Vol. 12 September, 1975 No. 4

PROCEEDINGS

OF THE

ROCHESTER ACADEMY OF SCIENCE, INC.

Autumn Session Day for Scientific Papers

State University College of Arts and Science

Geneseo, New York

Bailey Science Building

Saturday, October 26, 1974

ABSTRACTS OF PAPERS

CITATIONS IN THE ROCHESTER ACADEMY OF SCIENCE

Published by the Academy

Rochester, New York

PROCEEDINGS OF THE ROCHESTER ACADEMY OF SCIENCE, INC.
Established 1881

The pages of the Proceedings are open mainly for the publication of original, unpublished articles on any aspects of the Natural Sciences of Western New York and the adjacent areas; for the publication of articles by the scientists of the region; and for biographical articles on the scientists of this area or those who have contributed to our knowledge of the Natural History of Western New York. Other articles will be considered by the Publication Committee. The proceedings also will publish the significant news, notes, and activities of the Academy, its Sections, and Members.

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1974 Autumn Session Day for Scientific Papers

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Authors who were Fellows of the Academy at the time of this session are designated F. R. A. S.

The price of this issue is $1.00.

PROCEEDINGS OF THE ROCHESTER ACADEMY OF SCIENCE, INC.
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Chairman, Melvin J. Wentland,
St. John Fisher College, Rochester

ELEMENTAL AND CHEMICAL ANALYSIS USING THE 2 MILLION VOLT ACCELERATOR. P.W. Alley, J.R. Chen, G. Landry, T. Miller, D.M. Pinckney, J.D. Reber and G. Struman, Physics Department, State University College, Geneseo, N.Y.

The research program using the 2 million volt accelerator located at Geneseo is described.

A technique discovered about three years ago for identifying traces of metals in various substances is being perfected. The technique involves the detection of X rays produced by high energy protons. The technique can detect as little as a one hundredth of a billionth of a gram of an element and is sensitive to almost all elements simultaneously.

We have shown that this technique has significant applications in the geochemical and environmental fields, and promises new diagnostic capabilities in the medical field.

Results of analysis of water and rock samples collected in Western New York will be presented.

POSTGLACIAL GEOLOGY OF THE GENESEE VALLEY, GENESEO, NEW YORK. Richard A. Young, Department of Geological Sciences, State University College, Geneseo, N.Y.

The geological studies by H.L. Fairchild in the Genesee Valley established the existence of many proglacial lake stages during the retreat of the Wisconsinan ice sheet. Radiocarbon dates on glacial deposits in western N.Y. and elsewhere by other workers have led to refinements and some changes in Fairchild's postulated sequences of glacial moraines and lake stages. Archaeological and geologic investigations near Geneseo, N.Y. have established a postglacial sequence of lake deposits and river terraces over the past 8000 years. The existence of a postglacial "Finger Lake" in the Genesee Valley for a minimum of 4000 to 5000 years is indicated. Subsequent river terrace formation correlates approximately with major recognized postglacial climatic fluctuations. This sequence of events was contemporaneous with the final erosional development of the Genesee River gorge in Letchworth State Park and accounts for the diverse nature of the Genesee Valley floodplain between Dansville and Rochester, N.Y.

A WATER QUALITY STUDY OF SURFACE WATERS IN THE TOWN OF AVON, LIVINGSTON COUNTY, NEW YORK. Joseph B. Halbig, Kenneth R. Applin, James S. Scherrer, Department of Geological Sciences and Richard M. Eliasz, Biology Department, State University College, Geneseo, N.Y.

During a four month period in the summer and fall of 1974, the streams in the Town of Avon were routinely sampled at isolated points and their waters were quantitatively analyzed for bacteria content and selected inorganic constituents. The baseline study was conducted on a total stream system that measures approximately 75 miles in length and consists of seven subbasin systems that lie almost entirely within the 35 square mile area of the town. Benchmark information of the type obtained is considered important for future water quality planning in this area as well as other parts of the Genesee Valley drainage basin where a marked increase in the rate of urbanization is expected to occur in the near future.

Analyses for aqueous, inorganic species were performed in the laboratory by atomic absorption spectroscopy for Na, K, Ca, Mg, Fe, Pb and Cd, and by the mercurimetric titration method for Cl. Dissolved oxygen, pH, specific conductivity, and temperature were measured in the field. The concentration range and average concentration (in parentheses) for each of the elements is as follows: Na, 9.2 to 145.8 (34.6); K, 1.3 to 26.3 (4.4); Ca, 35,8 to 420.0 (100.1); Mg, 25.5 to 220.0 (64.3); Cl, 19.0 to 285.5 (64.2); analyses for Pb, Fe, and Cd were performed on a limited number of samples. A linear relationship between specific conductance and chloride concentration, hardness (Ca + Mg), and total dissolved solids was established using least square criteria; the correlation coefficients for each of these relationships were 0.87, 0.96, and 0.98, respectively. While most concentration levels fell well below the maximum permissible limits established for drinking water and other water uses by the State of New York, the USPHS, and other agencies, in some cases concentrations of Ca, Mg, or Cl closely approached or exceeded these limits. Sampling was also conducted at related points along five of the larger streams in order to recognize and explain variations in elemental concentrations resulting from such influences as the addition of tributary waters, the inflow of water from sulfurous springs, and contamination from point sources of man-made pollution. The two most

important sources of input of dissolved inorganic materials to the streams appear to be from sulfurous springs and agricultural fertilizers.

Bacterial analyses were performed to determine total coliform, fecal coliform, and fecal streptococci. The membrane filter technique was employed, which involved the incubation and growth of bacterial colonies on selective media. The fecal coliform: fecal streptococci ratios obtained from samples collected at isolated points and related points along streams was used as an indicator of the type of fecal contamination present. The bacterial data were further studied to determine if any relationships existed between the bacterial type or count and the amount of variation in certain inorganic species. There were two streams in the town that showed consistently high bacterial contamination that was well above toleration limits.

TOPOCLIMATIC VARIATION OF PRECIPITATION PATTERNS IN THE FINGER LAKES AND ALLEGHENY PLATEAU, WESTERN NEW YORK. Ray Lougeay, Department of Geography, State University College, Geneseo, N.Y.

The accuracy of the precipitation recording network in the Allegheny Plateau and the Finger Lakes regions of New York State was tested, using a water balance model to simulate the hydrologic cycle of this study area. A comparison of measured stream discharge and calculated runoff revealed consistently low values of calculated runoff. This discrepancy was attributed to low precipitation values, as measured in the study region. The precipitation data are generally recorded at valley locations which do not receive as much precipitation as the upland plateau, the latter being more representative of this study area. The water balance model has the capability of estimating evapotranspiration from the watershed. Thus, differences between calculated and measured liquid moisture output from the watershed are related to the fact that the measured precipitation data are not representative of the total region. It was found that measured average annual precipitation values for this total watershed (24,323 km^2) must be increased by 10.46 cm. changing the mean annual precipitation figure for the years 1960-1971 from 85.27 cm to 95.73 cm. This represents an adjustment of twelve percent.

Plumalina densa Hall, 1878, A REVIEW AND EXAMINATION. Barrett N. Rock and Donald B. Sass, Departments of Biology and Geology, Alfred University, Alfred, N.Y.

A specific stratigraphic interval in Western Steuben County, New York has yielded some new fossil specimens which are provisionally assigned to Plumalina densa Hall. The organisms appear to have occupied an impoverished ecological niche along with the sponge Clathrospongia sp. The history of the genus is reviewed and its possible affinities explored. Ruedemann's placement of the genus in the Anthozoan order Alcyonaria is accepted in light of present fossil data.

THE ARCHAEOLOGY OF ROC 49-4: PROGRESS REPORT ON EXCAVATIONS AT A NINETEENTH-CENTURY MONROE COUNTY FARM. David H. Day, Department of Sociology/Anthropology, Monroe Community College, Rochester, N.Y.

Rarely has it been possible for college freshmen to participate in archaeological fieldwork. A participatory archaeological program has, however, been developed at the Monroe Community College Campus, where excavations are underway on a nineteenth-century farmhouse and related structures. Use of this unique on-campus site for an experiment in archaeological methodology is discussed, especially focusing on the validity of inferential interpretations by consulting informants who once occupied the farm site. Problems and prospects of student and wider community involvement in the excavation are examined.

DEVELOPMENT OF A SCIENCE ACTIVITIES PROGRAM WITH SOME RELATED ARITHMETIC ACTIVITIES FOR EMOTIONALLY HANDICAPPED CHILDREN AT UNGRADED LEVEL (1-3). Angelo Lamendola, Part-time staff member, Home-Hospital Tutor Section of Division of Special Education, Rochester City Schools, Rochester, N.Y.

An investigation was conducted on the utility of developing and applying to practical use of science materials and activities for individual children at Hillside Campus School of Hillside Childrens Center at Rochester, New York. Children's age levels averaged 6-9 years with two youngsters of age 11. Achievement levels averaged from low, through low average, to average. Children were in an ungraded classroom containing grades first through third. Purpose of this particular school setting is to provide educational services to the child that can not function in the usual school

situation and to redirect this child for reentry to a regular school. Children generally remain for a period of 6 months to a year; in exceptional cases they stayed for as long as 2 years or so. As required, the class room teacher provided remediation for visual perceptual problems. Working within this context, my study was directed along the following guide-lines:

1. A searching of science programs developed or under development to 1972.
2. Relation of science activities to teaching-learning process focused on primary grade children having emotional handicaps.
3. Development of specific science activities and materials with a view to their utility and safety.
4. Test use of these activities.
5. Subsequent observations and possible future directions.

EARLY SURVEYS OF MONROE COUNTY, NEW YORK - I, II. J. Franklin Bonner, Former Director (Retired). Division of Regional Planning, Monroe County, N.Y. Dansville, N.Y.

I. An example of an early stream pollution survey (1930's) of Water Shed 300 (one of five surveyed) is presented. From 36 sampling stations in this water shed data were obtained on the bacteria index, colon index, dissolved oxygen, and the basic oxygen demand - here 21 stations had a colon index of 10,000 ("a menace to health"); 9 had an index of 1,000 ("suspicious conditions"); 4 had an index of 100,000 ("definitely dangerous"); and only 2 had an index of 500 or lower.

II. (Submitted; not presented). Other aspects of the Division of Regional Planning (DRP) are reviewed. The Monroe County Park Commission (1926) recommended to the Board of Supervisors in 1927 the establishment of a Regional Planning Board (RPB) and in 1928 submitted a Master Plan Program. In May, 1929 the RPB was organized; it later became the DRP with goals of better maps, factual surveys, data analysis and creation of plans, a vocational education program, and promotion of the Plan. In 1932 with the advent of "work programs" projects were formulated to advance the 1928 Master Plan. In-service training groups were organized to aid in municipal planning. During the period 1932-1942 from 50 to 125 adults and from 25 to 75 youths were assigned.

Maps. DRP had field sheets (of the U.S.G.S. Topographic Survey, 1930-1934) photographed to provide horizontal control for aerial mosaics; an aerial photographic survey (July, 1930) with 1,104 negatives at

1" = 1,000 ft.; and aerial mosaics (maps) for 16 quadrangles at 1" = 1,000 ft. The contract cost less than $12,000 and the maps were copyrighted by Monroe County - sale profits on these were equal to over fifty per cent of cost. In 1932 DRP requested the U.S. to replace the 1910 Geologic Soils Map with a new map on which soils were classified according to soil productivity (for local crops); it was completed in 1936 and published in 1938 - with the DRP providing office space and some personnel. The DRP, using U.S.G.S. horizontal control field notebooks, developed base maps of Monroe County at scales of one inch equals: 3,000 ft.; 4,000 ft.; and 16,000 ft. - copyrighted by Monroe County. Property Boundary (Tax) Maps (1932-1942) were prepared for all 19 Towns and 10 Villages with over 70,000 parcels of land - approximating 900 map sections. Boundary line data were copied from deeds in the County Clerk's office. These were useful in studies of blighted areas, soil productivity, foot front assessed value comparisons, population densities, etc.

Harbor Survey (1930-1932). DRP served as Director of the County-City Joint Harbor Survey (McElwee-Crandall of Boston made the study and recommendations for Port and Harbor Development) and supervised the core borings along the Lake front and for Irondequoit Bay. Reports were filed with the County Board of Supervisors and the City Manager, and the core borings and data were deposited with the UR Geology Department. Ground Water Resources (1933-1936). DRP provided the field work, maps and report and the U.S.G.S. and the U.R. geologists provided guidance; 4,400 wells located, logs recorded; also data on well depth and diameter, aquifer, water table, hardness of water; chemical analyses were made for each of 2,000 wells; a bed rock contour map at 25 ft. intervals was prepared; and 600 copies of report distributed.

Subdivision Regulations (1933). The Board of Supervisors established rules for filing subdivision plats and for providing review by DRP; studies were made of over 17,000 parcels of special districts having a high delinquent tax debt; town, village and city laws were amended by the State Legislature authorizing subdivision regulations. Forestation Program (1936-1941). DRP obtained 3, 500,000 transplant coniferous trees from the State Conservation Department; contacted owners of poor and eroded land, and distributed these without cost to the owner.

Plant Ecology. In 1936 the forestation program was augmented by the DRP when 132 test plots of grasses and legumes, pasture and lawn mixtures and variety test

rows were established and maintained at Churchville County Park through 1946. In 1936 the DRP began field surveys of fence rows and farm woodlots to determine the types and intensity of natural vegetation. The N.Y. State Museum (Botany Dept.) in 1938 employed a plant ecologist to expand this program, and the results were published by the Academy in 1968-1969.

The town of Riga in 1963 using applicable maps, data, and DRP procedures and studies published "A Plan to Guide the Development of the Town of Riga." At least 25 other public interest programs were completed by the DRP and accepted as viable requirements for the improvement of the physical, social, economic and administrative elements of master planning.

The following are in the U. of R. Library: "County Planning as Applied to Monroe County, N.Y.," (Lecture, College of Architecture, Cornell Univ., 1936, 22p.); delinquent tax studies of the towns of: Brighton(1936, 75 p.; 1937, 118 p.), Irondequoit (1937, 201 p.) and, Greece (1937, 114 p.); inventories for town planning (each 2 parts in 1 vol., 1938) for Webster and Wheatland; surface water pollution survey, Monroe Co., N.Y. (1938, 28 p.); inventory for planning, village of Scottsville (1940, 70 p.).

SENECA-IROQUOIS DIETARY PATTERN CHANGE: MEDICAL ANTHROPOLOGY AND SOCIAL HISTORY.* Russell A. Judkins, Anthropology Department, State University College, Geneseo, N.Y.

Direct and detailed observation of the dietary habits and nutritional intake of a group of Seneca Indians from Allegany Reservation, New York has revealed a dietary behavior complex which provides most required nutrients, but which also favors a high incidence of marked obesity. With regard to overall dietary patterning, dietary intake must be seen as only one component in a related functional network of biological, economic, prestige, and emotional factors. Besides these, there are historical aspects to the development of the contemporary dietary patterns of this group. Taken together, all these factors play an important role in the health status of these people. Obesity, diabetes mellitus and cardio-vascular disease are among the most serious health problems of the Seneca, and there is some reason to think that changing dietary habits may have a role to play in the etiology of these and other diseases.

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*Submitted, not presented.

An examination of the changing fashions with regard to predominant foods and diets of this group over the historical period reveals important shifts, which dietary-change hypotheses would suggest are related to the current high rates of incidence of degenerative diseases. The vastly increased use of white sugar in the diet, and changes in protein intake are cases in point. Ethnographic sources allow reconstruction of the diets of earlier periods, and these reconstructions suggest that the greatest changes in Seneca diet have taken place in the Twentieth Century. The conclusion is that while several distinctly aboriginal themes remain in contemporary Seneca diet, a revolution in diet and nutrition began several decades ago and is still in progress. It may be many years before the full health implications of these changes are known.

Plenary Session II. Environmental Science
Chairman, Archibald Reid,
Biology Department, State University College,
Geneseo, N.Y.

INVENTORY OF RARE AND ENDANGERED PLANTS OF NEW YORK STATE. Mildred R. Stauffer, Rochester, N.Y.

A statewide survey and inventory of rare and endangered plant species in New York is in progress by the Department of Environmental Conservation and the Commissioner's Advisory Committee, of which the author is a member. A series of preliminary lists of such plants has been submitted, and it is planned to prepare a semi-final listing by November 27, 1974, with the final inventory to be completed by February 27, 1975. This listing and an abbreviated, more popular type listing will be used by the Department of Environmental Conservation for educational and enforcement support of a revised native plant protection law passed by the New York State State Senate and Assembly this year.

In addition to the author of this paper, Dr. B.I. Coleman and Dr. David Hammond are members of the Commissioner's Advisory Committee from western New York. Suggestions of plant species for inclusion in the inventory should be directed to these persons for consideration by the total committee.

POLLEN PROFILE OF THE THOUSAND ACRE SWAMP, PENFIELD, NEW YORK. Bruce Gilman and Melvin J. Wentland - State University of New York, College of Environmental Science and Forestry, Syracuse; Biology Department, St. John Fisher College, Rochester, N.Y.

The Thousand Acre Swamp is one of the few virgin areas of considerable size remaining in Western New York and like Bergen Swamp it is an area that can provide valuable insight toward a more complete understanding of this region's paleoecology. A preliminary pollen study has revealed a unique vegetational history within the general pollen sequence of New England profiles. Though originally a bog forest, the shallowness of the basin, the soil characteristics and the adjacent upland communities probably allowed for the transition to a swamp forest during the hypsithermal period. Moist climatic conditions following this period have resulted in the present deciduous swamp forest.

BENTHOS OF THE DEEP BASIN OF CANANDAIGUA LAKE. Stephen W. Eaton and Patricia Weglinski, Department of Biology, St. Bonaventure University, Olean, N.Y.

In July 1927 Elon Howard Eaton took 47 Ekman Dredge (6x6x6 in.) samples along 5 east-west transects in the deep (30-76 meter) sediments of Canandaigua Lake. His data has been located in old unpublished notes and the same transects were repeated, as closely as possible, in 1974.

Very little change seems to have occurred in the almost 50 year interval. The four commonest taxa encountered were an annelid worm (species yet unidentified, an amphipod (Pontoporeia affinis), a pelecypod (Sphaerium sp.) and a dipterid (subfam. Tendipedinae). Other taxa taken in the samples included Mysis and an ostracod.

ECOLOGICAL PROBLEMS IN THE NORTH END OF CAYUGA LAKE. Gary L. Miller, Department of Science and Mathematics, Eisenhower College, Seneca Falls, N.Y.

Over the past half century there has been a large amount of research directed towards an understanding of the limnological and ecological characteristics of Cayuga Lake. Most studies to date have been centered on the deeper portions of the lake. An immediate study of the basic ecology of the shallow, northern end of Cayuga Lake is essential for two important reasons. First, the Department of Environmental Conservation of

the State of New York is pressing for the construction of a unified sewage system for the densely populated "Bridgeport" area on the northwest shore. Collection of data must begin immediately, in order to establish a baseline against which assessments of improvement can be calculated. Secondly, aquatic benthic weed abatement programs are being proposed by many groups, with many interests. The danger exists that some of these programs may serve only to temporarily treat symptoms or make the already bad situation even worse. The body of the paper will deal with on-going research related to the definition of the system and recommendations for aquatic weed control.

THE RESPONSE OF BACTERIAL POPULATIONS TO ORGANIC POLLUTANTS IN LAKE ONTARIO: THE DEVELOPMENT OF A LABORATORY MODEL INVOLVING OIL DEGRADATION. P.H. Pritchard and R.M. Ventullo, Department of Biological Sciences, State University College, Brockport, N.Y.

The fate of organic pollutants is as diverse as the chemical nature of the pollutant itself but it is, nonetheless, recognized that the metabolic activities of bacteria populations play a critical role in determining where the pollutant will ultimately residue or how fast the pollutant will eventually disappear. In an attempt to help broaden our knowledge about the response of bacterial populations to organic pollutants we have set up laboratory studies with the purpose of generating results which can readily be extrapolated back to a natural environment. This has necessitated the development of continuous flow or open types of enrichment systems. We have selected oil as our organic pollutant because it is relevant, because it is a complex organic substance which is composed of both readily degradable and highly recalcitrant hydrocarbons, and because it can be chemically analyzed by gas chromatography.

The continuous flow systems which we have developed represent a laboratory model of an oil slick. They consist of a layer of oil floating on a column of water in which fresh media was passed underneath continuously. Due to the problems associated with the insolubility of oil in water, the oil was not agitated or dispersed but was instead allowed to float undisturbed on the surface of the water. Experiments were initiated by placing a 2 mm thick oil layer on the surface of a fresh sample of Lake Ontario water such that a minimal salts medium of ammonium chloride, sodium phosphate,

magnesium sulfate and distilled H_2O could be continuously passed underneath the oil layer at a constant dilution rate. Degradation of the oil was monitored by examination of the bacterial populations present and by chemical analysis of oil using gas chromatography.

Despite the lack of mechanical dispersion, within a week to ten days bacterial growth began to accumulate at the oil-water interface as a thin white film. In about two-three weeks the mass of bacteria had increased at the water surface **and** become mixed with the oil layer. Small fluffy masses of the bacteria, containing small droplets of oil continuously flaked off at a slow rate and were washed out of the growth vessel. By the end of seven-ten weeks most of the oil had disappeared from the surface and the bacterial population began washing out.

This degradation scheme was quite consistent from experiment to experiment despite the use of different water samples. Only the time course between individual events varied. Eight ml of oil were generally completely removed from the continuous culture system in 40-50 days.

The metabolic capabilities of the isolates obtained from an entire degradation experiment were determined by their growth on various hydrocarbons and organic materials. Approximately 10-15% of all isolates obtained during an experiment were incapable of utilizing only hydrocarbons as a source of carbon and energy. Of those isolates that did attack hydrocarbons, less than 25% attacked more than one hydrocarbon type. Hexadecane and octane were attacked most frequently. Trimethylbenzene and decalin were rarely attacked. Most isolates grew extremely well on short chain fatty acids.

Gas chromatographic analysis of the oil has shown that actual degradation is taking place. Oil taken directly from the culture vessel showed an indiscriminate attack on aromatics and normal and branched alkanes as measured by alteration of peak height and shape. Normal alkanes showed the greatest % change during the experiment.

Significant amounts of oil were also recovered in the effluents. Degradation was more pronounced in these fractions and the extent of degradation differed from the oil sample in the growth vessel. Using sequential continuous culture systems in which the effluent of one culture vessel serves as the nutrient source for another, a greater degree of degradation in the oil was observed after passage through three successive vessels.

To further check the response of bacterial populations to the presence of oil, several environmental parameters were tested. The addition of readily degradable organic material such as the addition of oil % glucose or oil % propionic acid to the in flowing medium completely inhibited the oil degradation process. Small quantities of a nonionic detergent increased the solubilization of the oil but in fact also completely inhibited its degradation. The use of commercial bacterial seed cultures or the use of isolates from batch culture enrichments on oil resulted in extensive emulsification of the oil but very little degradation.

SOME ASPECTS OF PRECIPITATION CLIMATOLOGY IN THE GENESEE VALLEY. John M. Williams, Department of the Earth Sciences, State University College, Brockport, N.Y.

The precipitation climatology of the Genesee Valley is examined from the standpoint of differences in precipitation averages across the valley. Comparisons of the amounts in the valley with those in the higher ground south of Buffalo also are provided. In addition, the pattern of soil moisture is examined, and a statistical analysis of Rochester snowfall data also is presented.

A SECOND OCCURRENCE OF KINOITE, $Cu_2Ca_2Si_3O_{10}\cdot 2H_2O$. William W. Pinch, Eastman Kodak Co., Rochester, N.Y.

The rare mineral kinoite, previously known in several small specimens recovered from drill cores in the northern Santa Rita Mountains, Pima County, Arizona, has been found at the 2760 level of the Middle East Pit at Christmas, Arizona. From what is known about the locality so far, the kinoite appears to have come from a skarn zone in a phenocryst limestone. It is found as azure blue monoclinic crystals with an average length of 0.5 mm and ranging up to 1.8 mm. Some of the crystals show enlargement at the terminations forming "wheat sheaves" like stilbite; while a few are in balls, which when broken have a radial internal structure like wavellite. The kinoite is frequently coated with and embedded in clear apophyllite crystals up to 1.0 mm in diameter, the apophyllite usually covering the entire specimen. Other minerals associated with the kinoite are wollastonite crystals, cuprite, bornite, chalcopyrite, garnet and a light-green botryoidal mineral which could not be identified by X ray powder diffraction method, even though a good pattern was obtained. It is

possible that this may be a new species. Work will continue on this problem until it is resolved. Both the geology and the associated minerals of the two localities are almost identical. The kinoite was identified by X ray powder diffraction photographs (CuK, 114.7 mm camera), physical properties and morphology, and associated minerals. Forty-two specimens were found, about half of which were completely covered with apophyllite crystals. Since this first find about 500 specimens were found, almost all of them being covered with apophyllite crystals.

TSUMEBITE, ARSENTSUMEBITE AND BAYLDONITE - A STUDY. William W. Pinch, Eastman Kodak Co., Rochester, N.Y.

The minerals tsumebite - $Pb_2Cu(PO_4)(SO_4)(OH)$, arsentsumebite $Pb_2Cu(AsO_4)(SO_4)(OH)$, and bayldonite $PbCu_3(AsO_4)_2(OH)$ and their relationships to one another and to fornacite and vauquelinite were discussed. The history of tsumebite and arsentsumebite were discussed in detail. Arsentsumebite was discredited in 1956 by Guillemin and in 1965 the formula of tsumebite was found to be in error (on the basis of the structure) in an unpublished paper by Nichols. In a study made by this author, in part based on an unpublished paper by Bideaux, Williams and Nichols entitled "The arsenate analog of Tsumebite, A New Mineral", the conclusion was reached that arsentsumebite should be re-established as a valid species. These conclusions were based on Guinier powder diffraction comparisons of tsumebite, arsentsumebite and bayldonite along with infrared absorption curves on the three. The data fits in quite well with the work of Bideaux and fact strengthens it. The occurrence of the three was also discussed and it had been found that tsumebite is quite a bit commoner than has been thought. It occurs with azurite, malachite and cerussite specimens and is frequently labeled "bayldonite", and is from Tsumeb, South West Africa. The crystals are tiny (up to 1.0 mm), polysynthetically twinned and apple green in color. They are found on specimens collected in the 1930's and 40's. It differs from the original described tsumebite in color only, the original being dioptase green. Specimens labeled "bayldonite pseudomorphite after mimetite" have for the most part been found to be arsentsumebite pseudomorph after mimetite. During the 1930's many choice specimens were found, most of which are probably arsentsumebite. Of seven specimens checked, only one proved to be bayldonite. The physical description is

the same as for tsumebite except that the crystals are smaller twins (not exceeding 0.25 mm). The locality is also Tsumeb. The mineral bayldonite was also included, partly because it has been mistaken for both tsumebite and arsentsumebite and partly because of a recent find of exceptionally large single crystals (up to 10 mm) associated with cupro-adamite, schultenite and a new species named keyite (to be published in late 1975) in the deep zone at Tsumeb.

Session III, Plant Science
Chairman, Lawrence J. King
Biology Department, State University College,
Geneseo, N.Y.

VASCULAR PLANTS OF MOSS LAKE NATURE SANCTUARY, ALLEGANY COUNTY, NEW YORK. Elizabeth Cook, Biology Department, Houghton College, Houghton, N.Y.

This annotated catalogue of the vascular plants contains data on 65 families and 263 species located on the sanctuary. Most of the unusual and rare plants occur on the sphagnum mat and include Lycopodium inundatum and Utricularia cornuta. Isotria verticillata occurs in the surrounding woods. The complete paper was published in Science Studies, St. Bonaventure University, vol. xxix. (1973).

INTROGRESSIVE HYBRIDIZATION BETWEEN RED AND SILVER MAPLES. James W. Kelly, Botanist, Monroe County Parks Department, Rochester, N.Y.

The native "silver or soft maple" of western New York State has been determined as the Freeman maple (Acer x Freemanii, E. Murray). The name has been applied previously only to experimental material produced by crossing the red maple (Acer rubrum var. rubrum L.) and the silver maple (Acer saccharinum L.). The three species are distinguished by six selected characters. Five of these are used to formulate a hybrid index for measuring the degree of hybridity of samples of three populations of Acer x Freemanii. Pictorialized scatter diagrams based upon the index values show that introgression between Acer x Freemanii and Acer rubrum var. rubrum has been occurring in only one of the three populations. This research comprises an M.A. thesis (State University College, Geneseo, N.Y., 1972).

MICROSCOPY IN MUSHROOM STUDY. Leo J. Tanghe, F.R.A.S. Eastman Kodak Co. (Retired), Rochester, N.Y.

Much of the current new literature on mushrooms makes extended use of microscopy in their description and classification, and the advanced amateur must gain competence in this field. Two of the several techniques used in mushroom study are the preparation of spore deposits and gill sections. These techniques will be described briefly, representative photomicrographs will be shown, and their significance for the identification of mushrooms will be discussed.

THE AGARIC FLORA OF BERGEN SWAMP. Helen S. Vishniac, Biology Department, University of Rochester, and Leo J. Tanghe, Retired from Eastman Kodak Co., Rochester, N.Y.

During a four-year study of the fungi of Bergen Swamp, sponsored by Bergen Swamp Preservation Society, 133 species of Agarics were identified. Floristic studies of mushrooms suffer from both their sporadic fruiting habits and the variety of species concepts held by leading students of this group. The agaric check list compiled nevertheless constitutes a characteristic flora of litter-decomposers, wood-rots, and ectomycorrhizal forms. Members of each group are unique to the swamp habitat in varying degree. Illustrated with color slides.

A LIMNOLOGICAL STUDY OF LEROY LAGUNE, Grace L. Murray, Rochester, N.Y.

A two year study of a small artificial lake located on the campus of Monroe Community College south of Rochester in the Township of Brighton was made in 1969 and 1970, for the purpose of determining the depth of the lake and the rate at which it was being filled with silt, as well as to find out if there was enough plant and animal life in it to make it of value for field trips and research. As the study developed, it included the history, geology, physical characteristics, temperature, depth, chemistry, flora and fauna, and changes through the seasons.

The lake was planned in the lower, swampy area of the campus for beautification, as a catch basin for water flowing from higher ground, for modulating the flow of runoff toward the residential section to the east, and for providing landfill. Excavation begun in 1965, was completed in 1966. A connection was made to the Barge Canal so that water could be admitted to the lake during dry seasons.

As part of this study, soundings were made with transit and stadia pole. Although depth varied considerably in different sections, it averaged slightly less than four feet. However, near the mouth of the inlets, silt was being carried into the water making the lake much shallower. This was especially marked near the north inlet where an island was formed in 1969 and a

peninsula in 1970. (Since this study, changes have been made to correct this condition).

In general the water is chemically similar to the natural waters of the Ontario-Champlain Region with the exception that magnesium salts were in greater concentration. During late winter and early spring, amounts of magnesium and calcium salts and chlorine as sodium chloride were excessively high. Calcium and magnesium compounds were being leached from the soil and salt was coming from the de-icing of the parking lots and roads. The lake water is alkaline due largely to calcium bicarbonate; is of relatively high pH; is high in dissolved oxygen; and is low in free carbon dioxide.

Temperature ranged from four degrees centigrade under ice in December to seventy-five degrees in August. Water temperatures at the floor and at the surface never differed more than four degrees, and generally not more than two degrees centigrade.

Shallowness, warmth, alkalinity and abundance of minerals, resulted in high productivity. Sixty-two genera of algae and thirty-eight genera of protozoa were identified. Euglena was abundant, frequently coloring large areas of the lake surface. Worms, rotifers, water fleas, seed shrimp, and water mites were in the soil samples. Fourteen species of Odonata foraged along the edges. Largemouth bass, Micropterus salmoides, smallmouth bass, Micropterus dolomieui, and blue-gill sunfish, Lepomis macrochirus, all of which are introduced, continued to thrive and propagate. An island, the stopping place for water birds, also furnished homes for muskrats. The dominant flowering plant of the water, Myriophyllum exalbescens, a water milfoil, grew luxuriantly.

The lake is a picturesque addition to the campus and can be an outdoor laboratory for chemical and biological studies. The complete paper was published in the Proceedings of the Rochester Academy of Science, 12 (3) 289-377, (1974).

A LATE WISCONSIN BURIED PEAT POLLEN PROFILE FROM THE VALLEY HEADS REGION AT SOUTH DANSVILLE, NEW YORK. Ted Rynders, Science Department, Canaseraga Central School, Canaseraga, N.Y.

A buried peat deposit was discovered 4.25 miles SE of Dansville, N.Y. at 1875 feet above sea level. Pollen counts and profile were developed to a depth of 210 cm., to the underlying glacial clay. Profile

interpretation and carbon date of 15300 B.P. for the bottom peat indicate a possible pre-Valley Heads ice advance in the region.

ULTRASTRUCTURAL, HISTOLOGICAL, AND PHYSIOLOGICAL STUDIES OF PLANT TUMORS CAUSED BY CROWN GALL BACTERIA (Agrobacterium tumefaciens). Joseph W. Shail, Department of Seed and Vegetable Science, New York State Agricultural Experiment Station, Geneva, N.Y. and Lawrence J. King, Department of Biology, State University College, Geneseo, N.Y.

Levels of plant growth hormones occurring during development of crown gall leaf tumors initiated by Agrobacterium tumefaciens were investigated. The host plant used for this study was Kalanchoe daigremontiana. A histological and ultrastructural survey of normal, wounded control and tumor tissue was made. Tumors were excised at 7 day intervals post-initiation, extracted and tested for auxins (IAA), cytokinins and gibberellic acid. Auxins reached their highest level in 7 and 14 day tumors and gradually declined to levels approximating those in normal leaf tissue. Fourteen day tumors had the highest concentrations of cytokinins, although abnormally high levels were maintained throughout the first 28 days of tumor development. The level of gibberellic acid remained high throughout tumor development reaching its maximal concentration in 21 day tumors.

Distorted leaves and roots were observed on tumor surfaces. In cross section these teratomas were shown to emerge directly from the tumor tissue. The histological survey of tumor development shows proliferation of mesophyll cells and vascularization in older tumors. Ultrastructural comparisons of tumor and normal tissues reveal such changes in tumor cell morphology as: thickened cell walls, reduction in chloroplast number, clumping of endoplasmic reticulum and increased vacuolization. No changes in the structure of cellular organelles were observed. No visualization of a recognizable etiological agent for crown gall disease was found. This research comprises an M.A. thesis (J.W. Shail, Jr., State University College of Arts and Science, Geneseo, N.Y. April, 1975, 80 pp.).

AGEING IN THE GREEN ALGA, Dunaliella tertiolecta. A.H. Latorella, P.R. Regan, D. Eustice and E. Ritter, Biology Department, State University College, Geneseo, N.Y., and J. Haynes, Zoology Department, University of Maine, Orono, Maine.

The green alga, Dunaliella tertiolecta, undergoes morphological and biochemical changes upon transition from logarithmic to stationary growth phase. Sexual reproduction is observed for the first time, occurring infrequently during stationary-phase and resulting in a quadriflagellate zygote. Transfer of stationary-phase cells to fresh medium results in a large number of 4-lobed cells, possibly zygotes undergoing meiosis or aberrant cell division.

Electron-photomicrographs confirm the absence of any cell wall, cell-sheath, or pellicle. The chloroplasts of stationary-phase cells contain a large number of electron-dense particles. These particles are digested by α and β amylase and therefore assumed to be starch. Stationary-phase cells also contain a large number of small, round osmiophilic bodies. Biochemical evidence indicates an increase in starch, chlorophyll a, chlorophyll b and β carotene at the stationary-phase. The level of glycerol, however, is constant at all growth phases.

The amount of deoxyribonucleic acid (DNA) of cells in stationary-phase is 1/4 that of logarithmic-phase cells. The DNA of stationary-phase cells has a higher 50%-thermodenaturation point, indicating a higher guanine-cytosine content, than that of logarithmic-phase cells. Cells of stationary-phase cultures, when diluted with fresh medium, undergo a four-fold increase in DNA before undergoing division. There is a corresponding increase in ribonucleic acid (RNA) and nucleotide levels.

A PHOTOGRAPHIC SURVEY OF TRILLIUMS. H. Lou Gibson, F.R.A.S., Editor, Photographer and Consultant in Medical and Scientific Photography (Retired), Eastman Kodak Co., Rochester, N.Y.

Slides of 24 species of Trilliaceae were projected that exhibited many of the taxonomic keys.

An English Herb Paris (Paris sp.) was compared with the Japanese apetalous T. smallii and with American quadrimerous forms. A T. grandiflorum bearing leaves in 3 tiers demonstrated the near relationship of trilliums also to the Indian cucumber root (Medeola virginiana).

A new trillium (Alpine form) from the west coast of the United States was described - it resembles T. nivale, but each leaflet is only about 15 mm long. A form of T. luteum (?) (a sessile species previously unreported from the Rochester area) was shown (specimens are in the Geneseo Herbarium).

Aberrant green trilliums (T. grandiflorum and T. erectum) were included, and a brief discussion of possible causes was given. The author's experiments with the "degeneration" of such plants (T. grandiflorum) into clumps of "seedlings", and the subsequent "regeneration" of some of these into normal plants, were described briefly.

GRADIENT ANALYSIS OF THE VEGETATION OF THE BRYON-BERGEN SWAMP. Franz Seischab, Biology Department, Rochester Institute of Technology, Rochester, N.Y.

Although aerial observations and photographs of the Bryon-Bergen Swamp seem to show zonation of vegetation, direct gradient analysis indicates a vegetational continuum with gradual spatial change in vegetation. Indirect gradient analysis gives insight as to the direction of vegetational succession and to environmental gradients which exist in the Swamp.

Session IV. Animal Science
Chairman, Carey E. Vasey,
Biology Department, State University College,
Geneseo, N.Y.

ULTRASTRUCTURE OF THE TEGUMENT AND CAECAL EPITHELIUM OF METACERCARIA OF Amblosoma pojmanskae. Chiao-Ping Chou, Department of Anatomy, College of Medicine, Howard University, Washington, D.C. and Edward Ritter, Department of Biology, State University College, Geneseo, N.Y.

The tegument of the metacercaria is made up of two different types of cells, with the surface layer being an extension of the deeply embedded tegumental cells. Mitochondria, secretory vesicles, dense bodies, and a membrane lamella structure are present in this layer. Two mechanisms of secretion at the surface are postulated.

The caecal epithelium is a single layer of amorphous cells with cytoplasmic extensions into the lumen. The cells contain large numbers of mitochondria and a highly developed rough endoplasmic reticulum. The cytoplasmic projections are assumed to function in phagocytosis. The metacercaria are from a parasite found in a freshwater snail from Conesus Lake, Livingston County, N.Y. This research comprises an M.A. thesis (C. Chou, State University College, Geneseo, N.Y.).

THE MALE GENITALIA OF Megischus bicolor sickmanni (Schletterer) (HYMENOPTERA: ICHNEUMONOIDEA, STEPHANIDAE) AND Aulacostethus bilobatus (Provancher) (HYMENOPTERA: EVANIOIDEA, AULACIDAE) AND THEIR POSSIBLE TAXONOMIC SIGNIFICANCE. Carey E. Vasey, Biology Department, State University College, Geneseo, N.Y.

The male genitalia of the wasps, Megischus bicolor sickmanni and Aulacostethus bilobatus, are described for the first time and their similarities are noted. Evidence is presented which indicates that the Stephanidae should not be included in the Ichneumonoidea. Morphological features characterizing the phalli of Gasteruptiidae, Aulacidae, and Stephanidae suggest possible affinities between these families and that their present taxonomic positions are untenable. This research comprises, in part, a Ph.D. thesis (State University of New York, College of Environmental Science and Forestry, Syracuse University, Syracuse, N.Y., 1974).

A PRELIMINARY STUDY OF THE SNAILS (Gastropoda) OF CONESUS LAKE, LIVINGSTON COUNTY, NEW YORK. Jean O. Wade and Carey E. Vasey, Biology Department, State University College, Geneseo, N.Y.

Investigation of the gastropods of Conesus Lake, Livingston County, New York, was conducted by the Biology Department, State University College, Geneseo, New York, during the summer months of 1971, 1972 and 1973. This work included collection, identification and preservation of the specimens. Ten species of snails have been thus far documented.

OVERWINTERING CAPABILITIES OF INSECTS IN WESTERN NEW YORK. I. THE GALL FLY, Eurosta solidagenis. R.E. Morrissey and J.G. Baust, Department of Biology, State University College, Geneseo, N.Y.

Overwintering capabilities of insects in Western New York State differ markedly. Eurosta solidagenis, a dipteran, is able to withstand repeated freezing and thawing only as third instar larvae, due mainly to the accumulation through winter of three cryoprotectants, glycerol, sorbitol, and trehalose, in a stepwise time and temperature dependent fashion.

OVERWINTERING CAPABILITIES OF INSECTS IN WESTERN NEW YORK. II. THE LADYBEETLE, Ceratomegilla maculata. R.E. Morrissey and J.G. Baust, Department of Biology, State University College, Geneseo, N.Y.

The "ladybug", Ceratomegilla maculata, accumulates no identifiable cryoprotectants and is freezing susceptible. Survival of the species in the adult form is dependent upon the ability to spectacularly depress its supercooling point until Spring. Experimental evidence indicates that reduced food intake, and hence number of nucleators for ice formation, may be responsible. Aggregation of these ladybeetles by the thousands at the end of the summer may be under pheromonal control. The research of parts I and II comprises an M.A. thesis (R.E. Morrissey, State University College, Geneseo, N.Y., 1975).

THE EFFECT OF AMMONIUM INSTILLATION ON THE HISTOLOGY OF TURBINATE BONE IN RATS. J.V. Logomarsino, G. Chmielewski, and A.E. Barnitt, Jr., Department of Biology, State University College, Geneseo, N.Y.

Thirty albino rats (Rattus norvegicus) from three litters were used to determine the effect of ammonium instillation as a nasal irritant. Rats 3 to 4 weeks of

age remained with the dam and were randomly assigned to two groups. One-half of each litter was instilled intranasally three times weekly for six weeks with a 4.8 or 6% (v/v) solution of ammonium hydroxide. A 0.2cc solution was administered to each nostril. The other half of each litter was left as uninstilled controls. Two weeks post initial instillation (p.i.), the treated rats developed chronic sneezing and a purulent nasal discharge. All rats were sacrificed by an overdose of sodium pentobarbital at 6 weeks p.i. Nasal and tracheal swabs taken at necropsy failed to reveal the presence of Bordetella bronchiseptica. The heads were fixed in 10% neutral buffered formalin. After fixation, the heads were demineralized in EDTA, embedded in paraffin, sectioned at 8 µm and stained with hematoxylin and eosin. Evaluations of turbinate deformity, rhinitis, and osteopenia were made using light microscopy. Each evaluation was assigned a numerical grade of 0 for normal anatomy and 1, 2, or 3 for mild, moderate or marked lesions, respectively. Animals instilled with ammonium exhibited moderate to marked turbinate deformity and rhinitis. The lesions were characterized by extensive infiltration of neutrophils and lymphocytes, a purulent nasal exudate, epithelial metaplasia and hyperplasia, proliferation of fibrous connective tissue and proliferation of immature osteoblasts. This pathological anatomy is similar to the pathological anatomy of Bordetella bronchiseptica nasal infection of pigs. Therefore the rat may be used as an experimental model to study the prophylaxis of atrophic rhinitis in pigs.

RECENT ADVANCES IN FALCON RESEARCH. Tom Jacikoff, Biology Department, State University College, Geneseo, N.Y.

The natural populations of many Falconiformes, particularly those within the family Falconidae, have declined dramatically since the mid- 1940's. Prior to World War II, there were two hundred nesting pair of peregrine falcons (Falco peregrinus) east of the Mississippi River. Because DDT had been used until very recently, there are no nesting peregrines found in this area today.

Many falcon breeding programs have been initiated. Scientists at Cornell University have pioneered much of the work. Recently thirty peregrines have been captively produced at Cornell, through the use of a technique called second clutching. By 1976, scientists at

the university project that two hundred young peregrines will be hatching, an amount equal to what the Eastern North American nesting population was before 1940.

Reintroduction has taken place with much success in natural peregrine eeries in Colorado. The foster parents are very responsive to the captive bred peregrine chicks. By next year, cross-fostering with red-tailed hawks will be attempted here in the East by the scientists at Cornell. Because of the recent advances in falcon research, a spark of hope remains for the many endangered raptor species.

HISTOLOGICAL AND HISTOCHEMICAL ASPECTS OF THE NASAL (SALT) GLANDS OF NORMAL AND SALT STRESSED CHUCKWALLAS. Allan E. Barnitt, Department of Biology, State University College, Geneseo, N.Y.*

The microanatomy and histochemistry of the bilateral nasal (salt) glands of normal and hyperkalemically stressed lizards, Sauromalus obesus were studied to assess the manner in which the glands respond to osmotic stress.

In the normal lizard, a stroma of loose connective tissue, penetrated by many small blood vessels, surrounds the compound branched secretory tubules that comprise the parenchyma of the nasal gland. The parenchyma is composed of three continuous segments of tubular epithelium. The small, polygonal cells of the first or terminal segments contain desposits of glycogen and little succinic dehydrogenase in their basophilic cytoplasm. A large number of the terminal cells contain granules of endogenous peroxidase along with cytoplasmic deposits of mucin. The epithelium of the second or principal segment is composed of simple columnar cells. The third or collecting duct segment is lined with a pseudostratified columnar epithelium. The pseudostratified columnar epithelium of the collecting duct is contiguous with the stratified squamous epithelium of the main excretory duct. The cells of the collecting duct and of the principal segment contained moderate amounts of succinic dehydrogenase in their eosinophilic cytoplasm. Moderate amounts of non-mitochondria adenosine triphosphatase was found along the basal membranes of both the principal and collecting duct cells. A small round basal cell is

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*(Submitted; not presented)

randomly interspersed among the cells of the principal tubules and the collecting ducts. The apex of the basal cell does not reach the lumen and its cytoplasm is unreactive histochemically. The number of basal cells is very small in the principal segments, but they become progressively more numerous centripetally. These cells are very numerous among the cells of the collecting ducts. The basal cells might be undifferentiated secretory cells that divide and migrate from the collecting ducts and then differentiate, replacing worn out secretory cells.

Hyperkalemia evoked an increase in the size of the epithelial cells and a corresponding reduction of the intertubular connective tissue. Moreover, hyperkalemia caused an increase in succinic dehydrogenase in the cells of both the principal and collecting duct segments. The functions of the principal cells and the collecting duct cells might be similar in the secretion of electrolytes. Osmotic loading increases the endogenous peroxidase in the terminal cells, but appears to decrease the deposits of glycogen. There was no apparent increase in succinic dehydrogenase in the cells. The terminal cells probably secrete mucus and also peroxidase. It is possible that the cells of the terminal segments might be the vestiges of an ancestral sero-mucus gland.

PHOSPHATE AND pH EFFECTS ON BACTERIAL ACID PRODUCTION AND TOOTH ENAMEL DISSOLUTION. Barbara MacIntyre, Eastman Dental Center, Rochester, N.Y.

Some people have a natural immunity to the disease of caries while others have a natural affinity for rampant caries. All, however, have the same basics in common, i.e. all have teeth microflora and all eat a more or less common diet. Somehow, in our in vitro research which had been principally extended to rat studies, we felt that a relationship between rat and human caries should be established: therefore, the pH 6.8 (human mouth pH) and pH 8.0 (rat mouth pH). In our studies these comparisons could easily be made to determine if there was a basis for testing these additives on rats and relating the results to human caries. Diet is perhaps the most harmless and simplest way to introduce additives into the human mouth. Therefore, the unending search for safe additives that help protect the teeth.

Our in vitro findings that pH dependence affects the ability of phosphate to inhibit acid production

and bacterial growth are of interest in relation to the differences between human and rodent caries. Accordingly, we investigated phosphate effects on bacterial acid production and enamel decalcification with four strains of Streptococcus mutans in culture media of initial pH 6.8 and pH 8.0, containing phosphate concentrations from .00M to .10M and radioactive bovine enamel. Cultures were incubated anaerobically for 48 hours. When a combination of NaH_2PO_4 and K_2HPO_4 was used, the acid produced by bacteria was related to the phosphate concentration and initial pH. At all phosphate concentrations more acid was produced at pH 6.8 than at 8.0 with peak levels at .06M and .01M respectively. Slightly higher phosphate concentrations reduced or completely inhibited acid production at both pH levels.

At approximately these same peak levels enamel dissolution was significantly inhibited. Enamel dissolution was reduced 94 per cent at .06M phosphate for pH 6.8 and 97 per cent at .02M phosphate for pH 8.0.

When K, Na and NH_4 phosphates were used alone, there was less effect on enamel dissolution and acid production. The presence of Ca at pH 6.8 and at pH 8.0 had no apparent effect on acid production but had a slight inhibitory effect on enamel dissolution.

CITATIONS IN THE ROCHESTER ACADEMY OF SCIENCE 1975

PAUL E. DESAUTELS
Honorary Member

Beauty is in the eye of the beholder, but gems must possess an intrinsic beauty because a multitude of beholders find them beautiful. Our candidate devotes his career to bringing the two together. He is curator in the Department of Mineral Sciences for the Smithsonian Institution, and is a prolific author and lecturer on crystals and minerals in general.

Following a master's degree from the University of Pennsylvania, he taught chemistry at Towson State Teachers College in Maryland. There he became interested in mineralogy in a small way. The collection of micromounts he started there is now an outstanding component of the fabulous Smithsonian collections.

He is a member of eight mineral societies and is Vice President of the Editorial Board of the Mineralogical Record. His four extremely popular books are eminently authoritative, beautifully illustrated, and include topics from legends to locations to lasers.

He delivers many lectures a year, and recently was involved in a television story about the Hope diamond. The intriguing presentation was factual rather than fanciful, and it led one to feel that the famous curse lies not in the jewel, but in the traits of those compelled to covet its blue flame.

For captivating so many people with the elegant geometry and splendid colors of minerals, we warmly extend an Honorary Membership to him.

VINCENT MANSON
Honorary Member

Metallic minerals offer raw materials for both the jeweler and the smith. Our candidate has provided both artisans with the stuff of their craft, because he has prospected silver and other metals.

After gaining a master's degree at the University of Witwatersrand in his native South Africa, he came to Columbia University for his doctorate. He is now Associate Curator of the Department of Mineralogy of

the American Museum of Natural History in New York. He has been active in the design and installation of educational and dramatic mineral displays that are enjoyed by over three million museum visitors a year.

He brings a background of varied experience to his post. In Rhodesia he and his colleagues located an extension of a productive emerald deposit. He has surveyed the Kalahari Desert and Nova Scotia for heavy metals. Currently, he is applying geochemistry to the study of the evolution of the earth's crust--a field that also involves meteorites and moon rocks. His interests are not all in mineral technology. His recent efforts have been in environmental geology, and he has conducted courses concerning the impact of progress on the land we inhabit.

For his contributions to the utilitarian and for enriching human experience, we are proud to make him an Honorary Member.

LAWRENCE J. KING
Fellow

The color "green" is subjective, whether flashing from the culet of an emerald or shining off the surface of a leaf. Our member is a biochemist, and his green is that of the botanist.

His major botanical interest concerns weeds. Plants are able to consume minerals from the soil and atmosphere by reaping the sun's rays. Herbivores, not adept at transforming sunlight, consume the plants. Carnivores, taking the easy alternative to digesting cellulose, consume animals. Man consumes all. Our resources are too few for permitting fruitless plants to compete with cultivars. Yet in reducing this competition, we must not ruin soil or waste sunlight.

Research on applying growth hormones to the natural control of weeds was started when he was a Fellow at the Boyce Thompson Institute. Following a boyhood in Richmond, Indiana, he studied at Earlham College and worked for a doctorate in botany at the University of Chicago. He is now Professor of Biology at the State University of New York at Geneseo.

He has published "Weeds of the World--Biology and Control," and two subsequent volumes are in preparation. In 1974 he co-directed an extensive and varied session of scientific papers at his college under the aegis of the Rochester Academy of Science.

For unique contributions which will help to ensure that the green pastures of earth do not become weed lots, we are proud to welcome him as a Fellow.

WILLIAM W. PINCH
Fellow

Knowledge is in the mind of the seeker. Minerals give knowledge under X ray scrutiny. Our member is an authority on identification. He has discovered seven mineral species, one of which bears his name. His file of mineral data provides a worldwide reference source. He offers loan and x-ray crystallographic services in conjunction with his unique personal mineral and fossil museum.

The start of his profession in the Kodak Research Laboratories can be traced further back than to his days at the University of New Mexico. His career was resolved when as a Rochester boy he discovered, locally, the world's most complete calyx of a rare crinoid fossil. Upon its identification at the Smithsonian Institution, he donated it to their collection. In return, he received a magnificent crystal of emerald-green vivianite.

Always ready to share his experience and enthusiasm, he has been judge and nomenclaturist for the AFMS and is a Fellow of MSA. He wrote "Photography of Minerals" for the Eastman Kodak Company. He was co-director of the 1974 Rochester Academy of Science Mineral Symposium.

For providing a source of knowledge to those who seek to understand as well as prize their collections, we are happy to elect him Fellow of our Academy.

ROCHESTER ACADEMY OF SCIENCE

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