 

INTERDISCIPLINARY SCIENCE INTERACTION

Ed Kinney, Mt. Gilead Schools
143 N. Cherry St. Mt. Gilead, OH 43338

Our school system is presently in its fourth year of using junior high students to teach third grade students. The science curriculum guide was used to pick topics already covered by both third graders and seventh graders. Each lesson centered around a lab activity, a worksheet and the use of various science materials. A junior junior high student was responsible for teaching a forty minute science lesson to one or two third graders. Third grade teachers then used the science theme to develop projects in reading, writing, spelling and math. Interest centers and bulletin boards were also built around each science topic. The school year ended with an outdoor science education field day held at Mt. Gilead State Park. Junior high students involved third graders in eight different classes.

Data show an increased attendance on project days, higher ratings on the Culture-Free SEI, improved class social structure and increased home-school communication.

9:30

AN ECOLOGICAL PARADIGM FOR SCIENCE EDUCATION

David C. Schmidt. School of Interdisciplinary Studies, Miami University, Oxford, Ohio 45056

While working as a teacher’s assistant in a small elementary school, I found that there was a need to spark interest within the students concerning scientific explorations and studies. I feel that it is critical to develop students’ interest in science at an early age so that they may begin to establish a greater understanding and sensitivity towards environment and the oceans down the road. However, that a straightforward introduction into scientific nomenclature and scientific methods were not stimulating the interest of the students. In order to generate more interest in scientific studies, I created and taught a course on scientific exploration for children in the fourth and fifth grade. This course strongly emphasizes experience as it is based on each student’s perceptions as a basis for understanding the world around them. The course was broken up into four sections: 1) awareness development 2) understanding ecological principles 3) development of environmental ethics and 4) citizen science or ecological action. In order to evaluate the effectiveness of this program, I have conducted pre- and post-testing using a Likert scale. This measurement was used to evaluate children’s attitudes towards environmental/Scientific issues. I will be presenting both the methodology and results of my findings.

10:00

EVALUATION OF TEXTBOOKS BY STUDENTS

John F. Oakes. School of Interdisciplinary Studies, The University of Akron, Akron, OH 44325-3908

Student evaluation of textbooks could be useful when a new text is considered; however, such information is seldom systematically collected or controlled for bias and is consequently of dubious value. Four hundred students each identified characteristics particularly important for a text used in an anatomy and physiology class. The 43 most frequently mentioned aspects (eg., clarity of labels, non-glossy paper, and ease of the physical layout) were grouped into 15 items under three major headings (visual information, text information, and study aids) and developed into a rating survey. A student in a second class who chose to participate in the evaluations mentioned them in three readings in randomly assigned texts which corresponded in content to the current readings in the regular course text. Only minor differences were found among the five new texts when rated for visual, text, and study aids when compared with the regular course text. However, there were major differences when students expressed preferences for a new text over the regular text. Overall preference does not seem to be based on the objective factors identified by students as important characteristics for a text.

A significant bias effect was noted depending upon whether the new text or the course text was read first.

SECTION III. Science Education

Second Morning at 9:00 a.m.

Saturday, April 28, 1990

210 Fawcett

Robert E. Rohraugh, Presiding

9:30

GRADE LEVEL COMPARISON OF STUDENTS’ ATTITUDES TOWARD THE USE OF ANIMALS IN EDUCATION AND RESEARCH

Marine E. Hatcher, Eric Prockdd, Robert E. Rohraugh, Victor J. Mayer, and Lynn Edward Elsner, The Ohio State University and The Ohio Academy of Science, 6089 Godown Rd., Columbus, OH 43215

What do students of different ages think about the use of animals in education and research? Are younger students more concerned about pain and suffering than older students are? How do students at different grade levels perceive the use of animals in education? While these are interesting questions for science education, there has been little research in this area. To address this issue, a 25-item survey of attitudes toward animals in education administered to 935 students in grades 4-12. Multivariate analysis of variance indicated significant differences by grade level (4-5 vs. 6-8 vs. 9-12). Univariate analyses showed that students at different grade levels responded differently on 24 of the items. Students’ attitudes will be discussed in terms of their cognitive abilities.

9:30

AN ANALYSIS OF CURRENT MODELS OF TEACHING EVOLUTIONARY THEORY

James G. Osborn, 4229 Allison Circle, Fairfax, VA 22030

While recognizing the value of the empirical studies associated with the traditional model of evolution, dogmatic science has demanded a teaching of the subject on the primary and secondary levels that takes too little account of its hypothetical status. On the other hand, dogmatic religion advances a creationist model for the origin of species that is entirely incompatible with empirical knowledge. The key problem with the extreme creationist model is its unscientific and dogmatic view of how the life, science, in contrast, tends to ignore the possibility of purpose in the universe. Yet if the simplest of competing theories is the preferred one, then a teleological theory is desirable both rationally and politically, allowing for the premise of a purposeful origin of the universe while retaining the consistency and logic of empirical study.
Specifically, a purposeful universe focused on a concept of Heart—defined as the impulse to love—rather than Power is suggested that accommodates this constraint.

TEACHER-DEVELOPED CLASSROOM PROJECTS FOR EXPLAINING GEOLOGIC CONCEPTS TO EDUCATIONALLY DISADVANTAGED MIDDLE SCHOOL STUDENTS.

Robert G. McWilliams, Department of Geology, Miami University, Oxford, Ohio 45056.

Ohio's Education for Economic Security Act program provided the opportunity for 40 Ohio secondary teachers from 11 school districts to study geography at Miami University Geology Field Station in and near Lake Erie, Grand Canyon, Grand Teton National Parks during the summer of 1989. Participating teachers developed classroom projects for educationally disadvantaged middle school students using the integrative viewpoint of geology. This integrative viewpoint incorporates: (1) the study of objects in natural settings; (2) collaborative work in small groups; (3) comparison of unknown phenomena with easily-understood, present-day processes currently taking place; and (4) use of critical reasoning to collect, sort, cull, and synthesize information from many sources.

Selected classroom projects have been published and are free to Ohio teachers.

USE OF THE OHIO SCENIC RIVERS PROGRAM TO ENHANCE THE HIGH SCHOOL BIOLOGY PROGRAM.

Peter B. Kain, Marysville High School, 833 W. Maple St., Marysville, Ohio 43040.

The Ohio Scenic Rivers Program provides teachers with a worthwhile project for field study. The program has designated twelve state scenic rivers throughout Ohio. Monitoring a station for aquatic macroinvertebrates provides the Ohio Department of Natural Resources with base readings on all state scenic rivers. This activity provides students with experience in aquatic field studies, use of appropriate equipment, a sense of accomplishment while doing schoolwork, and the cooperation between the school and community. The method of monitoring water quality will be presented along with information on how to set up a program for your school or community group.

SECTION II. Science Education

Only Afternoon & Business Meeting at 1:30 p.m. Saturday, April 28, 1990

208 Fawcett
Rebecca Stricklin, Presiding

2:30 APPROACHES TO REDUCING LOSSES FROM THE OHIO SCIENCE EDUCATION PHINELINE

Gary D. McKenzie, Department of Geology and Mineralogy, The Ohio State University, Columbus, Ohio 43210-1398.

Economic competition and effective citizenship in a technologically complex world suggest the need for scientifically literate graduates from all of Ohio's schools and colleges. Interest in and opportunities for undertaking careers involving science and technology generally decrease with increasing grade level. Suggestions, of varying feasibility, for reducing these losses include: more appropriate/relevant science and math, hands-on science, better teaching materials and equipment, enthusiastic and qualified teachers (higher salaries), more hours in school and more homework (a national homework hour or two), greater expectations for the students (more hard work), out-of-class experiences at schools, businesses, science museums, travel, exhibits, and colleges after school, on weekends, and in summer camps. The college also shows drastic losses, where less than 40% of those intending to go into science as freshmen actually earn degrees in the field. Reform is needed in college teaching if we are to develop more science and mathematics graduates and better precollege teachers of science.

2:45 THE BF Goodrich VISITING TECHNICAL WOMEN PROGRAM

Christine K. Martin, The BF Goodrich Company, P.O. Box 122, Avon Lake, OH 44012.

Recent surveys of the available labor pool of Americans obtaining undergraduate and graduate degrees in science and technological fields indicate a growing shortage of this resource into the future. The outlook for women and minorities in these fields of study is even more dismal. Those American businesses that rely on a technical basis for competitive superiority will be at a disadvantage with growing global competition. Therefore, it is to our industries advantage to encourage young people to consider science and technology as fields of study. In response, the BF Goodrich Company has established a Visiting Technical Women Program designed to encourage young people in science and mathematics. The objectives of the program are to provide an opportunity for students to meet and interact with technical people, to provide evidence of successful careers, to provide information about job opportunities in technical areas, and to provide information about the preparation necessary for various technical careers. This program is designed to encourage a wide variety of students to consider science and technology as potential fields of study.
which provides them a significant plan for their learning experiences.

A sequence of events will be utilized to demonstrate examples of current educational technology used to develop experiences for students in science and mathematics education.

THE STATE OF ADVANCED PLACEMENT CALCULUS: THE NEED FOR SUPPORTIVE INSTRUCTIONAL MATERIALS
T. Michael Flick, Ph.D. Xavier University, Alter 14 Cincinnati, OH 45207

This paper presents the results of an assessment of the availability of printed instructional aids for use in advanced placement and freshman calculus programs. Specifically addressed is the general availability of materials to supplement existing calculus textbooks. Based upon these findings, specific curricular strategies are proposed. The findings are particularly significant to developers of instructional materials.

The results of a survey of Ohio's secondary schools are presented. Based on the survey, it can be concluded that 85% of Ohio High Schools offer a course in calculus. Of the 85%, 35% are of a non-advanced placement type, 47% are advanced placement Calculus AB, and 18% are advanced placement Calculus BC. The predominant textbooks used in these courses are by the author George B. Thomas.

Ohio educators indicate a strong need for the development of printed instructional materials to supplement existing textbooks.

SECTION H: Science Education
Poster Session at 10:00 a.m.
Saturday, April 28, 1990
Lobby Physical Education Bldg.

SCIENCE IS FUN-A PROJECT WHICH ENHANCES SCIENCE EDUCATION AT ALL LEVELS
Board J
@ 10:00 a.m. A. M. Sanguis, Miami University-Middletown
St Mary-Lenox-Monroe High School
Betty Rose Kibbey-McKinley Elementary
1210 S. Verity Parkway, Middletown, OH 45042

The presentation includes goals of the project SCIENCE IS FUN, the three phases which the project contains and specific goals for each phase. Phase I of the project in Super Saturday Science Sessions held on branch campuses of Miami University in the fall. Miami science teachers presented lectures, demonstrations and directed hands-on explorations to high school students and teachers. These challenges would not have been available at local high schools. In the spring Phase II of the project is held in junior high schools and elementary schools. The Science Carnival includes a series of hands-on explorations to excite young students in science. The explorations are designed and directed by the high school students and teachers who participated in Phase I.

The last phase is the Summer Science Camps held at Miami campus and high schools. The week long camps expose students to hands-on science activities, small group work with individual attention and home exploration. The camps provide training for select high school students and teachers who participated in Phases I and II.

6,000 students and teachers have been 'turned on to science' so far.

Poster PRESENTATIONS BY WINNERS OF 1988-89 Boards
BATTLE AWS FOR PROFESSIONAL DEVELOPMENT

In 1989 The Ohio Academy of Science and Battelle Memorial Institute selected the winners of the Battelle Awards for Professional Development. Battelle Awards for Professional Development -- an educational partnership of The Ohio Academy of Science and Battelle Memorial Institute -- promotes professional development of science and mathematics teachers. The Battelle Award winners who received a total of $10,000, will summarize their professional experiences this past year and be available to answer questions at the following times:

10:00 a.m. Connie Hubbard
Board K
Minerva High School
Minerva
$2,500 Science Teacher Award Winner

10:00 a.m. Paul Lenz
Board L
Miller City High School
Miller City
$2,500 Mathematics Teacher Award Winner

10:00 a.m. Rich Benz
Board M
Wickliffe High School
$5,000 School Award Winner

SECTION I: Anthropology & Sociology
Only Morning at 9:00 a.m.
Saturday, April 28, 1990
218 Fawcett
Dr. Barry E. Thompson, Presiding

9:30 CHILDREN'S TEMPERAMENT AND THE CLASSROOM: PATTERNS ACROSS CULTURES
Jeanne Ballantine and Helen Klein
Wright State University, Dayton, OH 45435

Cultural ideals provide the context for early socialization in schools. This study assessed ideal and actual temperaments of children as viewed by teachers in the United States, England, Israel, and Japan. Similarities and differences in ideals were found with the United States and England being most similar and Israel being most divergent. The temperament ideals for mood, intensity, activity and adaptability showed the greatest cross-cultural differences. Comparisons of temperament judgments of actual children from the United States, England and Israel found that England and the United States to be the most similar. The judgments of the Israeli teachers were different on the dimensions of mood, adaptability and distractibility of children. The results suggest the importance of cultural ideals of temperament for understanding perceptions of children, decisions about classroom environments and individual adjustment patterns.

9:45 CULTURAL INFLUENCES ON WOMEN'S SCIENCE CAREER CHOICES, Anna Bellisari, Department of Sociology and Anthropology, Wright State University, Dayton, OH 45435

Intensive interviews of a sample of Ohio State University female graduate students revealed cultural differences influencing the selection of academic majors and careers by American and foreign women in the sciences and the humanities. For example, women from Asian and African countries frequently indicated strong parental and societal pressures for specific scientific careers. Women from Europe and the U.S., on the other hand, were more often motivated by personal interest in the subject matter of their selected disciplines, and were more frequently concerned about combining future career and family responsibilities. Other cultural variables relating to career choices will also be discussed. Results of this study contribute to the understanding of women's participation in science and may enhance U.S. educators' efforts to improve science education for women.

10:00 CHILD CARE: AN EVOLVING SERVICE AND SHIFTING EMPHASIS
Willie F. Lauter, Suite 330 Plaza Nine, 55 Euclid Plaza, Cleveland, Ohio 44114

A picture of child care at various levels of government shows a disorganized system composed of multiple programs often conceived and administered independently of each other. All levels of government--federal, state, and local provide some form of child care through an extensive array of programs. Our study identified over $6 billion in spending for child care in 1988.

In the last decade, the direction of federal government spending has shifted from low-income families to middle- and upper-income families. The shift from block grants to tax credits means that low-income families may have access to less purchase-of-care assistance than previously.

Federal programs originate in several different Congressional committees and program administration is divided among several federal agencies and between levels of
government. In turn, state and local governments as well as private organizations add their own programs to the federal sponsors. Program fragmentation and lack of coordination result. Because of lack of a focal point service demand and supply is difficult to determine.

Insights on funding, coordination, quality standards, and services will be provided in the paper.

10:15  
GENDER-ROLE RESEARCH: A SOCIOLOGICAL PARADIGM  
Lene Wright Myers  
Sociology and Anthropology Department  
Ohio University  
Athens, OH 45701-2979

This presentation will focus on the importance of pursuing research on gender role socialization. It is derived from the author's ongoing research into the Effects of Early Gender Role Socialization on Occupational and Familial Role Performances Among Women.

10:30  
ETHNIC POWER TYPOLOGY  
FOUND IN ORAL HISTORY. Joanne Marchione and Susan Stearns  
2629 Greenview Circle W.M.  
Canton, Ohio 44708

Ethnic traditions are considered sources of family power. A proposed new ethnic power typology has emerged from the review of the ethnic related literature and data collected from oral histories. Knowledge of this power typology may assist health professionals in assessing and nurturing power values of families.

10:45  
A COMPARISON OF HUMAN VERSUS OTHER PRIMATE ELBOWS WITH IMPLICATIONS FOR LOCOMOTION: ADAPTATION AND EVOLUTION. Forrest J. Smith  
Department of Biology, Wayne College, The University of Akron, Orrville, OH 44667

The evolutionary relationship of humans and modern African apes (chimpanzee and gorilla) is a central question of modern biological anthropology. Molecular, anatomical and paleoanthropological studies are unclear, and sometimes in disagreement concerning the timing of the evolutionary split and, especially, locomotor relationships. Anthropologists who are descended from brachiation, hand-walkers or plantigrade quadrupeds? This study compares measurements from human distal humeri to those made by living primates including lesser and greater apes, and Old and New World monkeys. Further studies include a look at the radial head. There is also a critical discussion of adaptations for "stability" and "close-packing" of the elbow joint. Some light may be shed on the evolution of human locomotion in these studies.

SECTION I. Anthropology & Sociology  
Only Afternoon & Business Meeting  
at 1:30 p.m.

Saturday, April 28, 1990  
218 Fawcett  
George B. DeMuth, Presiding

2:00  
THE PIG SITE (33-LI-251): LATE FLEISTIDGE TO RECENT HUMAN OCCUPATION IN CENTRAL OHIO. B.T. Lepper, T.A. Ftolking, P.E. Hooge.  
W.A. Dancey, P.J. Fachecco, D.A. Nyer. Newark Earthworks  
State Memorials, Newark, OH 43055

The Pig Site (33-LI-251) is located in a small, south-facing amphitheater-shaped basin which drains into lower Racoon Creek in central Lake County, Ohio. An oval (8 x 10 m) topographic high is situated within this basin between two perennial springs. This topographic high is not natural but consists of man-made deposits. A minimum of four distinct cultural components representing different time periods tentatively are identified at the Pig Site: 1) an ephemeral Historic component; 2) a series of Early Archaic occupations; 3) a series of Early Paleoindian component. The Paleoindian component, which consists of a fluted point, a scrap and flint chippings, appears at this time because it appears to represent an in situ Early Paleoindian occurrence stratified below subsequent cultural occupations. Therefore, this site may yield evidence for periods of human occupation in central Ohio beginning 11,000 years ago.

2:15  
THE PREHISTORIC OWEN ROCKSHelter (33GR670). Gavine Pitner, Department of Anthropology, University of Cincinnati, Cincinnati, OH 45221

Archaeological material from Owen Rockshelter in Greene County, OH was examined in order to determine its chronology and the prehistoric activities that occurred at the shelter. A debris profile, a count and weight of material by volume, together with wiggon dates, typological lithic artifacts, and a faunal analysis were utilized in the study. Over 20.5 cubic meters of earth were excavated and processed for analysis by the University of Cincinnati Field Schools between 1982 and 1988. Lithic materials indicated that the shelter was used for more than 4000 years, from the Late Archaic through the Mississippian period. The radiocarbon dates of charcoal from hearths found in the shelter confirm late prehistoric use. The debris profile also showed usage in the more recent period. Faunal analysis provided evidence the shelter occupants used a broad variety of animals and suggests that a Spring through Fall occupancy was more likely. Therefore, it is most likely the shelter was used as a hunting encampment.

2:30  
THE S EA MAN FORT S IT E (33 ER 85). AN EARLY HUMAN OCCUPATION IN THE COUNTY, OHIO. George J. Wulff, Sandusky Bay Chapters, Archaeological Society of Ohio, Cleveland, OH 44101  
The Seaman Fort Site is located on a bluff between Lake Erie and the Ohio River. Six units were excavated in 1949 by the National Park Service. The units contained a well-preserved stone and mud house structure, one possible animal and a small, an Early Woodland pit feature. Many finds have supported early Woodland pottery vessels, of a variety similar to the Late Archaic form for Lorain County, Ohio, as well as diagnostic Early Woodland stemmed vessels and other Early Woodland during this time period.

2:45  
A CONSTRUCTION SEQUENCE FOR A HOPEWELL HILLTOP ENCLOSURE. Robert Ritter, Department of Sociology and Anthropology, Wright State University, Dayton, OH 45435

Stratigraphic and radiocarbon dating evidence obtained from the Pollock Works, a Middle Woodland hilltop enclosure in southwest Ohio, has made it possible for the first time to document the development of a hilltop site's plan. Construction is believed to have occurred in four stages during the first half of the 1st century A.D., beginning with a simple barrier wall placed across the approach to the plateau summit that was transformed into a more complex edifice incorporating gateways, exterior elements and a second, bluff edge wall. The implications of a phased construction program on the possible roles such sites may have played in the Hopewellian world are discussed.

3:00  
REIDENTIFICATION OF THE VIOLIN GREEK KNOBLY HILLCIRCLE. Charles R. Plateau, Joseph G. Chapter, Anthrop学ological Society of Ohio, Social Studies for Ohio, 41915

The violin knobly enclosures consist of a large circle and name enclosure. Most sites of this type are believed to be surrounded by a wall or series of walls. The violin knobly enclosures have been characterized as enclosing small, isolated, ceremonial sites. The violin knobly enclosures have been found in the Ohio River Valley. Each site contains a single, large circle and name enclosure. The violin knobly enclosures have been characterized as enclosing small, isolated, ceremonial sites. The violin knobly enclosures have been found in the Ohio River Valley.
ritual grounds for festivals such as the "Feast of the Dead." The Ceramic assemblage is specifically designed to provide technical research on the life and death of the Wolf Phase and its attendant ceramic hallmark type "Parker Fostenson.

**3:30**
The Totontacoronaron: Ethnic Identity of the Sandusky Tradition. Robert L. Vertrees, Ph.D. Director, The University of Toledo Archaeological Research Program, Toledo, Ohio 43606.
The Indian Hills Site (314-O-4), the type site for the Indian Hills phase, the terminal phase of The Sandusky Tradition, is a large prehistoric village which has produced an array of terminal trade goods and late 16th/early 17th century radiocarbon dates. It is postulated that the inhabitants of this village may be distinguished as the Totontacoronaron, a group identified by Father Le Jeune in the Jesuit Relations of 1645/6. Their name is believed to be derived from the geographic name Toton-taratonen, used by LaSalle (1682) to describe a river located at the mouth of Lake Erie along its south shore. Authorities such as Marry (1876-1886) and Delanglez (1938) believe this river to be the present-day Maumee. Jesuit Missionary Father Potter (1920) later lists this name in his historic Huron-Wendou grammar as Toton-taratonen; both references relating to the Riv. de la Me, a former name for the Maumee River. According to Robinson (1964), the name is ultimately derived from the Wendat language, which translates to "where the lake disappears." It is suggested that the name Totontacoronaron refers to the population that inhabited the Indian Hills site. This population represents the terminal phase of the Sandusky Tradition, prior to their military defeat and dispersal in 1643 by their traditional enemies, the Neutral Iroquois.

**SECTION J. Natural Resources Only Morning at 9:00 a.m. Saturday, April 28, 1990**

222 Fawcett

Robert L. Vertrees, Presiding

**9:00**
An Ethnolinguistic Approach to Improve Communication About Ways of Applying Knowledge from Two or More Disciplines. Robert L. Vertrees, Ph.D. School of Natural Resources, The Ohio State University, 2021 Coffey Road, Columbus, OH 43210-1085.

Effective communication in natural resource and environmental professions is hindered by the inconsistent and divergent use of terms to denote different ways of applying knowledge from two or more disciplines in endeavors such as teaching, research, public service, planning, policy analysis, and field management. This is demonstrated by a review of how terms such as "crossdisciplinary," "interdisciplinary," "metadisciplinary," "multidisciplinary," "pandisciplinary," and "transdisciplinary" are used in pertinent formal literature. Meanings explicitly or implicitly given these terms in the literature, and definitions or descriptions for some of them given in dictionaries or encyclopedias of education, are compared among themselves and from the standpoint of how well they agree with what is said in dictionaries of etymology about the origins and histories of meanings for the prefixes "cross," "inter," "meta," "multi," "pan," and "trans." This etymological approach has resulted in a set of definitions that is recommended for use by resource and environmental professionals. In addition, these professionals are urged to pay more attention to the responsibility they have to define the terms they use in a logically sound manner, to require this when reviewing the work of other professionals, and to teach this to students.

**9:30**
Evaluating public input into national forest planning: Satisfaction of participants with a U.S.F.S. Citizen participation program. Edythe Seehafer, Donald W. Floyd, Ph.D., and Robert L. Vertrees, Ph.D. School of Natural Resources, The Ohio State University, 2021 Coffey Road, Columbus, OH 43210-1085.

All National Forests have developed a forest plan through a planning process mandated by the National Forest Management Act of 1976. This study was of the citizen participation program of one of the last plans to be developed, the Wayne National Forest Plan. The study's basic purpose was to determine the extent to which the citizen participation program succeeded in gaining participant attitudes about the plan for the better. The study used two mail surveys: one to a random selection of persons who expressed interest in the plan and the other to persons targeted by the U.S. Forest Service for inclusion in the citizen participation program. The field-tested surveys included Likert-summated-scale questions designed to measure satisfaction with the citizen participation program and the plan. The basic analytical approach was to use discriminant analysis to identify the best predictors of plan and program satisfaction and to determine relationships between program participation levels and the satisfaction of various interest groups. Preliminary results indicate that satisfaction varied significantly across the interest group variable.

**10:00**
The Impact of Television on Public Environmental Knowledge Concerning the Great Lakes. Christine C. Brothers, Rosanne W. Forrest, and Victor J. Mayer, The Ohio State University.

The purpose of this study was to collect baseline information about public knowledge of the Great Lakes and to estimate the impact of a television news show in educating adults about the Great Lakes. Survey questionnaires containing multiple choice knowledge items and Likert-type opinion statements were fielded by 570 students at two Cleveland Ohio, shopping malls during April, 1990, to determine the current levels of information and opinions held. This baseline study revealed that knowledge levels about the Great Lakes are generally low while opinions held about the Lakes are generally environmentally positive. In May, 1989, WJW-TV8 in Cleveland broadcast selected questions from the survey, the correct answers, and accompanying explanatory video segments on the station's evening television news show. Following the broadcast, 46 Clevelanders completed the entire survey questionnaire, which was provided at county and city library branches. For both mall and library respondents, environmental knowledge levels and environmental concern were significantly enhanced and were more strongly associated with education level. Respondents who cited newspapers or lake experiences as their primary source of Great Lakes information were more knowledgeable than those who cited television, however, environmental opinion did not differ by media use. A comparison of knowledge scores on questions that had and had not been broadcast by the library respondents who had watched the television broadcast showed that the news show was indeed effective in increasing knowledge levels in those who viewed it. Moreover it is possible that the television news show is a vehicle for educational messages to the public.

**10:30**

For some time, outdoor education experiences have been used to introduce field experiments in science. Here, mathematics and science were integrated in projects in which measurements were gathered and analyzed.

The authors worked with inner-city junior high students during their outdoor education experience at the Earthlore Center in the Cuyahoga Valley National Park. Their adult tutors were trained in a preliminary session. First, students calculated species diversity. They were introduced to the relevancy of field data using point-quarter methodology. They analyzed data using percentages, tables, and sigma notation to calculate a diversity index. After the first field experiment, the adult tutors and students were enthusiastic and requested that the authors return with a second outdoor project. In the second project a month later, the students measured the angle of elevation to the top of a tree with a clinometer and used graph paper, rulers, and protractors to make a scale drawing and determine its height.

**10:45**
The relationship of an integrated core science course on college student achievement and attitude. David E. Todt, Shawnee State Univ., Portsmouth, OH 45662.

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were noted in the achievement results and the semantic differential form used. No student attitude differences were found between the integrated and traditional approaches.

SECTION J. Natural Resources
Only Afternoon & Business Meeting
at 1:30 p.m.
Saturday, April 28, 1990
222 Fawcett
Mel Hathaway, Presiding

2:00
ISOLATION, CHARACTERIZATION AND DETECTION OF CYANOBACTERIA (BLUE-GREEN ALGAE) TOXINS FROM FRESHWATER SUPPLIES. Carmichael, M.W.
Department of Biological Sciences, Wright State University, Dayton, OH 45435.

Toxins of cyanobacteria (blue-green algae) continue to be a problem in the maintenance of safe municipal and recreational water supplies for animal and human use throughout several areas of the world. New toxins from the two main groups of toxic compounds–the cyclic hepatotoxic peptides and neurotoxic alkaloids–have been isolated and chemically characterized. Newer methods of isolation and purification are now available for the detection of minor toxins in situations where no or little toxicity was previously identified. In addition preliminary results with immunological detection methods now make it possible to develop rapid test kits to the various toxins groups. These results will be presented within the context of the role of toxic cyanobacteria in water-based disease.

COMPARISON OF DRASTIC WITH ACTUAL NITRATE VALUES
Thomas Münzinger and Albrecht Stöcklein
Heidelberg College, Tiffin, Ohio 44883.

DRASTIC Indexes provide discrete numbers which can be used to evaluate groundwater contamination potential. The DRASTIC model does not estimate the nitrate concentration in private wells of Ohio. These data offer the possibility to look for correlations between DRASTIC Indexes and actual measured NO3 values. We examined whether correlations were present among county averages for NO3 and DRASTIC were also present within individual wells in a single county. The expectation is for increasing nitrate concentrations with increasing DRASTIC scores. For 171 wells in Pickaway County, there was no correlation whatsoever with the DRASTIC index. One must, therefore, look for correlations on more specific levels. But also the data available on the level of major hydrogeologic settings showed no correlation. On the contrary, the hydrogeologic region where DRASTIC predicted a higher pollution potential showed significantly lower NO3 values than the region with the smaller DRASTIC Indexes. This might be caused by a response-time effect.

The results imply three possible explanations: 1. The DRASTIC model is faulty on a small scale level; 2. The DRASTIC model works as expected, but the contamination data is in error, due to factors not considered in the model; 3. The DRASTIC model and the pollution data are correct, but DRASTIC gives us a correlation with NO3 on a far higher level than expected and than reasonable for drinking water.

HERBICIDE CONCENTRATIONS IN OHIO'S DRINKING WATER SUPPLIES. David B. Baker
Heidelberg College, Tiffin, Ohio 44883.

To assess the health risks posed by herbicides in Ohio's drinking water supplies, information regarding herbicide toxicity and exposures is necessary. Based on toxicity studies, lifetime health guidance levels have been established for alachlor and atrazine as approximately 2 µg/L and 3.3 µg/L, respectively. These two herbicides are widely used in Ohio and together comprise the bulk of the toxicity threat from herbicide contamination in drinking water.

Analysis of available concentration data for alachlor and atrazine in surface water and groundwater based supplies suggests that statewide average concentrations for alachlor and atrazine are approximately 0.1 µg/L and 0.26 µg/L, respectively. Determination of average concentrations are difficult because, in most samples, concentrations are below detection limits and the detection limits vary greatly among laboratories. For water supplies withdrawn from surface waters, average alachlor and atrazine concentrations were 0.15 and 0.42 µg/L, while for groundwater based supplies they were 0.036 and 0.05 µg/L. In a small number of private groundwater based supplies concentrations exceeded the lifetime health advisories. The "bulk" of the exposures occurs in the relatively small number of public supplies withdrawn from rivers draining agricultural watersheds. For the vast majority of supplies, both public and private, concentrations apparently are less than 1% of the levels that are deemed safe for lifetime exposures. Seasonal treatment to remove herbicides at selected water treatment plants and increased care in the handling of herbicides offer worthwhile potential to reduce exposures to these compounds for the small proportion of affected supplies.

3:00
CISTERNS AS A SUPPLEMENTAL WATER SOURCE FOR DOMESTIC USE IN RURAL OHIO. Hamel, W., Smith, Ph.D., Central State University, Wilberforce, Ohio 45384
The drought of 1988 has raised the consciousness of many in Ohio to the importance of planning for provision for dependable safe and sufficient sources of water. This is particularly true in rural communities and remote dwellings where alternative outside sources of water are often not practical or possible. Rain water cisterns have been used in the past for water supply in Ohio and may presently serve as a feasible alternative supplemental system for areas removed from distribution networks. Cistern technology is in continual development and usage of these systems have lately been receiving worldwide attention. Analysis of volume requirements are made for various demands and supply conditions to determine their possible applications in Ohio. An examination is made using the hypothetical variable numbers and minimizing the performance of cisterns during the past drought when serving as the only water source, as a supplemental or supplemental source and using constant or variable demands. Quality considerations, advantages and disadvantages of these systems are also considered.

3:15
CHARACTERIZATION OF BACTERIAL POPULATIONS IN AN IRRIGATION WELLFIELD IN SOUTHWEST OHIO
Stuart A. Smith, Nancy R. Otieno, and Eric V. Nelson
S.A. Smith Consulting Services, Ada, Ohio 45801-0088.
Department of Biology, Ohio Northern University, Ada, Ohio 45810

A two-year study was conducted of the characteristics of microbial populations in wells of a horticultural irrigation wellfield at Ada, Ohio, in the northwest Ohio carbonate aquifer. The utility of simple sampling and analytical techniques for aquifer microbiological studies was investigated. Sampling methods used were accepted standard techniques as well as newly developed immunological methods and a determination of average concentrations for alachlor and atrazine are approximately 0.1 and 0.3 µg/L, respectively. Determination of average concentrations for alachlor and atrazine are approximately 0.1 and 0.3 µg/L, respectively.

3:30
VARIABILITY IN THE pH OF THE NEARSHORE WATERS OF THE CENTRAL BASIN OF LAKE ERIE.
Ihor Hlobowskyj, Environmental Assessment and Information Sciences Division, Argonne National Laboratory, Argonne, IL 60439

I examined the seasonal variability in pH of the nearshore waters (water depth less than 9 m) of the central basin of Lake Erie. Daily pH values for the years 1984-1986 were obtained from the intake water quality records of six municipal water plants located along approximately 150 km of the central Lake Erie shoreline from Lorain, OH to Conneaut, OH. Mean water depths for the intake structures ranged from 4.6-6.7 m. During 1984-1986, the pH of the nearshore waters was typically greater than 7.5. Among sites, the pH ranged from 6.7-8.7. In general, pH values were the most basic and least stable in late summer and autumn, and least basic and most stable in winter. A correlation between the pH and the nearshore pH values along the central basin may reflect differences in local geology among the study sites. This trend was not found through Argonne National Laboratory.
were planted in April of 1986 by hydroseeding on the graded borrow-pit site at the Bergamo-Mt. St. John Nature Preserve, Dayton, Ohio 45469-0001.

Forb species which were more difficult to establish were propagated in soil-filled plastic-film cylinders. These, and other plants collected locally from the extremes in moisture conditions found on the site. Similarly, mulched soil holds moisture and it is less affected under short durations of rain.

Other issues examined included ink toxicity and use of farm implements for chopping and baling paper.

The affects of no-till in Knox Co.

Prairie vegetation has been planted on a sand and gravel borrow-pit site at the Bergamo-Mt. St. John Nature Preserve in Greene County, Ohio. Prairie species were selected for reclamation of this area because that type of community is well-suited to the extenuate in moisture conditions found on the site. To establish grasses, seeds obtained from Western sources were planted in April of 1986 by hydrosowing on the graded site. Just prior to this, seeds of several forbs obtained from Western sources were broadcast over the area. Subsequently, seeds of grasses and forbs collected locally were broadcast. Forb species which were more difficult to establish were propagated in soil-filled plastic-film cylinders. These, and other plants collected locally from disturbed sites, were transplanted into holes prepared with a soil auger. Despite the severe drought of 1988 over 40 prairie plant indicator species, along with a number of animal species, have become established on the site.

4:15 SITE IN GREENCE COUNTY, OHIO. Denis G. Conover and Donald R. Geiger, Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221-0006 (DGC) and Department of Biology, University of Dayton, Dayton, Ohio 45469-0001.

4:45 BEARS OF THE NORTHERN ROCKIES, Nicholas J. Smith-Sebasto, The Ohio State University, School of Natural Resources, 210 Kottman Hall, 2021 Coffey Road, Columbus, Ohio 43220.

Two species of bears, the black bear and the grizzly bear currently inhabit the northern Rocky Mountains in Wyoming, Idaho, and Montana. The black bear is a common game species and is hunted under state regulations in these states. However, the grizzly population is low and the species is listed as endangered by the federal government. Extremely limited grizzly hunting, often only for meat, is allowed within National Parks and by stockmen killing raiding bears regardless of species. Unfortunately, encounters with grizzlies by outdoor recreationists have occasionally resulted in human injury or death and, in many cases, the death of a bear. Some of these incidents may have been caused by incorrect identification of the bear.

There is a need to increase the awareness and knowledge of these publics and others to the behavioral and physical differences of the two bear species. Such an increase may help reduce unnecessary grizzly deaths and potentially dangerous human/bear encounters.

SECTION J. Natural Resources

Poster Session at 10:00 a.m.

Saturday, April 28, 1990

Lobby Physical Education Bldg.

3:45 THE AFFECTS OF NO-TILL IN KNOX CO. Robert Priddy, M. Vernon Nazarene College and Brad Ross, Knox County Soil and Water Conservation District.

Located in central Ohio, Knox County is a rural community of 1,400 farms covering an average slope of six percent in 300 feet. In the 1960’s, the average soil loss was eight tons per acre. To reduce soil erosion, no-till farming was started in 1968, and it has become the major farming technique in the County. During the past 20 years, no-till has reduced soil erosion by 50%. Crop yields have been comparable to or have exceeded conventional tillage yields.

Studies show that the seven to eight thousand pounds of mulch per acre buffers the soil temperature and moisture. The high soil temperatures under mulch are cooler than under bare soil. Mulched soil temperatures are warmer. Similarly, mulched soil holds moisture and it is less affected under short durations of rain.

3:45 SITE IN GREENCE COUNTY, OHIO. Denis G. Conover and Donald R. Geiger, Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221-0006 (DGC) and Department of Biology, University of Dayton, Dayton, Ohio 45469-0001.

4:00 ESTABLISHMENT OF A PRAIRIE ON A BORROW-PIT SITE IN GREENE COUNTY, OHIO. Denis G. Conover and Donald R. Geiger, Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221-0006 (DGC) and Department of Biology, University of Dayton, Dayton, Ohio 45469-0001.

4:15 SITE IN GREENCE COUNTY, OHIO. Denis G. Conover and Donald R. Geiger, Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221-0006 (DGC) and Department of Biology, University of Dayton, Dayton, Ohio 45469-0001.

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SECTION J. Natural Resources

Poster Session at 10:00 a.m.

Saturday, April 28, 1990

Lobby Physical Education Bldg.

Board A

USED NEWSPAPER FOR ANIMAL BEDDING

$ 10:30 a.m. 1210 Fuji Pkwy Building

Columbus, Ohio 43210-1010

Newspaper is a major component of household waste. Recycling markets for newspaper are glutted; consequently, legislative action mandates reduction in landfilling. One option for using some of the paper is as animal bedding on commercial farms.

Laboratory experimentation, stall trials, field trials and applied research were used in this study. Some results support prior research and are in turn supported by research being conducted elsewhere. Paper is at least as absorbent as other bedding materials; paperbed materials are much more sterile than other bedding materials; paper decomposes less quickly than sawdust but more quickly than other bedding materials; paper is a more effective insulator than other bedding materials. The results that are not coalesced with reported results from prior research are the negative results: paper can be more difficult to manage than other bedding materials; paper "travels" from the stalls and the animals; paper will pack as it is wetted and dried; and paper shred or fine chop do not work as bedding materials.

Other issues examined included ink toxicity and use of farm implements for chopping and baling paper.

Recommendations: locally generated paper be chopped and baled in a central location then used in farms within a close geographic region (closed loop economics); paper in 1-1/2 to 5 inch pieces be used in approximately a 50% mix with other heavily used lands, such as farmland or garden plots. Composted materials provide many nutrients for plants, and they also increase the soil's capacity to retain moisture.

My project is a tool to understand human impact on the environment. It also serves as a way to teach the community about life cycles and about recycling, composting in particular. By participating in a trial composting program, it will be impressed upon residents of my apartment building the amount of material they use within certain periods of time, such as a day or a week. From further research, I will propose programs adaptable to city-wide management of recycling.

4:45 SITE IN GREENCE COUNTY, OHIO. Denis G. Conover and Donald R. Geiger, Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221-0006 (DGC) and Department of Biology, University of Dayton, Dayton, Ohio 45469-0001.

Prairie vegetation has been planted on a sand and gravel borrow-pit site at the Bergamo-Mt. St. John Nature Preserve in Greene County, Ohio. Prairie species were selected for reclamation of this area because that type of community is well-suited to the extenuate in moisture conditions found on the site. To establish grasses, seeds obtained from Western sources were planted in April of 1986 by hydrosowing on the graded site. Just prior to this, seeds of several forbs obtained from Western sources were broadcast over the area. Subsequently, seeds of grasses and forbs collected locally were broadcast. Forb species which were more difficult to establish were propagated in soil-filled plastic-film cylinders. These, and other plants collected locally from disturbed sites, were transplanted into holes prepared with a soil auger. Despite the severe drought of 1988 over 40 prairie plant indicator species, along with a number of animal species, have become established on the site.

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SECTION K. Genetics & Cell Biology

Only Morning at 9:00 a.m.
Saturday, April 28, 1990

203 Health Sciences
Dr. Michael S. Herschler, Presiding

9:00 THE CONTRIBUTIONS OF CHROMOSOMES TO LARVAL COMPETITIVE ABILITY IN DROSOPHILA MELANOGASTER
R. Seiger, Department of Biological Sciences, Wright State University, Dayton, OH 45435.
The purpose of this research is to determine the effects of each major chromosome on larval competitive ability in four isogenic strains of Drosophila melanogaster. A breeding scheme was devised to substitute all combinations of chromosomes of one standard isogenic strain with chromosomes of each of the other three isogenic strains while maintaining the integrity of each chromosome. The 18 substituted strains and the 4 parental strains were tested in a single rigorously controlled stress environment in which, on the average, only 50% of the larvae could survive. Ten replicates of each strain were tested in pure culture in which 20 first instar larvae of a strain were put into a vial and mixed in mixed culture in which 10 larvae of melanogaster and 10 larvae of an isogenic strain of D. melanogaster were mixed together in each vial. Each strain was scored for the number of emerged flies of each species. The viability of the larvae of each strain varies significantly among the experiments. Further, the viability of a genotype is influenced by the genotype with which it coexists.

A genetical review of the coyote, Canis latrans, and related canids. Patrick J. Thomas and Bonnie L. Lamvermeyer, Department of Biology, Denison University, Granville, Ohio 43023.
Even though the coyote, Canis latrans, has been the subject of many ecological investigations, few studies have concentrated on the genetic variability of this species and its relatives. As the diversity of large carnivores declined in recent years, few opportunities existed to sample such animals as their populations expanded into new or resettled areas. It has been reported that coyotes were absent from states east of the Mississippi River for at least 60 years. Recently the numbers of coyotes has increased in Ohio as is evidenced by escalating predator claims. During 1989-90 blood samples were obtained from Ohio coyotes and domesticated dogs in an effort to examine the genetic structure of resident and invading canids. Horizontal starch gel electrophoresis coupled with specific staining procedures indicated polymorphisms in canine serum albumin and leucine aminopeptidase.

9:30 TAXONOMIC DETERMINATION OF COYOTE-LIKE CARDS USING IDEOLECTAL FACES OF HEMOGLOBIN
Kevin S. Beches and Bonnie L. Lamvermeyer, Department of Biology, Denison University, Granville, Ohio 43023.
This genetic comparison of the hemoglobin of the coyote, Canis latrans, and the domestic dog, Canis familiaris, was conducted in a search for a simple technique for distinguishing between the two species. Three groups were examined - coyotes from Utah, coyotes from Ohio, and different dog breeds. Blood samples were assayed through isoelectric focusing on a polyacrylamide gel in the 3-10 pH range. Banding patterns of the hemoglobin required no staining, but the gel had to be protected using a 1% trichloroacetic acid solution. This left a clear background with brown bands representing the hemoglobin. The Utah coyotes were found to have five banding patterns, four of which were shared with the domestic dog. In addition to these, C. familiaris was also found to have six patterns of CoHb. The Ohio coyotes were found to have five banding patterns, four of which were shared with the domestic dog. Hemoglobin appears to be of limited use for distinguishing between C. latrans and C. familiaris due to the overlap of banding patterns. As examination of the patterns of different dog breeds also failed to find a breed-specific indicator using hemoglobin.

9:45 TEMPERATURE-PROGRAMMED R-GENE EXPRESSION IN MAIZE. Bernard C. Mikula, Defiance College, Defiance, Oh. 43512.

The level of paramutated R-gene expression, in highly Inbred W22 background, was shown in previous studies to be related to light and temperature conditions at the time seedlings initiate tassels. The present report shows temperature alone can program a paramutated R-gene. R-genes of plants grown from seeds supplied by native Seeds/Search were crossed to a paramutagenic allele, R-1st, in Inbred W22 background. Tassels of plants grown at 22° or 28°C for 21 days before transplanting to field conditions, showed paramutated R-genes with significantly more pigments resulting from the lower temperature (22°C) treatment.

Since tassel tissue has not yet formed at the time of treatment, the temperature effect must be "remembered" and passed on to cells to be later differentiated into pollen grains. The temperature effect is pollen-transmitted and expressed in the testcross kernels of females grown under field conditions. This "memory" effect can be called genetic programming.

10:00 MOLECULAR ANALYSIS OF A SPONTANEOUS AMPLIFICATION OF ADH2 IN SACCHAROMYCES CEREVISIAE
Michael Derskey, Scott Crable and Charlotte Paquin, Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio, 45221.
An amplification of the alcohol dehydrogenase gene (ADH2) in Saccharomyces cerevisiae was characterized with Southern and sequence analyses. Approximately 4 copies of the normally glucose repressed ADH2 gene were found inserted into ribosomal DNA (rDNA) sequences. Each extra copy of the ADH2 gene replaces most of the 37S transcript in one of the approximately 250 copies of the rDNA. One of the junctions between the ADH2 and rDNA is located 7 nucleotides downstream of 20 thymidine residues in the normal copy of ADH2. At this junction, 16-29 adenines in the rDNA is expanded to 57-59 adenines in the DNA sequence in which the extra copies of ADH2 are located. The other novel joint is located in a 24 base pair region of 70% homology between ADH2 and the rDNA. These results suggest that the amplification was a two-step process: first, the ADH2 gene was inserted into the rDNA, then multiple copies were generated within the rDNA by unequal crossing over or gene conversion.

SECTION K. Genetics & Cell Biology

Only Afternoon & Business Meeting
at 1:30 p.m. Saturday, April 28, 1990

203 Health Sciences
Dr. Michael S. Herschler, Presiding

2:00 TRANSFORMATION OF E. COLI WITH THE ENVIRONMENTALLY SIGNIFICANT ABILITY TO GROW IN THE PRESENCE OF PARACHLOROPHENOL. Robert J. Stupi and Martha M. Kory, Univ. of Akron, Akron, Ohio 44325.
Two members of the Actinomycetes Line which degraded parachlorophenol and utilized it as a sole carbon source were isolated from an aerobic digester. At least 100 mg/L parachlorophenol was degraded by the isolates in 24-32 hours. To investigate this degradative ability, the cells were lysed and the DNAs isolated. Before lysis, the cells were sonicated and grown in 1-1.5% glucose. The sonication broke the mycelial fragments; the glucose prevented reformation of the mycelia and made the cell walls more susceptible to lysis. The DNA of the isolates was analyzed to determine the location of the parachlorophenol degradation gene(s). Several plasmid DNA bands were observed on the gel, however, no plasmids were obtained from either isolate. Subsequently, chromosomal DNA was obtained from each isolate and digested with several restriction enzymes. Each of the digested DNA's was transformed into competent E. coli strain H101 cells. The H101 cells previously could not grow in minimal medium containing parachlorophenol nor degrade parachlorophenol. The H101 transformed with the DNA of either the H101 digested chromosomal DNA of one of the isolates were able to grow in medium containing parachlorophenol. The characteristic of growth but no degradation supports the hypothesis that more than one gene is necessary for complete parachlorophenol utilization and degradation.

Glucose Metabolism by W Aeroglauma hypogaeae Membranae. Monica Ngu and K.P. Daft, Dept. of Biology, Denison University, Granville, Ohio 43023.
Members of the bacterial genus Mycoplasma are tiny prokaryotes that have no cell wall. Mycoplasma pneumoniae, the member of the genus that causes Kendall pneumonia, has an interesting outer membrane that is responsible for adherence of the microbe to eukaryotic respiratory epithelium. In the process of isolating the outer membranes of M. pneumoniae, we assayed the membrane for hexokinases. We found the membranes rapidly metabolize glucose to form three anionic products, none of which are glucose-6-phosphate.

The three anionic products, which can be separated on a DEAE cellulose, are polar, do not absorb UV light, and are quantitatively converted to gaseous materials after brief boiling in 0.5 M sulfuric acid. The formation of the anionic products was specific to the presence of K2HPO4 and adenosine 5’ triphosphate (ATP). Phosphoenolpyruvate and adenosine 5’ diphosphate will substitute for ATP in the metabolism of glucose, but gammae 5’ triphosphate cannot.

The significance of this membrane dependent metabolism of glucose by M. pneumoniae will be discussed in light of what is known about carbohydrate utilization in the metabolically noncomplex mycoplasmas.

2:30
AN ULTRASTRUCTURAL STUDY OF THE EFFECTS OF MAIZE DWARF MOSAIC VIRUS ON ZEA MAYS
C. Hickey and M. Rudzik. Department of Biology, Westminster College, New Wilmington, PA 16172

A study is in progress to examine maize dwarf mosaic virus (MDMV) and its effects on the ultrastructure of corn. A noninfective strain of MDMV (Zea mays var. O28, and a resistant strain, Ky61:2335, were manually inoculated with MDMV strain A. Samples were taken from the infected O28 and Ky61:2335. Healthy plants were used as controls. Tissues were fixed with a transmission electron microscope to observe subcellular progression of disease in leaf tissue.

2:45
INSECTIVORY AND SOCIAL DIGESTION IN DROSOPHILA. CREGG, T.C., A. MC CRATE, G. REVIAL, S. HALL, and A.L. RYPSTRA. Department of Zoology, Miami University, Oxford, Ohio 45056.

It has long been believed that Drosophila larvae feed almost entirely by ingesting yeast and possibly other microorganisms, coupled with several other independent observations led tentatively to the twofold conclusion that not only do Drosophila produce enzymes enabling them to digest a wide variety of substrates including chitin and cellulose, but also that these enzymes are ejected onto the substrates soon at least some digestion, especially of large polymers, takes place externally.

3:00
HOMOSTATIC ANTIOXIDANT CONTROL IN DROSOPHILA MELANOGASTER
D. Campbell and P. McCarthy. Department of Biology, Westminster College, New Wilmington, PA 16172

A series of experiments was conducted with Drosophila melanogaster to determine the validity of a homeostatic antioxidant control model of Harman's free radical model of aging. Research into the life-extending properties of individual antioxidants has yielded mixed results. One possible explanation for the failure of a single antioxidant to increase lifespan in a number of studies is that an organism has a fixed level of free radical scavengers and providing a dietary antioxidant control model, an extension of Harman's free radical model of aging. Research into the life-extending properties of vitamin C. Vitamin E, an antioxidant with non-overlapping capabilities to vitamin C, was found at highly specific concentrations to interact with vitamin C, to synergistically increase lifespan. All of these observations provide considerable support for a model of homeostatic antioxidant control.
SECTION K. Genetics & Cell Biology
Poster Session at 10:00 a.m.
Saturday, April 28, 1990
Lobby Physical Education Bldg.

Board C

GENETIC MAPPING OF A RIBOSOME EDITOR MUTATION IN E. COII. Randi Anderson, Department of Biological Sciences, Ohio Northern University, Ada, Ohio 45810.

A mutant of E. coli was examined with respect to amino acid polymerization rate and misreading of translation in vivo and in vitro. In completed proteins the mutant increased the missense error frequency only, without altering the rate of amino acid polymerization. The behavior of the mutant was that expected for a strain which contains defective tRNA synthetase. (The wild type allele of the ribosome editing mutation has been linked to within 0.1 min of a tetracycline-resistance insertion induced by transposon Tn10. The tetracycline-resistance insertion cotransduced with rpsL and rpsD at a frequency of 0.63 and 0.50, respectively, placing it at 53.1 min on the genetic map. This location indicated that the insertion and the ribosome editing mutation lie within the cI0 ribosomal protein operon. Complementation studies using plasmids containing fragments of the 55 operon indicated that the editing mutation is located in either L22, S3 or L16. The erythromycin-resistant nature of the ribosome editing mutant and the increased increase in l5,1GA for the ribosome leads me to speculate that the mutant ribosomal protein affects either translational of peptidyl-tRNA, the structure of the ribosomal site, or both.

Board D

PREFERENTIAL REPAIR OF THE BETA-ACTIN GENE IN L10:00 a.m.

Human cells. L. G. Barsalou and G. J. Kantor, Department of Biological Sciences, Wright State University, Dayton, Ohio 45435.

Normal human diploid fibroblasts are maintained in culture as nondividing cells to mimic the cell cycle condition found in most normal tissue in vivo. Cells in those populations efficiently repair damage in DNA. For example, cells exposed to ultraviolet light (UV), 254 nm, or sunlight repair about 75% of the pyrimidine dimers in 24 h. We have examined the repair rate of some specific genes to determine if some parts of the genome are repaired more efficiently than others. We find that the beta-actin gene is repaired rapidly, with about 75% of the pyrimidine dimers removed in 8 h following exposure to UV. We also find that the transcribed strand of the genomic DNA comprising the beta-actin gene is repaired more rapidly than the nontranscribed strand. Thus, there is heterogeneity of repair in different parts of the human genome. In nondividing cells it extends not only to specific genes but to the specific DNA strands comprising those genes. These results are consistent with the results of others obtained using proliferating cells and the dehydrofolate reductase gene and with the hypothesis that preferential repair of any genomic region condition result from the transcription activity of that region.

Board E

INHIBITION OF HERPES SIMPLEX VIRUS TYPE 1 REPLICATION BY 5-DIAZO-5-oxo-1-NORLUCINE(DON) on the replication of herpes simplex virus type 1 in cultured green monkey kidney (BGMK) cells were examined. DON is an analog of the amino acid glutamine and inhibits the synthesis of glycoproteins and nucleotides. The kinetics of HSV-1 replication in BGMK cells exposed to 20 mcg DON/ml indicate that DON inhibits virus replication at an extent greater than 99% and delays replication of the virus 2-4 hours. The addition of DON to cell cultures 1 hour prior to infection prevents the greatest inhibition whereas an additional 4 hours post infection yields virtually no inhibition. Concentrations of DON above 0.5 mcg/ml all produce inhibition of virus replication greater than 99% and a concentration of 0.1 mcg/ml inhibits HSV-1 replication 50%. At 1.0 mcg/ml, DON inhibits incorporation of radioactively labelled thymidine, uridine and mannose into the viral DNA, RNA, and glycoproteins by 25%, 30%, and 20%, respectively. When continuously exposed to DON at a concentration of 0.1 mcg/ml, which inhibits HSV-1 replication by 50%, BGMK cell replication is identical to control cells for at least 5 passages of 3 days each. DON inhibits herpes simplex virus replication at a concentration which does not inhibit BGMK cellular growth and may prove to be an effective anti-viral drug in vivo.

Board F

ROLE OF LANGERHANS CEKS IN THE REJECTION OF MURINE SKIN-EQUIVALENTS. Barbara E. Hull and Mary Lerner-Tung, Biological Sciences Department, Wright State University, Dayton, Ohio 45435.

The bilayered skin equivalent, constructed by layering a suspension of epidermal cells over a collagen matrix populated by fibroblasts, provides a convenient system for investigating the cellular mechanisms of graft rejection. The Langerhans cell, antigen-presenting cell which bears class II (1a) membrane antigens, has been postulated to play a role in the rejection of allogeneic skin grafts. Skin equivalents constructed using allogeneic cells from Brown Norway rats were rejected by Lewis rats. The epidermal cell suspension was incubated in mouse anti-rat Ia antigen antibodies followed by magnetic Dynabeads® coated with goat anti-mouse IgG antibodies. A magnet was then used to remove the Ia-IgG antibodies from the cell suspension. Skin-equivalent grafts constructed using the Ia antigen-depleted epidermal cells were rejected at the same rate as the grafts containing untreated allogeneic epidermal cells. These results suggest that the Langerhans cell does not play a critical role in the rejection of murine skin grafts.
NEW CONSTRUCTIONS OF GROUP DIVISIBLE DESIGNS. Susan Harris, Department of Mathematics and Statistics, Wright State University, Dayton, Ohio 45435

A group divisible design (GDD) with parameters (m,n,k,λ) consists of m points split into n point classes (called “groups”) of k points each, together with blocks (i.e. subsets of the point set) of cardinality λ satisfying: Given any two distinct points p and q, the number of blocks containing both points is λ, if p and q belong to the same point class and 0, otherwise. These designs are useful in agricultural, genetic and industrial experiments. In this paper, constructions for three families of GDD’s studied by Freeman (1976) and Bush (1979). We also generalize a construction of Bannai, Ito, Sezaki and Pott (1990) and obtain new families of GDD’s. More specifically, we obtain GDD’s with parameters (4t+1,2t,4t+2,2t+1) whenever 4t+1 is a power of a prime number. These new designs admit a regular abelian automorphism. The method of construction would use a finite field with 4t+1 elements. Two initial blocks will be explicitly described. The resulting blocks can be generated from the initial blocks. Our description of the Freeman/Bush designs is much simpler and can be effectively used by statisticians to construct designs for experiments.

OPTIMAL BOUNDARY CONTROL OF THE NAVIER-STOKES EQUATIONS. Thomas Svobodny, Department of Mathematics and Statistics, Wright State University, Dayton, Ohio 45435

An optimal control problem for the Navier-Stokes equations of incompressible fluid flow in a bounded domain is presented. The control is Dirichlet (that is, control is effected by specifying the velocity field on all or part of the boundary) and can be of the ‘slip’ type (tangential) or of the ‘mass-transfer’ type (normal). These controls, which may or may not be explicitly constrained, are amalgamated in the context of admissible input operators for the control system. The cost criteria are expressed in terms of Sobolev norms of the state. The existence of an optimal solution and a necessary condition for optimality is derived; this latter requires the use of abstract duality products which can be thought of as extending particular singular integral equations. Regularity of the optimal solutions studied and applications to drag minimization and flow stabilization are outlined.

SUTTON'S NEEDLE PROBLEM — VARIATIONS AND APPLICATIONS. H. J. Khani, Department of Mathematics and Statistics, Wright State University, Dayton, Ohio 45435

In 1733, Georges Louis Leclerc, Comte de Buffon (1707-1788) submitted a memoir to the Proceedings of the Paris Academy of Sciences in which he considered the now famous Needle Problem: what is the probability that a needle randomly tossed onto a grid of equidistant parallel lines touches a line? This is considered to be the oldest problem in the history of probability. This famous experiment and its solution involved the first time that integral calculus was used in the history of probability. This famous experiment and its solution involved the first time that integral calculus was used in the history of probability.

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This study investigated physical and motor fitness components of twenty-one minority elderly females ages 60-88 yrs (X=73.4 yrs) participating in a ten-week aerobic exercise program. The volunteer subjects were pre-tested for body composition, weight, flexibility, grip strength, muscular endurance, coordination, and agility. Following the pre-test subjects participated in a ten-week low impact chair exercise program performed to music. The program comprised of range of motion, light muscular endurance, strength, and agility exercises in which the subjects sat on chairs and progressed to a standing position. After the program subjects were post-tested using the same variables. Significant differences were found between the mean pre- and post-tests for flexibility, muscular endurance, and agility. Post-test scores were 13.49 to 15.64 seconds.

These results suggest that low intensity exercise programs improve selected motor and physical fitness abilities of elderly women.


The purpose of this investigation was to examine the responses times of eleven independent minority elderly women (X age=74.25 yrs) using the Nelson Reaction Timer. The time Required to stop the free-falling calibrated timer between the index finger and the thumb constituted the subject’s response time trial. Upon completion of twenty trials, the five fastest and slowest trials were eliminated and the remaining ten trials averaged to establish the subject’s composite response time. The mean time for all subjects was 187.3+51 msec. Subjects were segregated into three age-groups of six subjects each: 60's (X age=82.2+1.4 yrs), 70's (X age=79.25+1.4 yrs), and 80's (X age=82.25+1.4 yrs). The mean response times for these groups were 181.42+2.7, 186.4+2.3 and 186.44+3.7 msec., respectively. Statistical analysis did not indicate significant differences among the three groups. These values are of importance to physical educators and recreational therapists working in promotion and maintenance of the physical functioning of older adults. The Nelson Reaction Timer provides an inexpensive and practical means of quantifying eye-hand response time.

THE EFFECTS OF COGNITIVE WORK ON SOCIAL JUDGMENT AND SOCIAL MEMORY. John J. Skowronski, Nanette Romine, and Donal E. Carlson, The Ohio State University at Newark, Newark, Ohio, 43055.

Research has indicated that the cognitive work required by difficult judgments leads to enhanced recall for facts contributing to the judgments. However, judgments from well-learned procedures or schemata require little cognitive work, yet should also be associated with enhanced recall. In our experiments examining these possibilities, subjects were exposed to five levels of cognitive work varied in extremity and implicational consistency, then made timed trait judgments. The exact trait term used in these judgments varied from study to study. For all conditions, the same variables. Significant differences were found between the mean pre- and post-tests for flexibility, muscular endurance, and agility. Post-test scores were 13.49 to 15.64 seconds.

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the trait judgment terms also affected processing time, but had no impact on stimulus memory. These results suggest that the relationship between judgment response times and stimulus memory depends on the nature of cognitive work involved in the judgment.

EPISODIC MEMORY AFFECTS DATING ACCURACY: EVIDENCE FROM SELF AND OTHER DIARIES. John J. Skowronski, Laura Shannon, Drew Betz and Charles P. Thompson, The Ohio State University at Newark, Newark, Ohio, 43055

In many aspects of life, such as casual conversation or courtroom testimony, we are often asked to assign dates to events. Researchers interested in event dating have recently begun to explore the factors that affect dating accuracy. One of the factors that should directly affect dating accuracy is the strength of the episodic memory trace. In comparison to poorly-recalled episodes, episodes that are well-remembered should provide memory cues that aid in the reconstruction of the event's date. We investigated this hypothesis using a diary memory procedure in which people kept diaries for both themselves and for a person close to them. At the time of recording, people recorded the pleasantness, typicality, and memorability of the event. At the end of the quarter, subjects were given the events in a scrambled order, one at a time, and were asked to date each event. Multiple regression analyses indicated that episodic memory plays a significant role in event dating: Self events, recent events, memorable events, and both highly pleasant and highly unpleasant events were associated with increased dating accuracy. Furthermore, females were more accurate than males. The practical and theoretical implications of these data will be discussed.

PRIMING EFFECTS IN SOCIAL MEMORY: EVIDENCE OF THE ISSUE OF SPONTANEOUS INFERENCE. John J. Skowronski, Margaret Van Buren, and Donal E. Carlson, The Ohio State University at Newark, Newark, Ohio, 43055

Recently, some researchers in the area of social cognition have proposed that people frequently make spontaneous inferences about an individual's behavior based on a remembered behavior using a priming paradigm. Subjects read pairs of stories that described different actors. Some pairs implied the same personality trait, but others did not. For each pair of stories, subjects were presented with 4 behaviors, one at a time. Subjects were asked to decide whether each behavior came from the story pair just read (some did not), and the response time to each behavior was recorded. Subjects completed the task under one of three instruction conditions. Subjects were asked to either memorize the stories, to form impressions of each of the actors in the stories, or were given no instructions. Results indicated that priming effects (faster response times) generally occurred when subjects responded to a trait-related behavior immediately after responding to a behavior that pertained to the same trait, but that the amount of priming observed was lower for the memory conditions than for the impression or control conditions. These results indicate that people do frequently access the trait implications of a behavior when encoding that behavior, and that memory set instructions inhibit this encoding mechanism.

BRUISES, SUICIDE, AND ROCK AND ROLL

A number of variables have been associated with adolescent suicide and drug use. The intent of this study was to test the relationships among high risk suicidal tendencies, drug/alcohol use (with peers and in isolation), music preference, and locus of control with religiosity and parent and social relationships serving as mediating variables. Adolescent subjects (N=100) from Christian, Jewish, and public school institutions were surveyed. A Q-factor analysis established typologies of high risk of suicide in adolescents. Gender was also analyzed as a discriminating variable among types.


Subjects (n=50) from a large Christian counseling center were asked to complete a set of instruments which measured the constructs of religiosity, locus of control, social support, and family and peer relationships. To establish discriminate validity, the subject ranging in age from 11 to 18 years old, was identified by counseling center counselors as being either at high or low risk for suicide. High risk subjects were identified.

SECTION M. Psychology

Only Afternoon & Business Meeting
at 1:30 p.m. Saturday, April 28, 1990

067 Rike
Robert Deitchman, Presiding
Such systems employ a variety of measures. Georgia has mandated that all of its teachers pass a broadly based standardized content examination in their area of teaching certification in order to retain their license to teach.

Hope, Activity Level, and Quality of Life
Sara Staats and Virginia Greggs
The Ohio State University at Newark, Newark, Ohio 43055

The Hope Index defines hope as an affective cognition and measures hope as the interaction between wishes and expectations. Hope is seen as a precursor to action and, therefore, as a necessary precursor to increased success of goal attainment and, in turn, an improved quality of life. In a study of 152 non-institutionalized persons fifty years and older (X = 64.4), hope correlated with number of activities of the past week (r = 0.18, p < 0.06) and with estimated success of obtaining individually expressed goals within the next five years (r = 0.32, p < 0.001). Participants reported their quality of life on the nine rung Cantril ladder. Measures ranged from r = -0.76, p < 0.0001 for quality of life in the past five years to r = 0.26, p = 0.001 for expected quality of life five years in the future. Three experimental procedures designed to increase hope, activity level and, therefore, quality of life are discussed.

ABSOLUTE VS. RELATIVE FACTORS IN QUALITY OF LIFE ESTIMATES Christie Partlo, and Dr. Sara Staats The Ohio State University at Newark, University Drive Newark, Ohio 43055

In satisfaction with life and self-reported quality of life relates more to what a person has or to what they have in comparison to others. Satisfaction with life is also more related to, and borrowed from, other people. Industrial models of satisfaction as well as quality of life models of satisfaction are often based on competitive or relativistic considerations rather than actual considerations (Lepler, 1971; Campbell, Converse, & Rodgers, 1976). However, a purely relativistic view can not be sustained because rich differences are reported between people in different social groups and in ratings of satisfaction across countries. In the present research we compared an aggregate of three absolute variables (income level, highest grade level, and lack of health restrictions) with an aggregate of three relativistic variables (income in comparison to friends, education in comparison to friends, and health in comparison to friends) as predictors of satisfaction with life and quality of life. Our results show that for a group of 158 people over 50 years of age, absolute variables correlated significantly with life satisfaction, present, and expected quality of life (r = .21, .20, and .29, respectively, p < .05) while comparative variables correlated significantly with negative emotions. Age trends in the relationships are discussed.

Factors of Intent to Get a Degree and Perceived Quality of Academic Life
Sara Staats and Nokah Butler
The Ohio State University at Newark, Newark, Ohio, 43055

Attrition of undergraduates continues to affect colleges and two-year institutions, and non-traditional students are in particular. Recently, the attention has focused on reasons for leaving college rather than reasons for leaving. In a review of this literature, Bier & Mazer (1985) propose a model with intent to leave as the last variable before the occurrence of dropping out of college. However, there has been little direct measurement of this variable excepting for a study by Johnson (1987), who used a single yes-no item. Several facets of the intent variable have not been investigated. We measured global intent to get a degree and six facets of intent to get a degree in 136 students at a computer institute. Global intent correlated with perceived quality of academic life (r = .25, p < .01). Considering various facets of intent, reveals that commitment to major but not commitment to a particular location (i.e., transfer intent) are predictive of satisfaction with academic life.

Widowhood: Positive Affect in Unexpected Places
Sara Staats, Ph. D, Lovisa M.
Pleasanton, The Ohio State University at Newark, Newark, Ohio 43055

Marriage is widely recognized as a buffer against distress and certainly widowhood is a catastrophic event that is usually associated with loss of social support, decreased income, and loss of positive affect (Argyle, 1987). As part of a larger study on quality of life, 55 married women and 42 widowed women over 50 were surveyed and interviewed. The survey instruments measured hope, satisfaction with life, positive and negative affect. The interview protocol included questions relating to quality of life, social activities, interactions with friends and membership in social organizations. Results indicate that although widows had significantly less income (t=4.14, p<.0001), satisfaction with life, present self-rated quality of life, and several measures of physical health were not different between married and widowed women. Widows actually did more things with friends than did married women (t=2.28, p<0.01), tended to belong to more social organizations and tended to have participated in more social activities during the past week. Type of activity and social organization membership by marital status will be discussed with an aim to improving interventions for widows.

Perceived Physical Health and Expectations
Sara Staats and Deborah Miller
Department of Psychology
The Ohio State University at Newark, Founders University Drive
Newark, Ohio 43055

Perceived physical health is an important correlate of affect and of ability to function (Riker & Wong, 1984). In fact, perceived physical health may be a better predictor of life quality than actual measures of physical health. The present study investigates the predictors of perceived physical health in a non-institutionalized population of persons aged 50 to 91 years. The research participants responded to a questionnaire that included measures of hassles, uplifts, expectations, and wishes. Interview questions produced information on income, grade level, activities, and other variables. Perceived health was modeled using a stepwise multiple regression analysis. Expectations, uplifts, hassles, satisfaction with life, and grade of school completed yielded an R 2 0.288, with expectations being the single best predictor of perceived health. The number of self-reported doctor visits per year did not correlate with perceived physical health. The results are discussed in terms of Lazarus theory.

Grade Completed, Income, and Affect in Adults
Presenters: Dr. Sara Staats and Jean K. Stewart,The Ohio State University at Newark, University Drive Newark, Ohio 43055

Education is a personal resource that is related to income and makes a small but consistent contribution to quality of life (Campbell, Converse, & Rodgers, 1976). The present research extends our knowledge of the effects of education on a non-institutionalized population of adults ranging in age from 50 to 91 years of age. The 39 male and 11 female participants were asked to indicate the highest grade level completed and then to compare their education to others on a five point scale. Education correlated significantly with income for both the males and females (r = .32 and r = .36, respectively). Differences in quality of life and affective variables between males and females were not pronounced in the group that had a high school education. Type of preferred activity as a function of grade level will be discussed.

Gender Differences in Self-Rated Depression by Adolescent Psychiatric Inpatients, Kathryn Creunmayer and John F. King, Wittenberg University, Springfield OH 45501 and Henry V. Soper, Neuropsychiatric Institute, Camden State Hospital, Camden, CA 91030

Twenty-seven adolescents composing 53% of a psychiatric inpatient unit (12 males and 14 females) were given the Beck Depression Inventory (BDI) and also were rated by their social workers on a 5-point Home Quality Scale (HQS). It was predicted that depression scores would be lower for males than females and across gender they would be inversely related to quality of home environment. Results confirmed both predictions: first, male BDI scores were positively skewed whereas female BDI scores were negatively skewed with medians predicted that depression scores would be lower for males than females and across gender they would be inversely related to quality of home environment. Results confirmed both predictions: first, male BDI scores were positively skewed whereas female BDI scores were negatively skewed. Second, the rank order correlation of the BDI and HQS scores was r = .377 (n=27, p<.05) showing that across gender depression scores would be lower for males than for females. Furthermore, the Mann-Whitney test yielded U=13.5 (p<.001) showing the distribution of male scores was significantly lower than the distribution of female scores. The rank order correlation of the BDI and HQS scores was r = .377 (n=27, p<.05) showing that across gender depression scores would be lower for males than females. The Mann-Whitney test yielded U=13.5 (p<.001) showing the distribution of male scores was significantly lower than the distribution of female scores. The rank order correlation of the BDI and HQS scores was r = .377 (n=27, p<.05) showing that across gender depression scores would be lower for males than for females. Furthermore, the Mann-Whitney test yielded U=13.5 (p<.001) showing that across gender depression scores would be lower for males than for females.

Differential Effects of Self-Concept, Coping Styles, and locus of Control in Treatment vs. Nontreatment Groups of Dating Behaviors
Cynthia Boone, Department of Educational Foundations, University of Akron, Akron, OH 44325-0001.
This paper will examine characteristics predictive of success in treatment programs for eating disorders. A group of 50 subjects, self-diagnosed as eating disordered, will be examined. Self-diagnosis will be determined by subjects' membership in OA, a 12 step program of recovery for compulsive overeaters, similar in form to AA. Twenty-five subjects are members of OA and have undergone hospitalized treatment for their eating disorder. Twenty-five subjects are OA members who have never been through a clinical treatment program for their eating disorder. Both groups will be given a series of tests measuring self concept, internal-external locus of control, and coping styles. Demographic characteristics of the sample will also be collected. Relationships will be examined for those characteristics most predictive of success in recovery from the eating disorder.

SECTION N. Junior Academy
First Morning at 9:00 a.m.
Saturday, April 28, 1990

204 Fawcett
Melissa Beuerlein. Presiding

9:00 ATOMIC SPECTRA-MEASUREMENT OF THE RYDBERG CONSTANT
Jeremy Riddell, 1254 Berry Rd, Bellbrook, Ohio 45305

Atomic spectrometers first discovered the laws of the regularly spaced lines in the Balmer series of the hydrogen spectrum late in the 1800's. Rydberg derived rules to express wavelength in terms of n, and R, the Rydberg constant. The purpose of this experiment was to calculate the Rydberg constant by determining the wavelengths of the visible hydrogen lines with a home-built apparatus. A spectrometer was constructed using a 30mm x 30mm diffraction grating with 1200 lines/mm, blazed at 500 nm. A lens focused the incident light onto a thin slit, which is imaged by a second lens as a collimator and illuminates the diffraction grating with a dense beam of light. A riflescope is angled off to one side of the grating and receives the diffracted light. The scope's crosshairs are aligned with a specified line and the angle between the incident and diffracted light is measured. The Rydberg constant was measured in two ways with a hydrogen Geissler tube source generating four Balmer lines. First, the grating equation was solved for wavelength using the angle measurement and the Rydberg constant was computed from \( R(n_f/n_i) \). A value of 109,679 cm\(^{-1}\) was derived, an error of 0.55%. Second, Ne, Kr, and Hg Geissler tubes were used to calibrate the apparatus, resulting in a measurement error for R of only 0.18 percent.

THE OPTIMUM TEMPERATURE OF UREASE ACTIVITY
Chandana Reddy, Perkins High School, 3714 Campbell Street, Sandusky, Ohio, 44870

This study determined the effect of temperature on urease in its hydrolysis of urea. Urease is an enzyme found in jack bean seed, Canavalia ensiformis. Urease catalyzes the decomposition of urea into ammonia and carbon dioxide. It was hypothesized that the enzyme would have an optimum temperature. A known quantity of urease was reacted with a known quantity of urea for 20 minutes at desired temperatures. To stop the reaction, lead nitrate was added. A test strip reading was added, denaturing the enzyme. Ammonia production was determined by titrating the urea with hydrochloric acid. As the solution temperature was increased, ammonia production increased, but beyond 80 degree Celsius, ammonia production dropped off sharply. This study showed that the optimum temperature of the urease enzyme is approximately 80 degrees Celsius, with rapid enzyme inactivity above this temperature, probably due to thermal denaturation.

COSMIC X-RAY PRODUCTION BY INTERDIMENSIONAL COLLODION.
Albin R. Jones
Rt. 3 Box 50832, Beavercroft, Ohio 43176

The purpose of this project is to establish an adequate theory to explain the production of cosmic X-rays by blackholes. As it is known a blackhole is an anomaly in the barrier of time and space created by the collapse of a star. The phenomena of the blackhole is supposed to absorb all forms of electromagnetic radiation, according to present-day theory a blackhole is the major source of cosmic X-rays. In my research I believe that I have come up with a hypothesis which can explain this.

According to an accelerator experiment performed at Brookhaven National Laboratory, an X-ray of a certain energy value can decay into two subparticles, an electron and a positron. By utilizing this data we can establish that a high energy collision of these two would result in the production of an X-ray pulse. This type of collision occurs when an electron enters a blackhole and its antiparticle, the positron, enters the antimatter whitehole. When the two collide in the center, they go through a tunnel, a tunnel quantum transition. This reaction has been called the \( \Theta \equiv \alpha, \pi, x \) series. The X-ray then exits and disappears throughout the accretion disk.

9:45 ELECTRONIC INDUCTANCE SCALE
Mall Heston 8072 Mark Rd. N. E.
Kensington, OH 44427-9610

An Inductor-Capacitor-Resistor (LCR) circuit, powered and tuned by a wave generator, can be utilized as an electronic inductance scale to determine the weight of an unknown mass. Each mass will stretch the inductor, or spring, directly varying the inductance as the weight of each additional mass increases the pull on the spring. This inductance shift of the spring from normal to extended position directly varies the voltage measured across the inductor because the capacitive reactance, which remains constant, and the variable inductive reactance become unbalanced. This voltage shift can be measured on an oscilloscope, then divided by the total original voltage to visualize the fractional voltage difference. The fractional voltage differences for a set of weight masses with known grain increments can be plotted against the corresponding masses and transferred to a graph. The weight of an unknown mass can be determined by obtaining the fractional voltage difference which is compared to the graph of known masses plotted against their fractional voltage differences. The LCR circuit can be connected to an Analog to Digital Converter (ADC), which converts the measured voltage to the binary code. The ADC will link the LCR circuit to a computer through a serial port where the information can be processed as before and the weight predicted by the computer.

THE CONVERSION OF ORGANIC WASTES TO COMBUSTIBLE GAS (PRIMARILY METHANE) BY THE USE OF RUMINANT BACTERIA
Mark Myers
25772 Britanny Rd.
Perrysburg, OH 43551

Methane (CH\(_4\)) is a gas that is used widely as a source of heat and energy. Methane can be produced in the decomposition of organic materials, such as manure, when anaerobic bacteria are present and active. In this experiment, the control group consisted of 200 g of low manure mixed with 200 g of water in five individual Erlenmeyer flasks. These flasks were submerged in a water bath heated to 35° C. The gas produced by the bacteria is bubbled through water into graduated cylinders, where the gas can be measured and analyzed. The collected gas ranged from 75-80% methane. In a period of seven weeks, approximately 13 ml of gas was produced per gram of manure. Currently this experiment is being conducted with a mixture of grass clippings and solutions containing rumen bacteria from the control experiment.

10:05 COULD EARTH PLANTS SURVIVE ON MARS?
Carol Felechko, 1132 Westgate Rd, Toledo, Ohio 43615

An experiment was conducted to determine if Earth plants could survive in an environment like Mars. To simulate Mars and as a control, Earth, I used two 19 liter jars; one with Martian and the other with Earth soil & atmosphere. To simulate Mars atmosphere I used carbon dioxide, CO\(_2\), & vacuum pump. I heated the Martian soil electrically. I placed 4 plants & 200 seeds into both jars. These were; a pachysandra (P. procumbens), a parlor palm (C. elegans), a cactus (N. concinnus), a succulent (A. variegata), & rye grain seeds (S. cereale). Martian jar was kept cold, as were identical plants for comparison. Earth jar was kept at room temperature. Both were monitored 60 days. Plants grew slowly in the Mars jar & flourished in the Earth jar. The cold duplicate plants were dying. After 8 months all the Mars plants were dead. I began a new, identical experiment, placing the Mars jar next to the Earth jar. One month later the Mars plants were dying.
I determined the Mars plants died from one or more of three causes: ample of water, air pressure, or atmosphere. I believe that if Earth plants were to live on Mars they would need substantial protection from the Martian environment.

10:30
ANALYSIS AND DNA FINGERPRINTING TO DETERMINE THE ORIGINS AND GENETIC FINGERPRINTS OF VARIOUS MCF-7 BREAST CARCINOMA CELL CULTURES. Ilea A. Mathis, 6491 Tassel Court, Westerville, Ohio 43081.

Through the years, cell culturists who have grown cells for experimental purposes have been plagued with problems. Contamination and growth difficulties are only two of many problems that stum the growth and quality of cell lines.

One of the latest problem cell lines is MCF-7, a human breast carcinoma line started in 1973 by Soule, Vazquez, Long Albert, and Brennan from a pleural effusion derived from a breast carcinoma. In the past few years, demand for those cells has become selective. Several isolated MCF-7 cultures from across the nation have demonstrated differences in (a) morphology, (b) growth characteristics, (c) hormone receptor combination, and (d) antibiotic resistance.

In this project, four cultures will be analyzed to determine the origin and genetic fingerprint of each:
1. MCF-7/ATCC (American Type Culture Collection)
2. MCF-7/NCI (National Cancer Institute)
3. MCF-7/ADR (Aldromycin Resistant)
4. MCF-7/MCT (Michigan Cancer Foundation)

I believe the cultures are, indeed, different genetically, and possibly, in origin. If this is proven true, the future and the past of the MCF-7 line should be seriously questioned by the scientific world.

HELP TAKE A BIT OF JUICE OF CRIME.

10:45 Jennifer Costello 300 Harris Street
Newport, Ohio 45768

There are many aspects of criminology. Scientists and policemen use the methods of fingerprinting, ballistics and foot-printing to unravel crimes.

Fingerprinting allows the police to compare fingerprints discovered at the scene of a crime with records of fingerprints kept in police computers. If a suspect is available, police will compare the suspect's fingerprints with the prints discovered. Assuming that the prints match, the police have their culprit.

Ballistics open the doors to other avenues of criminology. This science permits police and scientists to trace a bullet to the gun from which it was fired. The barrel of the gun will emboss grooves on the bullet. If scientists can match the bullet and the gun they are one step closer to solving the crime.

Foot-printing is another exciting dimension of criminology. This method permits scientists to crust a shoe print that was discovered at the crime scene. The aforementioned method can determine the type of shoe the assailant wore and help to eliminate suspects. Scientists and detectives need to solve a crime in order to uncover clues not associated with fingerprinting, ballistics or foot-printing.

SECTION N. Junior Academy
First Afternoon & Business Meeting at 1:30 p.m. Saturday, April 28, 1990

204 Fawcett

Melissa Beuerlein, Presiding

4:00
THE EFFECTS OF AN ELECTRICAL FIELD ON BRASSICA RAPA

Daniel Sherman
1939 Princeton Drive
Toledo, OH 43614

The main focus of this project was to determine if an electrical field has a definite effect upon Brassica rapa, the common mustard plant. In my study, I looked at three aspects of the plant's growth. First, I measured the percent of planted seeds that sprouted. Second, daily height measurements were taken, and the results plotted on a graph. Finally, I cut off all leaves, and dried them out so that they could be weighed in order to establish a definite numerical value for total leaf matter. For few years, I had expected, but fell in a more complex path. The graph of the data fell in a pattern resembling a skewed polynomial. Its equation is that of:
y = 1.9555x - 0.0002x^2 + 0.9823x^3 + 1.370x^4 + 13.75x + 26.33, where x represents angle of attack, in degrees, and y represents lift capacity, in centimetre.

It is known that urease can be derived from the Jack Bean, Canavalia ensiformis. This project tested various other beans in a search for an alternate source of urease. These were the legumes Field Pea (Pisum sativum), Lentil (Lens culinaris), Lima Bean (Phaseolus luna tus), Pigeon Pea (Cajanus cajan), Kidney Bean (Phaseolus vulgaris), and others. Urease was detected only in the Pigeon Pea. The powdered Pigeon Pea was dissolved in water, mixed with a urea solution, and left to react at room temperature. The presence of the enzyme was tested by titration for resulting ammonia.

The activity of Pigeon Pea urease was compared with that of Jack Bean and found to be less active, although this may have been caused by insufficient processing of the raw Pigeon Pea compared to the commercially available Jack Bean meal.

4:30
EXOGENOUS SINGLET OXYGEN

Sameer Ibobati, 408 Madison Court, Bowling Green Ohio 43402

Singlet oxygen, the lowest energy excited state of molecular oxygen has numerous biological effects including reactions with cellular components initiating degenerative processes such as DNA damage, promotion of tumors, induction of cancers, heart disease and aging. The hypothesis was that singlet oxygen is sufficiently cytotoxic to account for pathology in cancer, heart and aging problems. A Separator-Surface-Filter System, working on the principle of photoenazinization was used to externally generate singlet oxygen and to observe its effects on Saricsa loretz (colorless). The experiment had two parts. An oosam was performed to observe the cytotoxicity on bacteria. Varying the distance between sensitizer and bacteria (from .05cm to .2cm) gave different survival rates. The second part was the bioassay which was a search for the cytotoxicity on bacteria from various cells. In the bioassay the cytotoxicity and gas-phase lifetime of the agent responsible for cell killings. Since this gas-phase lifetime matched the gas-phase lifetime of singlet oxygen known from cited sources it proved that only singlet oxygen was generated. This lifetime data is essential in photoreduction treatments of various diseases. Determining the mechanism of singlet oxygen cytotoxicity is necessary for finding ways to minimize pathology in heart attacks, cancer and aging.

4:45
THE EFFECT OF VARIATIONS IN ANGLE OF ATTACK OF A CLARK-Y AIRFOIL ON ITS LIFT CAPACITY

Steven S. Brack, 2021 Roanwood Drive, Toledo, Ohio 43613-1605

In this series of experiments, I set out to determine what correlation could be found between angle of attack, the angle of the airfoil to the inflow air. I constructed a wind tunnel by building a chamber and connecting it to a tank-type vacuum cleaner. This eliminated accelerations from the air flow, thus helping to reduce diversions from static values. I also chose to use a Clark-Y airfoil for the primary reason that it is used around the world as a benchmark for the testing and comparison of other airfoils, and for the secondary reason that the Clark-Y, having a simply curved upper surface, and a flat lower surface, is easier to construct and study. The airfoil was hung up in an inclined position and balanced to neutral mass. Thus, lift could be measured by the triple beam balance which was attached to the airfoil. At the experiment progressed, new airfoils were tried, I discovered that the relationship between angle of attacks and lift capacity was not linear, as I had expected, but fell in a more complex path. The graph of the data fell in a pattern resembling a skewed polynomial. Its equation is that of:
y = 1.9555x - 0.0002x^2 + 0.9823x^3 + 1.370x^4 + 13.75x + 26.33, where x represents angle of attack, in degrees, and y represents lift capacity, in centimetre.

Seven new locality records for reptile and amphibian species in north central Hamilton and south central
Butler Counties, Ohio were reported during a recent study. Documentation of these records is essential if they are to be considered a genuine addition to the knowledge of Ohio's herpetofaunal distribution.

Three methods of validating new distribution records were used. We discuss and illustrate the pros and cons of reporting personal observations, photo documentation, and preservation of specimens, as well as the decisions involved in choosing the most appropriate method of documenting new observations.

9:30 AM

DOES PSYCHOLOGICAL STRESS AFFECT THE ANTIBODY LEVEL FOR THE EPSTEIN-BARR VIRUS? Jennie Evenson 147 East Oakland Avenue Columbus Ohio 43201

The purpose of this study is to determine if the immune system, specifically antibodies, are affected by stress. This was done by measuring the antibodies when the subjects were under stress. The theory is that the body enters a state of immunodepression in which the immune system activity is greatly reduced when under intense psychological stress. The experiment used ten third-year medical students, who were proven to have the Epstein-Barr virus, to draw blood four weeks before final exams, during exams, and two weeks after exams to demonstrate the stages of psychological stress. The blood was tested in an assay called the Enzyme Labelled Immunoassay. This assay uses virus specific antigens which bond with the antibodies. The amount of antibody bonding with the antigen can then be measured on an Enzyme Labeled Immunoassay Reader. The results showed that the antibody level was substantially decreased during and two weeks after the final exams. These results imply that psychological stress limits production of antibodies, therefore causing the body to be more susceptible to active infection of the Epstein-Barr virus.

9:45 AM

ELECTROPHORETIC BIOTYPING OF THE YEAST CANDIDA ALBICANS USING ENZYME PATTERNS Sandesh Dew, St. John's HS, Toledo, and Department of Microbiology, Med. Coll. of Ohio, P.O. Box 10008, Toledo, OH 43699-0008

Candida albicans is a pathogenic yeast that can cause invasive infection and lesions known as thrush in certain immunocompromised people. Because of its virulent nature, it would be useful to follow the spread of the yeast in clinical settings. This study reports the use of polyacrylamide gel electrophoresis to biotype or "fingerprint" the yeast strains. Furthermore, the electrophoretic biotypes are compared with the serotypes of the strains in order to determine if a correlation exists between the two methods of fingerprinting. A total of 76 strains were biotyped using the following four enzyme systems: a-chitinase, phosphatase, maltase, and glucose-6-phosphate dehydrogenase. After cluster analyses of the strain biotypes, initial results suggest little correlation between the electrophoretic biotypes of the strains and their respective serotypes. (This study was performed in the lab of Dr. Paul P. Lehmann.)

10:00 AM

A STUDY OF THE EFFECTS OF NaCl AND HCHO ON THE FERMENTATION PROCESS Steven C. Schenk 53 Beck Bay Rd. Bowling Green Ohio 43402

This project studies the effects of NaCl and HCHO on the fermentation process. The idea behind it is to discover the general effect of pollutants on biological functions. Thus a knowledge of similar pollutants' effects on the environment is gained.

The experiment was conducted in the following way. An erlenmeyer flask is filled with water and sucrose. Yeast is added in the following four ways. Four such apparatuses are set up with identical amounts of water, sucrose, and yeast. Three of the flasks also have different percentages of NaCl or HCHO added to them. The CO2 given off is measured in graduated cylinders. Curves of gas generated versus time are plotted on graph paper. Complete analysis of the data is now in process. A hypothesis has been formulated that both the NaCl and the HCHO will slow down gas generation.

10:15 AM

SYNTHESIS AND ANALYSIS OF A COORDINATION COMPOUND, COBALT (III) CHLORIDE HEXAMINE. Chris Tweney, 114 Liberty, Bowling Green, Ohio, 43402.

This experiment explores the synthesis and analysis of a coordination compound. The compound is prepared by the reaction of cobalt (II) chloride hexahydrate, ammonium chloride, ammonia, carbon, and hydrogen peroxide. Your samples were prepared for analysis. Chloride was determined by the Mohr's method and cobalt was determined spectrophotometrically. Percent ammonia was determined by using a specially designed apparatus to collect the ammonia given off upon heating the unknown and bubbling it into hydrochloric acid. The amount of hydrochloric acid left unreacted was determined by titration with sodium hydroxide. As an additional experiment, an attempt will be made to dissolve the unknown in hydrochloric acid and finding concentration of cobalt spectrophotometrically. As a known cobalt (III) compound is not available, a cobalt (II) compound will be oxidized with hydrogen peroxide to transform it to cobalt (II) and provide the needed absorbance versus concentration curve. Percent of cobalt, ammonia, and chloride will be used in determining the experimental empirical formula of the unknown. The theoretical empirical formula of the unknown is CoCl_xNH_y.

10:45 AM

THE CONVERSION OF WASTE CARBOHYDRATES TO ALCOHOL. Presented by Dana E. Jensen 3644 Rosebrier Court Toledo, Ohio 43606

In this project I investigated the conversion of waste carbohydrates to alcohol. The main interest is in the turning of waste to a usable product. The purpose is to save money the emphasis is on efficiency. In my own research I tried to obtain the maximum possible efficiency as inexpensively as possible. The following are some ideas on increasing the efficiency of the conversion: The use of a weak acid to weaken the carbon-hydrogen bonds in the carbohydrate increases the alcohol output. The use of a solvent still to preheat the volume of liquid then minimizes the need for energy-wasting open flames. The use of distillation columns packed with sponges or lined with spikes increases the efficiency of the distillation process. Finally the use of drying agents such as Sodium Sulfate, or "Molecular Sieve" on higher percentage alcohol eliminates the need for distillation.

Using these and other tactics I set out to obtain an efficient and cost effective conversion, and I feel it is entirely possible to put the process to practical use, thereby benefiting the consumer and industry alike.

SECTION N. Junior Academy
Second Afternoon at 1:30 p.m.
Saturday, April 28, 1990
206 Fawcett
David M. Weaver, Presiding

4:00 PM

HOLOGRAMS IN DIFFERENT TYPES OF LIGHT Presented by Dave Poulette 15700 Van Aken #3 Shaker Hts., Ohio 44120

Problem: In which type of light will boys or girls most frequently view a hologram?

Hypothesis: Both boys and girls will view the hologram in fluorescent light the greatest number of times.

Experiment: The purpose of the experiment was explained to subjects. Subjects were instructed to view the hologram in
the 60 watt light control box. Subjects were then asked to fill out a questionnaire. If the hologram was viewed then "yes" was checked on the questionnaire. Subjects then completed trials on seven other lights. The test box contained the following lights: fluorescent, ultraviolet, incandescent 100 watt, incandescent 40 watt red, yellow, green and blue.

Results: Of the twelve girls tested, five out of six saw the hologram under the fluorescent light. Of the twelve boys tested, five out of six saw the hologram under the fluorescent light.

Conclusion: The subjects most frequently saw the hologram in the fluorescent light as predicted and there was no gender difference.

4:15 AHAHO ii NOVEMBER, Toledo, Ohio 43615

The purpose of this research was to determine the morphological changes in the various cell regions of the nucleus of the guinea pig after the animals were subjected to several types of damage to the cochlea. There were four groups of animals. A control group consisted of healthy guinea pigs with nothing done to the cochlea. The second group was comprised of animals which had been injected an ototoxic drug which did extensive damage to the cochlea. Of a third group the animals were subjected to extreme noise levels which are known to damage the stereocilia of the receptor cells in the organ of Corti of the cochlea and produce hearing impairment. The fourth group consisted of animals whose hearing was damaged and a prosthetic device was implanted in order to provide artificial stimulation of the auditory system. Regional volumes in the cochlear nucleus of all these animals were then measured in order to determine any changes. In order to prepare the cochlear nucleus for examination, the brain was removed from each guinea pig after sacrifice and frozen. The part of the brain containing the cochlear nucleus was mounted in a cryostat at -20°C and sectioned transversely using a microtome with sections 20 micrometers thick. One group of every section was stained for acetylcholinesterase activity to determine whether relaxation to vasodilators is independent or dependent of endothelin.

4:30 MR. CLEAN AND AROMATIC SCENTS. Amy Jo Roy, 817 Edgewel! Avenue, Ashland, Ohio 44805.

Newborn Sprague-Dawley rats were exposed to Mr. Clean liquid lemon detergent, men's British Sterling cologne, or pine shavings to see if they showed a preference to one of the scents. Odors were mixed with the bedding in each of the rearing cages for the first 16 days of life and then the rats were tested between the ages of 29-31 days old. Four males and four females were tested alone from each of the three rearing cages for 30 minutes. Most rats spent the majority of the time in the pine shavings test chamber and the least amount of time in the cologne chamber. The subjects showed no preference for the odor they were raised with in their cages. Some factors that might have influenced the results are: length of time spent in test chamber, amount of odor present in test chamber, the length of time exposed to scent in rearing cages, and the strength of the odors in the rearing cage and test chambers.

4:45 RECYCLING ENERGY WITH SOLAR CELLS. Stanley Dickerson P.O. Box 93 Scio, Ohio 43988

The purpose of my research was to see if energy could be recycled. To test my hypothesis, I used seven solar cells and an incandescent light bulb. I placed the solar cells around the light bulb so that they could make electricity from it. Then I wired the solar cells into the circuit with the light bulb and two ni-cad batteries used as the power source for the light bulb. With the light on, the electricity made by the solar cells was then added to the circuit to recycle the energy.

I found that energy can be recycled. In my research there was an increase of 0.2 volts. The total cost was about five dollars per solar cell. If the price of solar cells goes down, it might become more profitable. My research indicated other possibilities to increase the efficiency of recycling energy. Some such possibilities would be a different type of light source (e.g. a fluorescent light) and the use of fiber optics.

SECTION N. Junior Academy
Poster Session at 2:30 p.m. Saturday, April 28, 1990
Lobby Physical Education Bldg.

Board A

<table>
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<th>Poster Session at 2:30 p.m.</th>
<th>John Beck, 255 Campbell Drive, Hamilton, Ohio 45111</th>
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<tr>
<td><strong>FOLK &amp; ENDOTHELIN IN GLYCEROL TRINITRATE INDUCED DESENSITIZATION TO VASODILATORS</strong></td>
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<td><strong>DESENSITIZATION TO VASODILATORS</strong></td>
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<td><strong>ROLE OF ENDOTHELIN IN GLYCEROL TRINITRATE INDUCED DESENSITIZATION TO VASODILATORS</strong></td>
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The role of endothelin in glycerol trinitrate induced desensitization to vasodilators will be investigated in the pig coronary and the rabbit thoracic aorta. The tissues will be hung in organ baths and tissue tension measured with a Grass Polygraph. After pre-treatment with glycerol trinitrate, tissues will be contracted with histamine or U4409. Nitroglycerin, U-Bromo cyclic GN, Sodium Nitroprusside, Forskolin, Thrombin, Substance P, and Calcium Ionomophore A23187 will be used to determine whether relaxation to vasodilators is independent or dependent of endothelin.

Board B

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<th>Poster Session at 2:30 p.m.</th>
<th>Greg Clemons, 5700 Sulphur Springs Road, Brookville, OH 43909</th>
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<tr>
<td><strong>THE GREENHOUSE EFFECT: DOES TEMPERATURE AFFECT CO2 ABSORPTION IN THE OCEAN?</strong></td>
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<td><strong>IN THE GUINEA PIG COCHLEAR NUCLEUS.</strong></td>
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This experiment was conducted to discover if temperature affects the ocean's ability to absorb and hold carbon dioxide. The hypothesis was that temperature affects the ocean's ability to absorb the carbon dioxide. To elaborate further, it was thought that the coldest water could best absorb the gas of the three temperatures tested.

To test this, three aquariums containing ten gallons of synthetic ocean water were set at three different temperatures. The three controlled temperatures were 62, 72 and 82 degrees Fahrenheit. Five consecutive days of the same length of day II dry ice (CO2 source) was placed in each tank. The PH levels were measured at five different times of day. These times were: after adding the ice, while it was dissolving, after it had dissolved, one hour after it had dissolved, and the next morning.

The recorded data proved the hypothesis to be correct. Temperature does affect how well the ocean absorbs and holds the carbon dioxide. As the temperature increases, the ocean's absorption ability of the gas decreases.

Board C

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<th>Poster Session at 2:30 p.m.</th>
<th>Greg Clemons, 5700 Sulphur Springs Road, Brookville, OH 43909</th>
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<tr>
<td><strong>THE EFFECTS OF DIFFERENT CULTURE MEDIA ON THE GROWTH OF A LICHEN SYNTHESIZED FROM SEPARATE ALGA AND FUNGUS SYMBIOTICS.</strong></td>
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<td><strong>AMY M. EFLNER.</strong></td>
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A lichen is a symbiotic partnership between an alga and a fungus. According to Lynn Margulis (1990) algae and fungi isolated from native Ohio species of lichen was collected in Delaware County. The hypothesis is that when the algae and fungus are combined they will grow together as symbionts best on agar with no aiding nutrients. Analysis will be conducted using some compound light microscope with results recorded by color and black and white photographs.

Board D

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<th>Poster Session at 2:30 p.m.</th>
<th>Robin Evans, 16405 Maple Lane Minerva, OH 44157</th>
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<td><strong>AN ARCHITECTURAL EXPERIMENT: ROOF DESIGN VS. STRAIN CAPACITY</strong></td>
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<td><strong>DESIGN VS. STRAIN CAPACITY.</strong></td>
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I hypothesized that there was an increase of 0.2 volts. I then tested the strengths with an electronic strain gauge connected to a voltage monitor which was connected to an
The purpose of this research is to determine whether females one female. It also set out to determine whether age was expressions—happiness, anxiety, depression, anger, and you viewed the video? What are some clues that gave away this emotion to you? The hypothesis was proven correct, 59 subjects (33 female, 26 male) viewed the videotape the character expressing? What are some possible reasons for this emotion to you? The hypothesis was proven correct, females identifying more correctly than males, and female adults proving to be the best overall.

Apple computer. With Vernier’s “Project Programs” disk the computer determined the strength by reading the voltage change from the bending of a metal bar that was placed between the beam and the center rafter. When weight was applied the results showed the post and beam model with a .563 voltage change, the common rafter model with a .412 voltage change, and the truss model with a .023 voltage change. I also tested the designs with the deflection method. I tied a string with a lead sinker from the center rafter. When weight was applied the post and beam deflected five mm, the common rafter deflected two mm, and the truss roof deflected one mm. Both tests proved the truss design was the strongest and most practical of the three.

The purpose of this research is to determine whether females or males were best able to identify 5 nonverbal emotional expressions—happiness, anxiety, depression, anger, and “neutral”—each acted out individually by one male and one female. It also set out to determine whether age was a factor in the ability to identify emotions. The hypothesis was that females would be more capable of determining the emotions because of societal stereotypes. 59 subjects (33 female, 26 male) viewed the videotape and subsequently identified four things. What emotion was the character expressing? What are some possible reasons for this emotion to you? The hypothesis was proven correct, females identifying more correctly than males, and female adults proving to be the best overall.

Twenty students were studied by a seventh grader for total cholesterol, high density, low density lipoproteins, tryglycerides as well as dietary habits and physical activities. The group was divided into ten Amish and ten non-Amish children of equal gender. The results revealed that the non-Amish children had more total cholesterol level as well as low density lipoproteins. The Amish children not only had more high density lipoproteins but also amazingly low tryglyceride levels. The author attributes the difference in the findings to a difference in dietary habits and lifestyles of the two groups. The results suggest the need for further and larger studies to explain this dramatic difference seen in this very first study comparing the Amish and non-Amish children.

The paper to be presented at the 99th Annual Meeting of the Ohio Academy of Science will apply to the polymer composites in a specially designed apparatus, which is known as the experimental factor, during the casting. This is known as the experimental factor. The experimental factor in this project is the pressure of air around the liquid casting as part of the experiment. This is known as the experimental factor, which is measured in pounds per square inch. After the completion of the experiment on 3/2/90 I will complete a paper on aspin on the effects of different agents on gram-positive bacteria versus gram-negative bacteria. I took 8 different common household products and 2 antibiotics and tested them on 4 different types of bacteria. I wanted to see if the agents would affect bacterial growth. The bacteria I chose was 2 gram-positive organisms, Streptococcus pneumoniae and Staphylococcus pyogenes, and 2 gram-negative organisms, Klebsiella oxytoca and Pseudomonas aeruginosa. The results suggested the need for further and larger studies to explain this dramatic difference seen in this very first study comparing the Amish and non-Amish children.

Fourteen dairy herds were evaluated to determine a correlation between bacterial colony forming units (cfu) and bulk tank SCC. Incidence and types of mastitis causing organisms in the bulk tank of these herds were identified by standard milk culturing techniques. Each herd’s mastitis milking hygiene and mastitis control program was evaluated by observation of milking techniques and completion of a questionnaire by the farmer. The data was then submitted to the farmer to encourage maintenance of LSCC.

The experiments consisted of two participants who were cleared of any aspirin or any prescribed medication. Their blood was then drawn and a Prothrombin Time (PTT) was used. Starting the following week, they took an aspirin a day for three weeks. At the end of the experiment, the results proved that the aspirin caused the blood of one participant to clot slower and the other’s to clot quickly. This proved and disproved my hypothesis which was aspirin will indeed cause the clotting rate of blood to decrease.

I tested five commonly used liquid handsoaps to determine their effectiveness as antimicrobial agents by culturing bacteria in petri dishes before and after washing with each test soap and comparing the amount and type of bacteria that grew.

After the completion of the experiment on 3/2/90 I will complete a paper on aspin on the effects of different agents on gram-positive bacteria versus gram-negative bacteria. I took 8 different common household products and 2 antibiotics and tested them on 4 different types of bacteria. I wanted to see if the agents would affect bacterial growth. The bacteria I chose was 2 gram-positive organisms, Streptococcus pneumoniae and Staphylococcus pyogenes, and 2 gram-negative organisms, Klebsiella oxytoca and Pseudomonas aeruginosa. The results suggested the need for further and larger studies to explain this dramatic difference seen in this very first study comparing the Amish and non-Amish children.
from the three groups which then should have the same survival rates. The Mass of the group of goldfishes were determined by a trip-beam balance and then they were placed in three separate groups of relatively close mass. Then the fish were frozen in the solution. They were thawed in a pan of cool water with a heat lamp fixed on the pan. Then the results were recorded. The hypothesis was rejected because the medium sized fish had the best survival rate. Taking all the variables into account such as the health and age of the fishes you cannot safely say that there is a difference in the survival rates.

Board M

THE EFFECTS OF DECREASED WATERING ON PLANT GROWTH, PRODUCTION, AND NUTRITION. Dan Woodard, 11412 T.R. 100, Kenton, Ohio 43326.

In a greenhouse, 4 rows each of carrots, sweet corn, lima beans, and green beans were grown, each receiving .3, .5, .7, or .9 inch of water weekly. Hypothetically, plant growth and yield would decrease significantly between .3 and .5 inch, as would plant uptake of nutrients. Although this drop off was not found, the plants did produce less when less water was applied. Corn watered the most produced twice as much as corn watered the least, carrots 1.24 times, lima beans 1.66 times, and green beans 1.14 times accordingly. Plant analysis showed only calcium, magnesium, sodium, and iron levels reacted as expected, with amounts being directly proportionate to the amount of water which was applied. Copper and zinc levels were invariant. Nitrogen, potassium, and manganese levels were erratic. Phosphorus and boron levels were unexpectedly higher with reduced watering. Since the drop off point had not yet been found, 10 rows of kohlrabi were planted and watered at 0, .05, .1, .2, .3, .5, 1, and 2 inch increments. The greatest drop off was discovered to lie between 0 and .05 inch according to average plant tissue weight results. Kohlrabi leaf analysis results have not yet arrived, so the project is not yet completed.

Board N

CAN A LOSS OF HEARING BE COMPENSATED BY ANOTHER SENSE? Scott M. Yano, 2-18118 US20, Fayette, Ohio 43521

A literature survey was conducted and revealed that deafness is one of the most common physical handicaps. There are several existing aids that help the deaf. The goal of this Science Project was to build a unique aid to help the deaf lead better lives.

The hypothesis of this project was, "Can a Loss of Hearing Be Compensated By Another Sense?" The basic function of the aid developed in this project was to detect a sound and then alert a person of that sound by activating a device attached to the person's skin.

The original circuit for this device was a sound-activated microphone whose output was amplified and sent to a DC motor. The necessary components were purchased and a prototype assembled. Many modifications were made to the original circuit before the device became operational. Considerable development work was then expended to make the device small enough to be worn on a person's wrist - like a watch.

Two unique features were incorporated into the device. They were: First, a sensitivity control, which allows a person to choose the sound level needed to activate the device. This range from ordinary speech to an emergency alarm. Second, a timer control, which allows a person to choose the length of time the device stays activated.

Actual testing has shown that this new aid can help deaf people lead more productive lives. Therefore, in conclusion, and in answer to the original hypothesis, yes, a loss of hearing can be compensated by another sense.

SECTION O. Engineering

Only Morning at 9:00 a.m.

Saturday, April 28, 1990

108 Favcett

Tom Hartley, Presiding

Systolic Arrays are networks of processors that rhythmically compute and pass data through systems. These arrays feature the important properties of modularity, regularity, local interconnections, and a high degree of pipelining and multiprocessing. In this paper, a general methodology for the design and performance analysis of systolic arrays is described. In the design phase, a three-step procedure for the systematic derivation of systolic arrays is proposed. These steps can be outlined as follows: (1) Extracting parallelism from the algorithm, (2) Pipelining the computations, and (3) Modifying the dependence graph of the pipelined computations so that it satisfies the systolic properties. The resultant "systolic graph" is then directly mapped into an array of processing elements and "synchronized" by incorporating an appropriate number of "latches" or "delay elements" in the interconnection buses and/or the processing elements.

The performance of systolic arrays is analyzed in terms of the "computational time", "pipelining period", and the "utilization rate" of the processing elements. A method using the classical concepts of "space-time diagrams" and "time-snapshot" is described for this purpose. Parameters which reflect the cost of systolic arrays in terms of the "array size" and the I/O (input/output) lines are also discussed.

The new model is flexible and easily applied to a wide variety of speech impaired individuals.

OPTIMAL FILTERING OF SPATIALLY-INVARIANT IMAGE SEQUENCES. Young-In Shin and James B. Farison, Department of Electrical Engineering, The University of Toledo, Toledo, OH 43606.

This paper presents a general derivation for the weighting vector representing the optimal filter for processing (filtering) a spatially-invariant image sequence to produce one composite image in which a desired feature or process in the image sequence is emphasized while the interfering features or processes in the image sequence are suppressed. An explicit form for the filter vector, which provides data compression of the sequence into a single image, is given in terms of the desired and undesired feature signature vectors/matrices.

A spatially-invariant image sequence is a sequence of images in which the physical location of image features does not change in the successive images of the sequence. Such images occur in medical imaging applications such as magnetic resonance (MR), in which a sequence of patient images is taken with different MR parameters. Different regions image differently due to their different physical/biological compositions.

The new results are based on forming a vector and a matrix signature of each process or feature, and maximizing an energy ratio of desired-to-interfering processes. They follow earlier work by Miller, Windham, Abd-Allah, Farison, et al at UT, Medical College of Ohio and elsewhere.

9:45 ON THE DESIGN AND PERFORMANCE ANALYSIS OF SYSTOLIC ARRAY ARCHITECTURES. M.Y. Namiat and R.G. Mohiy, Dept. of Electrical Engineering, The University of Toledo, 2801 W. Bancroft St., Toledo, OH 43606.

Systolic Arrays are networks of processors that rhythmically compute and pass data through systems. These arrays feature the important properties of modularity, regularity, local interconnections, and a high degree of pipelining and multiprocessing. In this paper, a general methodology for the design and performance analysis of systolic arrays is described. In the design phase, a three-step procedure for the systematic derivation of systolic arrays is proposed. These steps can be outlined as follows: (1) Extracting parallelism from the algorithm, (2) Pipelining the computations, and (3) Modifying the dependence graph of the pipelined computations so that it satisfies the systolic properties. The resultant "systolic graph" is then directly mapped into an array of processing elements and "synchronized" by incorporating an appropriate number of "latches" or "delay elements" in the interconnection buses and/or the processing elements.

The performance of systolic arrays is analyzed in terms of the "computational time", "pipelining period", and the "utilization rate" of the processing elements. A method using the classical concepts of "space-time diagrams" and "time-snapshot" is described for this purpose. Parameters which reflect the cost of systolic arrays in terms of the "array size" and the I/O (input/output) lines are also discussed.

Finally, the complete design and performance analysis of systolic arrays is illustrated by means of an example. The systolic array proposed in this illustration include the length, the mesh, and the triangular type of arrays.
This paper investigates the cost estimates of two different computer components from physical and performance viewpoints. It is shown that performance measures, data storage capacity, and data transfer time are better cost predictors than physical cost drivers.

When these performance characteristics are used to estimate unit costs, the type of storage device used becomes transparent. This reinforces the concept that a functional description of a device is a better and more direct cost estimating tool than physical parameters.

This functional concept and the fusion of optical technology with electronic components lead to a discussion of the advantages of optical switching devices over complex electronic integrated circuits. Optical devices offer potential solutions to interconnection, signal interference, and propagation speed.

Extrapolating performance with cost-decay and complexity growth curves, the paper predicts when cost-effective optically driven chips will take their place alongside the more conventional electronic chips.

**Evolution of Hypercube and Hypernet.** Devinder Kaur, Dept. of Electrical Engineering, The University of Toledo, Toledo, OH 43606-3390

The paper surveys the earlier attempts of connecting processors in parallel and distributed environment. It describes the various multistage interconnection networks emphasizing the tradeoff of commonality in them along with the subtle differences. A generalized hypercube structure based on mixed radix number system is described for a given number of processors N, which results in a variety of hypercube configurations. It is shown that a Boolean n-cube hypercube is a special case of generalized hypercube topology. The various network parameters of hypercube are described.

Another modular network, called hypernet, which combines the positive features of both hypercubes and tree based topologies and maintains a constant node degree is described. The principles for constructing hypercubes and hypernets are analyzed. The architectural potentials of these networks are manifested by mapping some of the algorithms onto them, to illustrate their capability to support parallel processing and the gains achieved in terms of speed up and fault tolerance.

**Section O. Engineering**

**First Afternoon & Business Meeting**

at 1:30 p.m. Saturday, April 28, 1990

108 Fawcett

Tom Hartley, Presiding

**2:00**

**Computer Aided Selection of Free Machining Steels to Increase Screw Machining Productivity.** Miles P. Plitt, Plant Metallurgist, Bliss & Laughlin Steel Co., 900 West Smith Road, Medina, Ohio 44256.

A computer model of the multiple spindle screw machining process has been developed. This model permits the rapid evaluation of proposed changes in the material being machined, as well as changes in other operating parameters such as feed rate, speed, and depth of cut. Using process information specific to the part being manufactured, the model rapidly determines if the machining cost savings exceed the increase in material cost, thereby justifying the change in material grades.

By allowing the parts manufacturer to objectively evaluate the material's cost compared to its machining performance, the model enables the manufacturer to become more competitive, reducing the cost of each part produced, minimizing the time required for manufacture, and increasing productivity and profitability. Field studies have demonstrated the validity of the model and verified the savings achievable through its application.

**The Dynamics of a Net Impacted by a Constant Thrust Projectile.** Daniel C. Deckler, Prof. J. C. Banks, The University of Toledo, Toledo, OH 43606.

The dynamics of a net that has been impacted by a constant thrust projectile are examined. The net is modeled using the lump parameter method in which the mass and drag coefficients of motion are obtained using Lagrangian mechanics. A set of second order nonlinear differential equations results. These equations are integrated and put in the format where A is the system Jacobian. A Portran simulation using a fourth order Adams-Bashforth integrator can then be applied to study its dynamics. Each nodal position and velocity as well as the eigenvalues of A can be found as a function of time for various values of elements string constant, element length, nodal mass, and nodal drag coefficient. With these assumptions, the nodal equations of motion are obtained using Lagrangian mechanics. A second order nonlinear differential equations results. These equations are integrated and put in the format where A is the system Jacobian. A Portran simulation using a fourth order Adams-Bashforth integrator can then be applied to study its dynamics. Each nodal position, velocity, and acceleration is determined, and the eigenvalues of the Jacobian are obtained as a function of time for various values of elements string constant, element length, nodal mass, and nodal drag coefficient.
A parametrically optimized self-tuning regulator is proposed to autotune a power system stabilizer of a single-machine power system. Although the well-known double-zero double-pole power system stabilizer works reasonably well over a limited range of operating conditions, the system configuration and load conditions may change, which demands autotuning of the stabilizer over a wide range of operating conditions by identifying the system operating conditions and providing the required control action. The proposed self-tuning regulator consists of a parameter identification scheme which identifies the nonlinear power system with a predictive model and a control design scheme which utilizes parameter optimization in deriving the control. The control design procedure consists of choosing a regulator structure that the tuning the regulator parameters. The flexibility of specifying the order and the structure of the regulator offers advantages in autotuning well known simple controller structures. The proposed method outperformed the fixed parameter stabilizer and the minimum variance self tuner when applied to a computer simulated single machine power system example.

ON FUZZY STABILIZERS FOR SYNCHRONOUS GENERATORS. J. J. Dai and A. A. Ghandakly, Dept. of Electrical Engineering, The University of Toledo, Toledo, Ohio 43606

The paper presents a novel design of synchronous generator stabilizer using fuzzy control. The algorithm forms a look-up table based on a set of linguistic decision rules which could be easily established from machine's inherent characteristics. When applied, the look-up table is stored in the computer's (or microprocessor's) memory. The sampled generator shaft speed error, its first derivative and second derivative are quantized and then used as entries to the look-up table to find proper control signals. Both exciter and governor fuzzy stabilizers are described in this paper. Computer simulation studies with results compared with conventional fixed lead-lag stabilizer show that the performance of fuzzy stabilizers is comparable to that of conventional one. It is concluded that the fuzzy stabilizer has the advantages of more straightforward design procedure and less implementation while it performs as well as the conventional stabilizer.

AN EXPERT SYSTEM FOR REAL AND REACTIVE POWER DISPATCH OF POWER SYSTEMS. W.M. Refaey, Department of Electrical Engineering, University of Toledo, Toledo, Ohio 43606; M.M. Azeen, University of Helwan, Cairo, Egypt; O.H. Abdalla, University of Helwan, Cairo, Egypt; I.H. Khalifa, University of Helwan, Cairo, Egypt; A.A. Ghandakly, University of Toledo, Toledo, Ohio 43606

This paper describes an expert system which assists the optimal real and reactive power dispatch for the economic operation of power systems. The expert system continuously checks the power system operating conditions on the basis of voltage magnitudes and line power flows. If abnormal operation is detected, the expert system displays possible control actions to be chosen by the operator. The Control actions include the generator real power outputs for the real power dispatch; and shunt capacitors and/or reactors, transformer tap settings and generator bus voltages for the reactive power dispatch.

The proposed expert system utilizes a linear power flow model to obtain the controller sensitivity functions with respect to the controlled variables. The expert system is effectively incorporated into a conventional language, such as QuickBasic on an IBM PC. Example results are presented.

SECTION O. Engineering
Second Afternoon at 1:30 p.m.
Saturday, April 28, 1990
112 Fawcett

Yung-Tse Hung, Presiding

2:00 EVALUATION OF EFFECTIVE FACTORS IN BATCH TREATMENT OF MILK WASTEWATER, CONTAINING Cr(vi) AND LIMO. Majid Zarrinazfar, Yung-Tse Hung, Cleveland State University, Cleveland, Ohio 44115

The effects of various concentrations of Cr(vi), LIMO and TOC (Total Organic Carbon) on the aerobic batch treatment of milk wastewater was studied in these experiments. The factors: TSS (Total suspended solid), VS (Volatile suspended solid) and TOC were determined in 48 hours. Orthogonal Regressive method was used to evaluate the data. A mathematical model was developed to show the effective factors treatment of milk wastewater in presence of LIMO and Cr(vi). The developed mathematical model was used to generate several data points. The calculated data points were in close agreement with the experimental data.

2:15 EVALUATION OF EFFECTIVE FACTORS IN BATCH TREATMENT OF MILK WASTEWATER CONTAINING O-CHLOROPHENOL AND LIMO. Majid Zarrinazfar, Yung-Tse Hung, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

The effect of high and low concentrations of the three factors, O-Chlorophenol, LIMO and milk wastewater TOC (Total Organic Carbon) on Bio-Augmentation was studied in eight batch, aerobic completely mixed Reactors. The factors TSS, Total suspended solid, VS (Volatile suspended solid) and TOC were determined in 32 hours. Using Orthogonal Regressive method, the results of these experiments were evaluated and formulated. A mathematical model was developed to show the effective factors in Bio-Augmentation of milk wastewater. Using the developed model, some data points were generated. The calculated data points were in close agreement with the experimental data.

2:30 APPLICATION OF BIOAUGMENTATION IN WASTEWATER TREATMENT. Tong Yu and Yung-Tse Hung Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

This paper is a detailed review of the currently available literature of bioaugmentation. The application of bioaugmentation has a history of more than 10 years. Its first application was in 1977. In the initial stage bioaugmentation was used to solve some urgent operational problems in the water pollution control plant and achieved some good results. Then many research studies were conducted both in the fields and in the laboratories for a better understanding of bioaugmentation in this decade and different applications and the experimental results which support the opinions were summarized. Also the author's opinions on the researches which should be made in the future were given.

2:45 ROLE OF BIOCATALYTIC AUGMENTATION ON BATCH ACTIVATED SLUDGE TREATMENT OF POTATO WASTEWATER. Abdul N. Javid, Yung-Tse Hung, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

A study was conducted to determine the effects of bioaugmentation in the activated sludge treatment of potato wastewater. Synthetic potato wastewater using potato juice was used as reactor feed. The nine reactors were represented by the addition of different dosages of LMO (Live
A laboratory study was conducted to evaluate an existing, full scale municipal wastewater plant using rotating biological contactor (RBC) as a secondary treatment process. The plant was operated under tropical climate condition with a designed flow rate of 13,600 GPD (gallons per day).

Operating parameters including BOD (biological oxygen demand) and SS (suspended solids) were evaluated. For the period of 28-month study, the overall BOD removal efficiency of the plant was 86.27%. The BOD of raw influent, primary secondary effluent and final effluent was 191.144, 83.36, and 6.64 respectively. The overall BOD removal efficiency was 78.26%. The SS concentration was 155.15, 82.08, 37.38, and 33.73mg/l, for raw influent, primary effluent, secondary effluent and final effluent respectively. The data were employed to determine two linear equations, BOD loading versus SS loading versus effluent SS.

3:00 EVALUATION OF A FULL SCALE MUNICIPAL ROTATING BIOLOGICAL CONTACTOR PLANT UNDER TROPICAL CONDITIONS. Aik Heng Lee*, Yung-Tse Hung**, Nk Faud Nk Abllei*, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115, School of Housing, Building and Planning, University of Malaysia, Malaysia.

A study was conducted to evaluate an existing, full scale municipal wastewater plant using rotating biological contactor (RBC) as a secondary treatment process. The plant was operated under tropical climate condition with a designed flow rate of 13,600 GPD (gallons per day).

Operating parameters including BOD (biological oxygen demand) and SS (suspended solids) were evaluated. For the period of 28-month study, the overall BOD removal efficiency of the plant was 86.27%. The BOD of raw influent, primary secondary effluent and final effluent was 191.144, 83.36, and 6.64 respectively. The overall BOD removal efficiency was 78.26%. The SS concentration was 155.15, 82.08, 37.38, and 33.73mg/l, for raw influent, primary effluent, secondary effluent and final effluent respectively. The data were employed to determine two linear equations, BOD loading versus SS loading versus effluent SS.

3:15 ROTATING BIOLOGICAL CONTACTOR FOR MILK WASTEWATER TREATMENT WITH BIOAUGMENTATION PROCESS. Aik Heng Lee, Yung-Tse Hung, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

Two four stage laboratory scale rotating biological contactor (RBC) units were operated at a different organic loading strength ranging from 30 to 75 mg/l TOC (total organic carbon). Synthetic milk wastewater was used as feed. The bacterial culture product used in the bioaugmentation process was type N-1 of LLMO, manufactured by General Environmental Science Corp., Cleveland, Ohio. The overall carbonaceous substrate removal efficiency measured in term of TOC concentration ranged from 82.14 to 87.71% and 80.99 to 88.67% for the RBC reactor with and without bioaugmentation, respectively. A major removal was occurred in the first stage for both reactors. There was a significant difference of 14% at stage 1 (30°C) due to the bioaugmented and non-bioaugmented reactors due to the anoxic condition in the reactors.

3:30 EFFECT OF MEDIA ADDITION AND BIOAUGMENTATION ON THE TREATMENT OF MILK WASTEWATER BY A TWO-STAGE ANAEROBIC/AEROBIC LAGOON PROCESSES. Jerry R. Taricska and Yung-Tse Hung, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

A laboratory study was conducted to determine the feasibility of using a two-stage anaerobic/aerobic lagoons on the treatment of milk wastewater, to examine the effects of bio-augmentation on the anaerobic and aerobic lagoons and to examine the effects of media addition to 50% of the anaerobic lagoon volume. The experimental set-up consisted of anaerobic/aerobic lagoons. The first set consisted of three pairs of parallel trains of two-stage lagoon units. Bioaugmentation was applied to one train of each parallel train of lagoons. The second set of lagoons had media added to 50% of its volume and bio-augmentation was applied to one train of each parallel train of lagoons. Media addition improved an aerobic unit with both media and bio-augmentation was improved by 12.12%. The two-stage TOC removal was 97.145 and 97.082% with and without bio-augmentation respectively.

3:45 THE INFLUENCE OF SOME ENVIRONMENTAL FACTORS IN YEAST AEROBIC FILTER SYSTEM. Nian-Fa Tang, Yung-Tse Hung, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

Three factors, temperature, initial TOC, and initial yeast concentration were chosen as affecting factors in this test. The test was conducted in 6 anaerobic filters according to a regression-orthogonal design plan. The results of the test was calculated by statistical method. TOC removal, TSS and PH are chosen as evaluation items. The influence of the factors has been found and explained in a natural environment. TOC removal efficiency of the filters is affected by temperature. TOC removal of filter #1 (40°C) is 16.5% higher than that of filter #5 (20°C) at 12th day, and 8.3% higher at 30th day. In the first two days, main TOC removal is caused by temperature. Almost no effectiveness is caused by initial removal and gas production follow a first order plug flow kinetics very closely. Within the range of substrate concentration tested (276-4004 mg/l TOC), there was no noticeable effect between inhibition on substrate utilization. The obtained data show a slight effect of bio-augmentation on the hydrolysis. The result showed that an influent TOC concentration of 176mg/l, a 97% TOC removal.

4:15 A LABORATORY STUDY OF THE EFFECTIVENESS OF BIOAUGMENTATION. Tong Yu and Yung-Tse Hung, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

A laboratory study was conducted to investigate the treatability of milk wastewater using four-stage anaerobic filters in series. The effect of bioaugmentation on different stages of treatment was also examined. The media tested for primary and secondary filter has a specific surface area of 27ft². While the tertiary has a specific surface area of 27ft². The tertiary stage consisted of activated carbon and charcoal media with porosity of 0.64 and 0.44. The biokinetics determined show that the substrate removal and gas production follow a first order plug flow kinetics very closely. Within the range of substrate concentration tested (276-4004 mg/l TOC), there was no noticeable effect between inhibition on substrate utilization. The obtained data show a slight effect of bio-augmentation on the hydrolysis. The result showed that an influent TOC concentration of 176mg/l, a 97% TOC removal.

4:30 ANAEROBIC BATCH TREATMENT OF MILK WASTEWATER IN PRESENCE OF LIMO AND PHENOL. Majid Zarriniasar, Yung-Tse Hung, Civil Engineering Department, Cleveland State University, Cleveland, Ohio 44115

A laboratory study was conducted to investigate the effects of bioaugmentation on the insoluble, particulate and macromolecular organic materials in wastewater and sludge into soluble, small molecular organic materials. Batch of 34, 132, and 147 hours, respectively, were conducted in this study. Starch wastewater and primary settling tank sludge were taken respectively as the representatives of the macromolecular and particulate organic materials. Limo, a liquid mixed culture bacteria system, was used as the bioaugmentation product. For starch wastewater the TOC concentration raised significantly after 60 hours as the VSS concentration decreased relatively in the same period. And the higher the concentration of the starch, the higher the TOC concentration reduction of the experiments. (For the primary settling tank sludge it is difficult to determine whether there is a significant difference between the experimental reactors and the controlled reactors.)
Aerobic Batch treatment of milk wastewater was studied in presence of various concentrations of Phenol and LIMO in both stirred and nonstirred conditions. The effects of these three factors, LIMO concentration, Phenol concentration and stirring condition on the Bio-augmentation were determined and compared. General Regression Method was used to formulate data and a mathematical model was developed to show the effective factors in aerobic treatment of milk wastewater under the experimental conditions.

SECTION R. Ecology

First Afternoon & Business Meeting
at 1:30 p.m. Saturday, April 28, 1990

068 Rike

R.J. Garon and J. Runkle, Presiding

THE CURRENT EELGRASS SITUATION (1985-89)
AND THE FILLED SALT-MARSH SUCCESSION
REVISITED (1980-89) AT CAPE ANN, MASSA-
CHUSETTS. Ralph W. Dexter, Dept. Biological
Sciences, Kent State University, Kent, Ohio 44422.

Since the latest epidemic of eelgrass disease at Cape Ann in 1984, Zostera marina virtually disappeared throughout the Annisquash Tidal System. By 1989 a dozen or so small patches (less than 1 m in diameter) each appeared in Goose Cove and Goose Cove seedlings have increased along the low water line at Wingaersheek Beach, both at the northern end of the Annisquash Tidal River. Eelgrass has persisted in a series of moves along the eastern shores of Ipswich Bay, increasing generally each year, and a large patch has developed off Niles Beach in Gloucester Harbor.

The filled salt-marsh succession initiated in 1958 by deposits of sand has continued to develop and by 1989 the restored salt-marsh and the beach grasses had almost completely been obliterated by an overgrowth of reed grass throughout the area and over the slopes of the dykes, with sumac dominating the top of the dykes, and cattail and red and cedro encroaching from the adjacent land.

TIMING OF RELEASE AFTER DISTURBANCE IN TWO
SPECIES OF SOUTHERN BEACH (NOTHOFAGUS) IN NEW
ZEALAND. Runkle, James R. Department of
Biological Sciences, Wright State University, Dayton, OH
45435, USA.

Two Nothofagus species coexist as canopy trees in many old-growth forests of New Zealand but differ in several aspects of their life histories. N. fusca (Hook.f.) Oerst. is more shade intolerant, growing faster, getting larger, but not surviving as well in the understory as N. menziesii (Hook.f.) Oerst. I sought to determine if aspects of their life histories. N. fusca (Hook.f.) Oerst. spends more time suppressed than N. fusca usually became taller eventually, probably in response to a later disturbance. Few suppressed N. fusca were found.

THE PROBABLE ROLE OF FIRE IN THE GENESIS OF THE
10-YR WILDLIFE CYCLE, John F. Wing and Mark B.
Witte, Wittenberg University, Springfield, OH
45501.

An aerobic Batch treatment of milk wastewater was studied in presence of various concentrations of Phenol and LIMO in both stirred and nonstirred conditions. The effects of these three factors, LIMO concentration, Phenol concentration and stirring condition on the Bio-augmentation were determined and compared. General Regression Method was used to formulate data and a mathematical model was developed to show the effective factors in aerobic treatment of milk wastewater under the experimental conditions.

2:00

THE CURRENT EELGRASS SITUATION (1985-89)
AND THE FILLED SALT-MARSH SUCCESSION
REVISITED (1980-89) AT CAPE ANN, MASSA-
CHUSETTS. Ralph W. Dexter, Dept. Biological
Sciences, Kent State University, Kent, Ohio 44422.

Since the latest epidemic of eelgrass disease at Cape Ann in 1984, Zostera marina virtually disappeared throughout the Annisquash Tidal System. By 1989 a dozen or so small patches (less than 1 m in diameter) each appeared in Goose Cove and Goose Cove seedlings have increased along the low water line at Wingaersheek Beach, both at the northern end of the Annisquash Tidal River. Eelgrass has persisted in a series of moves along the eastern shores of Ipswich Bay, increasing generally each year, and a large patch has developed off Niles Beach in Gloucester Harbor.

The filled salt-marsh succession initiated in 1958 by deposits of sand has continued to develop and by 1989 the restored salt-marsh and the beach grasses had almost completely been obliterated by an overgrowth of reed grass throughout the area and over the slopes of the dykes, with sumac dominating the top of the dykes, and cattail and red and cedro encroaching from the adjacent land.

2:15

TIMING OF RELEASE AFTER DISTURBANCE IN TWO
SPECIES OF SOUTHERN BEACH (NOTHOFAGUS) IN NEW
ZEALAND. Runkle, James R. Department of
Biological Sciences, Wright State University, Dayton, OH
45435, USA.

Two Nothofagus species coexist as canopy trees in many old-growth forests of New Zealand but differ in several aspects of their life histories. N. fusca (Hook.f.) Oerst. is more shade intolerant, growing faster, getting larger, but not surviving as well in the understory as N. menziesii (Hook.f.) Oerst. I sought to determine if aspects of their life histories. N. fusca (Hook.f.) Oerst. spends more time suppressed than N. fusca usually became taller eventually, probably in response to a later disturbance. Few suppressed N. fusca were found.

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THE PLANT COMMUNITIES OF LAKE KATHERINE STATE NATURE PRESERVE. J. M. Adams, F. A. Bryan, Department of Botany, Ohio University, Athens, Ohio 45701; and John F. Bryan, Department of Natural Resources, Columbus, Ohio 43224. The purpose of this study is (1) to collect quantitative, baseline data from the plant communities of Lake Katherine State Nature Preserve, and (2) to examine the change, composition, and diversity of these communities to similar communities on a local (Jackson County), regional (Southeastern Ohio), and state-wide basis. Three types of forested plant communities were targeted for this study: hemlock, appalachian oak, and mixed flood plain. More than 80 person-hours were spent at this preserve during this study. From 20 point grid samples, 30 transects were taken in five separate areas: two ridge-tops, two mesic coves, and one flood plain. Results from these 50 transects will be presented and comparisons will be made with data collected from other plant communities in Jackson County, southeastern Ohio, and state-wide.

INBREEDING IN TRIODANIS PERFOLIATA. A CHASMODAGM/MICLIECHOMAGM SPECIES. Finn S. Bryan, Department of Botany, Ohio University, Athens, OH 45701. Tridanais perfoliata (Campanulaceae) is an annual which produces potentially outcrossing, chasmogamous flowers (CH), and obligately self-crossing cleistogamous flowers (CL). Although CH flowers are available for cross-pollination, they should practice inbreeding, either by selfing or by mating with relatives. I wanted to judge how much CH flower production is selfed. If they are inbreeding, then CH progeny should show levels of heterozygosity similar to those of the CL progeny. I compared the levels of heterozygosity of CH and CL progeny of 25 individuals from one population of Tridanais perfoliata, using starch gel electrophoresis. Also, since a history of inbreeding can cause heterozygosity in the distribution alleles across populations, I analyzed the distribution of genetic variation among progeny from nine populations of Tridanais in southern Ohio.

POLLEN LIMITATION AND NATURAL FRUIT PRODUCTION IN MAYAPPLE COLONIES (Podophyllum peltatum L.). Sandra L. Whisler and Allison A. Snow, Botany Dept., The Ohio State Univ., Columbus, OH 43210. Seed production may be pollen limited in many plant populations. Studies have demonstrated this conclusively. We determined natural levels of fruit set for 156 mayapple colonies at two sites in central Ohio. There were no significant differences in natural fruit set between sites. Fruit set was generally low, and many colonies produced no fruits. We found no significant increase in percent fruit set as colony size increased, small colonies were likely to have zero percent fruit set while larger colonies usually produced at least one fruit. To determine whether seed set was pollen limited, we compared levels of fruit and seed production from hand- and naturally pollinated plants from the same colony. Fruit set was much higher following hand-pollination at both sites. Seed set per fruit was also appeared to be pollen limited, although not as severely as fruit set. Experimental crosses indicated that most colonies were self-incompatible and some were composed of more than one genotype.

HIGH POLLINATION RATES AND NONRANDOM FERTILIZATION IN Hibiscus moscheutos. Allison A. Snow and Timothy R. Pan, Botany Dept., Ohio State Univ., Columbus, OH 43210; Dept. of Biology, Georgia Southern College, Statesboro, GA 30460. High rates of pollen deposition can lead to pollen tube competition and nonrandom fertilization based on the pollen donors' identity. In natural populations of Hibiscus moscheutos, anthophorid bees delivered surplus pollen to receptive stigmas within a few hours of anthesis. This resulted in competition among pollen tubes for a limited number of oocytes. Direct observations of pollen tube growth rates showed that significant differences between pairs of outcross donors were common, as were differences between selfed and outcrossed pollen. We used an electrophoretic marker (PDI) to examine the relationship between pollen competitive ability and the proportion of seeds sired by a given pollen donor. The evolutionary implications of this process will be discussed, with an emphasis on variation among individuals in the male component of reproductive success.

SECTION R. Ecology
Second Afternoon at 1:30 p.m.
Saturday, April 28, 1990
072 Rike
Horton Hobbs and David MacLean, Presiding

2:00 WHY DO LISTRONOTUS APPENDICULATUS WEEVILS PREFER TO LAY EGGS ON MALE RATHER THAN FEMALE INFLORESCENCES OF SAGITTARIA LATIFOLIA? D. Bryan Bishop and Gayle Muenchow, Botany Dept., Ohio University, Athens, OH 45701. The weevil, Listronotus appendiculatus, uses Sagittaria latifolia plants as hosts. The plants have separate genders. The weevils lay some eggs on leaves, but most eggs are laid on inflorescences. We have found that they do not distinguish between the plant genders with respect to the leaves, but that they lay significantly more eggs on male than female inflorescences. Male inflorescences have fewer abortive buds at the tip. The number of eggs laid is negatively correlated with the number of abortive buds at the tip, so this difference in inflorescence morphology may be influencing the weevil behavior. We have also studied the relative survivorship and growth of weevil larvae on inflorescences of different genders.

2:15 POSSIBLE 10-YR CYCLE IN THE CANADIAN BREEDING POPULATIONS OF THE WHOOPING CRANE, GRUS AMERICANUS (L). John F. Wing and Donald F. Grizzle, Department of Psychology, Wittenberg University, Springfield, OH 45501. Johnsgard (1983) reports fall counts for juvenile and adult whooping cranes which wintered annually at Aransas National Wildlife Refuge, TX from 1938-1982. These two 45-yr records show upward trends. Both with and without removal of trends the juvenile data is not significant (p<.05) 10-yr and 20-yr cycles using the contingency periodogram (Legendre et al, 1981), whereas the adult count does not show significant cycles. Since the whooping cranes breed on the border of NY and Alberta, CANADA, it is possible that breeding, brooding site mortality, and/or fail migration mortality is affected by the boreal 10-yr cycle. Since Macean (1953), Macean (1987) and, to a limited
more pronounced responses than did males. Evidently urine became familiar after only 1 encounter and remained familiar even at 3-week intervals. The female subject showed with the subject in a random order. Each set included 2 individual scents were quickly learned and remembered over a winter 1988, the behavior of 3 captive hybrid canids (WolfxDog, 2 males, 1 female) in response to urine of dogs (all neutered females) was observed. Just before each of 4 study sessions, urine was collected from source dogs housed far from the site. Individual subjects were put one by one in a separate enclosure and presented with urine of 4 sources. Each urine sample was sprinkled on a cleaned brick and placed within the subject in a random order. Study of animals’ responses to each preparation were observed for 10 min. The animals spent significantly more time investigating the unfamiliar urine of 380 sec than familiar (80 sec) or control (75 sec). Unfamiliar urine became familiar after only 1 encounter and remained familiar for even 3-week intervals. The female subject showed more pronounced responses than did males. Evidently individual scents were quickly learned and remembered over a behaviorally meaningful time period.

Discriminant analysis was used to analyze the results of 348 bird-feeding trials conducted from 1982 to 1985 for four size classes, seven appearance categories, and five larval host types of species of moths and butterflies used as prey. Discriminant analysis of individual feeding trials correctly classified 97.5 percent of prey taken and ranked the predictor variables according to their relative importance in determining prey acceptability. Characteristic least acceptable to birds were: (1) large size, (2) bark-like appearance, (3) warning colouration, (4) woody generalist, and (5) dead-leaf-like appearance. Characteristic least acceptable to birds were: (1) small size, (2) mimetic appearance, (3) butterfly appearance, (4) herbivorous specialist food type, (5) black-and-white appearance, and (6) extra large size. A multiple regression analysis of prey taken revealed that size alone and larval host type combined with other prey characteristics were the most important variables in determining the selection of prey regardless of their abundance in the trials. The attentiveness of the male American Goldfinch to the Incubating Female. Amy K. HarCh & David W. Waller. Department of Biological Sciences, Kent State University, Kent OH 44242.

The male American Goldfinch (Carduelis tristis) visits the incubating female at the nest and feeds her by regurgitation. The female will extend her neck on the nest and emits "begging" calls in connection with the male’s visits. The influence of ‘begging’ on the male’s feeding is not clearly established. Six nest sites of breeding pairs were located near Kent, Portage Co., Ohio and observed during incubation in July and August of 1988 and 1989 for a total of 37 hours in 20 sessions. Visits by the male, both feeding and non-feeding, were recorded as well as "begging" by the female during visits. The male visited an average of every 27 min whether the female was present or not. Of 86 visits with the female present, 61 resulted in feeding, and the male fed the female an average of every 82 min. Feeding alternated with non-feeding in a non-random pattern. The female "begged" during 51% of the visits. No feeding occurred with "begging", but "begging" did not insure feeding. Unrequited "begging" on one visit did not predict feeding on the next; but non-feeding on one visit did predict "begging" on the next. Excess visits by the male may prevent cuckoldry, or insure that his genetic investment in the eggs is protected. It appears the male controls the feeding schedule, and the female initiates the act. COARSE FILTERS V. FINE FILTERS: A COMPARISON OF TWO APPROACHES TO FINDING POTENTIAL NATURAL AREAS. John A. Koor, WolfXDog, Inc., 5010 Ritter Road, Mechanicsburg, PA. 17055, and R.J. Garono, Department of Biological Sciences, Kent State University, Kent, OH 44242.

Heritage programs typically use two approaches to find and evaluate potential natural areas. The search for high quality plant communities provides a "coarse filter" for screening areas, while a survey for populations of state listed taxa provides a "fine filter". The two approaches are often used together. Little has been done to determine which of these two approaches is the more efficient.

The influence of "begging" on the male’s feeding is not clearly established. Results from laboratory and field studies indicate that decomposing terrestrial leaves and aquatic macrophytes are sources of trihalomethanes (THX) precursors in drinking water reservoirs. THX’s are generated by chlorination during the chlorination of waters by the reaction of chlorine with naturally-occurring organic compounds. THX’s are of concern because they have been shown to be carcinogenic and mutagenic.

Results from laboratory and field studies indicate that decomposing leaves and macrophytes are potential sources of precursors in reservoirs receiving a large portion of organic material from terrestrial and littoral vegetation. The rate and yield of precursors is dependent on particle size and microbial activity. Autumnal peaks in THX precursor concentrations in water samples correspond to autumnal fall and aquatic macrophyte senescence. The findings suggest that watershed, lake, and reservoir management of these precursor sources may reduce precursor concentrations in drinking water supplies. REGIONAL PATTERNS IN THE TROPHIC STATE OF OHIO RESERVOIRS by Donald G. Fulmer, Department of Biological Sciences, Kent State University, Kent, OH 44242.

Watersheds are the primary source of nutrients which are critical in determining reservoir productivity and algal biomass. The hypothesis is that watersheds with similar watershed characteristics should have similar trophic states (nutrient concentrations and algal biomasses). A map of Ecoregions of the Conterminous United States (Comerick, 1967) was used to delineate regional watershed
patterns of soil type, land use, land form, and vegetation. A survey of 21 reservoirs in 4 of the 5 Ohio ecoregions was conducted during the spring and summer of 1989. These 4 ecoregions contain approximately 95% of Ohio’s reservoirs. Total phosphorus and chlorophyll-a concentrations were determined at 50 sites along each reservoir's longitudinal axis, and in major embayments. Similar data from Ohio lake surveys in the 1970s were evaluated. Total phosphorus and chlorophyll-a concentrations could be grouped into 3 distinct regions, corresponding to the ecoregion map. Concentrations were highest in the northeast corner, lowest in the southwestern region, and at intermediate levels in between. The results have important implications. Some reservoirs have higher concentrations than expected from ecoregion characteristics, suggesting that these water bodies have a high potential for restoration.

4:30  IN SITU SEDIMENT TOXICITY EVALUATIONS USING PTERIOXAN FROM LARVAE, DAPHNIA MAGNA AND CERATOPHTHON DURUM. Skalski, C. G. Sassen-Brickson, and G.A. Button, Jr. Biological Sciences Department, Wright State University, Dayton, OH 45435.

Ecological assessments of contaminated stream sites are enhanced by field testing. In situ exposures (2-7 days) of fathead minnows and cladorocans were conducted in streams impacted by nonpoint and point source pollution. Sediments contained high concentrations of metals and polynuclear aromatic hydrocarbons. Fish and benthic macroinvertebrates at both study sites were severely depressed. In situ sediment toxicity was frequently less than laboratory exposures and in situ reference survival rates were acceptable. In situ interstitial water exposures with Daphnia magna also revealed survival rates significantly different from laboratory exposures. In situ sediment exposures proved to be useful and sensitive indicators of both degraded and nondegraded stream conditions.


Oligochaete density and individual species distributions within the Cleveland Harbor area of Lake Erie were compared between 1978 and 1989. Observations were made from harbor, transitional, and open water samples. Oligochaetes from 3 different temporal samples were obtained from each habitat type. Oligochaetes were first sub-sampled, then enumerated and identified to species. The harbor showed a 4.1% decline in oligochaete from an average of 1,837/m² to an average 3,674/m². The species found in 1989 included all of the 15 species found in 1978. The oligochaete distribution within the harbor area was complex, and the life stages varied significantly between sites. The results have important implications for understanding the distribution and abundance of oligochaetes in the Great Lakes. The study was funded by the National Science Foundation.

SECTION R. Ecology
Poster Session at 10:00 a.m. Saturday, April 28, 1990
Lobby Physical Education Bldg.
DUPликATES AND THEIR RETENTION IN THE LIBRARY COLLECTION. Dale Henshaw, Jr. Carlson Library, University of Toledo, Toledo, Ohio 43606.

In all library collections there exists a small number of titles that are heavily used. Some examples are reserve collections that provide supplementary materials for large classes, alternative textbooks for required courses with large numbers of students, critical and/or standard editions of popular titles and authors are needed, and reference works in great demand. Automated circulation systems that collect use data allow librarians to monitor duplicates. To effectively maintain the duplicate segment the librarian needs to know the institution's past acquisition pattern. The role of requests, transfers from reserve collections, overlapping of approval plans, and the decision to add duplicate volumes based on subject or use parameters all need to be evaluated. A volume's use pattern, subject, type, author and age all contribute to the decision to retain a duplicate.

Preliminary Observations of Traditional and Nontraditional Students' Library Skills at Kent State University, Rajinder Garcha, Carlson Library, University of Toledo, Toledo, OH 43606.

A study was undertaken to compare library skills and attitudes of traditional and nontraditional students entering Kent State University during the Spring Semester of 1989. It was discovered that nontraditional students present a challenge to library instruction due to a lack of familiarity with and commitment to the academic routine and a lack of library experience overall. Freshmen students were administered a questionnaire prior to receiving any formal library instruction. Chi-square tests were used to test significant differences between the two groups regarding the variables of library skills and library attitudes. Because of the sample size, the study was limited. However, some observations were made that merit further study and may have implications for library instruction programs which will be designed to address the growing population of nontraditional college students in the 1990s.

11:00

The American Society for Information Science has developed a code of ethics for information professionals. After the manner of the Code of Ethics of the American Library Association, the value and role of codes and the relation of the ASIS and ALA codes will be discussed. Furthermore, it is further argued that there is an implicit ideology at work within the so-called information society and ASIS's endorsement of such a society and its concern for information technologies and their institutionalization. Features of this ideology are discussed in terms of their ethical implications. Finally, drawing on this discussion, issues of global concern for information scientists will be raised: whether information scientists will contribute to such phenomena as the widening gap between the information rich and information poor; diminishing public and free access to information; and the devaluation of historical information, despite codes of ethics and proclamations to the contrary.

SECTION S. Library & Information Sciences
Only Afternoon & Business Meeting
at 1:30 p.m. Friday, April 27, 1990
Rooms 315-316 Univ. Library
Ms. Norma Pearson, Presiding