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Concurrent Session No. 1 - Plant Ecology; Glacial Ecology

F. K. Seischab, presiding

PINE BARRENS VEGETATION OF EASTERN AND NORTHERN NEW YORK, A MULTIVARIATE APPROACH. John M. Bernard, Department of Biology, Ithaca College, Ithaca, New York.

Regions of pitch pine (*Pinus rigida*) dominated forest, called Pine Barrens, are found scattered throughout the northeastern United States. They typically occur on coarse, sandy soils and have a canopy of the pines plus oaks with an understory of ericaceous shrubs. Forty-seven quadrat samples of such vegetation were taken in eight separate regions of upstate New York during summer 1981. The data were analyzed by means of detrended correspondence analysis using the computer program DECORANA.

The sample pattern showed two distinct groups of Pine Barrens, based on their location. The individual stands were grouped on the basis of soils, those with the highest sand contents at one end of the gradient.

Species were also distributed on the soils gradient. Scrub oaks and successional species were at the extreme dry and sandy end, typical Pine Barrens species in the middle, with ericaceous shrubs and mesic species at the moist end of the gradient.

Each of the eight areas was distinct from the others and different than pine barrens of Long Island and New Jersey.

PORT HURON ADVANCE IN WESTERN NEW YORK, GEOMAGNETIC AND STRATIGRAPHIC EVIDENCE.

W. J. Brennan and L. A. Gruendike, Department of Geological Sciences, State University of New York, College at Geneseo, Geneseo, New York 14454

A geomagnetic secular variation record has been obtained from oriented samples collected from the base of proglacial lake clay exposed in the Genesee valley. The clay was deposited in a succession of proglacial lakes which existed during the deglaciation of western New

York. Sampling sites are located along the path of retreat of the ice front from the Valley Heads Moraine to the southern shoreline of Lake Ontario 90 km to the north. As a result of the onlap of the clay on the underlying till, the secular variation record is synchronous with the retreat of the ice front.

From the position of the Hamburg Moraine to Lake Ontario the secular variation record is continuous and without any conspicuous interruptions that would have resulted from a long pause or significant readvance of the ice front. The secular variation record is therefore compatible with the interpretation that the Hamburg Moraine represents the limit of the Port Huron advance in western New York.

Farther north near Geneseo, two sequences of proglacial lake clay are separated by 4.9 m of clay till that appears to have been derived from the lower sequence of lake clay during an oscillation of the ice front. The upper sequence of lake clay is approximately 13,000 yr. B.P. in age. The absence of an interruption in the secular variation record for the time when the ice front was near Geneseo suggests that the oscillation occurred in a brief time interval and over a distance that did not exceed a few km.

SPECIES WHICH THRIVE WITH SALT: AN EFFECT OF THRUWAY DE-ICING. H.S. Forest, State University College at Geneseo, New York 14454.

The use of salt for de-icing of roads has produced a number of significant environmental effects, but there has been no report of vegetational changes produced. Expressways are particularly salted to maintain bare pavement, thus the Thruway provides a suitable laboratory for observing salt-favored species.

Although it is not an obligate halophyte, the large reed grass, Phragmites australis (Cav.) Trin., has become known to some extent as "Thruway grass". It has probably spread rapidly from the Atlantic coast along the Thruway, although it was in the Rochester area earlier, having been reported in 1917. Its presence was restricted to a few localities, however.

Upon recent examination, other less obvious plants have been found. Four species found near the pavement appear to be recognized in the Rochester area for the first time, Poa arida Vasey, Puccinellia distans (Jacq.) Parl., Carex praegracilis W. Boott, and Spurgularia media (L.) L. Presl. Other species in the saline sites include Festuca arundinacea Shreber and also Poa compressa L. and Poa pratensis L. which are not generally considered as salt tolerant.

STUDY OF THE FOSSIL POLLEN STRATIGRAPHY IN SAND ROAD BOG, ONTARIO COUNTY, NEW YORK. Lori Franklin, Community College of the Finger Lakes, Canandaigua, New York.

Peat samples from Sand Road Bog (two miles west of East Bloomfield) were collected every 20 centimeters to a maximum depth of 480 centimeters. Initial microscopic examination indicates that members of the Pinaceae are most frequent. Discussion of the pollen profile will center on the post glacial forest communities of this locality.

STUDIES OF SALT POLLUTION IN STREAMS OF LIVINGSTON, WYOMING, AND GENESEE COUNTIES. John F. Hamberger, Biology Department, State University College, Geneseo, New York.

The history of Livingston, Wyoming, and Genesee counties is rich in both salt mining and processing. Many salt companies, such as the International Salt Company and the Morton Salt Company, have operated through the years in these counties using nearby streams as sources of water. The specific conductance, or ion content, of streams adjacent to industrial salt areas of the past and present was determined at specific points. From these readings, I concluded that there is indeed salt present in areas of present use; the specific amounts depended on the salt industry process used. The streams adjacent to areas of former use showed little or no excess salt in their waters. This implies that salt pollution in these types of streams does not linger for long periods of time, as long as the source of the pollution is terminated.

ECOLOGICAL STABILITY OF ADIRONDACK MOUNTAIN SUMMIT VEGETATION.

E. H. Ketchledge and R. E. Leonard, SUNY-College of Environmental Science and Forestry, Syracuse, New York, 13210.

In September, 1957, Howard E. Woodin of Middlebury College established a permanent vegetational transect above timberline in a remote area on the north-west slope of Mount Marcy, highest peak in the Adirondack Mountains. The transect is a triangle one-hundred feet long on each side; vegetation was recorded by means of the line-intercept method, and was reported in *Ecology*, Vol. 40, No. 2, April 1959. In 1962 Ketchledge (unpublished) re-measured the transect with the point-intercept method to compare the suitability of the two intercept techniques for evaluating invasion or loss of species in alpine chamaephyte- cryptophyte vegetation. In 1981, Ketchledge and Leonard re-measured the transect with the line-intercept method again to evaluate floristic-ecological changes since establishment.

Comparison of these three sets of data shows little change in the vegetation along the transect during the past quarter century. Isolated from the recreational traffic that elsewhere traverses the summit meadow, the reference area is untrammled and appears to be in equilibrium with the natural environment. Minor differences in species occurrence or coverage devolve from sampling error rather than from ecological shifts.

These results are in marked contrast to the vegetational degradation being experienced along and adjacent to the State trail system nearby on Mount Marcy and on other alpine high peaks in the Adirondacks.

A STUDY PLOT COMPARISON OF WINTER WHEAT GROWN ORGANICALLY AND INORGANICALLY.

John I. Mosher, Ph.D., Department of Biological Sciences, State University of New York at Brockport 14420

The purpose of this study was to compare quantity and quality of Ticonderoga variety winter wheat grown with different fertilizers. Other plant characteristics such as root structure and grain head were also compared.

This study was conducted on private land in the township of East Gaines, Orleans County, New York.

Two experimental plots were set up next to one another. Each plot measured 3.5 feet by 55 feet. Both plots were prepared in a similar manner with the exception of the types of fertilizer applied. Both plots were planted with the same amount of seed wheat at the same time on October 14, 1980.

One study plot was fertilized with the standard, 10-10-5 Agway brand Nitrogen, Phosphorus, Potassium (NPK) fertilizer commonly used by local farmers for wheat on this type of soil.

The other study plot was fertilized with P3K, a liquid microbial enzymatic fertilizer produced by V.J. Petrik Laboratories, of California. P3K is a microbial "organic" fertilizer.

The hypothesis was that in soil with 2% or more organic matter the P3K fertilizer would perform as well as the standard water soluble NPK fertilizer.

Earlier germination, better grain heads, and generally more robust plants which matured earlier than in the NPK plot were noted in the P3K plot. The best production and quality of wheat berry were observed in the P3K fertilized "organic" study plot.

A REPORT ON ORGANIC SOIL BUILDING TECHNIQUES USED ON DEPLETED SOIL AND CHANGES IN PLANT PRODUCTION
J.I. Mosher, Ph.D., Department of Biological Sciences,
State University of New York at Brockport 14420

The purpose of this report is to share observations of changes in soil and production noted since 1979.

These reported observations were made on the Fancher Campus of State University College, Brockport, New York.

The soil of the field used in the observation is heavy clay and was severely depleted by modern farming techniques twenty or more years ago. In 1979 an area 33 meters by 42 meters was prepared in order to conduct a pilot study comparing three methods of Biological Plant Production. Soil analysis conducted during the 1979 study indicated a marked improvement during the growing season of that year.

This report notes additional changes in soil quality and production of this study plot under continued "organic" cultivation using manure and commercial organic fertilizers. Also a new area of the same size, which had not been cultivated since farming

on the area ceased, was put under "organic" cultivation using manure as the main source of fertilization.

The hypothesis is that the ecological approach to cultivation, loosely termed organic in this report, is a positive step in rebuilding soils depleted by modern agriculture techniques and improving soils which have not been seriously damaged.

NOTES ON JAPANESE KNOTWEED (POLYGONUM CUSPIDATUM)
IN GENESEO, NEW YORK. Arthur J. Myers and
Lawrence J. King, Department of Biology, State
University College, Geneseo, N.Y.

Japanese knotweed was introduced into the North-eastern U.S. around 1825. Only when massive growths developed, has this species become a severe problem. Although it has spread extensively in Western N.Y., Japanese knotweed has not yet received detailed study. An inclusive New Jersey study has been conducted by R.R. Locandro (Ph.D. thesis, Rutgers, 1973).

Polygonum cuspidatum is a perennial dioecious plant, that has escaped from cultivation and now inhabits many waysides and urban areas. Although it may be quite a beautiful sight, when in full bloom with its feathery masses of white flowers, when left unchecked will spread rapidly and in time become obnoxious.

Three population sites of Japanese knotweed occurring in Geneseo were used as study areas. While experiments on germination revealed no seed viability, those experiments on the plant's rhizome system did show it's ability to spread prolifically. It's rhizomes, even when chopped up into sections or retrieved from frozen soil in mid-winter, still developed and initiated young shoots in a short period of time. Stem growth rates of field plants ranged from 3.68cm to a very high value of 6.71cm per day; during a 10-day period (April 29-May 8, 1981). Maximum heights of approximately 6-10 feet were obtained by early summer.

Since the distribution of this species is largely associated with human activities, Japanese knotweed should receive the attention of botanists and other scientists.

AN ASSESSMENT OF LATE AND POST-GLACIAL CLIMATIC CHANGES IN TERMS OF THEIR POSSIBLE ROLE IN THE PLEISTOCENE EXTINCTIONS OF NORTH AMERICAN MEGAFUNA.

Stephan Rosen, Hobart College, Geneva, New York 14456.

Documented in the fossil record of the late glacial and post-glacial deposits of North America is the extinction of what P.S. Martin estimates to be 70% of North America's Pleistocene megafauna. These extinctions correspond in time with two significant events: the first arrival of humans in the New World and the change from later glacial (Pleistocene) to the post-glacial (Holocene or Recent) times.

Many researchers believe that humans were responsible for the extinctions. It appears though, that climatic changes accompanying the deglaciation of North America brought great and rapid alterations of the terrestrial environments, such as increased continentality, higher temperatures and greater aridity. These three factors may have caused the demise of the megafauna, by eliminating or shrinking many of their habitats and forcing them into heightened competition. The now extinct forms might have been less severe, but the catastrophic character of these changes resulted in extinction.

AN ORDINATION OF THE VEGETATION OF THE CUMMING NATURE CENTER.

Franz K. Seisshab. Department of Biology, Rochester Institute of Technology, Rochester, NY 14623.

The importance values of 38 arboreal species from 288 sampling sites at the Cumming Nature Center were subjected to Bray-Curtis Comparative Ordination. The ordination display indicates that the vegetation is responding to two environmental gradients. The X ordination axis corresponds to a topographic moisture gradient. A successional-disturbance gradient is seen along a portion of the Y ordination axis.

Quercus alba, Q. rubra, Acer rubrum, A. saccharum, Fagus grandifolium and Tsuga canadensis form a vegetational continuum along the topographic moisture gradient. Along the successional-disturbance gradient can be seen a vegetational continuum of Alnus rugosa, Cornus racemosa, Rhamnus cathartica and Populus tremuloides

PATTERN IN SUCCESSIONAL OLD FIELDS: ARE SOME SPECIES CHOOSY NEIGHBORS? Rachel Studer, Biology Department, and Gary W. Towsley, Mathematics Department, SUNY College of Arts & Science, Geneseo, N.Y.

Thirty fields abandoned from agriculture located on fertile, high-lime soils around the northern half of Conesus Lake were separated (by factor analysis) into four fairly discrete types: the familiar goldenrod-New England aster-white aster type, two types which related to the former history as hay fields, and a weedy young type. Species data were gathered from m^2 quadrats; therefore an association study was performed to determine if pairs of species co-occurred more frequently than by chance within that relatively small area--or whether they showed a tendency toward repulsion. It was found that some species tend to associate freely with a variety of other species, while others are more fastidious in "selecting" their neighbors.

Concurrent Session No. 2

Nectar Production; Ornithology; Error Correcting Codes

P. A. Haefner Jr. presiding

RESPONSES OF BOBOLINKS (DOLICHONYX ORYZIVORUS) TO ARTIFICIAL SKIES. Robert C. Beason. Biology Dept., State University of New York, Geneseo, NY 14454.

The migratory orientation of adult Bobolinks (Dolichonyx oryzivorus), caught from the wild, and hand-reared Bobolinks was tested under seasonally appropriate, but stationary, skies in a planetarium. The adults that responded appeared to base their directional choice on the cues provided by the stars. Hand-reared birds which had no exposure to the natural sky were unable to select a preferred direction based upon the information available to them in the planetarium.

METHODS OF STUDYING NECTAR PRODUCTION IN FLOWERS AND ITS SIGNIFICANCE. Marlene Campbell and E.E. Southwick, Department of Biological Sciences, State University of New York, College at Brockport 14420.

Nectar production in flowering plants was studied using several techniques to determine the volume of nectar produced, sugar concentration of the nectar, total sugar produced, time of day production occurred, and external factors affecting production. A system of study was designed to investigate the availability of nectar to insects. The results of such studies could provide useful insight into pollination biology, insect energetics and agricultural problems.

ANIMAL FLIGHT. Walter H. Carnahan, 191 Island Cottage Rd. (14612)

The speaker's main interest in the birds and bees is as flying machines. This talk treats with why animals fly and exposes some misconceptions of how they do it. The structure and mechanisms of animal flight are explored as is the possibility of man learning enough from other flying animals to copy them. Man may be on the verge of a break-through!

New Eurypterids from the Phelps Waterlime Member, Fiddlers Green Formation (Bertie Group), Late Silurian of Eastern New York State
Samuel J. Cieurca, Jr., 48 Saranac St., Rochester, N. Y. 14621

Three new eurypterids have been found in the waterlime at the top of the Fiddlers Green Formation (so-called "Herkimer Pool" of early authors). This horizon, about 1 meter thick, has provided a diversified eurypterid fauna characterized by the common form Eurypterus remipes remipes DeKay.

The new eurypterids discovered include a representative of the Hughmilleriidae, Nanahughmilleria humilis n. sp.; a stylonurid, Herkimeripterus rare n. g. et n. sp.; and a presumed Carcinosomatid, Paracarcinosoma? mohawkensis n. sp.

The specimens on which the new forms are based were obtained at Passage Gulf in eastern New York (Cieurca New York eurypterid locality number 57). The types are being deposited in the Smithsonian Institution.

SONG COMPONENTS ELICITING SPECIES RECOGNITION IN THE YELLOW WARBLER (Dendroica petechia). Frank E. Mochol, Department of Biology, SUNY at Geneseo, Geneseo, New York 14454.

Territorial male yellow warblers (Dendroica petechia) were exposed to experimentally altered songs to determine the components of song which elicit species recognition. Normal yellow warbler and common yellowthroat (Geothlypis trichas) songs were used as controls. A behavioral index was used to grade the birds' responses to the experimental songs. In most cases the birds responded to the experimental songs as strongly as they did to the control normal yellow warbler song. Apparently, the order and arrangement of phrases does not play a part in species recognition. Figure morphology and the arrangement of figures in time within each song probably play an important role in species recognition in the yellow warbler.

ENERGY COSTS OF FORAGING ON ARTIFICIAL FLOWER PATCHES OF VARIABLE AND CONSTANT NECTAR VOLUMES: PROPOSED STUDY AND PRELIMINARY OBSERVATIONS. Andrew Schreffler and E.E. Southwick, Department of Biological Sciences, State University of New York, College at Brockport 14420.

It has been thought that foraging insect pollinators select flowers providing the greatest energetic reward. However, it has also been suggested that foragers select flowers of more certain reward rather than those of less certain, but perhaps greater, reward. If this is true, a patch of flowers each containing a constant nectar amount should be more attractive to foraging honey bees than a patch of flowers with variable nectar volumes, provided they are the same distance from the bees home nest. If the constant nectar volume patch is further from the nest than the variable nectar patch, there should be a specific distance at which the energetic benefits of both patches would be equal and at greater distances, the bee should shift to the variable but nearer patch. The energy cost of flight over this distance should be equal to the increase in energy cost of foraging on the variable patch over that of the constant patch when they are adjacent. We are testing this hypothesis using artificial flower patches, and report here on preliminary observations.

AGING EFFECT ON NECTAR PRODUCTION IN ASCLEPIAS SYRIACA IN MICHIGAN. Alrun K. Southwick, The University of Michigan Biological Station, Pellston 49769 and E.E. Southwick, Department of Biological Sciences, State University of New York, College at Brockport 14420.

The effect of flower age on production of nectar in Asclepias syriaca was studied by monitoring individual blossoms throughout their flowering life. In northern Michigan flowers, nectar was produced for 6 days. Daily nectar samples were analyzed for volume, sugar concentration and total sugar content. We found a large variation in nectar volume and total sugar among individual flowers, however all flowers followed the same pattern of nectar production. Nectar volume and sugar production peaked about 50 hours after anthesis and declined to zero after 120 hours. Nectar concentration was greatest in the first samples taken, declining in subsequent sampling.

CIRCADIAN RHYTHMS OF METABOLISM IN WINTER HONEY BEE COLONIES. Edward E. Southwick, Department of Biological Sciences, State University of New York, College at Brockport 14420.

In winter, metabolism of honey bee (Apis mellifera L.) colonies showed marked 24-hour periodicity, even when held under constant cool conditions in the dark. Phase shifts in the light-dark cycle were followed by similar shifts in the metabolic cycle. Minimum rates of metabolism (as low as 3.4 w kg^{-1}) were usually reached in early morning during the dark (ca 0500), and maximum rates (as much as 10 times higher) were attained in midday (1400). Colonies with brood showed less excursion because of increased nighttime rates of metabolism. Mass specific metabolic rates for intact whole colonies of 10,000 to 24,000 bees were $\frac{1}{2}$ to $\frac{1}{4}$ the rates reported in the literature for small groups of bees.

PHOTOSYNTHETIC COST OF NECTAR PRODUCTION. Edward E. Southwick, Department of Biological Sciences, State University of New York, College at Brockport 14420.

Reproductive effort channelled into nectar production by Asclepias syriaca was estimated in the field. Total photosynthate was determined from leaf area, rate of photosynthesis and photosynthetic photon flux (PPFD). Daily nectar production was measured in the field. Energetic equivalents were utilized to determine the fraction of total photosynthate (assimilated carbohydrates) that was secreted as nectar. Nectar accounted for 10 to 30% of daily photosynthate produced during flowering and 2.5% of total lifetime photosynthate.

EASTERN BLUEBIRD NESTINGS AT WEST HILL NATURE PRESERVE, ONTARIO COUNTY, NEW YORK. Wendy Walker, Community College of the Finger Lakes, Canandaigua, New York.

West Hill Nature Preserve, property of the Nature Conservancy, is taking an active interest in promoting the population of the Eastern Bluebird, Sialia Sialis, on the preserve due to the nationwide decline of this species. A nest box trail begun five years ago has been successful in establishing breeding sites. Discussion of nesting success will include spring arrival, nest site selection, intra and inter specific competition, nesting behavior and foraging techniques.

GENERALIZED ZINOVIEV CODES. James A. Wiseman, Rochester Institute of Technology, Department of Mathematics, One Lomb Memorial Drive, P.O. Box 9887, Rochester, New York 14623.

A new method of constructing error correcting codes is presented which, in over 30 cases, yields larger codes for a fixed length and minimum distance than any previous code. Furthermore, there are several instances where the previously largest known code is non-linear, whereas the new code is linear. The technique is a refinement and generalization of Zinoviev's construction method and thus falls under the general heading of a concatenation procedure. An easily applied linearity criterion results from adopting a somewhat different viewpoint than that of Zinoviev's, and is responsible for demonstrating the linearity of the new codes.

Concurrent Session No. 3
Animal Ecology; Animal Physiology
D. Merrill, presiding

THE EFFECT OF RADIATION ON ESTRADIOL-INDUCED UTERINE GROWTH

S. Barron, R. Gardner and J. Douthwright-Fasse
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Rochester, New York 14623

Estrogen stimulated uterine growth is a precisely timed biological event which has been well characterized and is dependent on many endocrine systems. The response of the rat uterus to estrogens is a particularly well documented phenomenon which clearly illustrates the biochemical sequence of events that lead to cell division in eukaryotic cells. In this study, the rat uterus is used as a model system to investigate the effects of radiation upon growth and cell division in vivo.

Three days after being ovariectomized, twenty-one-day-old rats were exposed to doses of 0, 50, 125, 250, 500, and 1000 rads of γ radiation. Twenty-four hours after irradiation, half of the rats in each dosage group were injected with 5 g estradiol IP. The remainder of the rats were injected with 0.5 ml of 0.9% saline. The rats were sacrificed twenty-four hours after injection. The uteri were excised and growth responses were determined by measuring in vitro ^3H -thymidine incorporation into DNA, wet weights, and protein levels.

^3H -thymidine incorporation into DNA in vitro appears to be very sensitive to radiation exposure. The total amount of ^3H -thymidine incorporation into DNA of saline treated rats was significantly higher ($p < .05$) in rats exposed to radiation than in non-irradiated saline control rats. This response may reflect a DNA repair mechanism. In addition, radiation exposure appeared to profoundly alter estradiol-stimulated uterine growth responses. In estradiol injected rats exposed to radiation, the total amount of ^3H -thymidine incorporation into DNA was significantly lower ($p < .05$) than in non-irradiated controls. Estrogen-stimulated protein levels and wet weights were altered by some doses of radiation, although there was no conventional dose-response curve.

The results indicate that estrogen-stimulated uterine growth may provide a unique system for investigating the effects of radiation in vivo. Additional studies are scheduled to study the effects of radiation on amino acid uptake and ^3H -uridine incorporation into RNA to further characterize the effects of radiation on estrogen-stimulated uterine growth

A CRITERION FOR THE DOMINANCE OF MYOGLOBIN FACILITATED OXYGEN TRANSPORT IN MUSCLE TISSUE. Patricia Clark, Mathematics Department, Rochester Institute of Technology, Alfred Clark, Jr., Department of Mechanical Engineering, University of Rochester.

In the steady state transport of oxygen in muscle tissue, importance of diffusion of oxygen bound to myoglobin (facilitation) to diffusion of free oxygen can be discussed in terms of a single parameter. This parameter is the order-of-magnitude of the ratio of oxygen demand to the maximum that can be supplied by free oxygen diffusion alone. When this parameter is small, the free oxygen distribution in the muscle tissue is essentially that due to ordinary diffusion alone. As the value of this parameter approaches unity, facilitation begins to strongly affect oxygen transport. When the maximum possible flux of free oxygen is approximately equal to the demand, the resulting free oxygen partial pressure in the tissue is so low that the reversibly bound oxygen in the tissue oxymyoglobin can be released. Beyond this point, the transport is dominated by the myoglobin facilitated transport.

The nonlinear diffusive oxygen transport from the capillary to the surrounding muscle tissue mitochondria is analyzed in cylindrical geometry. A singular perturbation procedure is used to demonstrate the significance of the demand-supply parameter in predicting the relative importance of ordinary molecular diffusion to myoglobin facilitated diffusion.

A POSSIBLE MECHANISM FOR DIISOPROPYLFLUOROPHOSPHATE-INDUCED MEMORY LOSS IN RATS

R. Gardner, R. Ray, J. Frankenheim, K. Wallace, M. Loss, and R. Robichaud

Rochester Institute of Technology, Biology Department and Pennwalt Pharmaceutical Corporation, Department of Pharmacology, Rochester New York 14623

Passive avoidance retention and cortical [H^3]-Quinuclidinyl benzilate (QNB) binding were examined in rats that were chronically treated with diisopropylfluorophosphate (DFP), an irreversible acetylcholinesterase inhibitor. Retention of a passive avoidance response in DFP-treated rats was significantly lower when compared to vehicle-treated controls. Passive-avoidance retention decreased from 93% in control animals to 68% in DFP-treated rats.

QNB binding studies revealed the density of muscarinic receptors in cortical homogenates was significantly reduced from $0.95 \pm .05$ pmoles/mg protein in controls to $0.72 \pm .04$ pmoles/mg protein in DFP-treated rats. Scatchard analysis of QNB binding curves did not reveal a decrease in affinity of muscarinic receptors. Based on data that DFP induces a central cholinergic receptor subsensitivity, this study supports the hypothesis that central cholinergic receptors are associated with mechanisms involved in memory storage.

MICE AS HABITAT INDICATORS? A PILOT STUDY OF THE ABUNDANCE AND DISTRIBUTION OF WOODLAND RODENTS.

William Hallahan, Department of Biology, Nazareth College, Rochester, N.Y. 14610

This report is a pilot test of the hypothesis that woodland rodents may serve as habitat quality indicators. Peromyscus maniculatus and Clethrionomys gapperi appear to be the most abundant herbivores in the three communities investigated. A comprehensive survey of small mammals was conducted by live-trapping in three distinct communities: white pine, mixed deciduous, and Norway spruce. Each site measured about 100 meters by 100 meters.

For species to be good indicators, they must have a narrow range of requirements. If two similar species live in the same habitat, there will probably be considerable niche overlap. This overlap would create a locus of competition which would force the two populations to assume narrow niches. Perhaps the most obvious effect on the niche would be spatial displacement or food preference changes.

The mark and recapture method was used to estimate the abundance of the rodents in the three habitats. The results indicate that P. maniculatus dominated in the white pines and C. gapperi dominated in the spruce. In the more mesic mixed deciduous community, microhabitats were more diverse and vegetation more dense. Here, the two species were nearly equal in density.

The spatial distribution of these rodents supports the conclusion that both species cohabit the communities in relative harmony. An analysis of sex differences in trap success and intertrap mobility revealed some interesting species differences. P. maniculatus males and C. gapperi females were more mobile and were caught more often than their counterparts. The implications of this will be discussed.

The conclusion is that these two rodent species, by their adaptations for living together in the same community, can serve as indicators of habitat quality and could serve as monitors of habitat changes (eg. tree removal) associated with timber management.

This project was supported by a joint grant from Nazareth College and the Rochester Museum and Science Center and conducted at the Cumming Nature Center.

THE ROLE OF TEMPERATURE IN GOVERNING GROWTH OF BROWN TROUT (SALMO TRUTTA L.) IN STREAMS. Richard Preall. State University of New York, College of Environmental Science and Forestry, Syracuse, N.Y. 13210.

During the summers of 1979 and 1980 brown trout (Salmo trutta L.) populations in three Central New York streams were electrofished monthly. Length, weight and scale sampling have provided average estimates of the growth rate for each age class of trout.

Previous growth studies concerning trout have indicated stream temperature as a dominant factor. To better understand the role of temperature a FORTRAN IV computer model utilizing published bioenergetic equations of J.M. Elliott has been developed. Based on laboratory-measured, temperature-dependent metabolic rates and average age class size the model generated a maximum growth figure. This figure is the maximum weight gain a brown trout could achieve within a given temperature regime and time span. Comparisons of the actual growth rate to the theoretical maximum rate have provided an efficiency factor, such as 70% of maximum, for the trout during each growing season.

Since the efficiency factor incorporates temperature it can be used when comparing trout populations of streams of widely varying temperature regimes. Other features governing growth rates, e.g. food availability, community structure, stream volume and alkalinity can now be studied independently of stream temperature, thus clarifying their influence on trout growth.

A PRELIMINARY LIMNOLOGICAL INVESTIGATION OF THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF A MEROMICTIC POND. Michael A. Principe, S.U.N.Y. College of Environmental Science and Forestry, Syracuse, N.Y.

Lowery Pond, the largest of the three ponds which comprise the Junius Ponds system in Junius, N.Y. (10 km northeast of Geneva, N.Y.), was studied from October 1979 to November 1980. This hardwater pond has a surface area of 7.03 ha, and consists of three coalescent basins (south, central, and north) which are separated by sublacustrine shelves. Comparisons of light penetration, thermal cycles, and chemical distribution within the three basins showed the central and south basins to be meromictic, and the north basin to be holomictic. Lowery Pond's proportionately great depth in relation to surface area, sheltered basin, continental climate, high calcium and bicarbonate concentrations and alkaline pH values suggest that the meromixis present in the central and south basin is of biogenic origin. A bathymetric map of Lowery Pond has been made. From morphometric parameters and total dissolved solids data the stability (thermal and chemical) within Lowery Pond on October 29, 1980 was determined to be 139.45 g-cm/cm^2 . Lowery Pond's annual heat budget for 1979-80 period was calculated to be $9,740 \text{ cal/cm}^2$. The mixolimnetic summer heat income equaled $9,033 \text{ cal/cm}^2$.

A FISHERIES SURVEY OF THE CENTRAL PORTION OF THE NYS BARGE CANAL AND ASSOCIATED DRAINAGE BASIN AREAS.

Paul M. Sawyko, Rochester Gas and Electric Corp., 89 East Avenue, Rochester, N.Y. 14649

During 1979 and 1980 RG&E undertook a fisheries survey, utilizing electroshocking techniques, within portions of the Oswego River Canal/NYS Barge Canal/Seneca-Cayuga Canal/Genesee River System as part of an ecological study performed at RG&E's Beebe Station located on the Genesee River. In 1979 nine locations were sampled between Brewerton (at the Western end of Oneida Lake) on the East, to Lockport on the West, including most major inlets into the canal system. In 1980 the same areal extent was sampled, however sampling was primarily restricted to the NYS Canal System proper, thus reducing the number of locations to six. Qualitative information concerning fish species inhabiting these areas is presented.

Nearly 50 species, comprising 16 families, were identified during these two sampling years, with the Cyprinidae being represented by the most species. Certain species were confined to, and others absent from, the two smaller, rapidly-flowing inlet streams versus the larger, more sluggish waters of the canal system proper. Likewise most species found in the canal proper appeared to be present throughout this portion of the waterway system. Dominant species within the canal, having occurred at least once at more than half of the sampling locations each year include northern pike, carp, emerald shiner, brook silverside, rock bass, smallmouth bass, pumpkinseed, black crappie and yellow perch.

Previous surveys of the fisheries of this region are sparse, however while none of the species encountered are unusual for this area, this survey does document the presence of such species. This recently collected information may be of some value for use in future environmental assessments, if needed, associated with the NYS Canal System.

FURTHER INVESTIGATIONS INTO THE MIGRATION OF GIZZARD SHAD (DOROSOMA CEPEDIANUM) IN THE GENESEE RIVER. Paul M. Sawyko, Rochester Gas and Electric Corp., 89 East Avenue, Rochester, N.Y. 14649.

Since 1976 an autumnal, downstream migration of juvenile gizzard shad has been observed by RG&E during the course of ecological studies conducted at RG&E's Beebee Station located on the Genesee River. Due to the presence of a series of impassable waterfalls downstream of this power station any upstream migration of these fish is not possible, therefore an investigation was initiated to try to determine the location and extent of the source population for these fish. During 1979 and 1980 a survey was conducted, utilizing electroshocking, within portions of the Oswego River Canal/NYS Barge Canal/Seneca-Cayuga Canal/Genesee River System in order to provide information concerning this population and its movement patterns. In 1979 nine areas of this waterway system were studied, including most major inlets, extending from Brewerton (at the Western end of Oneida Lake) on the East, to Lockport on the West.

In 1980 this survey was reduced to six areas, most located on the canal system proper; however a fish marking program, utilizing fluorescent paint applied by a spray gun, was instituted in an attempt to aid in determining movement patterns.

In 1979 gizzard shad were found in three areas: Seneca-Cayuga Canal, and the NYS Barge Canal at Brewerton and Rochester. In 1980 they were found in all six of the areas surveyed. The marking program added little to the results in that recovery of marked fish was extremely rare.

Results of the entire study are hardly conclusive in terms of defining migratory patterns, yet very valuable in understanding the extent and potential of gizzard shad distribution. Large populations of gizzard shad appear to be present throughout this region, and their origin may be from a number of the larger waterbodies interconnected by this waterway system. The fluorescent marking program did not appear to be a successful technique for tagging this species of fish, probably due to the fragility of the species and the excessive loss of scales resulting from the marking technique. The findings do support previous theories on the possible invasion of various species via connecting waterways in NY State.

ECTOPARASITES OF THE GRAY SQUIRREL, SCIURUS CAROLINESIS,
FROM LIVINGSTON COUNTY, NEW YORK.

William A. Schutt, Jr., and Edwin J. Spicka (Department of Biology, State University College of Arts & Science, Geneseo, New York)

Ectoparasites of the Gray Squirrel, Sciurus carolinensis, from Livingston County, New York, were studied using visual observation. Sucking lice were most abundant with three species found: Neohaematopinus sciuri, Enderleinellus longiceps, and Hoplopleura sciuricola. One flea, Orchopeas howardi, was predominant. Ixodes marxi was the only species of tick found. Mites, Haemogamasus reidi, Androlaelaps fahrenheitzi, and Cheyletus sp., were collected in low numbers. The accidental presence of a single bird mite, Trouessartia sp., was noted. Four species of chiggers were found, all in low numbers: Eutrombicula alfreddugesi, Neotrombicula whartoni, Euschongastia sp., and Walchia americana.

MOVEMENT OF ROCK BASS IN SOUTHERN LAKE ONTARIO. J.F. Storr, P. Martin, J. Myers, Division of Biology, State University of New York at Buffalo. C. Lange, Eco Research Inc., Akron, New York 14001.

Of over 70,000 fish tagged in Lake Ontario from 1972 to 1980 in a fish tagging program, 6,803 have been rock bass (Ambloplites rupestris (Rafinesque)). From these, 757 tags have been returned by anglers or recovered in the netting program. Examination of return data from fish ragged at the Rochester Gas and Electric Ginna Nuclear Power Plant and Sterling sites indicate that rock bass range as far as 106 miles. Dispersion patterns of the rock bass best fit the theoretical curve $Y=Ae^{bx^c}$ where Y is the number of recaptures at a given distance (x) and A and b are constants. Values of c ranged from $\frac{1}{2}$ to 2, depending on the time interval between tagging and recapture, a value of 2 approximating a random dispersion.

Arbitrarily selecting July 1 as a mid-spawning date, we found differences in dispersal patterns before and after this date, with rock bass dispersing more rapidly and further in the earlier period. Reasons for this variation are not readily apparent. The dominant eastward moving current along the southern shore of Lake Ontario had no apparent effect upon E/W dispersal patterns.

Overall, rock bass display a very short residence time in any one location. Less than 18% of the returns were taken at the site of tagging. This suggests that the local "fishing hole" is more of an attractant to fish which are constantly moving from place to place than of there being a resident population.

Analysis of the baits selected by anglers shows that 55.6% used worms, 30% artificial lures and 13% minnows. Only 1.5% of recaptured rock bass were taken with crustaceans although they are an important part of the rock bass diet.

Of major significance, the study indicated that a point source of pollution will affect a very low percentage of fish in the immediate area (because of constant movement and low residence times), but a fish so affected may travel long distances and thus there is no guarantee that a fish caught far from a point source of pollution will not be contaminated.

A PRELIMINARY SCANNING ELECTRON MICROSCOPE STUDY OF THE ANTENNAE OF THE FLY SOLVA PALLIPES (LOEW). Carey E. Vasey and Edward Ritter, Biology Department, State University College, Geneseo, N.Y.

The structural characteristics of the antennae are useful in the identification of Diptera. In the Xylomyidae, the flagellum is annulated giving the illusion that it is a multisegmented structure. These annulations are clearly visible in scanning electron micrographs.

Taxonomic descriptions are given for species of this family by Leonard (1930) and Steyskal (1947). However, neither author has indicated structural aspects of the flagellum beyond the notation of pseudosegmentation. Scanning electron micrographs depict an intricate system of sensory receptors which are for the first time described herein. Additional descriptions of the structural components of the first and second antennal segments are included.

Concurrent Session No. 4 - Chemistry

B. D. Joshi, Presiding

RESOLUTION OF N-DONOR COBALT COMPLEX ENANTIOMERS BY ELECTROPHORESIS IN STABILIZING MEDIA.

Michael J. Brookman and Thomas A. Donovan, Dept. of Chemistry, Buffalo State College, Buffalo, NY 14222.

The electrophoretic behavior of enantiomeric cobalt (III) complexes in optically active gel matrices was explored and the results were compared with those obtained using a paper substrate.

Low voltage electrophoresis in a starch gel medium was used to obtain the resolution of $[\text{Co}(\text{en})_3]^{+3}$ and the apparent resolution of $[\text{Co}(1,2\text{-pn})_3]^{+3}$ and $[\text{Co}(\text{dipy})_3]^{+3}$. Observations made during the electrophoresis of these metal complex enantiomers suggest two different mechanisms for resolutions.

SOME COMPLEXES OF 5-AMINO-2-THIAPENTANOIC ACID.
Thomas A. Donovan and Susan L. Snyder, Dept. of
Chemistry, Buffalo State College, Buffalo, NY.

The technique of "template synthesis" was used to prepare a number of coordination compounds incorporating the ligand 5-amino-2-thiapentanoate ($\text{H}_2\text{NCH}_2\text{CH}_2\text{SCH}_2\text{COO}^-$). Condensation of mercaptoethylamine ($\text{H}_2\text{NCH}_2\text{CH}_2\text{SH}$) with chloroacetic acid (ClCH_2COOH) in an alkaline environment produced neutral hexacoordinate complexes of Co(II), Ni(II), and Cu(II). These complexes were characterized by elemental analysis and by measurement and interpretation of their ultraviolet, visible and infrared spectra. Magnetic moment determinations were also made for some of the complexes.

Failure to obtain an analogous complex with Zn(II) has been attributed to size and ligand field effects.

MOLWT - A UTILITY PROGRAM FOR CALCULATING MOLECULAR WEIGHT FROM A LINEAR STRUCTURAL FORMULA. Bhairav D. Joshi, Department of Chemistry, State University College, Geneseo, NY 14454.

The wide spread use of electronic calculators has displaced the log table from most modern textbooks in freshman chemistry. The periodic table of elements, however, still complements the inside cover of most chemistry texts. Books specializing in chemical problem solving, especially at the freshman-sophomore level, devote significant amount of space for listing atomic and molecular weights of common chemical substances. For the professional chemist, there are reference works which list the molecular weights of numerous compounds for ease of use. With the advent of microcomputers and interactive computing it is now the turn of the periodic table of elements, and the information derived from it, to be displaced from its prominent place in textbook covers, and reference works. The ease with which such information can now be retrieved from the computer, or even a pocket calculator, should be of tremendous help to students as well as to professional chemists. At Geneseo a project is underway to create a set of interactive computer programs to retrieve and use any desired information from the periodic table of elements stored in a computer.

This paper describes a utility program, MOLWT, that should be of interest to all chemists. Given a linear structural formula of a molecule, the syntax of which will be discussed, MOLWT will calculate accurate value of molecular weight of any compound containing any number of atoms. The periodic table of elements is used as the data base by MOLWT. The program is called by simply typing MOLWT.

This work is supported by a grant from the State University of New York Research Foundation, Grant # 125-4008B.

COMBUSTION PRODUCTS OF SOME CONSTRUCTION POLYMERS - I, THERMAL AND ACOUSTIC INSULATORS.

Surjit Singh and Adegboyega J. Kadree, Department of Chemistry, State University College at Buffalo, Buffalo, N.Y. 14222.

The behavior of various man-made building materials were studied, when such materials are subjected to thermal stress by simulated fires under draft conditions. The combustion products were frozen on a 'cold finger'. The frozen products were then dissolved in suitable solvents and analyzed by Infrared, gas chromatography, nuclear magnetic resonance, mass spectrometry and other physical methods. On the basis of our qualitative and quantitative work we can conclude that man-made materials generate large amounts of hydrogen cyanide, hydrochloric acid and monomeric and lower (di, tri, etc.) polymeric forms of the chemicals from which they were constituted.

COMBUSTION PRODUCTS OF SOME CONSTRUCTION POLYMERS - II QUANTITATIVE DETERMINATIONS OF HCl AND HCN.

Surjit Singh and Lynn A. Walker, Department of Chemistry, State University College at Buffalo, Buffalo, N.Y. 14222

The behavior of various Polyvinyl Chloride and Acrylonitrile based building materials was studied, when such materials are subjected to high thermal stress including combustion by simulated fires under draft conditions. The combustion products were condensed on a dry ice acetone 'cold finger'. Hydrogen cyanide and chloride were determined as precipitated silver salts.

Concurrent Session No. 5

Plant Physiology; Invertebrate Physiology

J. Douthwright-Fasse, presiding

THE EFFECTS OF RADIATION ON DNA SYNTHESIS IN PLANTS.

Francesca Geertsma

Pittsford Sutherland High School

Previous studies demonstrated that gamma radiation induced decrement in root growth and an increase in chromosomal aberrations. This study explores molecular mechanisms involved in the onset of radiation damage and recovery in peas seedlings. Two hypotheses were tested, (1) the challenge to cellular integrity by radiation induced damage will be reflected in the DNA synthesis, and (2) the cellular expression of radiation induced damage is dependent on the metabolism of the organism. To test hypothesis 1, groups of pea seedlings were irradiated at 250 and 1500 rads. Controls were sham-irradiated. Blind readings of DNA synthesis were made 1,2,4,6,24 and 36 hours after radiation. DNA synthesis was measured by the uptake of a radioactively labeled precursor, $^3\text{HTdR}$. Results were that the 250 rad group showed a perturbation at 6 hours followed by a return to control value, whereas the 1500 rad group steadily decreased to 25% of control value and did not recover.

Hypothesis 2 was tested by irradiating two groups of seedlings at 1500 rads and sham-irradiating 2 control groups. One irradiated and one control group were kept at 4°C before irradiation until measurement 6 hours later. The other irradiated and control groups were left at room temperature (25 C) throughout. Results were that the room temperature irradiated plants synthesized substantially less DNA than their controls, whereas the cold treatment irradiated plants evidenced the same amount of DNA synthesis as their controls.

It is concluded that molecular level changes occur after irradiation, that repair of DNA producing mechanisms is dose dependent, and the development of damage after irradiation is dependent on metabolic processes within the organism.

Further experiments are underway to extend the cold treatment study beyond 6 post-irradiation hours to test whether the present findings represent postponement of damage or damage avoidance.

THE STRUCTURE AND FUNCTION OF A PROTEIN CRYSTAL FOUND IN THE STIGMATOID TISSUE OF LILIUM LEUCANTHUM.

Stanley R. Gawlik, Biology Department, St. John Fisher College, Rochester, New York.

In the cytoplasm of stigmatoid cells of Lilium leucanthum a protein crystal, sensitive to pronase, can be observed. The crystal first appears in the cisternae of the rough endoplasmic reticulum in the stigmatoid cells at the surface of the stigma and follows a basipetal pattern of development. Prior to anthesis, when chemotropic activity can be demonstrated, the crystal is membrane free and attained a size of 16 to 20 μ m.

Immature excised pistils cultured under sterile conditions in Nitsch's medium containing L-(5-³H)-proline take up the label and concentrate it in the crystal. Mature cultured pistils containing the label were pollinated. Pollen tubes removed from the stylar canal of labeled pistils contained the label.

After anthesis the crystal follows a basipetal pattern of degradation. During this period there is an accumulation of microbodies in the vicinity of the degrading crystal.

The role of the crystal as a stored food reserve or as a source of the chemotropic compound is considered.

OBSERVATIONS ON MELANIN MOVEMENT IN THE SOUTH AFRICAN CLAWED FROG AND THE NORTHERN LEOPARD FROG. Joan E. Nichols, Edward Ritter and Allen F. Reid, Biology Department, State University College, Geneseo, N.Y.

The movement of melanocytes and melanin granules were affected by changes in light conditions as well as by the injection of α -Melanin Stimulating Hormone (MSH). The results of these movements were observed by use of light and electron microscopy.

In light background adapted frogs of both species the epidermal melanocytes are located near the epidermal dermal junction. The melanocytes of these frogs are punctate in appearance with most of the melanin concentrated around the cell nucleus. In dark adapted frogs of both species the epidermal melanocytes are located just

below the epidermal surface. These melanocytes are stellate in appearance with melanin concentrated in the cell processes.

Injection of α -MSH causes melanin dispersion in amphibians as well as a corresponding movement of the epidermal melanocytes. The dermal melanocytes do not appear to change position but the melanin granules do disperse.

SCANNING ELECTRON MICROSCOPE OBSERVATIONS OF THE
CESTODES CORALLOTAENIA MINUTIA AND CORALLOBOTHRIUM
FIMBRIATUM.

C. Tallman, Genesee Community College, Batavia, NY,
E. Ritter, S.U.C. at Geneseo, Geneseo, NY.

The topography of the cestodes Corallotaenia minutia and Corallobothrium fimbriatum were studied by scanning electron microscopy (SEM). Both cestodes are unarmed and have four suckers on the scolex. Corallobothrium has distinct lappets above the suckers whereas Corallotaenia has none above the suckers but does have distinct lappets below them. The scolex of Corallotaenia has an apical sulcus in all stages of development. The scolex surface is sparsely covered with microtriches. The immature proglottids of Corallobothrium are wider in proportion to those of Corallotaenia. The greatest density of microtriches is on the mature proglottids of both worms.

The SEM observations of microtriches confirms previous transmission electron microscope investigations. The surface morphology of these worms is compared to other cestodes as well as to each other.

HISTOCHEMICAL LOCALIZATION OF HEPATOPANCREATIC PEROXIDASE OF THE
FRESHWATER CRAYFISH CAMBARUS ROBUSTUS.

T. Tiersch and D. Merrill, Department of Biology, Rochester Institute of Technology, Rochester, New York 14623

Peroxidases (E.C. 1.11.1.7. Donor: H₂O oxidoreductase) are a class of hemoprotein enzymes that utilize hydrogen peroxide to oxidize a wide variety of organic and inorganic compounds. Despite the fact that the distribution of these enzymes in both plants and animals is extensive, their biological significance remains largely unknown. Myeloperoxidase, a lysosomal enzyme of vertebrate leukocytes, has been shown to possess potent bactericidal, virucidal, and fungicidal activities and may be responsible, in part, for the destruction of phagocytosed microorganisms.

The hepatopancreas of crayfish of the genus Cambarus has been reported to possess significant peroxidase activity. This organ is responsible for both digestion and absorption, and consists of two lateral pairs of blind-ending lobes, each with a central lumen leading directly into the midgut. The surface is studded with short tubules composed of a simple epithelium separating the lumen of the gut from the circulating hemolymph. A network of stationary phagocytic cells has been reported to be associated with the vasculature of the organ.

To explore the possibility that hepatopancreatic peroxidase is a lysosomal enzyme of phagocytic cells, we utilized assays reported by workers investigating the in vitro microbicidal activity of vertebrate myeloperoxidase. Our findings suggest that although the peroxidase of this organ can catalyze many of the reactions characteristic of vertebrate peroxidases, it appears devoid of in vitro microbicidal activity. Therefore, to identify the specific cells of the hepatopancreas that possess peroxidase activity, we employed a standard histochemical assay using 3,3'-diaminobenzidine (DAB), a specific peroxidase substrate. From this work, we have gathered both light and electron microscopic evidence suggesting that peroxidase activity is contained within secretory vesicles of the glandular epithelium and not within the lysosomes of stationary phagocytic cells. Further examination of these vesicles seems to indicate that peroxidase and other products are delivered through a holocrine mode of secretion in which vesicular contents are extruded into collecting ducts. The function of the peroxidase remains unknown.

Concurrent Session No. 6

Histology of Ceramic Bone Cements

R. Gardner, presiding

Eurypterids (Hughmilleriidae) from the Silurian of New York State and Ohio
Samuel J. Cieurca, Jr., 48 Saranac Street, Rochester, New York 14621

The Pittsford Shale at the base of the Vernon Fm. in New York has furnished hundreds of specimens of an interesting eurypterid, Hughmilleria socialis Sarle. Since the report of this type of eurypterid by Sarle in 1902, other Hughmillerialike eurypterids have been reported from a number of localities in the U. S. and Europe.

Recent discoveries have provided three new species that add to our knowledge of the stratigraphic and geographic distribution of this type of eurypterid.

The Late Silurian Phelps Waterlime Member (Fiddlers Green Formation) has provided a single carapace of a rare form, Nanahughmilleria humilis. Two new occurrences are recorded here. The Illion Shale (below the Vernon Fm.) has yielded a small Hughmilleriid, Parahughmilleria waeringensis n. sp. Early Silurian strata in Ohio have provided another Hughmilleriid, Parahughmilleria domagalai n. sp. The Ohio locality was recently discovered by Mark Domagala who brought this discovery to the authors attention. Additional finds should add materially to our knowledge of the Hughmilleriidae, their morphology, distribution and evolution.

THE IMPLANTATION AND HISTOLOGY OF BARIUM-FERRITE MAGNETIC CERAMICS: A PRELIMINARY STUDY.

M. Landolf, College of Liberal Arts & Sciences, Alfred University, Alfred, N.Y., 14802, J.P. Rausch, College of Liberal Arts & Sciences, Alfred University, Alfred, N.Y., 14802, L. Gardner, New York State College of Ceramics, Alfred University, Alfred, N.Y., 14802, and E.A. Monroe, New York State College of Ceramics, Alfred University, Alfred, N.Y., 14802.

Magnetic implants composed of barium ferrite ($BaO \cdot 6Fe_2O_3$) were implanted in the femora of ten laboratory rats. Two rats were sacrificed following implantation times of 1, 2, 3, 4, and 5 weeks. The femora were extracted with the implants intact. Histological examinations as to the amount and type of tissue surrounding the implant were made to determine whether or not new bone was formed. These data were used as criteria for evaluating both the biocompatibility of the ceramic implants and the capability of the implants to induce osteogenesis.

THE EFFECT OF AN EXPERIMENTAL CERAMIC BONE CEMENT ON FETAL RAT TIBIAS GROWN IN VITRO. Carol R. Lange, Medical Services Department, S.U.N.Y. Ag. and Tech. College at Alfred, Alfred, NY 14802.

Tibias were removed from fetal rats at day 19 of the gestation period. Extraneous tissue was removed leaving the periosteum intact. One tibia was grown in tissue culture in contact with the bone cement. The other tibia was also grown in vitro and served as the control.

Measurements of changes in length, wet weight and dry weight were taken at 2, 4, 6 and 8 days. Histological studies were carried out with both light and electron microscopy.

Analysis of the data showed no significant differences in mean length between the experimental and control groups. But significant differences ($P < .05$) are noted between mean wet weights at day 6 and between mean dry weights at day 8. In both instances the experimental group weighed more. The percent changes in mean length, wet weight and dry weight within the control groups are: length: 24% from 2.54 mm to 3.16 mm; wet weight: 14% from 1.83 mg to 2.09 mg; dry weight: -9% from .58 mg to .53 mg. Corresponding changes within the experimental group are: length 42% from 2.60 mm to 2.70 mm; wet weight: 49% from 2.05 mg to 3.05 mg; dry weight: 23% from .53 mg to .84 mg.

Photomicrographs revealed no difference in cellular detail between the two groups. These results suggest that the experimental ceramic cement does not have a toxic effect on fetal rat tibias grown in vitro. These findings have led to a current histochemical study of alkaline phosphatase activity.

THE USE OF CERAMIC-ACRYLIC BONE CEMENT TO MAINTAIN THE ALVEOLAR RIDGE FOLLOWING TOOTH EXTRACTION: A PRELIMINARY STUDY.

J. P. Rausch, College of Liberal Arts and Sciences, and E. A. Monroe, New York State College of Ceramics, Alfred University, Alfred, New York 14802.

The miniature swine were fasted for 24 hours prior to the injection of atropine sulfate (I.M.), .07-.09 mg/kg administered to dry secretions. This was followed immediately by chlorpromazine hydrochloride (I.M.), 1.1-1.4 mg/kg and at a different site ketamine hydrochloride (I.M.), 20-22 mg/kg. Pentobarbital sodium (I.V.), 24 mg/kg was administered through a 23 ga. in-

dwelling cannula in the medial ear vein as needed to maintain Stage IV anesthesia. The local extraction site was infiltrated with 2% lidocaine solution, containing 1:100,000 epinephrine to control bleeding, administered through a 27 ga. needle. Routinely, each animal was intubated with an endotracheal tube 7 mm in diameter.

Immediately following the extraction an experimental bone cement (65% polymethyl methacrylate - 35% alumina) was mixed with and aliquot of monomer and permitted to polymerize in the right canine tooth socket and the right I₁, incisor tooth socket. Upon completion a series of X-ray films were exposed and color photographs were taken.

The animals were returned to the lab for monthly clinical and radiographic checkups.

Following a 6 month implantation time two animals were sacrificed and the jaws extracted for histological evaluation of the tissues. No evidence of inflammation or other adverse tissue response was observed. The results confirm the biocompatibility of the experimental bone cement. No encapsulation of the implant was found.

PHOTOPERIOD EFFECTS ON GONADAL RECRUDESCENCE IN YELLOW PERCH, PERCA FLAVESCENS.

Matthew J. Sanderson, State University College, Geneseo

The environmental effects of photoperiod on reproductive physiology was studied in the yellow perch, Perca flavescens. Laboratory experiments were conducted where fish were exposed to controlled photoperiods at a constant 19-23 C temperature. A critical photoperiod between 12 and 14 hours for maturation of both testis and ovaries was indicated by the results. Calculation of the Gonosomal index of the testis and ovaries along with histological examination provided the basis for assessing gonadal recrudescence. Spawning of yellow perch at the 42 N latitude where the experiment was carried out should occur in mid-March to late April.

IMPLANTATION AND HISTOLOGY OF A CERAMIC-ACRYLIC BONE CEMENT IN LABORATORY RATS. D. Testrake*, D. Beckwith**, E.A. Monroe**, and J.P. Rausch***. *401 E. State St., Olean, NY 14760; **NYS College of Ceramics, Alfred University, Alfred, NY 14802; ***College of Liberal Arts and Science, Alfred University, Alfred, NY 14802.

Preliminary study of the biocompatibility of a ceramic-acrylic bone cement was conducted. The material used consisted of 30% volume ZrO_2 and 70% volume polymethylmethacrylate (PMMA). The femurs of laboratory rats were used as implant sites. General anesthesia was used, the femurs were exposed and stabilized with hemostats. Using a carbide burr in a dental hand drill, two 3mm x 1mm defects were drilled in each femur. The defects in the left femur were packed with the ceramic-acrylic bone cement. PMMA was implanted in the right femur of each rat as a control. The rats were maintained for various lengths of time, then sacrificed. The femurs were removed and embedded in a polymeric medium, spurr. Thin sections were made and stained. Preliminary histological study consisted of phase-contrast microscopy of the stained sections.

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