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126th Annual Report
of the
New York State Museum
and Science Service

NEW YORK
BOTANICAL GARDEN

July 1, 1963 - June 30, 1964

MUSEUM BULLETIN NUMBER 401

NEW YORK STATE MUSEUM AND SCIENCE SERVICE

ALBANY, NEW YORK

*The University
of the State
of New York*

*The State
Education
Department*



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The University of the State of New York

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HUGH M. FLICK	Associate Commissioner for Cultural Education
WILLIAM N. FENTON	Assistant Commissioner for State Museum and Science Service
VICTOR H. CAHALANE	Assistant Director of State Museum

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1966	GEORGE F. GOODYEAR,	Buffalo
1967	CHESTER M. SUTER,	Chatham
1968	BRIAN H. MASON,	New York City

The Staff

State Museum and Science Service

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Anthropological Survey

WILLIAM A. RITCHIE State Archeologist, Associate Scientist
ROBERT E. FUNK Junior Scientist

Biological Survey

DONALD L. COLLINS State Entomologist, Principal Scientist
DONALD P. CONNOLA Senior Scientist (Entomology)
PAUL F. CONNOR Scientist (Zoology)
RODNEY C. DE GROOT Senior Scientist (Botany)
HUGO A. JAMNBACK, JR. Senior Scientist (Entomology)
DONALD M. LEWIS Junior Scientist
EUGENE C. OGDEN State Botanist, Associate Scientist
RALPH S. PALMER State Zoologist, Associate Scientist

Geological Survey

JOHN G. BROUGHTON State Geologist, Principal Scientist
JAMES F. DAVIS Scientist (Geology)
DONALD W. FISHER State Paleontologist, Associate Scientist
Y. WILLIAM ISACHSEN Associate Scientist (Geology)
W. LYNN KREIDLER Senior Scientist (Geology)
LAWRENCE V. RICKARD Senior Scientist (Paleontology)
ROSS P. SANGSTER Science Research Aide — Wellsville Office
ARTHUR M. VAN TYNE Scientist (Geology) — Wellsville Office
VACANT Senior Scientist (Geochemistry)

State Museum

VICTOR H. CAHALANE Assistant Director

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JENNIFER CHATFIELD	Associate Curator (Interpretation)
CHARLES E. GILLETTE	Associate Curator (Archeology)
CLINTON F. KILFOYLE	Associate Curator (Paleontology)
EDGAR M. REILLY, JR.	Associate Curator (Zoology)
STANLEY J. SMITH	Associate Curator (Botany)
JOHN A. WILCOX	Associate Curator (Entomology)

Exhibits

HELEN C. FISHER	Museum Technician (NDEA)
EDITH FROELICH	Museum Technician (Temporary)
LEWIS E. KOHLER	Museum Technician
LOUIS J. KOSTER	Senior Museum Technician
HAROLD W. ROSS	Museum Technician (NDEA)
ROBIN D. ROTHMAN	Museum Technician
THEODORE P. WEYHE	Museum Exhibits Designer

School Services

C. MICHAEL DARCY	Museum Education Supervisor
S. CRAIG SMITH	Museum Instructor (NDEA)
MARY JANE STAUCH	Museum Instructor (Temporary)
PAUL WEINMAN	Museum Instructor

Library

EILEEN COULSTON	Librarian, Junior Scientist
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MARYELLEN CANFORA	Stenographer
LINDA A. HEERAN	Stenographer (NDEA)
JOAN C. KELLEY	Senior Stenographer
JOSEPH T. KILLEA	Mail and Supply Helper
ROSELLE LITHGOW	Clerk
PATRICIA SARGOOD	Stenographer
MARJORIE R. SCHMIDT	Principal Clerk
GRACE SMITH	Senior Stenographer
CATHERINE M. STAPLETON	Stenographer
MARY C. STEARNS	Stenographer
EILEEN A. WOOD	Senior Stenographer

Guards

JOHN C. CUNNINGHAM	Building Guard
ANTHONY GENSICKI	Building Guard
EDWARD W. MCCARTY	Building Guard
WILLIAM C. ZIMMER	Museum Caretaker

Photographer

JOHN A. HELLER	Museum Photographer
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Maintenance

JACOB SMALLENBROEK	Carpenter
JAMES WIEDEMANN	Maintenance Man (Carpenter)

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General Statement

I have the honor to return a report on the activities and accomplishments of the New York State Museum and Science Service for the year ended June 30, 1964.

The leveling of buildings between State Street and Lincoln Park for the South Mall has enhanced the prospect for a new State Museum building. The planning effort for a new museum facility occupied the major attention of the staff during much of the year. Although the cultural center may not occupy a very high priority in the minds of State budgeters and planners, it is apparent that something will have to be done to relieve the dreary monotony of office buildings. No tourist is going to come to Albany to see State offices, but he will come to visit a cultural center. As the director of a great natural history museum remarked, "If they've torn down the buildings, you've got it made."

This concern is shared by the planners. At the end of the calendar year 1963, the officers of the Department were called to a conference in the Office of General Services, and almost overnight we were required to file requirements for museum galleries, the storage of collections, and laboratories for the scientists of the Science Service. Anticipating that this demand would arise, we had sketched the dimensions of this facility and the nature of its programs in the *12th Annual Report of the New York State Museum and Science Service*, which happily we were able to put on the table at the first planning meeting. Copies were also in the hands of the budget examiners.

With full knowledge that improved public relations would be necessary to sell such a facility to the taxpayer who will pay for it and use it, to put our colleagues in the museum profession throughout the nation on notice, and to fulfill the request of the American Association of Museums, we commissioned the writing of a general sketch of our services to the public entitled "A Service to Science" which appeared in the January issue of *Museum News*. Reprints of the article documented a presentation to the Regents which was attended by the Commissioner of General Services on January 23. The requirements for the new facility which were then in preparation were filed February 3.

The most difficult to communicate and yet the most significant requirement of any such facility is the need for a balance of space

between exhibit galleries, ranges for systematic collections, laboratories, and other facilities. A proportion of 40-40-20 is a standard rule in the museum profession that is most honored in the breach by architects. One of the most serious difficulties in communicating this idea to architects is the length of the chain of command and the possibility of the erosion or rearrangement of the balance so that the galleries completely dominate the museum to conform with the popular image. We have had the good fortune of a personal visit from the chief architect for the Mall; if we can now arrange to develop a close working relationship with his firm by affording one of his junior architects working space within our establishment, it is conceivable that our program requirements can be translated into architects' plans.

In viewing museum buildings around the world, we have seen altogether too many examples of the erosion of the original formula in government-built museums. In one instance, no offices were provided for the staff, to say nothing of storage for collections. In another, laboratories were omitted. In a third museum, air conditioning compressors completely filled a hall, and in a fourth instance, no one anticipated the depth of ceiling required for recessing air conditioning ducts and lighting for museum galleries. With these matters in mind, the Assistant Commissioner attended the dedication of the new Museum of History and Technology of the Smithsonian Institution and inspected the new research facilities and ranges of the U. S. National Museum of Natural History. The Assistant Director continued his close contacts with other museum facilities under construction. To this end, he and the Associate Commissioner visited the Milwaukee Public Museum and museums in Chicago, as did the Assistant Commissioner on another occasion.

Cooperation with other museums of the State has increased markedly during the year. The "museum aid bill" as the legislation implementing the so-called "Hochschild Report," as the *Report of the Commissioner's Committee on Museum Resources* has come to be known, was introduced a second time in the 1964 Legislature, without success. Both the report and the legislation have aroused wide interest in the nation, stimulating inquiries from New Jersey, Illinois, Connecticut and California, but the legislation has not yet attracted sufficient grass roots support within New York State to secure its passage. To be certain, the New York State Association of Museums has skillfully guided the legislation and made its existence known to legislative leaders who have expressed sympathy for it, and strong support has come from the major cultural institutions of New York

City, Rochester and Buffalo. So far, the bill has fallen between the two stools of massive appropriations for the Education Department and insufficient revenues. It is apparent that State aid for museums is undergoing the same life cycle as State aid to libraries, and that ultimately it will be an accepted part of the State Education Department's package of services to cultural institutions.

A related phase of cooperation with other museums is an increase in the number of queries for the chartering of new museums. The staff assisted several new corporations in the formation of museums. The Assistant Commissioner, at the request of an attorney, visited the extensive collection of a private citizen in Rochester with a view to recommending a way to convert a private collection to educational purposes. He also visited several institutions that had been chartered in previous years to render further advice on their programs. It is apparent that, as the demand for this service increases, a museum extension division is in the offing. Looking forward from chartering museums to their registration under the State aid bill, the Regents Minutes and other records of the Department were researched toward compiling an up-to-date list of museums that might qualify as educational institutions.

Saying "no" to a taxpayer is sometimes difficult. Gracefully refusing to hang in the Museum a framed photograph of a natural formation (operated as an attraction for private gain) because accepting the gift would imply in the donor's mind the obligation of the State Museum to exhibit it and would therefore give one commercial enterprise an unfair advantage over others is an awkward situation that skates the narrow line between a geologic or archeologic site and private enterprise. It is much easier to give advice to the trustees of a nature preserve, or even to a commercial bank concerning natural history prints appropriate as decor for bank offices, or to an arboretum as a possible research site for our scientists. Simplest of all is to give advice in one's specialty, as to assist a composer in his search for Seneca music. Perhaps most satisfactory was the continuing advisory capacity of the Assistant Commissioner to the Seneca Nation of Indians toward planning their rehabilitation as a result of the building of the Kinzua Dam.

Cooperation at the professional level is one of the most enjoyable and rewarding experiences for the scientist-administrator. SIAM are the initials for the Summer Institute in Anthropology for Museums which was held in July and August at the University of Arizona, Tucson, and involved three members of our staff. SIAM was a six weeks' training course for museum personnel, sponsored by

the American Association of Museums, financed by the National Science Foundation, and held at the Arizona State Museum. It was one of two such training programs to upgrade the quality of teaching in the two most popular natural science areas of museum interpretation—anthropology and astronomy. Fellowships were awarded to two members of our staff—the Associate Curator of Archeology and a Museum Instructor—and the Assistant Commissioner, who was a member of the planning committee, participated for one week as a consultant teacher. Participants felt it was a valuable experience. It was probably the best-staffed summer course in anthropology held in any university in recent years. For some of us, the return to teaching was a welcome experience.

At the research level, we were involved in the organization and conduct of a conference on anthropological research in museums held at the National Museum of Canada, Ottawa, during October. Here, an attempt was made to explore the ways that anthropological collections in museums can be used most fruitfully to advance research in the study of man and how museums may best get back into the forefront of anthropology as a science.

The scientist-administrator who does not maintain some contact with the field or the laboratory dies on the vine as the field is converted to other uses. In response to a request from the Conservation Department for an article on the Seneca Green Corn Ceremony, the writer spent a week in the field during July with the Seneca Indians of Allegany Reservation, the site of his former research, and then a week writing the article. He also edited for publication Captain William Hyde's *Observations on the Five Nations of New Yorke, 1698*, the first description of these interesting people by an English observer. The original manuscript is in the Gilcrease Foundation, Tulsa, Oklahoma, and was discovered by the writer some years ago. He also continued the writing of a general book on the Five Nations of New York (which was commenced during a Professional Development Leave).

A research administrator takes greatest pride in research accomplished by his staff. He is also proud of their ability to attract grants from outside sources. Just as the universities have experienced an alteration of their structure as a result of private and public grants that have come to the faculty, so a public museum that has been wholly supported by public funds finds it difficult to ingest grants secured by its staff scientists. We now have two large public grants from national foundations and two smaller private grants from private foundations, which in total exceed the annual Science Service



Figure 1. On October 19, 1963, the province of Ontario, the village of Clinton, the Six Nations, the New York State Museum and Science Service, and the University of Toronto Press honored Horatio Emmons Hale (1817-1896), the eminent Iroquoian scholar, on the occasion of the reprinting of his classic *The Iroquois Book of Rites*, for which Dr. William N. Fenton wrote the introduction. (Ontario Dept. of Travel and Publicity photo)

research budget. The principal investigator who receives his salary and travel from the public institution finds himself in a conflict of reporting relationships between his administrative superiors and the granting agency. There is a tendency to take one's public position for granted and look to one's colleagues in the community of science for judgment on one's research results. The scientist naturally looks upon his research grant as his project, and does not always regard it in the same way he does State-financed research. Even though the grants come from public funds or from funds given in lieu of taxes, and are made to a public institution, reporting relationships become confused.

A second aspect of national grants to State and private universities affects the acquisition of new collections. Within the last year, while the State Museum was awaiting the disposition of a budget request for the purchase of a fossil collection within the State, which would have been an important research adjunct to the State's large collection of invertebrate fossils, the same collection was purchased by an out-of-State university, and a State university at that, with funds furnished to a principal investigator by the National Science Foundation. Had the New York State Museum applied to the National Science Foundation for funds to purchase the collection, which we would deem an inappropriate request, it probably would have been denied.

As a professional anthropologist, the writer served as an officer of one learned society, honored the usual requests of colleagues to address their students, served on a fellowship screening committee, and was involved in three trips to Canada on literary, museum, and university matters, all at the request of Canadian officials, as listed in the Appendices. His office was deeply involved in the preliminary stages of American participation in the International Congress of Anthropological and Ethnological Sciences which involved communication with a wide variety of agencies. Of possible interest to educators, he wrote one of the chapters for the *Report of the Commission on the Humanities*.

It is frequently said of the State Museum that "when European men of science come to this country, their first question is, 'Which way is Albany?'" The famous words were spoken by Louis Agassiz, the Swiss naturalist of the last century, in addressing the American Association for the Advancement of Science at Albany, 1856. It might be said that this question is still asked.

Visitors of the year included Godfried W. Locher, Professor of Anthropology, University of Leiden, Holland; Rudolph Karl Bigalke,

MacGregor Museum, Kimberley, South Africa; and Frem Pong Bdu, Nigeria, graduate fellow at Yale.

STAFF CHANGES

On September 5, C. Michael Darcy was appointed provisionally to the position of Museum Education Supervisor vacated July 25 by Janet L. Stone, who began a two year leave of absence with the Peace Corps in Africa. Judith A. Drumm resigned September 4 to undertake graduate study at Rutgers University, and Paul Weinman was appointed to this instructorship on December 12. Maryellen Canfora's position of Typist was reclassified to Stenographer on July 25. On October 17, S. Craig Smith was appointed to the Museum Instructor position vacated by Mr. Darcy and Grace Smith was appointed Senior Stenographer upon the resignation of Vera McMillen Wheeler.

WILLIAM N. FENTON
*Assistant Commissioner for
State Museum and Science
Service*

Accomplishments of the Surveys

ANTHROPOLOGICAL SURVEY

Aboriginal settlement pattern studies in the Northeast were continued with National Science Foundation support, and new and important facts were obtained. Two field parties headed by the State Archeologist and the Junior Scientist, respectively, with six graduate student assistants carried out intensive excavations on four important prehistoric sites in central and eastern New York and eastern Massachusetts. The work added a large volume of significant settlement pattern information to that already accumulated by our researches under this program into the development of agriculture, village life, and the growth of communal longhouse society.

At Kipp Island in central New York the first settlement pattern data for the Point Peninsula culture of the Middle Woodland period were uncovered. Three types of houses were revealed, together with a large amount of artifact materials and hearth charcoal from which radiocarbon dates ranging between A.D. 310 and 630 have been secured. A cemetery connected with this site was also explored, yielding the remains of 120 individuals and significant burial data.

At Vineyard Haven, Massachusetts, the State Archeologist excavated a stratified site of the Early Woodland period and obtained abundant data relating to the cultural sequence and to the adaptation of a primitive group to a coastal ecology.

Two large village sites of the Late Woodland period, Kelso in central New York and Garoga in the eastern part of the State, were excavated under the supervision of the Junior Scientist. The former site, representing the earliest Iroquois village so far known, was characterized by two large palisaded enclosures and numerous proto-longhouses ranging up to 128 feet in length. The Garoga village of the late prehistoric Iroquois represents the only complete excavation of a classic Iroquois town site on record.

In addition to the above program, work was begun in the Hudson Valley on river valley surveys in New York State for the purpose of discovering the archeological resources of the State and planning for their systematic, long-term investigation.

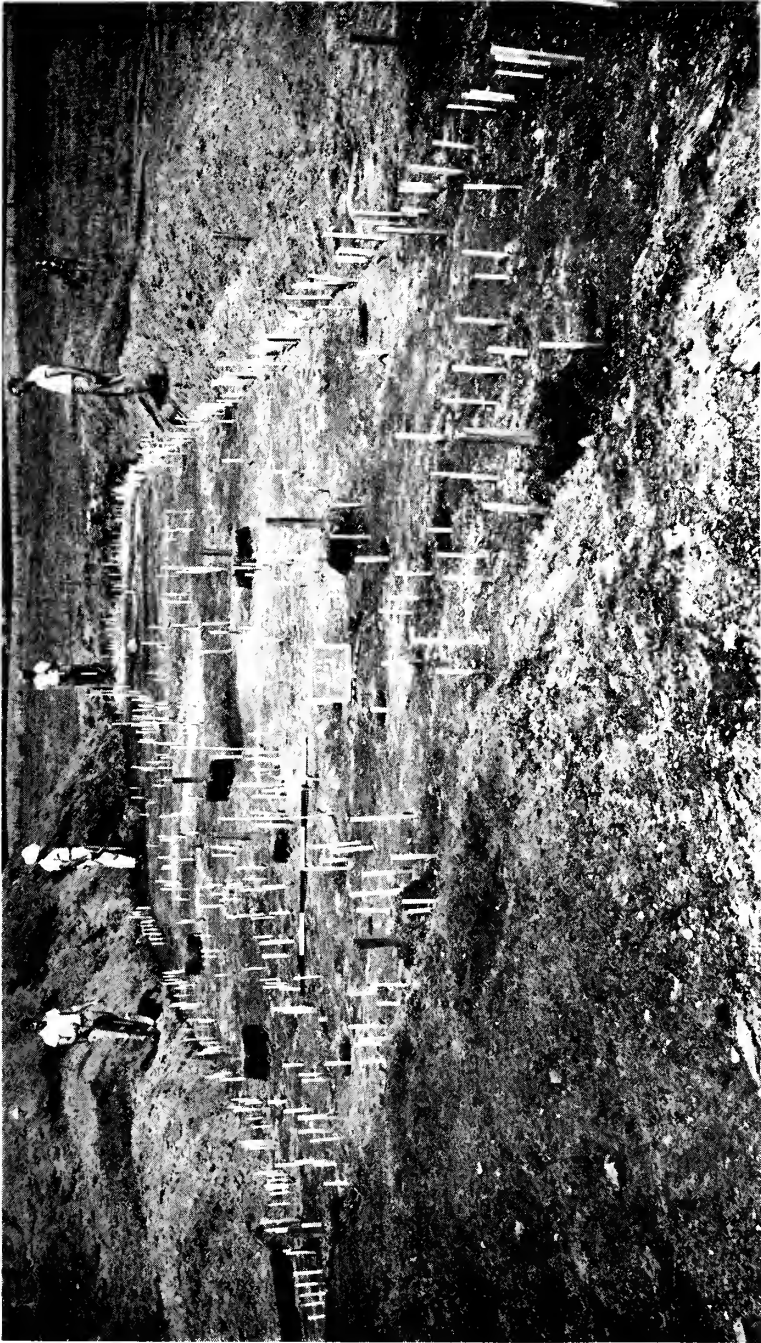


Figure 2. State Science Service personnel excavating floor of earliest known Iroquois culture. About one-half is exposed; remainder (foreground) has been backfilled. Kelso site, Ellbridge, Oneida County, N. Y.

During the year the data from the Kipp Island and Kelso site excavations were studied, analyzed, and prepared for publication. The State Archeologist completed a book manuscript entitled *Early Man to Iroquois* to be published by the Natural History Press of the American Museum of Natural History. A paper on "Early Man in New York" was also written; it was read for him at the annual meeting of the American Association for the Advancement of Science in Cleveland.

Cooperative work of the State Archeologist included giving aid, advice, and information to a large number of professional and amateur students, colleagues, State agencies, and others. Finally, office activities and administrative work included interviews with 206 local and out-of-town visitors.

WILLIAM A. RITCHIE
State Archeologist

BIOLOGICAL SURVEY

Most of the work of the Biological Survey is concerned with two large fields: (1) natural resources and ecology and (2) public health. Within these two areas are several programs with separate but inter-related projects.

The first field, natural resources and ecology, includes research on forest pests—fungus diseases, white pine weevil, and gypsy moth; on specialized botany, including studies of fossil pollen and aquatic plants; and on small mammals.

Within the first area, with deterioration of the American beech tree as his first assignment for study, the newly appointed Senior Scientist (Botany) [Mycology] has discovered 20 new fungal associates of beech, and demonstrated a probable connection with the oyster-shell scale insect (*Lepidosaphes ulmi*).

A long-term study in forest ecology and genetics was begun by the Senior Scientist (Entomology). This study will attempt to determine the factors which favor resistance of white pine to attack by white pine weevil. Observations and investigations over a period of several years, some of which were summarized in State Museum and Science Service Bulletin 389 *White Pine Weevil Attack in Relation to Soils and Other Environmental Factors in New York*, by D. P. Connola and Earl C. Wixson, have led to this new approach. It recognizes, incidentally, the desirability of finding methods other than use of chemical insecticides for control of forest and other pests.

The small mammal survey, in addition to its contribution of ecological data and specimens, also has an important bearing on the

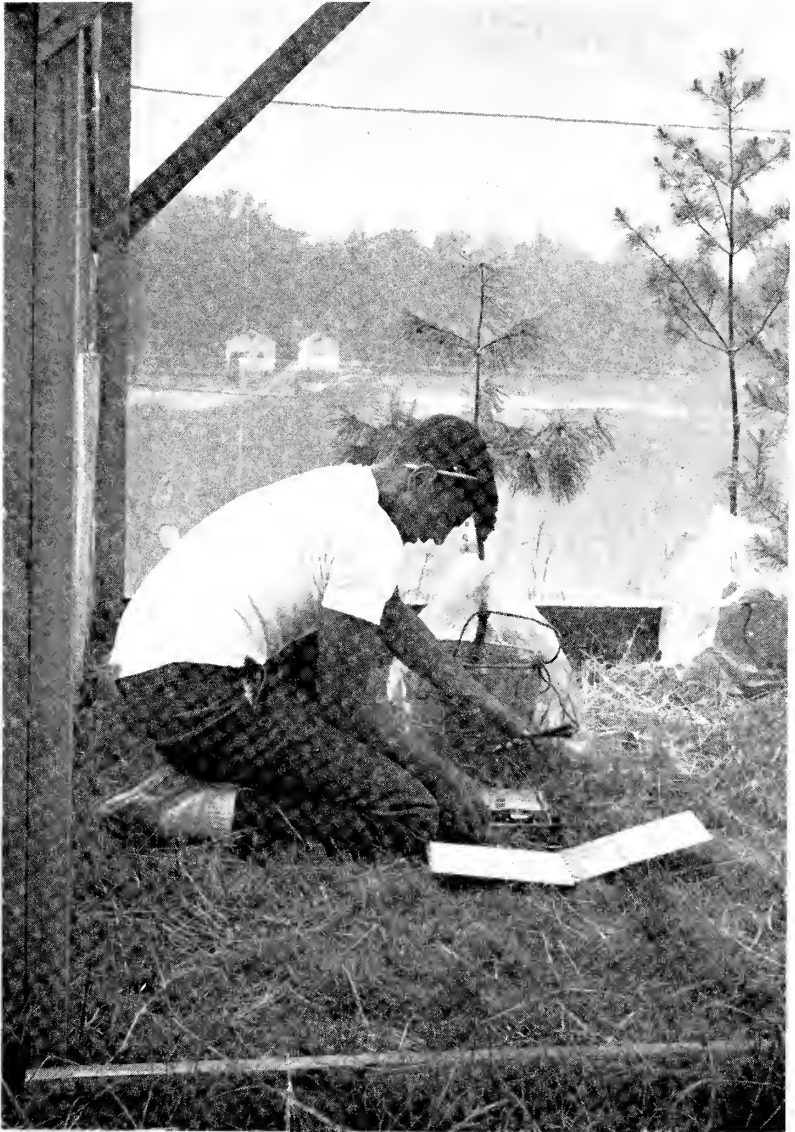


Figure 3. In a study of weevil attack in relation to water balance, white pines were placed in large cages and exposed to the insect. Half of the trees were deprived of moisture by regulating the amounts of water given. Soil moisture was measured (as here) twice weekly by means of a Delmhorst meter.

second or public health area. The Scientist (Zoology) brought specimens of birds, as well as mammals, and his specialized knowledge to the virus, vector, and host survey on Long Island. Of special interest in this program was the finding by Dr. Elinor Whitney, bacteriologist and virologist of the State Health Department, that the six isolates of a new virus from the mosquitoes and animals collected by our staff were related to the Hart Park Virus discovered in California. This new virus was officially named Flanders Virus, from the Flanders Bay area near Riverhead, where the host specimens were found. It was described in a paper by Dr. Whitney in the *American Journal of Tropical Medicine and Hygiene*.

That portion of the pollen studies listed as "Travels of Airborne Pollen" which is supported by a grant from the U. S. Public Health Service is classified in the public health field. The State Botanist, leader of this project, was appointed to the Research Committee of the American Academy of Allergy and was elected chairman of the Committee on Pollen and Mold. A set of instructions for the construction and use of the intermittent roto-slide pollen sampler was prepared, and arrangements were made for distribution of the instructions by the American Academy of Allergy. Detailed blueprints have been made available from the Oak Ridge Reproduction Service in Tennessee.

All members of the Survey have participated in planning for the new Museum and Science Service building that is proposed for the South Mall.

DONALD L. COLLINS
State Entomologist

GEOLOGICAL SURVEY

The Geological Survey is making steady progress in basic and applied research. In order to meet obligations, however, it will be necessary to add specialists in other fields, particularly in environmental geology and its subdivision, urban geology. Data must not only be collected and compiled but they must be prepared in such a way as to be intelligible to laymen and other nongeological specialists.

During the year, the State Geologist served as chairman of a Science Service committee to make plans for office and laboratory space in the South Mall. In order to meet needs of the next 10 to 15 years, staff, space, and budget should be about three times the present level.

The oil and gas office at Wellsville was expanded by the addition of two small offices which will be available for visitors who wish



Figure 4. The intermittent rotoslide pollen sampler is widely used for obtaining the pollen count and for research in aerobiology.

to make microscopic studies of well cuttings. There is also additional space for cutting and storing well samples. A small display of minerals and rocks of interest to visitors has been prepared.

Collections of Cricoconarids in Devonian and Silurian strata have been made by the State Paleontologist. They will be used in a study of the morphology, paleoecology, and stratigraphic usefulness of this extinct group of mollusks. The State Paleontologist also studied and photographed a new edrioasteroid from the Manlius Limestone.

Stratigraphic sections on Crane Mountain, in the North Creek Quadrangle, were measured by the Associate Scientist (Geology). This mountain appears to have important significance for the interpretation of Adirondack geological history.

Preliminary skeleton logs of all wells through the Onondaga and deeper in New York State have been completed by the Senior Scientist (Geology). Eventually, the results will be used to update Bulletins 373 and 390. Considerable time was spent checking data for the project on subsurface formations below the Trenton in New York State.

A collection of Silurian Lower and Middle Devonian conodonts is being assembled by the Senior Scientist (Paleontology), in order to establish zonation within rocks of these periods. The collection now includes conodonts from three Silurian formations, twelve Lower Devonian units, nine Middle Devonian units and four Upper Devonian horizons.

A preliminary report on the suitability of the Restof mine for storage of art objects in case of enemy attack was compiled by the Scientist (Geology). Gas samples from the mine were collected for analysis at the Pittsburgh laboratory of the U. S. Bureau of Mines.

The following projects were undertaken by temporary personnel:

A microscopic study was completed of all well samples in the Museum collection for those New York State wells penetrating the interval between the Trenton limestone and the Precambrian basement. This comprehensive study will permit a more valid correlation of the subsurface units in the State and should lead to a much clearer understanding of the subsurface stratigraphy. Members of the permanent staff assisted in this interpretation.

Geologic mapping in the four 7½-minute quadrangles which make up the Tarrytown 15 minute quadrangle was continued. A structural analysis of the New York City group of rocks in this area is developing, which indicates multiple folding from different directions during several mountain-building periods. Interpretation of this extremely

complex structure will be a major contribution to the geology of the New York City metropolitan area.

Extensive collections of New York State rocks (particularly in the Adirondacks and the Hudson Highlands) were made, in order to study the form and apparent origin and genesis of zircon, an important accessory mineral which is not destroyed during orogenic episodes.

Mapping in the Berlin quadrangle was continued as a contribution to the understanding of Taconic geology. The first Middle Cambrian rocks in New York State were found, as was an extensive trilobite fauna in Lower and Middle Cambrian rocks. The trilobites are being studied at Johns Hopkins University, and it is already apparent that a great many new genera and species will be described.

Paleoecological investigations of the Helderberg Limestones in central and eastern New York, based on a careful lithological study, were continued. The results will be correlated with earlier findings on the stratigraphy of the Late Cayugan and Helderbergian rocks (Bulletin 386).

Extensive collections of Middle and Upper Devonian vascular plant remains from new exposures in the Catskills were made. The material will be studied at Cornell University and the specimens eventually deposited in the Museum collections.

A map of the glacial geology of western New York between Lake Erie and the Genesee River was essentially completed. It will be published eventually as one of the series on the same base as the State Geologic Map.

A number of radiometric age determinations on rocks of the Adirondacks and the Hudson Highlands was also carried on.

JOHN G. BROUGHTON
State Geologist

The Museum

The staff of the New York State Museum has completed another year of care for the scientific collections and of educational service to the public.

THE PUBLIC

Total attendance in the exhibit halls was about 222,500; an increase of four percent over the previous year. This figure was based on an estimate of 150,500 persons on the 253 weekdays and 38,200 for the 52 Saturdays, plus actual counts of 2,759 on the five holidays and 11,059 during the 21 Sundays that the Museum was open. A change of openings from summer to spring-fall months, initiated in 1962-63, was continued. About twice as many people took advantage of this schedule as compared with visitation in summer during previous years. Excellent publicity material on the Sunday as well as regular weekday openings was distributed to radio and TV stations by the Radio-TV Bureau of the Department of Commerce.

More than 100 different books, pamphlets, kits, and other items were carried at the Sales Desk in the foyer. The stock was increased to include postcards and new colored slides of some exhibits. Each item has been chosen on the basis of its educational value or capacity to stimulate intellectual and scientific curiosity. The offerings aroused so much interest that a portion of the proceeds from the yearly sales total of \$6,655 was devoted to hiring a part-time attendant to handle the sales and release the Museum guards for patrolling the halls and performing other duties.

Service to visitors was improved by building an additional coat-room to supplement the very inadequate space which was often piled high with the outdoor paraphernalia of school classes. Waste space under the cliffs of the Gilboa Fossil Forest exhibit was utilized. Here, behind the Sales Desk, a room was built and fitted with hangers and a clothes-receiving bench. The two rooms can accommodate the belongings of 200 visitors. Outside the entrance is a wall cartoon showing a snowshoe hare "jumping" out of its winter coat, a deer fawn "losing" its spots in autumn, and other natural history examples of "coat shedding" in caricature.



Figure 5. Even before entering the classroom, these winter visitors learn a lesson on adaptation to environment.

In conjunction with work on the second coatroom, the pumping system for the stream in the fossil forest exhibit was completely redesigned. A new pump was installed in a soundproofed compartment under the artificial ledges of the diorama. The old pump, which was noisy and prone to break down, was removed from the first coatroom where it had been an annoyance for many years.

EXHIBITS

The outstanding accomplishment in exhibition was the completion, after two years of planning and preparation, of a description of the history and applications of bird art to science. This display was installed in two especially designed cases, each 45 feet in length. By necessity, they were located in the two corridors between the Rotunda and Biology Hall and separated by a large light well. Hopefully, they can be brought together within a few years in a new building. The exhibit was planned by two Scientific Aides, Mrs. Aileen Merriam and Richard L. Scheffel; design and assembly were accomplished by Theodore P. Weyhe, Museum Exhibits Designer, assisted by Robin D. Rothman, Museum Technician, and all members of the exhibits-preparation staff. The task involved manufacture and assembly of 150 pictures, reproductions, and other objects, plus 170 labels. Original paintings were contributed by the artists, Richard E. Bishop of Philadelphia, Pa., Don Eckelberry of Babylon, N. Y., Francis Lee Jaques of St. Paul, Minn., and Roger Tory Peterson of Old Lyme, Conn. Books, plates, and other material were given by 19 other donors.

Two permanent exhibits were completed and installed in Paleontology Hall. The colorful display of protistids ("first" animals) and a fine restoration of Devonian marine life in its natural setting were planned by the State Paleontologist, Donald W. Fisher, designed by the Museum Exhibits Designer, and executed by Louis J. Koster, Senior Museum Technician, and his associates. Another diorama concerning the black shale environment of the Ordovician period was nearing completion at the end of the year. A figure of an Indian child, planned several years ago and sculptured by the Senior Museum Technician, was finished and installed in the Iroquois Bark House. Exhibits were made of the fulvous tree duck (an aberrant species which showed up recently on Long Island) and of "Ge-oddities" (three rare minerals of the northwestern Adirondacks). The old display of fluorescent minerals was rebuilt and furnished with new lighting. Renovation of the extensive series of New York

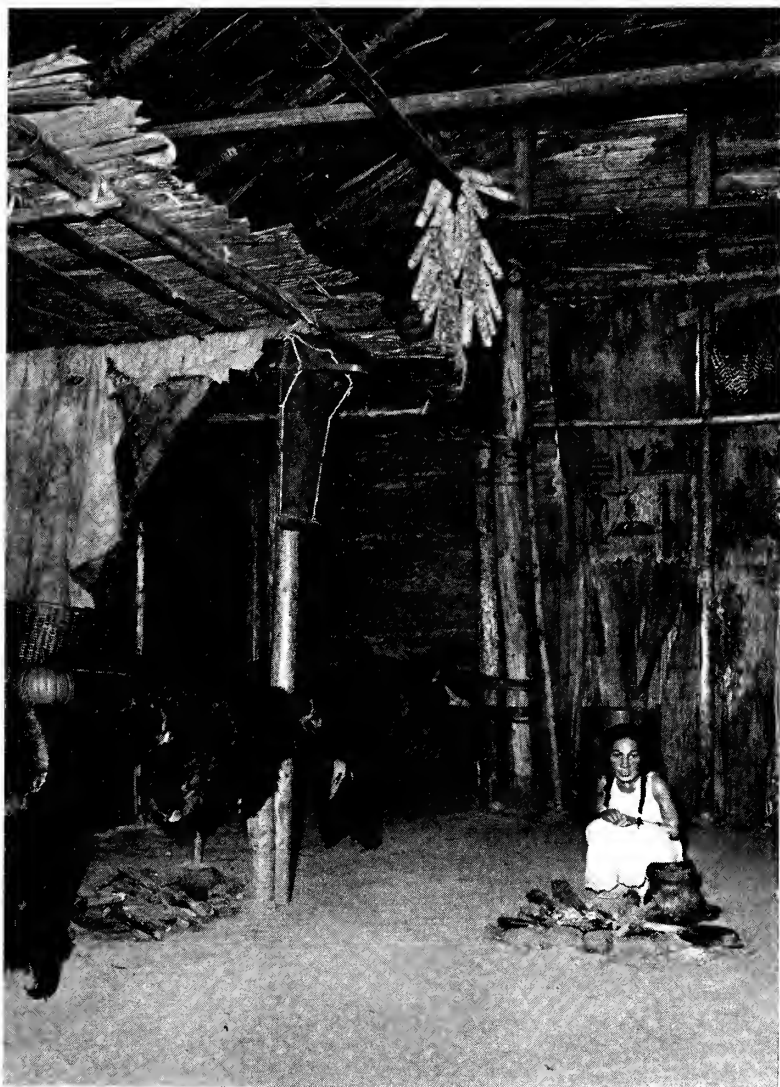


Figure 6. The Indian child sculptured by Louis J. Koster, Senior Museum Technician, resides in the Iroquois Bark House.



Figure 7. What at first appears to be an exhibit of trophies turns out as a lesson in conservation. Big game hunters Dr. and Mrs. W. Brandon Macomber, of Albany, carefully avoided collecting those species in danger of extinction.

reptiles continued; specimens of additional species were collected and reproduced in epoxy, and a new facade and canopy were added to give a new look to the old cases.

The exhibit halls were enhanced during the year by two temporary shows. Some two dozen specimens from the Macomber donations of mammals were brought out for a lesson in the conservation of Africa's rapidly vanishing wildlife. For a month, we were privileged to show 20 pieces of animal sculpture by Anna Hyatt Huntington. The loan, which had been arranged with the artist shortly before her death, was carried out by the Mariners Museum, Newport News, Va. Display of the aluminum casts were greatly enhanced by placement on special surfwood paneled pedestals, which were painted black and white and backed by a clump of white birch trees. This setting was originated and designed by the Museum Exhibits Designer.

A final, major change in the exhibition area was effected this year with the dismantling of 92 old exhibits in the former Morgan Hall by Charles E. Gillette, Associate Curator of Archeology. He was assisted by student labor and by volunteers under the Museum Aide Program of the Senior Girl Scouts.

EDUCATION

Improvements were made in the operation of the school education program, a department of the State Museum which during recent years has become increasingly useful in rendering service to the public. In a reappraisal of the role of education within the Museum as a whole, it is realized that interpretation of the Museum to the public is an area of prime responsibility. To make the most effective use of resources and personnel, however, services must be tailored to particular needs. At present, the schoolchildren and teachers of New York State appear to be that segment of the public most in need of instructional service and also in the best position to take advantage of it. Under Jennifer Chatfield, Associate Curator of Interpretation, and C. Michael Darcy, acting Museum Education Supervisor, the workshop program for teachers was improved and expanded. One of the sessions was an aerial field trip which enabled participants to obtain a graphic concept of the geology and the patterns of historical development and land use of the Capital District. Fifty teachers (who paid personally for the half-hour flights) were thoroughly briefed and furnished with maps for recording impressions which would enable them later to do a better job of

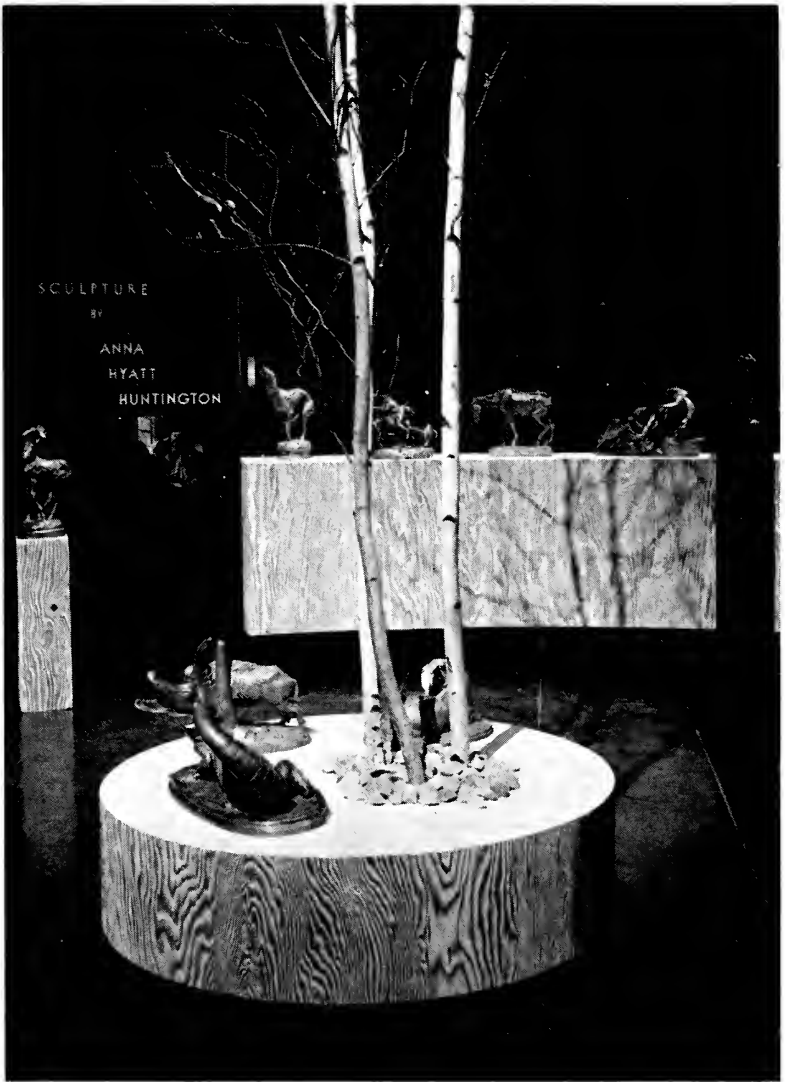


Figure 8. A diversion from pure learning, an exhibit of animal sculpture offered aesthetic enjoyment as well.

class instruction. Much information was contributed to the workshop program by the scientific staff of the State Museum and Science Service. Lecture-demonstrations, supplementing those by the Museum Instructors, were given by Messrs. Borst, Connor, Fisher, Gillette, Reilly, and Wilcox and by William L. Lassiter, Division of Archives and History.

This program for improving science instruction in schools should be extended in the State. Because of lack of personnel and funds for staff travel, teacher workshops are restricted to the Capital District.

By using the mails, however, other educational services have been made available through an informative and idea-provoking newsletter to some 3,000 teachers throughout New York State. This letter serves to keep teachers and other interested visitors aware of the Museum's program and what it can offer them. More loan kits of scientific materials have been prepared and additional "leaflets" up to 74 pages in length have been written or are in preparation. All of these materials, it is hoped, will enable teachers to do a better job of teaching.

For the third summer, a series of films on nature and natural resources conservation was presented as a free service to the public. Drawing a total audience of 950 persons (50 percent larger than that of the previous season), it was necessary to move from the overcrowded classroom to improvised seating in the old History Hall.

The Museum education staff received several Science Congress award winners and, with the assistance of exhibits technicians, installed their displays in Orientation Hall for several months' viewing. Instruction on special subjects for visiting school classes was contributed by curators. Dr. Reilly was especially active in lecturing to youthful biology groups, both in the Museum and elsewhere in the region. Several Girl Scouts performed clerical chores in the education office (and also worked at the public information desk and in archeology collections). We maintained a listing in the Albany Junior League's "opportunities for public service" without attracting volunteers.

Science classes for school groups continued with one significant change. In an effort to improve instruction for both children and teachers using our available staff and facilities, general tours of exhibits were dropped. Practically all such requests in the past had been made on behalf of groups of youngsters who came to the Museum with no advance preparation for learning and as only one stop in an excursion to their capital city. (In 1962-63, general tours were given to 3,500 individuals.) As teacher demands for instruction



Figure 9. Teachers are briefed before an aerial field trip to study patterns of land use in the Capital District. (Knickerbocker News photo)

and material to supplement the established school curriculum had increased in recent years, it now seemed essential to concentrate efforts in this area.

Our records show an increase in the number of visiting children in groups of all types of approximately 5,000, almost 15 percent larger than in the previous year. Classes from schools also increased in the same proportion. Unfortunately, due to delay in filling two vacancies resulting from resignations of members of the teaching staff, the latter was undermanned over 25 percent for the first half of the Museum's school year. Although instructors carried at least 10 percent heavier teaching loads, many requests from schools for instruction of their classes were necessarily refused. Primarily for this reason, the number of children registered in the Museum education program was 3,500 to 4,000 less in 1963-64 than in the preceding year, a decline of about 15 percent. This loss of pupil instruction was more than balanced by expansion of service to teachers in workshops and in statewide distribution of teaching aids.

SCIENTIFIC COLLECTIONS

In the collections, highlights were as follows: Archeology, further progress was made in reidentifying articles from the Morgan and Beauchamp collections; botany, almost 5,000 specimens accessioned and maps completed for all species of mosses represented in the Herbarium; geology, the Trainer collection of minerals, donated to the State Museum in 1949, was cleaned, cataloged, and prepared for loan to the newly organized Southeast Museum at Brewster; paleontology, 27 new types, some 700 New York bryophytes and graptolites from Germany and Czechoslovakia were added to this collection, which continued to be heavily used by scientists from other institutions; zoology, over 700 items added, and a long-needed rearrangement of bird nests, osteology, mammals, and alcohol-preserved collections began following installation of steel shelving. The curator of geology continued research on clay minerals in the Lower Devonian carbonate rocks of the upper Hudson Valley, and the curator of entomology carried on his studies of the leaf beetles. The last named completed and turned in for editing a 350-page synopsis of one of the subfamilies, the Galerucinae, and the curator of botany submitted his manuscript entitled "A Check List of Grasses of New York State." Both works will be published as Museum Bulletins.

GIFTS RECEIVED

Among numerous gifts from thoughtful and generous donors were a fine collection of minerals from the southern Adirondacks by Elmer B. Rowley, Glens Falls, a select group of minerals from Ivigtut, Greenland, by Harold Newman, Lower Burrell, Pennsylvania, an outstanding hexagonite specimen by William Rocco, Scotia, and 20 specimens of African mammals which were given by Dr. and Mrs. W. Brandon Macomber, Albany. The latter also had mounted for exhibition, without expense to the State Museum, the head and neck of a black rhinoceros which they had donated in 1958. We also received a mounted tuna, 9 feet, 7½ inches long and 890 pounds—a record at the time it was caught in 1939—as a gift from the J. A. Manning Paper Company of Green Island. After minor repairs, the tuna was placed on the west wall of Biology Hall near the Hecht collection of fishes.

LIBRARY

The State Museum maintains a small library containing files of its own publications, publications of other N. Y. State agencies, publications of other state surveys, other Museums, and federal documents relating to science, as well as books and periodicals which are used frequently by the staff. The major responsibility of the librarian is in the reference field. Increasingly, she and her one part-time clerk are finding it difficult to keep up-to-date with the expanding volume of scientific publications. Another complicating factor is inadequate room. Although the former quarters in the main building were crowded, the Museum library was moved 4 years ago to a room in the Annex that was 25 percent smaller. The only available storage space, then and now, is a city block and two floors distant. As a result, time and effort is expended in withdrawing and returning items which are required for use by the staff but for which room is not available in the Museum library.

STAFF ENRICHMENT

A grant of funds obtained by the American Association of Museums made it possible for two of our staff, curator of archeology Charles E. Gillette and education instructor Judith A. Drumm, to attend the 6-weeks session of the Institute in Anthropology for Museum Personnel at the University of Arizona. The opportunity



Figure 10. Present facilities do not permit an increase in library resources for a dynamic scientific organization. The juxtaposition of clerical activities and reference reading is not ideal.

to brush up on the science and preservation-curatorial methods and the exposure to the ideas of fellow workers were highly advantageous. Three members of the staff, Miss Chatfield, Miss Rothman, and the writer, participated in seminars on Africa which were arranged by the Department's Office of Foreign Area Studies with a grant from the New World Foundation. This, too, was a broadening experience.

NEW BUILDING PLANNING

Several man weeks of time were spent by the Museum staff in drawing up space requirements for a new home on the South Mall. It appears that the State Museum and Science Service will require approximately 400,000 square feet to house the present staff and such additional programs as can be expected during the next two or three decades and to provide exhibits in the natural and physical sciences which are adequate for educational needs. The Assistant Director continued his studies of buildings for features which may be adaptable to use in our plans. For this purpose, trips were made to Chicago (Natural History Museum and Art Institute), Milwaukee (Public Museum and Art Museum), and St. Louis (Museum of Westward Expansion, Science Museum, and Missouri Botanical Garden's Climatron). The State Museum's education staff contributed to the fact-gathering effort by conferring with about 200 teachers in 20 schools of the Albany area to obtain comments on the educational services which would be expected in a new museum. (Results of this survey were also used in revamping our current education program to obtain maximum usefulness.)

MISCELLANEOUS

Among the activities of the writer which were outside of his official duties but related to them was the completion of a survey and report on the status of the cougar, grizzly, and wolf in North America for the New York Zoological Society and the Boone and Crockett Club.

VICTOR H. CAHALANE
Assistant Director, State Museum

Appendix A

1964 GRADUATE STUDENTS HONORARIA RECIPIENTS

Entomology

FITZGERALD, TERRENCE D., State University College of Forestry at Syracuse University Bionomics of a lepidopterous bark miner in ash trees..	\$540
WING, MERLE W., Cornell University Taxonomic revision of Nearctic ant genus <i>Acanthomyops</i>	600

Geology

FULLERTON, DAVID S., Yale University Glacial geology of the Upper Mohawk Region, New York	540
GROSVENOR, FLORENCE A., University of Rochester Brachiopoda of the Rondout formation in the Rosendale quadrangle	300
HELENEK, HENRY L., Brown University Investigation of origin and metamorphic evolution of major rock units in the Hudson Highlands.....	420
* KIRCHGASSER, WILLIAM, Cornell University Stratigraphy and paleoecology of the Cashaqua shale formation in central and western New York.....	300
LINDHOLM, ROY C., Johns Hopkins University Petrology of the Onondaga limestone.....	420
MCCONNELL, CARL L., Yale University Stratigraphic study of the Grenville metasedimentary sequence in eastern Adirondacks	480
* TURNER, BRIAN B., Yale University Geology of southern half of Schroon Lake quadrangle	480

Zoology

DUNHAM, DAVID W., Cornell University Behavioral study of rose-breasted grosbeak.....	480
WOLFE, JAMES L., Cornell University Certain aspects of population dynamics of the eastern chipmunk	600

* Renewal.

\$5,160

Appendix B

Conferences and professional meetings in which the Museum and Science Service staff participated:

- American Anthropological Association, annual meeting, San Francisco, Calif.—Fenton, Ritchie
- American Anthropological Association, board meeting, Detroit, Mich.—Fenton
- American Association of Museums, annual meeting, St. Louis, Mo.—Cahalane
- American Association of Petroleum Geologists, Toronto, Can.—Fisher, Kreidler
- American Bryological Society Foray, Adirondack Mountains—Smith, S. J.
- American Committee for International Wildlife Protection, annual meeting, New York, N. Y.—Cahalane
- American Indian Ethnohistoric Conference, Newberry Library, Chicago, Ill.—Fenton
- American Institute of Biological Sciences, annual meeting, Amherst, Mass.—Connor, De Groot, Lewis, Ogden, Vormevik
- American Mosquito Control Association, annual meeting, Chicago, Ill.—Collins
- American Ornithologists' Union, annual meeting, Gainesville, Fla.—Palmer
- Association of Science Museum Directors, Springfield, Ill.—Cahalane
- Atmospheric Biology Conference, Minneapolis, Minn.—Ogden
- Atmospheric Sciences Research Center, Whiteface Mountain—Smith, S. J.
- Boone and Crockett Club, annual meeting, New York, N. Y.—Cahalane
- Central States Anthropological Association, Milwaukee, Wis.—Fenton
- Commissioner's Staff Conference, Diamond Point, N. Y.—Fenton
- Conference of Pennsylvania Geologists, Stroudsburg, Pa.—Kreidler, Rickard
- Cornell University Teachers Workshop, Schakleton Point, Oneida Lake, N. Y.—Reilly
- Defenders of Wildlife, annual and executive committee meetings, Washington, D. C.—Cahalane
- Directors of Systematic Collections, 8th Conference, New York, N. Y.—Fenton
- Eastern States Archaeological Federation, Philadelphia, Pa.—Gillette

Entomological Society of America, annual meeting, St. Louis, Mo.—Collins
 (Eastern Branch), annual meeting, New York, N. Y.—Collins
 Federation New York State Garden Clubs, annual meeting, Cooperstown, N. Y.—Reilly*
 Fort Ticonderoga Memorial Ceremony, Fort Ticonderoga, N. Y.—Fenton
 Geological Society of America, annual meeting, New York, N. Y.—Broughton, Davis, Fisher, Isachsen, Rickard
 Massachusetts Historical Society, Boston, Mass.—Fenton
 National Academy of Sciences, National Research Council, Philadelphia, Pa.—Fenton
 National Museum of History and Technology, Washington, D. C.—Fenton
 New York Academy of Sciences, Geologic Sciences, New York, N. Y.—Isachsen*
 New York State Archeological Association, Auringer-Seelye Chapter meetings, Fort Edward, N. Y.—Funk*, Gillette*
 New York State Archeological Association, annual meeting, West Point, N. Y.—Funk, Gillette, Ritchie*
 New York State Archeological Association, Mid-Hudson Chapter meeting, Rhinebeck, N. Y.—Funk*
 New York State Archeological Association, Van Epps-Hartley Chapter, winter meeting, Albany, N. Y.—Funk, Gillette, Ritchie*
 New York State Archeological Association, Van Epps-Hartley Chapter, annual meeting, Fonda, N. Y.—Gillette
 New York State Association of Museums, Council meeting, New York, N. Y.—Fenton
 New York State Department of Health, Interdepartmental Health and Hospital Council, Committee on Pesticides, Albany, N. Y.—Collins
 New York State Geological Association, Syracuse, N. Y.—Broughton, Fisher, Kreidler, Rickard
 New York-Vermont Interstate Commission on Lake Champlain Basin, Vergennes, Vt.—Broughton, Davis
 Northeast Museums Conference, West Point, N. Y.—Fenton
 Northeastern Forest Pathology Workshop, Morgantown, W. Va.—De Groot
 Northeastern Forest Pest Council, annual meeting, Boston, Mass.—Collins, Connola, De Groot
 Northeastern Forest Tree Improvement Conference, New Brunswick, N. J.—Connola
 Paleontological Research Institute, Ithaca, N. Y.—Fisher and Rickard
 Peck Mycological Foray, Oneonta, N. Y.—De Groot, Smith
 Sigma Xi, Albany Club—Ritchie*
 Society for American Archeology, Chapel Hill, N. C.—Ritchie*

* Gave talk.

- State Natural Resources Committee for Cornell and Syracuse Universities, Ithaca, N. Y.—Cahalane, Fenton
- U. S. Department of Agriculture, Interagency Conference on *Bacillus thuringiensis* (Gypsy moth pathogen), New Haven, Conn.—Collins, Connola
- U. S. Department of Health, Education and Welfare, Biennial Vector Control Conference, CDC, Atlanta, Ga.—Collins
- Wayne State University, Detroit, Mich.—Ritchie*
- Wenner Gren Foundation of Anthropological Research, Conference on Africa, New York, N. Y.—Fenton

* Gave talk.

Appendix C

Cooperative Work (Service): Extension program by the staff of State Museum and Science Service to various groups:

- Adirondack Mountain Club—Cahalane, Reilly*
- Albany Academy for Girls—Reilly*
- American Folklore Society—Fenton
- American Museum of Natural History, Libraries and Collections—Palmer
- American Telephone and Telegraph Company—Kreidler
- Appalachian Trail Conference—Cahalane
- Blue Creek Garden Club—Reilly*
- Brown University—Isachsen
- Capital Area School Development Association—Gillette
- Cayuga Museum of History and Art—Fenton*
- Chatham High School Nature Club—Reilly*
- Colonie Cub Scouts—Reilly*
- Connecticut Entomological Society—Jamnback
- Cornwall Museum—Reilly*
- Dartmouth College, Department of Geology—Isachsen, Rickard
- East Greenbush Science Fair—Reilly*
- Fort Hunter Elementary School—Reilly*
- Fort Plain Museum—Gillette
- Fredonia College Biology Club—Reilly*
- Harpur College Anthropology Club—Fenton*
- Hudson Valley Girl Scout Council—Gillette
- Independent Petroleum Association of America—Kreidler
- Institute for Iroquoian Studies, Brantford, Ontario, Can.—Fenton
- Institute for Iroquois Research (Symposium)—Fenton
- International Congress of Anthropological and Ethnological Sciences, Permanent Council—Fenton
- Interstate Oil Compact Commission—Kreidler
- Joint Legislative Committee on Indian Affairs—Fenton
- Kinderhook Memorial Library—Fenton*
- National Herbarium of Canada—Smith, S. J.
- National Museum of Canada—Fenton
- National Park Service—Fenton, Ritchie
- Natural Resources Committee of Cornell and Syracuse Universities—Cahalane
- New Jersey Geological Survey—Rickard
- New York Botanical Garden—Smith, S. J.
- New York State Bureau of Criminal Investigation—Gillette, Smith, S. J.
- New York State Department of Agriculture and Markets—Smith, S. J.

* Gave talk.

New York State Department of Commerce—Kreidler, Smith, S. J.
 New York State Department of Conservation—Kreidler
 New York State Department of Health—Fenton
 New York State Department of Public Works—Fenton, Funk
 New York State Executive Department—Kreidler
 Niagara Mohawk Power Corporation—Kreidler
 Pok-O-Moonshine Counselors, Willsboro—Reilly*
 Rensselaer Polytechnic Institute—Rickard
 Roberson Memorial Center, Committee of 100—Fenton
 Robert A. Taft Sanitary Engineering Center—Lewis
 Rochester Academy of Science—Cahalane
 School for Christmas Tree Growers—Connola
 Seneca Nation of Indians at Salamanca—Fenton
 State University of New York at Albany—Smith, S. J.
 State University College at Geneseo—Smith, S. J.
 State University College of Agriculture at Cornell University—
 Smith, S. J.
 State University College of Forestry at Syracuse University—
 Collins, Connola, Smith, S. J.
 Staten Island Institute—Smith, S. J.
 Summer Institute in Anthropology for Museums, Tucson, Ariz.—
 Drumm, Fenton, Gillette
 Syracuse University, Department of Anthropology—Ritchie
 University of Rochester—Rickard
 University of Toronto—Fenton
 University of Waterloo, Ontario, Can.—Fenton
 University of Wisconsin—Fenton*
 U. S. Bureau of Mines—Kreidler
 U. S. Fish and Wildlife Service—Ritchie
 U. S. Public Health Service, New York City—Collins
 WHUC Radio Station—Reilly*
 Wildcliff Youth Museum—Fenton, Reilly

* Gave talk.

Appendix D

COOPERATING AGENCIES

A continuing function of the Museum and Science Service is to cooperate with agencies and organizations concerned with museum and research activities in this and other states, with the governments of the United States and Canada, with universities and industry in the discovery, analysis, and dissemination of scientific information. These contacts are frequently of reciprocal services, and they arise often out of the personal contacts of the staff and, if so listed, would measure individual participation, but they are here tabulated for the organization.

Brown University
Bryn Mawr College
Colgate University
Cornell University
Fort Klock
Harpur College
Huyck Preserve
George Landis Arboretum
National Commercial Bank & Trust Company
New York State Department of Commerce
New York State Department of Conservation
New York State Department of Health
New York State Department of Labor, Division of Industrial Hygiene
New York State Department of Public Works
Syracuse University
U. S. Geological Survey

Appendix E

PROFESSIONAL AFFILIATIONS:

Offices held by staff

- Adirondack Mountain Club, Vice-President—Cahalane
- American Anthropological Association, executive board—Fenton
- American Committee for International Wildlife Protection, Vice-Chairman (reelected)—Cahalane
- American Ornithologists' Union, Committee on Bird Protection, Chairman—Cahalane
- Defenders of Wildlife, President—Cahalane
- Federation of New York State Bird Clubs, Research and Publications Committee, Chairman—Reilly
- Nature Conservancy, Eastern New York Chapter, Trustee—Cahalane
- New York State Archeological Association, Van Epps-Hartley Chapter, Treasurer—Gillette
- Shaker Museum, Trustee—Fenton

Publications

Six Museum bulletins, including an annual report, were printed in 1963-64. They totaled 814 pages of text and 111 plates, figures, charts and maps. An Educational Leaflet comprising 30 pages and 11 figures was also printed; a second with 78 pages and 14 illustrations was reproduced by the multilith process. Six miscellaneous publications of the newsletter type were issued in multilith: three numbers of the *New York State Geogram* totaled 48 pages, and three pamphlets containing current information of interest to teachers contained about 20 pages. Members of the staff published 12 papers, totaling about 75 pages, in outside books, journals, etc.

At the close of the year, six manuscripts had been accepted for publication. One was designed for the map and chart series; the others, totaling about 900 manuscript pages, will be Museum bulletins.

State Museum and Science Service

PUBLICATIONS

- 1963 The Empire State Geogram. Triannual Newsletter of the Geological Survey. 2 illus. Vol. 2, No. 1, Fall, 1963. 16pp.
 - 1964 The Empire State Geogram. Triannual Newsletter of the Geological Survey. 3 illus. Vol. 2, No. 2, Winter, 1964. 16pp.
 - 1964 The Empire State Geogram. Triannual Newsletter of the Geological Survey. 2 illus. Vol. 2, No. 3, Spring, 1964. 16pp.
 - 1964 125th Annual Report of the New York State Museum and Science Service, July 1, 1962-June 30, 1963. N. Y. State Mus. & Sci. Serv. Bull. No. 395. 53pp.
 - 1964 Museum Education. Monthly Newsletter of the Education Office. Vol. 1, No. 5, April, 1964. 4pp.
 - 1964 Museum Education. Monthly Newsletter of the Education Office. Vol. 1, No. 6, May, 1964. 4pp.
 - 1964 State Museum Services: Teacher's Guide. 12pp.
- Connola, D. P. & Wixson, E. C.**
- 1963 White pine weevil attack in relation to soils and other environmental factors in New York. N. Y. State Mus. & Sci. Serv. Bull. 389. 80pp., 4 pl., 13 figs., 3 maps

New York Botanical Garden Library



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