120th ANNUAL REPORT

of the

NEW YORK STATE MUSEUM AND SCIENCE SERVICE

July 1, 1957—June 30, 1958

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MUSEUM BULLETIN NUMBER 374

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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Assistant Commissioner for State Museum and Science Service
WILLIAM N. FENTON, A. B., Ph. D.

Assistant Director of State Museum
VICTOR H. CAHALANE, B. S., M. F.

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Museum Advisory Council

1958	James L. Whitehead	Staten Island
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1960	Hardy L. Shirley	Syracuse
1961	Arthur A. Davis	Rochester
1962	Vincent J. Schaefer	Schenectady

The Staff

State Museum and Science Service

WILLIAM N. FENTON, *Assistant Commissioner*

Anthropological Survey

WILLIAM A. RITCHIE.....State Archeologist, Associate Scientist

Biological Survey

DONALD L. COLLINS.....State Entomologist, Principal Scientist
DONALD P. CONNOLA.....Senior Scientist (Entomology)
PAUL CONNOR.....Scientist (Zoology)
HUGO JAMNBACK, JR.....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
DONALD W. FISHER.....State Paleontologist, Associate Scientist
WM. LYNN KREIDLER.....Senior Scientist (Geology)
TERRY W. OFFIELD.....Scientist (Geology)
LAWRENCE V. RICKARD.....Senior Scientist (Paleontology)
ARTHUR M. VAN TYNE.....Scientist (Geology)—Wellsville Office
VACANT.....Associate Scientist (Geology)

State Museum

VICTOR H. CAHALANE, *Assistant Director*

Curatorial

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CLINTON F. KILFOYLE.....Associate Curator (Paleontology)
MARY CATHERINE REED.....Senior Curator (Geology)
EDGAR M. REILLY, JR.....Associate Curator (Zoology)
STANLEY J. SMITH.....Associate Curator (Botany)
JOHN A. WILCOX.....Associate Curator (Entomology)

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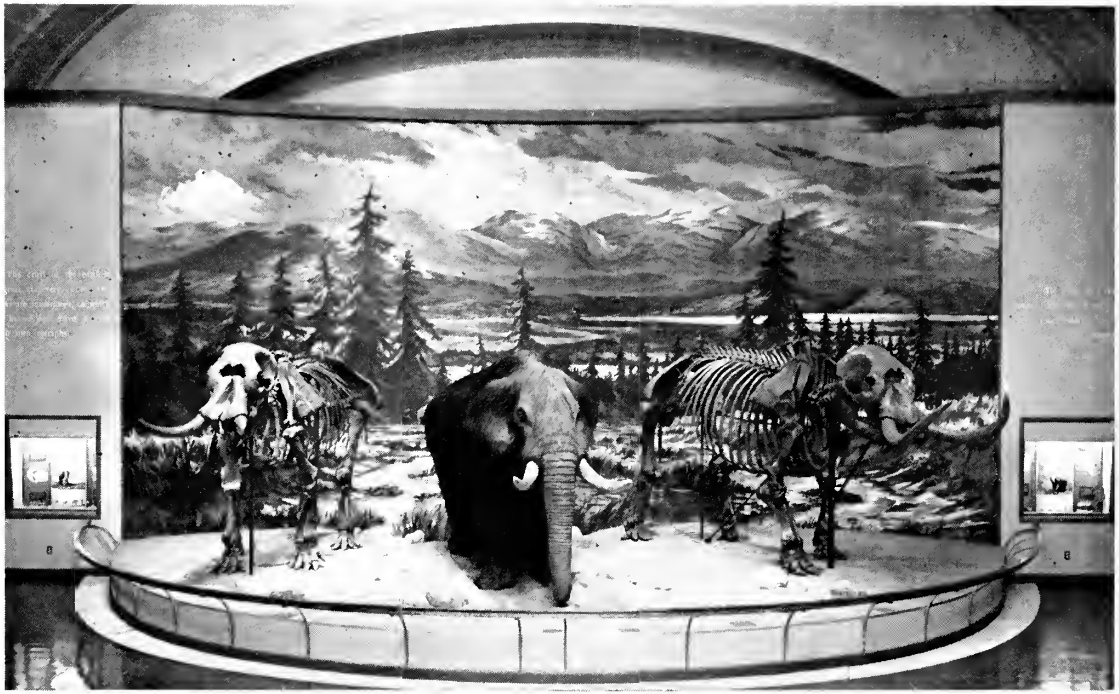
WALTER J. SCHOONMAKER.....Museum Exhibits Planner
THEODORE P. WEYHE.....Museum Exhibits Designer

School Services

RUTH RUBIN.....Museum Education Supervisor



The mastodons stand in their new setting in front of a backdrop which depicts the Catskills in the late Pleistocene. This exhibit is 40 feet wide and 20 feet high. With the flanking displays on mastodon and mammoth life histories, it was completed during the year 1957–58.

General Statement

I HAVE THE HONOR TO SUBMIT a report of the major activities and accomplishments of the New York State Museum and Science Service for the year ending June 30, 1958.

The 120th Annual Report marks the second of a new series, when publishing resumed last year. When an institution passes the century mark it is useful to review its goals and aspirations. These were made explicit at the Commissioner's staff meeting at Cooperstown in June 1957 and they have guided our course in the year since. The increase of useful knowledge, the preservation of the cultural heritage and its interpretation to the general public are the three broad functions of cultural and scientific institutions that are performed, in part, for the Department of Education, by the State Museum and Science Service. The State Science Service fosters research in the natural sciences, the Museum stores and conserves knowledge and diffuses it among men. School children, other State agencies and adults are the recipients of these services. To the extent that the State Museum and Science Service fosters original research in the natural sciences, preserves the State's natural history collections, interprets its discoveries and collections to the public and diffuses scientific and useful knowledge, it is unique in the Department. Carrying out these functions entails collecting, accessioning, organization, storage and maintenance of physical objects. The collections accumulate yearly even with judicious pruning. Collecting and research without publication or interpretation is meaningless and the preparation of research reports requires spacious laboratories equipped with recent devices. An adequate program in interpretation needs specialized personnel to facilitate the flow of an idea from planning room to designer's board, to the preparation laboratory and into the exhibition halls. There an alert education staff greets the visitor and supplements what is taught in school with what may be seen in the Museum.

The annual budget for all these services has now passed the $400,000 mark. Of this amount, more than half goes into basic research in the natural sciences, principally biology and geology; yet smaller amounts go to anthropology and the rest to interpretation.

Collections, exhibits and research are the three essential ingredients of any museum program. Regarding the past year in the light of these considerations, the scientist sees the strength of a museum in its reference collections. Viewed thus, the quality of the New York State

Museum lies in its paleontology, botany, entomology and Indian collections. Its policy should be to encourage the collection and preservation of the natural history of the State. With this in mind, we have endeavored to fill deficiencies as rapidly as possible and we have culled existing collections for undocumented specimens and duplicates. When, for example, the director of the Ticonderoga Museum asked for assistance in locating birchbark canoes for the forthcoming Champlain celebration, we commenced a search which led to an arrangement with the Hudson's Bay Company to manufacture the necessary canoes at the Manouan Post, and in the process acquired two canoes for the State Museum, one by gift and one by purchase.

In the will of P. E. Clark of Ellenville, an unusual collection of quartz crystals unobtainable elsewhere was left to the State Museum. P. E. Clark, a member of an English family which came to the Hudson Valley in the 19th century, was county surveyor during most of his life and he had contributed as junior author to the report of the State Paleontologist in 1901. He represents the tradition of amateur science in America which somehow must be linked to the current search for science talent among school children. Through the generosity of Dr. W. Brandon Macomber of Albany, the comparative collections were enriched for study and exhibit purposes in anthropology and zoology by specimens which were brought back from an expedition to East Africa. The curators report accessions of new records of plants and new species previously uncollected from the Allegheny Valley. Indians may have been the agents of introduction at a period yet unknown.

In any survey to determine the national need for the preservation and servicing of systematic collections in biology, the Peck Collection of fungi will rank among the Nation's assets. Yet the State Museum and Science Service does not have a mycologist on its staff to service the collection and to discover leads that touch both medical research and problems in forest economy.

To the public, a museum is exhibits. Though the exhibits staff is renovating some old exhibits and installing new ones which meet modern standards, to the participants results seem slow and progress discouraging. But to our visitors, improvement is noticeable and comment is favorable. A particularly happy occasion, November 27, 1957, was the presentation of a major exhibit telling the story of real and synthetic diamonds. One of the features is a plaque containing some of the first diamonds made by man in the General Electric Research Laboratory in Schenectady which was presented by Dr. A. L. Marshall, manager of the Chemistry Research Department, and accepted for the Department by Commissioner Allen. The presentation ceremony was held at a luncheon at the DeWitt Clinton Hotel and attended by the

staffs of the two collaborating institutions and their wives. The exhibit has been popular with school children.

The Museum celebrated Arbor Day jointly with the State Library in sponsoring an exhibit of nature writers featuring watercolors in the rotunda by Professor Herbert Faulkner West of Dartmouth College. The Fuertes exhibit of bird drawings in April heightened the popularity of the original illustrations for *Birds of New York*, which are on permanent exhibition in the Museum.

The number of organized school groups visiting the Museum declined while total attendance rose to 140,000. But the present staff is not able to meet the mounting demands for a stronger extramural program. This will require professional leadership.

One of the problems in museum administration is to involve the research staff in planning exhibits and advising preparators during construction without destroying their effectiveness as scientists. If we are to shorten the chain that runs from research through collections to interpretation, the talents that exist in the research staff and that are to be found in other areas of the Department must be utilized in every possible way in planning exhibits and in assessing the reaction of the visitor. The State Geologist and the State Paleontologist have been particularly generous of their time in planning Paleontology Hall. Studying the reaction of visitors to old and new exhibits is a project for the future.

Renovating the exhibits has an inevitable effect on attendance and underscores the principal disadvantage of our present location. As part of the Department of Education we occupy the fifth floor of a monumental building situated downtown in a neighborhood without parking facilities for visitors. The present location is the outgrowth of a more leisurely decade when the visitor came to Albany by rail or river, but now the out-of-town tourist traveling the Thruway bypasses Albany and the Museum. The few friendly complaints indicate the many citizens who never succeed in finding parking space to visit their State Museum. The problem of the city museum is like that of banks and department stores whose customers have fled to the suburbs. Experience elsewhere in the country suggests that a suburban location with parking for 10 school buses and 200 cars is the ideal situation. Immediately, the staff looks forward to the urgently needed laboratories for the Science Service which are being provided in the wing. But the real solution which everyone recognizes is to build a new museum and laboratories near one of the Thruway exits. As in factory layout, a single level is the ideal museum plan with ample grounds for parking, outdoor exhibits and recreational facilities.

The State Museum Advisory Council met on May 9, 1958, to review accomplishments, to consider residual problems in the light of previous recommendations, and to formally open the Mastodon Group in Paleontology Hall. The minutes of the council were wide-ranging in topics covered, but their counsel was translated into four recommendations which the Regents at their June meeting sanctioned in a memorandum of purpose for the guidance of the Commissioner and his staff:

1. In view of the investment in research and the manifest need for planning and development of New York State, ways and means should be found of publishing a new geologic map of the State by the most modern and economical method during the next two years.
2. Toward realizing the State Museum's program of exhibits renovation and with the goal of a new State Museum constantly in view, the Regents should adopt the policy and the Department find the means of moving steadily from building single exhibits to the planning and execution of whole halls.
3. Achieving the same objective can be greatly enhanced by making the Museum a more effective teaching instrument in science education. This means drawing on resources of curriculum development, creating awareness and improving understanding in school districts of how to use the Museum, and exploring with SUNY the utility of a course in museum pedagogy. The visit to the State Museum should be a meaningful experience for families and school groups.
4. The first step in the planning of a relocated State Museum center, to house programs in natural history and history, is the selection and reservation of a site.

The research policy of the three Surveys of the Science Service derives from their mission—discovering the natural resources, exploring the relation of man to these resources and interpreting the record of man's aboriginal occupation of the State, which is essentially an operation in basic research. Of the three kinds of research—basic, developmental and applied—the work of the State Museum and Science Service is largely of the background variety of basic research. It also serves the oil industry, the mining and extractive industries, manufacturers, public health and conservation interests. It does little research for the determination of policy.

In administering such a program five guides to policy are recommended: *(a)* Maintain a balance among natural science disciplines. *(b)* Advance and support those projects which center around clearcut scientific problems, the pursuit of which by the methods proposed and

by available personnel is apt to lead to significant results as evidenced by publication. *(c)* Undertake those problems which are in the public interest and are apt to produce useful applications. *(d)* Seek out and support students to do research on problems which may later prove significant and on which no one else is working. *(e)* Publish.

The Science Service is organized into three Surveys: Anthropological, Biological and Geological, and the work of the Surveys is integrated with that of the Museum. The Biological and Geological Surveys are led by Principal Scientists; the Anthropological Survey is presently expanding and is collaborating with Public Works in highway salvage archeology and with the faculties of universities in ethnological studies. Team research is very difficult to plan and achieve. The strength of science has always been the individual scientist and his project. In recent years scientists have tackled larger and more complex problems by working in teams. Interdisciplinary or team research is best carried on in the context of a central problem. Several branches of this Service collaborated in the Allegheny project last summer and some interesting crossties developed between botany and geology and between botany and ethnology. Reports on the geology and zoology of the Allegheny Valley are in hand but fieldwork in botany and ethnology is continuing. Research in the Adirondacks continues to be project and discipline centered. Previous commitments to specific problems postpone identification and work on large regional problems. Administratively, the problem is not to discourage individual research nor curtail large programs but to encourage the individual scientist to acquire the habit of working in teams to deliver within his competence reports on problems of vital interest to the taxpayers.

For a decade before the public became excited about attracting bright students to careers in science, the State Museum and Science Service was cooperating with the universities through its Graduate Student Honoraria program. During the summer months, the Museum has employed as temporary experts science faculties of neighboring universities. This is continuing. But this past year a concerted effort was made to strengthen the honorarium program by correspondence and visitation to the graduate schools. Graduate faculties universally acclaim this program as our best effort even when their offerings do not match the fields of the State Museum. Of the some 100 alumni of the program to date, many are already teaching on the science faculties of universities. To put our program in a better light a printed circular was distributed for the first time inviting students to apply by April 15 for assistance in carrying out summer research required by their graduate problem. This research must be in one of the fields covered by the New York State Museum and Science Service [anthro-

pology, biology (botany, entomology, zoology) and earth sciences (geology, paleontology)], and must be performed within New York State. Applicants for grants must be United States citizens and preference is given to New York State residents and to nonresidents enrolled in colleges or universities in the State. The range of the grants as listed depends on the type of project and the duration of the fieldwork. Applications are received and read by a committee consisting of the State Scientists; they are then rank-ordered and awards are made as far down the list as the money lasts.

As a consequence of efforts to make this program better known the competition was unusually keen this year and the amounts of the stipend and the number of awards were increased.[1] Because of this program, an exchange of persons has been suggested between the State Museum and Science Service and the universities of the State in which State Scientists would teach for a term in one of the universities and a member of that faculty, having a specialty not represented on our staff, would spend a sabbatical in Albany working on our collections or on some research problem of his choice. Thus, the State Museum and the State Library would realize their potential as university research centers.

Albany as a focus of American science became apparent when we joined with the Department of Health as hosts to the American Ethnological Society on May 24, 1958. Other such meetings, conferences and symposiums are scheduled for the future.

Administratively, a number of improvements may be noted. The whole budget process has been sharpened. After a management study, an improved method of assigning and controlling the use of State cars was adopted. It has worked amazingly well. The size of the fleet of newer cars has increased and the older passenger cars are being discarded regularly in the fall. The directional movement is toward a smaller permanent fleet of newer vehicles. In collaboration with the Bureau of Publications, considerable attention was given to improving the quality of printing in Museum bulletins. Regular monthly staff meetings continue to follow the Commissioner's staff meetings by a week, and in the spring these meetings became reporting seminars to inform each other on systematic research in progress. Invited guests from within the Department attend. Departmental and internal communication is facilitated.

For 12 years commencing in 1946, the State Legislature has granted a lump sum appropriation to enable the State Science Service to conduct "surveys and major scientific studies relative to the natural

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[1] The winners are listed in Appendix A.

resources and natural history of the State." This allotment has hovered at $40,000, more or less, and is used to finance in the order of 14 to 18 projects in anthropology, biology and geology. The program has gradually grown with the strength and competence of the staff and to this sum in the past year have been added the proceeds from research grants from private sources and public foundations:

Ward Melville, Esq., Stony Brook, Long Island, for the excavation of an archeological site at Stony Brook and for the publication of the results	$4,250
National Science Foundation for research on aboriginal settlement patterns	8,800
National Science Foundation for Second Conference Directors of Research Museums of Natural History	4,500
National Park Service for archeological reconnaissance of Allegheny River Basin	750
National Institutes of Health for radioactive tagging and sampling of ragweed pollen	24,000
Total of grants received in two-year period	$42,300

The employment problem in geology that was critical has been temporarily solved by several new appointments. Terry W. Offield was appointed provisionally as scientist (geology). One vacant position of senior scientist (geology) was reclassified to associate scientist (geology) and an appointment had been recommended at the close of the year. The position of junior scientist (geology) in the Wellsville office was reclassified to scientist (geology). However, James N. Bowerman resigned from this position and was replaced by Arthur M. Van Tyne. We still have been unable to keep a curator of geology for more than a year. Mary Catherine Reed, who was appointed provisionally, returned to the U. S. Geological Survey. The position of scientific aide (botany) was reclassified to junior scientist. The maintenance man (carpenter) position was reclassified to carpenter. Charles A. Scott and Henry Fisher resigned as building guards and Francis J. Lynch was appointed to fill one of these vacancies.

The archeological program of the Anthropological Survey reported below supported two major excavations disclosing contrasting patterns of aboriginal settlement. Perhaps the most significant advance in archeological research in years was the enactment of legislation enabling State and Federal cooperation in the recovery of archeological and paleontological remains during highway construction with Federal subsidies. The law also provides for the issuance of permits to responsible

university departments, museums and research institutes for collecting on State lands. Arrangements for administration of the law were progressing at the year's end.

The researches of the State Botanist in cooperation with meteorologists at the Brookhaven National Laboratory and the steady increase in the zoological program have reduced the former preponderance of entomology in the research program of the Biological Survey. In entomology the gypsy moth ecological studies assumed greater importance in view of the widespread concern over large-scale aerial spraying. For the first time, some research has been undertaken on the life history of the gypsy moth, its habits and natural factors affecting its growth and control and an attempt has been made to assess the effects of spraying for blackflies on neighboring forms of life.

The Geological Survey has continued to maintain a balanced program of basic and applied research in the earth sciences. The most significant contribution has been the team effort by the entire staff of the Geological Survey toward its major goal—a new State geologic map. The range and variety of its publications attest to the support of other areas in former years and to its contributions to the engineering geology of the St. Lawrence Seaway Canal. Cooperation with other Departments of State government is a feature of the work of the Science Service and may be noted in the reports of the separate surveys.

The Governor's Committee on the Utilization of the Thomas Indian School, on which the Assistant Commissioner represented the Department, brought its work to a conclusion with the leasing of the buildings from the Seneca Nation to the Department of Mental Hygiene. Thus, the State's investment is protected and the Seneca Nation has an income during a particularly stringent financial period. The Office of the Attorney General asked for assistance on some Indian litigation. At the request of the City of Elmira and the Department of Commerce a group of civic leaders in Elmira was advised on the establishment of the Strathmont Museum, its administration and staffing, and its charter was granted by the Board of Regents. Similarly, the Players Club of New York was advised on its library which was subsequently chartered. A charter was likewise recommended for the Capital District Mineral Club. Both The University of Buffalo and Syracuse University consulted members of our staff on the establishment of new positions in anthropology and geology.

Perhaps the challenge which most excites the scholar turned administrator is the opportunity to function again in his own field of endeavor. Edmund Wilson, the distinguished critic and writer of *The New Yorker* magazine, intrigued by the phenomena of Indian conservatism, set out to do a piece on Iroquois nationalism. His path led to the State Museum

and his questions took us back to the field. In April, the Assistant Commissioner received the 1958 citation for the Peter Doctor Memorial Scholarship Fund for distinguished service to Empire State reservation people.

The policy of a research museum toward the professional development of its staff should encourage and enable them to contribute significantly to the programs and activities of learned and scientific societies. The extent of this participation may be gleaned from the tabulation of meetings attended where papers were read, Appendix B. Similarly, the staff serves an even greater number of lay groups, as evidenced by talks given, Appendix C. Beyond these formal contacts, the research and educational programs bespeak an even wider range of reciprocal services, Appendix D. The list of publications by the staff—15 in official and 22 in outside media—speaks for itself.

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

Members of the Geological Survey, State Museum and Science Service, visit a rig which is drilling for gas or oil in the Catskill Mountains. Examination of the well cuttings assists in identification of the rock formations being penetrated. This aids the oil and gas industry in planning the location of future drilling sites.

Accomplishments of the Surveys

Anthropological Survey

THE NATURE OF OUTSIDE SUPPORT for this activity has already been mentioned. With two major excavations and a number of minor ones and a continuation of the research on the Seneca language the program promises some interesting results. The report of the State Archeologist suggests that we are on the way to discovery of the true relationship between the earliest Mohawk settlement in eastern New York and the identity of the people of Owasco culture in the Susquehanna drainage. Though of no economic consequence to the State, public interest everywhere in this work has been enormous.

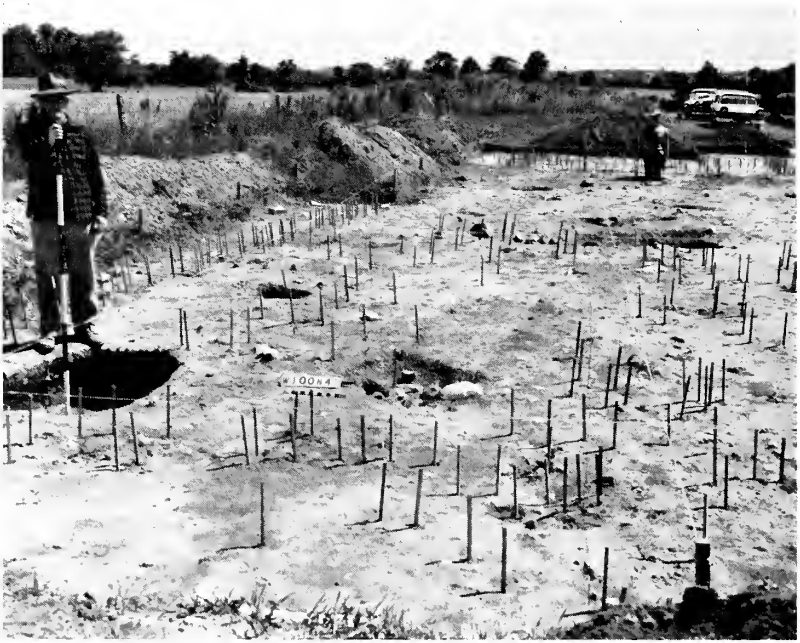
Fieldwork

The major field research project undertaken with the aid of a National Science Foundation grant was the inauguration by the State Archeologist of a three-year program of investigation into the development of aboriginal settlement patterns in the Northeast. With a field party totaling six undergraduate and graduate students, excavations were carried on during July and August on the Getman site, Montgomery County, and the Bates site, Chenango County.

The Getman site, covering some two acres, with an estimated population of about 200, is the earliest large Mohawk-Iroquois village known. Five longhouse floors were wholly or partially exposed, together with food storage pits, hearths and other features, all lying within a double-walled stockade, traced by post molds in the subsoil, measuring approximately 320 feet in diameter. The largest house floor, fully uncovered, had a length of 88 feet and was 23 feet in width.

It is now evident that, among the easternmost Iroquois tribe, the typical horticultural and communal settlement pattern of the later Iroquois was already in existence on the Chance ceramic horizon of cultural development. Determination of the actual age of this village will be attempted by radiocarbon dating.

The Owasco culture village on the Bates farm near Greene proved to be a smaller and earlier settlement. It consisted of a single-line, oval palisade, 96 feet by 50 feet. House floors appeared to be circular or oval and small (10-12 feet in diameter). Storage pits with kernels of charred corn and cooking hearths with pottery and other artifacts



Archeological excavations of the State Science Service in 1957 on a prehistoric Mohawk-Iroquois site in Montgomery County. The floor plan of a longhouse, measuring 88 x 23 feet, is outlined by stakes set into the post molds of the original wall and interior supports. Large food storage pits may be seen at either end, and a row of seven hearths extends along the center of the structure. Charcoal from one of these fireplaces has been radiocarbon dated at about A.D. 1398.

were numerous. Radiocarbon dating from charcoal will be attempted. This, the first Owasco village site ever to be fully excavated, will have been completely explored in the summer of 1958.

Archeological site reconnaissance in connection with settlement pattern studies, salvage, cooperative relations with amateurs, or related to our broad program of statewide research, was conducted on sites in Chenango, Orleans, Niagara, Essex, Albany, Columbia, Wayne, Schuyler and Livingston Counties.

A week's reconnaissance was made on the Allegany Indian Reservation of the Seneca Nation in search of archeological sites which might be flooded by the proposed Kinzua Dam.

At the invitation of the Cohannet Chapter, Massachusetts Archeological Society, a week was spent in excavating with this group on the

Assowampsett site in Plymouth County, Mass. Excavation of another large lodge floor site, 33 feet in diameter, confirmed their previous discovery of similar features on this Archaic period site. The circular lodges here traced apparently pertain to the Laurentian tradition and represent the oldest discovered settlement pattern in New England. Data from this excavation are to be used by the New York State Archeologist in his report on settlement pattern studies in the Northeast.

Collections were studied in Toronto and Midland, Ontario, at the American Museum of Natural History, the University of Kentucky and the Baltimore Academy of Natural Sciences.

Laboratory Analysis

The ceramic remains from the Bates and Getman sites were analyzed and seriated, in order to place these sites in the chronological framework of the Owasco and Mohawk cultures, respectively.

Toward a major report in progress, Frontenac Island material excavated by the State Museum in 1953 was completely reanalyzed, and available data for the Middlesex complex in the Northeast were scrutinized critically for their relationship with the Adena.

Office Activities and Administration

The State Archeologist received 156 local or out-of-town visitors, including professional colleagues from various American and Canadian institutions, some students and others amateur archeologists. Between these calls he made a detailed distributional study of beveled adzes in the Northeast in connection with research and writing on a forthcoming publication, *The Archeology of New York State.* He also did a number of minor jobs of writing.

Cooperative Work

The State Archeologist advised the Department of Public Works on highway salvage archeology and legislation and with his colleagues in botany planned pollen studies for dating archeological sites in New York. With the Assistant Commissioner he assisted the director of the Fort Ticonderoga Museum in his plan for an Indian museum. The State Archeologist with the assistance of the curator examined and identified various human remains on five occasions for the New York State Police Laboratory; and twice for the Niagara County coroner. He prepared and set up a permanent exhibit at the Suffolk County Historical Museum on materials from the Stony Brook site.

Wallace L. Chafe, Sterling Fellow at Yale, for the second year continued a study of the Seneca Indian language and completed an analysis of its structure. In late spring, Dr. Chafe returned to the field, where he succeeded in recording the first day of the recitation of the Code of Handsome Lake, the Seneca Prophet, and translating it. He also prepared for publication a glossary of terms in the Seneca language for ethnological fieldworkers. At the year's end he was appointed assistant professor at The University of Buffalo.

At our invitation, Dr. William C. Sturtevant, ethnologist at the Bureau of American Ethnology, Smithsonian Institution, collaborated with Dr. Chafe in recording various Seneca ceremonial speeches and songs. The cooperation of the Seneca Nation in these studies has been most gratifying.

The great advances in the humanities and the social sciences are made by scholars who are permitted to concentrate on a period or an area over many years. Perception in these disciplines as in the natural sciences is sharpened by prolonged concentration. Repeated observation is the nearest thing to experimentation in the natural sciences. Introducing a second observer to the scene often quickens one's critical faculties. The Assistant Commissioner, therefore, welcomed the chance to introduce Edmund Wilson to the Seneca midwinter ceremonies at Allegany Reservation which the former has been repeatedly observing since 1934. In several visits to the valley during the year he completed a photographic census of housing in the area of the proposed Allegheny Reservoir. Using a technique developed by Military Intelligence researchers of taking horizontal views to lend a third dimension to aerial photographs enabled him to demonstrate the changes in land use and the settlement pattern between aerial surveys a decade apart. Pictures lend accuracy to statements about housing conditions, their number and architectural style. They also serve to elicit additional information and pinpoint its accuracy. Thus, man's occupation of the valley may be added to its geology, fauna and flora.

Biological Survey

HAVING A LUMP SUM GRANT for the period of three years enables the scientist to plan and carry out a project without the uncertainties of annual budgeting. Thus, the grant from the National Institutes of Health enabled the State Botanist to approach the Brookhaven National Laboratory of Associated Industries, Inc. with his own funds in hand and with State support to arrange collaborative research with resident meteorologists. Both he and the junior scientist in botany were given

the titles of Guest Biologist and Guest Junior Biologist, as is the custom with visitors, thereby making that institution's facilities available to their use.

The grant funds are administered by our business office and are disbursed on the State Botanist's recommendation subject to the approval of the Principal Scientist, Biological Survey and the Assistant Commissioner.

In view of the widespread concern over large-scale aerial spraying, entomologists of the Biological Survey hoped that studies of the ecology of the gypsy moth may yield definitive answers as to what are the natural control factors that can be relied on and should be encouraged to keep the moths in check. The species evidently is here to stay.

The small mammal survey, conducted cooperatively with the Interdepartmental Committee on Rabies and under the direction of the State Zoologist, has continued to accumulate evidence that small mammals do not constitute reservoir-hosts of the disease rabies. This project has been one of the largest single contributors of specimens to Museum study collections and has furnished many significant records.

Field Research by Projects

Botany Project No. 1. Aquatic plant fragments: their identification from anatomical characters.

The number of samples was increased from 75 to 210, each backed by an herbarium sheet and with extra material for freehand dissection. Considerable progress was made in the laboratory work; some 570 microscope slides have been prepared.

Botany Project No. 2. Survey of airborne pollen grains and fungus spores.

Sixty-one graphs have been made and 14 graphs are being prepared for the final report which is planned to be completed during the winter of 1958–59.

Botany Project No. 3. Ragweed pollen content in the air, in relation to weather conditions.

This project is carried on with the cooperation of the Meteorology Group of the Brookhaven National Laboratory. Samplers were operated in wind tunnels on the tower, enlarging on tests made previously. Results to date are being presented in a paper entitled "Field Experiments in Sampling Airborne Pollen," by E. C. Ogden and Gilbert S. Raynor for the *Journal of Allergy.*

Botany Projects No. 4. Pollen spectra of bog and lake sediments.

After the preliminary work previously reported which included the making of a "Hiller" type sampler and the taking of test samples, two specific studies were begun in the spring of 1958; both had a view to correlating floristic and climatic conditions in prehistoric times with archeological studies. The sites are at Lake Lomoka (near Penn Yan) and Crusoe Lake (near Auburn). Dr. Donald D. Cox, Department of Science, Marshall College, West Virginia, and Dr. Clair Brown, professor of botany at Louisiana State University, are carrying out these projects.

Botany Project No. 5. Tagging and sampling of ragweed pollen.

Begun this year in cooperation with scientists in biology, health physics and meteorology at Brookhaven National Laboratory, the research is supported by the National Institutes of Health grant and the use of equipment and facilities of the Atomic Energy Commission.

A botanist injects a ragweed plant* (Ambrosia trifida) *with radiophosphorus to label the pollen in connection with hay fever studies.

Plants of *Ambrosia artemisiifolia* (common ragweed) and *A. trifida* (giant ragweed) were grown in the greenhouse and in the field for summer experiments. Designs of several styles of pollen samplers have been prepared and four of these machines are now being constructed for tests. A new wind tunnel was being built that will give any wind velocity from 0 to 30 m.p.h. and allow visual and photographic records of air dynamics adjacent to the sampling device.

A third study is supported, in part, by a student honorarium grant. LaVerne H. Durkee of the State University College of Forestry at Syracuse is sampling selected lakes at about 50-mile intervals, from the Pennsylvania border north to Canada, through central New York.

Botany Project No. 6. Checklist of the grasses of New York State.

The curator of the botanical collections reports that the work on the checklist is 97 percent complete. Approximately 350 additional specimens were collected, which brought the total of new records on the distributions of grasses in New York State to 900.

Botany Project No. 7. General survey of the vascular plants of New York.

Records (either sight or supported by specimens) were made in Albany, Allegany, Cattaraugus, Clinton, Columbia, Dutchess, Erie, Essex, Franklin, Greene, Hamilton, Lewis, Rensselaer, Rockland, St. Lawrence, Saratoga, Schenectady, Schoharie, Tompkins, Ulster, Warren and Washington Counties. These records involved 1,650 species and subspecies. Many of these records were made during special trips to northern New York, southeastern New York and to the drainage of the Allegheny River. This project is 87 percent completed.

Botany Project No. 8. Flora of the Allegany Reservation and vicinity.

At various times during the summer of 1957, Museum botanists, both temporary and permanent staff, made collections and observations in the Allegany region as follows: Stanley J. Smith, 3 weeks; Dr. George J. Schumacher, 3 weeks; Dr. W. C. Denison, 12 weeks. Reports are in preparation.

The entomology office continued to carry on project work of four types in two fields: (*a*) on forest insects (*b*) on nuisance insects and insects of public health importance. It also identified a large number of insects of all orders and carried on systematic taxonomic work. The Senior Scientist (Entomology) and temporary assistants partly from the Conservation Department report data on eight projects, in part, as follows:

Entomology: Projects on forest insects.

1. *Beech scale and* NECTRIA *fungus.* The seventh year in a 10-year program. Each of five study plots now has both the scale (insect) and the associated bark disease (fungus). All but one of the plots contain marked study trees that have died since the study began.

2. *Gypsy moth.* (*a*) *Ecological studies.* The collection of data in 13 study plots was continued, with special attention to the relation between egg mass counts and defoliation. In addition, a special study was undertaken to determine (1) how ecological factors operate to keep the gypsy moth in check in specific areas of low gypsy moth incidence and (2) what is lacking or out of balance in areas where the gypsy moth causes complete stripping and (3) whether the environment can either be manipulated so that severe damage does not occur or whether at least a more specific index than those now available for predicting probable gypsy moth defoliation can be developed.

A systematic search was made for a suitable area for concentrated study of several of these points. An area was located near Glenville, Schenectady County, and the first season of a planned three-year study was begun there in May 1958. Since the factors governing gypsy moth abundance and its cyclic nature are not well understood, the number of study years required cannot be accurately forecast.

(*b*) *Experimental sprays against gypsy moth.* It is obvious that the status of all insecticides tested for possible use as a substitute for DDT against gypsy moth is far from clear. It is expected that tests of new insecticides as they are developed and screened will be made yearly by the Conservation Department and that we will continue to participate in the planning of the tests and the evaluation of the results.

3. *White pine weevil.* (*a*) *Large-scale control tests.* About 1,000 acres of white pine plantations in the Watertown area were sprayed as a demonstration-control test in the spring of 1957. The spraying was supervised and carried out by the State Conservation Department, the U. S. Forest Service and the State Entomologist's office. The dosage was 4 pounds of DDT in 4 gallons of kerosene per acre.

Comparisons with the work of other years on a less ambitious scale indicate that when optimum spraying conditions occur at the right time in relation to beetle emergence and activity, and advantage can be taken of this coincidence of favorable factors by an experienced pilot, a satisfactory control can be obtained. But since such a coincidence of favorable factors cannot always be expected to occur, the airplane cannot always be relied upon as the sole instrument of control.

(*b*) In 1958 tests were made with a portable knapsack-type gasoline-powered mist blower, the Kiekens Whirlwind. The insecticide tested

was 1 percent lindane with 1 percent Arachlor by weight, as an extender, in emulsion form. Complete results are not yet available, but it appears that this method has possibilities with small trees.

(*c*) Potentially one of the most important phases was the continuation of the "plantation studies," i. e., the study of the relation of soil factors to attack by white pine weevil. Data from 9 of the 15 forest districts were assembled and analyzed. Analysis of data from 166 one-tenth-acre plots shows that the incidence of weeviling is less on light sandy soils, especially when drainage is good and there is no hardpan. All phases of this work at present under study should be completed during 1958.

4. *Studies of thinning and other silvicultural practices in relation to insect buildup in forest plantations.* These studies were continued by John Risley, of the Conservation Department, under our direction. Killing of trees in plantations for thinning purposes apparently is accomplished more safely by the use of sodium arsenite applied to a complete ax girdle bark frill around the trunk.

5. MATSUCOCCUS *scale.* The infested area has greatly increased and at least doubled in size since 1951, but is still confined to the western half of Long Island. In Westchester County the scale has not progressed any farther north than it had in 1956 near White Plains.

6. *Red pine sawfly.* Observations in the 25 established study plots were continued in St. Lawrence County. Data relative to egg deposition and subsequent defoliation were collected. From these data derive two sequential sampling plans: one based on a 15-inch tip sample and the other on a 6-inch tip sample. Both plans appear quite comparable and indicate that most of the eggs are laid on needles at the tip of branches. Studies will be extended one more year to determine which of the two plans is the most reliable in predicting extent of defoliation.

7. *Forest tent caterpillar.* Routine observations were continued for the fourth year.

8. *Other forest pests checked annually:* Birch leaf miner (*Fenusa pumila*) ; *Ips pini* and other bark beetles.

Entomology: Projects on nuisance insects and insects of public health importance.

9. *Salt-marsh tabanids* (*greenhead flies*). During the summer of 1957, the fieldwork necessary for the preparation of keys for the identification of the immature stages was completed. The control measures as applied through the spring of 1957 were evaluated during the summer, and several phases of the studies of the effects of these measures on

salt-marsh fauna were completed. No evidence of repopulation was found in the spring in the larger of the two plots described last year. Therefore, this section was not treated, but instead the adjacent salt marsh on the west end and on the opposite side of the bay was treated. After this series of treatments a reduction in the adult population as well as in the larval population was noted. The studies of other fauna, including forms of interest to sportsmen and conservationists, indicated that blue-claw crabs and dipterous larvae were especially sensitive to the dieldrin dosages as applied (0.3 lb. per acre in granulated form), whereas birds, molluscs and fish were much less sensitive.

10. CULICOIDES (*sandfly*) *control.* Earlier observations were continued, using the sampling methods developed and reported last year, namely, that breeding of the most important species, *Culicoides melleus*, is restricted to the sandy beach in a narrow intertidal band in protected bays and coves. This allowed the development and testing of a control measure. Evaluation of the reduction in adult populations has not yet been made in New York.

11. *Blackfly control.* Successful completion of several phases of greenhead fly and sandfly work on Long Island permitted the scientists (entomology) to attend problems left unsolved or not yet attacked in the Adirondacks. The blackfly control problem in the high peaks around Tahawus and the question of the effects of yearly stream treatments on the other arthropod stream fauna during seven years needed investigation.

Accordingly, in April 1958, the scientist (entomology) established headquarters at Blue Mountain Lake, with laboratory facilities made available through the courtesy of the Adirondack Museum. The principal accomplishment was making a preliminary survey of the *Culicoides* ("punkies" or "no-see-ums," synonymous with sandflies) of the Adirondacks, with particular attention to breeding sites of species which attack man. This research is complex and will require several years.

Entomology: Projects on systematic and taxonomic problems.

12. *Identification and classification of the leaf beetles.* (CHRYSOMELIDAE). This large family contains many species which are pests on trees and other plants grown for food or ornamental uses.

(a) *Revised taxonomy of the Chrysomelidae.* Produced a manuscript consisting of nearly one hundred and fifty pages; about two-thirds of the work is completed.

(b) *Abbreviated catalog of species.* The catalog lists 1,400 North American species. It will include original descriptions, citations of recent publications and notes on the range of each species.

(c) *Keys to the identification of chrysomelids.* This study will probably produce the most useful report since it will provide descriptive keys for the identification of the leaf beetles. Though mainly a compilation, very few of the keys did not call for additional field and laboratory studies. Work of this sort ties in very closely with project (*a*). The manuscript comprises 340 pages, 210 figures and a bibliography of 600 items.

Zoology Project No. 1. Small mammal survey.

For the third year the scientist (zoology) and assistants surveyed small mammals with special reference to the possibility of their acting as reservoir-hosts of the disease rabies. Although only two of the several high-rabies areas have been sampled, to date no evidence of rabies has been found in any small mammals except bats. This negative evidence is extremely important, and it might be added that of the dozen or more states that had rabies projects, ours is the only one, so far as we know, that is attempting to provide an answer to the question, "Are small mammals other than bats, reservoir-hosts of rabies?"

In 1957-58 the small mammal collections were made in Schoharie County, with Richmondville as headquarters. Collecting was done throughout the year. Trap nights (1 trap for 1 night) for mouse and rat traps totaled approximately 21,000. In addition, "tumble-in" cans were used to the extent of 4,000 "can nights."

The fieldwork was reduced after May in order to spend more time preparing reports for publication. An idea of the extent of the trapping and treatment of the trapped animals can be gained from the following figures: Total numbers taken, 1,684; total number of preserved skins with skulls, 336; total number of skeletons that were preserved, 86. Also, about 100 skulls without skins, chiefly of shrews, were saved.

Brain tissue for the rabies studies for Schoharie County was preserved chiefly during the spring and fall of 1957, totaling 230 brains (37 bats, remainder mostly shrews), plus 35 pairs of bat salivary glands. These figures brought the total number of brains submitted for rabies studies to 1,148.

Weights, measurements, reproductive data and other information for about 1,130 specimens of Schoharie County mammals had been obtained as of June 18.

Zoology Project No. 2. Biological progression.

The Assistant Director of the State Museum made field studies in southwestern Cattaraugus County, in an area where he had made a wildlife and forest survey in 1926, to record changes in the biota during the

intervening 31 years. Some striking progress was noted in reforestation and a number of animal species which had arrived or increased as a result of vegetative and climatic changes.

Zoology Project No. 3. Allegheny fauna.

During July and August, a survey was made in the Allegany Indian Reservation, Cattaraugus County, to determine the identity and ecological relationships of the amphibians, reptiles and mammals present and to estimate the probable effects of flooding on them. The work was done by Dr. Margaret Stewart of State University College for Teachers at Albany, with assistants Gary Larson and Thomas Watthews. A report was submitted and is awaiting publication.

Laboratory Work by Projects

Many of the field projects described or listed above entail a large amount of laboratory work and require additional temporary subprofessional assistance. This is especially true of the botany projects, which involve the making of microscope slides and the detailed examination of thousands of specimens. In entomology, hundreds of gypsy moth caterpillars were caged, fed, reared and examined daily for parasites. The white pine weevil plantation studies involved the collection of several hundred soil samples. Their analysis in the laboratory will take two men several weeks.

In the *Bird Handbook* project, which is carried on in cooperation with the American Ornithologists' Union, over 70 percent of the manuscript for loons through ducks has been received. The State Zoologist is writing sections that were not otherwise assigned, and the Associate Curator (Zoology) completed over 100 detailed range maps.

Office Activities and Administration

Each of the biology groups has a routine of office work which varies little from year to year but comprises certain essential services. These include maintenance of card index files on subjects of special interest, additions to the collections of photographs, including color transparencies, and answering of numerous letters and telephone calls, particularly those involving pest problems, identification of specimens and answering questions of visitors, as well as those simply requesting biological information.

Professional Activities of the Staff

The State Botanist was appointed to the Pollen and Mold subcommittee of the Research Council of the American Academy of Allergy. The scientist (entomology) was reelected vice president of the Northeastern Mosquito Control Association. The State Entomologist continued as editor of *Mosquito News,* the official publication of the American Mosquito Control Association, a scientific journal published quarterly with an international circulation of about 1,600. He was appointed chairman of the Membership Committee of the Entomological Society of America, and also served on the Exhibits Committee of the annual meeting of that society in Memphis, Tenn. The State Zoologist attended the 12th International Ornithological Congress at Helsinki and during the trip conferred with colleagues in England and Sweden, as well as in Finland. This trip was made possible partly through support of the National Science Foundation and the American Scandinavian Foundation.

Geological Survey

THE MOST SIGNIFICANT CONTRIBUTION was work carried on by the entire staff of the Geological Survey toward its major immediate goal—a new State geologic map. Stratigraphic geologists made real advances in the compilation of the Paleozoic portion of the map. Work was renewed on the compilation of data in the Precambrian rocks of the Adirondacks and decisions were reached on the base map to be used for publication, the publication scale and the overall format.

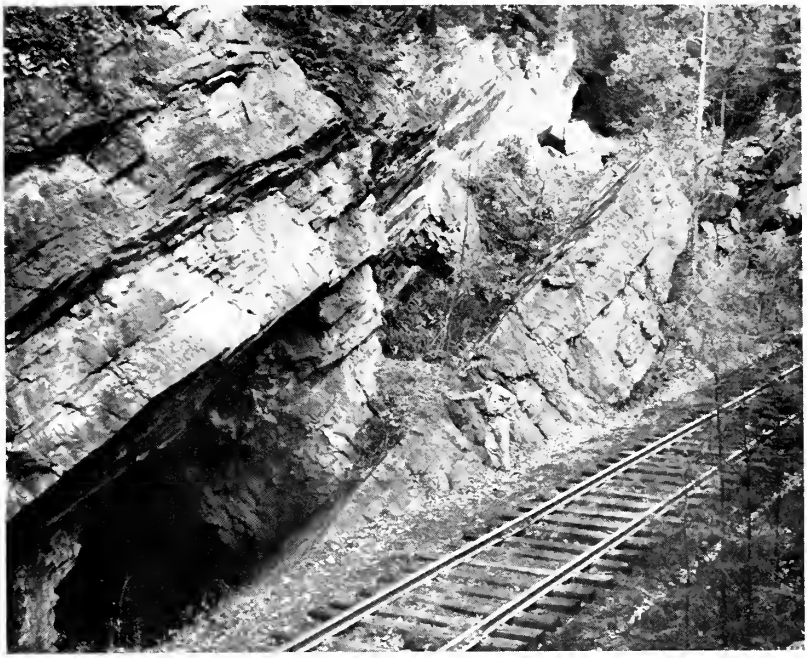
The State Paleontologist and the senior scientist (paleontology) presented a well-developed plan which will direct the activities of staff paleontologists and stratigraphers toward a summarization of accumulated knowledge of the State's sedimentary rocks. This will be accomplished not only by the State geologic map but also by the preparation of a lexicon of geologic names, correlation tables and monographs on the four major Paleozoic systems found in the State.

Field Research

Fieldwork of the Geological Survey was directed toward geologic mapping, both for the purposes of the State geologic map and in greater detail in areas of particular interest. Investigations of mineral resources were also carried on. This work was done both by permanent staff members and by geologists temporarily employed for the summer months.

1. *Bedrock geology of the Plattsburgh and Rouses Point* 15*-minute quadrangles*

The State Paleontologist carried on field mapping in the Plattsburgh and Rouses Point quadrangles of northeastern New York. Information gathered during the past three years has filled a gap in our knowledge of the State. Field mapping will be completed next field season. Fossil collections have been made to supplement the stratigraphic collection and the structural geology is also being studied.



Fieldwork by the Geological Survey contributes to a better understanding of the rocks and mineral resources of New York State. The measured stratigraphic section exposed at this abandoned natural cement mine near Rosendale contains fossil-bearing limestones of Late Silurian and Early Devonian age which have been tilted by mountain-building forces.

2. *Bedrock geology of the Canaan and State Line* 7½*-minute quadrangles*

Taking advantage of excavations for the construction of the Berkshire Spur of the New York State Thruway and the recent appearance of accurate base maps, the State Paleontologist, assisted by Thomas Tal-

madge, started work in eastern Columbia County. His results will illuminate the historic scientific controversy concerning the manner of structural deformation in the complexly folded and faulted Taconic Mountains. Starting with a month's reconnaissance in the fall of 1957, work has continued since.

3. *The type Schodack area*

The State Paleontologist also began a study of the type Schodack formation which has never been mapped in detail nor described adequately, either lithologically or paleontologically. Two weeks of intensive field mapping in May-June encourage belief that this work will have use beyond the limits of the typical Schodack rocks.

4. *Geologic mapping in Orange County*

The scientists (geology) began geologic mapping in the Goshen and Greenwood Lake 15-minute quadrangles in southeastern New York. This work is an outgrowth of interest developed in this area by the discovery of uranium deposits. The work to date has been concentrated in the Pine Island and Wawayanda 7½-minute quadrangles; approximately 1/5 of a projected three-summer project has been completed. The area includes Precambrian marble metasediments in granite and Paleozoic sandstone, dolomite, limestone and shale. The study involves detailed structural and petrologic research in the Precambrian rocks and details of the structure, stratigraphy and possible subdivision of the sedimentary rocks. Five days were also spent in making a geologic, magnetic and radiometric survey of a uranium property near Warwick, N. Y.

5. *Studies in the Helderbergian limestone*

The senior scientist (paleontology) resumed stratigraphic research in the lower Devonian limestones of eastern New York, completing detailed studies between Cherry Valley and Catskill. Significant results were obtained by tracing a bentonite bed (this ancient volcanic ash fall is extremely useful as an indication of contemporaneous deposition) and the faunal zone in the Kalkberg limestone.

Field Research of Temporary Personnel

1. *Investigation of limestones by counties*

Continuing a county-by-county survey of New York State limestones carried on jointly with the New York State College of Ceramics, John H.

Johnsen of Vassar College, assisted by Charles Rockwell of Harpur College, mapped and sampled the limestones of Lewis County. He also mapped the contact between the Middle Ordovician shales and limestones of the 15-minute Boonville quadrangle for the State geologic map.

2. *Taconic geology of eastern New York*

Donald B. Potter of Hamilton College continued mapping in the Taconic region of Washington County. In addition to making a general contribution to Taconic geology, he will also complete the mapping of the four 7½-minute quadrangles included in the former 15-minute Hoosick Falls quadrangle. This work is progressing slowly as expected, owing to the complexity of folding and faulting and the scarcity of palcontological control and mapping. Potter was assisted by William Harris.

3. *Upper Devonian rocks of central and eastern New York*

Robert G. Sutton of the University of Rochester started work in the geologically poorly known region between Cayuga Lake and the western Catskills. The summer of 1957 was spent in reconnaissance work but resulted in a greater amount of usable information than had been anticipated. A different technique of correlating was employed—that is, the utilization of sedimentary structures such as ripple marks, flow casts, grooves etc., and the consistency of orientation of these features in specific zones. This type of approach was attempted because paleontological control is not possible since over three-fourths of the mappable rocks units are nonmarine in origin and there are exceedingly few fossils. Frederick Manley assisted Sutton during the 1957 field season and Elmer Humes during the summer of 1958.

4. *Glacial geology of western New York*

Mapping of Pleistocene surficial deposits continued in western New York under the direction of Ernest H. Muller of Cornell University. Much of the 1957 field season was directed toward a study of the glacial geology of the Allegheny River Valley, particularly the area which will be flooded if the Kinzua Dam is constructed. Copies of Muller's report, as well as one on the bedrock geology prepared by Irving H. Tesmer, have been made available for use by both the U. S. Corps of Army Engineers and the Seneca Nation. the litigants in the action. Muller also restudied the area of the Salamanca reentrant (that part of the State not covered by the last glacier) and completed work in the southern

half of Cattaraugus County. Work began in 1958 in northern Cattaraugus County and southern Erie County. Geologic maps of the surficial deposits will be useful in suggesting the sources of sand and gravel as construction materials.

5. *Knickerbocker project*

A restudy of the geology of the New York City metropolitan area has been needed. A committee of the Geological Survey and the colleges and universities in the New York metropolitan area are cooperating. Professor Kurt E. Lowe of City College is directing the activities of geologic compilers in the New York City area. Charles H. Behre, executive officer of the Department of Geology at Columbia University, and John G. Broughton, State Geologist, are acting with Professor Lowe as a steering committee. Simon Schaffel, of City College and Rutgers University, and Seymour Tilson, of New York University and Columbia University, acted as geological compilers and collected and indexed data from State, municipal and private sources. These data are being plotted into a geologic map of the Borough of Manhattan. Other boroughs will be treated in similar fashion.

6. *Glacial geology of the Oswego area*

During the 1957 field season, Russell F. Kaiser of Syracuse University completed a map of surficial deposits in the entire area within 25 miles of Oswego. This study was carried on in anticipation of industrial development of the Port of Oswego and uses a technique of mapping dependent on geologic interpretation of soil maps. A manuscript report was submitted.

7. *Geology of the Palmer Hill mining district*

Lorence F. Collins, of the University of Illinois, engaged in the geologic mapping and interpretation of the Palmer Hill iron mining district in Clinton County. These ores are unusual mineralogically and the study of their origin is of some importance both scientifically and economically.

Laboratory Work

Much time was directed toward compilation and interpretation of old and new data for the State geologic map, in particular by the senior scientist (paleontology). Some phases of the work await purchase of a final compilation base. Y. William Isachsen, professor of geology at

State University Teachers College at Plattsburgh, voluntarily contributed compilation work on the Adirondack Mountain area. After consultation with specialists in the printing of large colored geologic maps, it is proposed to prepare the New York State map at a scale of 1:250,000 (approximately four miles = one inch) and to issue it in a five-sheet atlas with explanatory text on the inside covers.

Approximately 250 specimens were identified for approximately 75 individuals by the senior curator of geology. The bulk of such specimens could be readily identified on sight or by use of a petrographic microscope, but a substantial number could not be completely identified without X-ray equipment. In anticipation of this equipment, the senior curator of geology and the scientist (geology) attended a five-day X-ray diffraction school sponsored by the North American Phillips Electronics Company, Inc., in Mount Vernon, N. Y. In June arrangements were made through the offices of the Surplus Property Administrator for the transfer of X-ray diffraction equipment from the Atomic Energy Commission.

The State Paleontologist carried on library research and laboratory study of fossils for his contribution on tentaculitids, hyolithids and other conical shells of unknown biologic affinities for the *Treatise on Invertebrate Paleontology*. He also prepared preliminary copy of a correlation chart of the Silurian formations of New York.

The senior scientist (geology) continued work on well locations and compilation of well records for the western New York portion of the "dry hole map." He was assisted during the fall and winter by Peter Muder, an undergraduate student, and during the spring by Howard Herman, a graduate student, both of Rensselaer Polytechnic Institute. Sample analyses of two deep wells (Ellis No. 1 and F. W. Hargrave No. 1) in southwestern New York was completed by the scientist (geology), Wellsville office. He also cut and filed 7,065 samples from 29 wells, representing a cumulative depth of almost 70,000 feet. An Oriskany structure map covering the area of current drilling activity in Allegany County and portions of Steuben, Livingston and Cattaraugus Counties was prepared for a more complete understanding of the drilling developments.

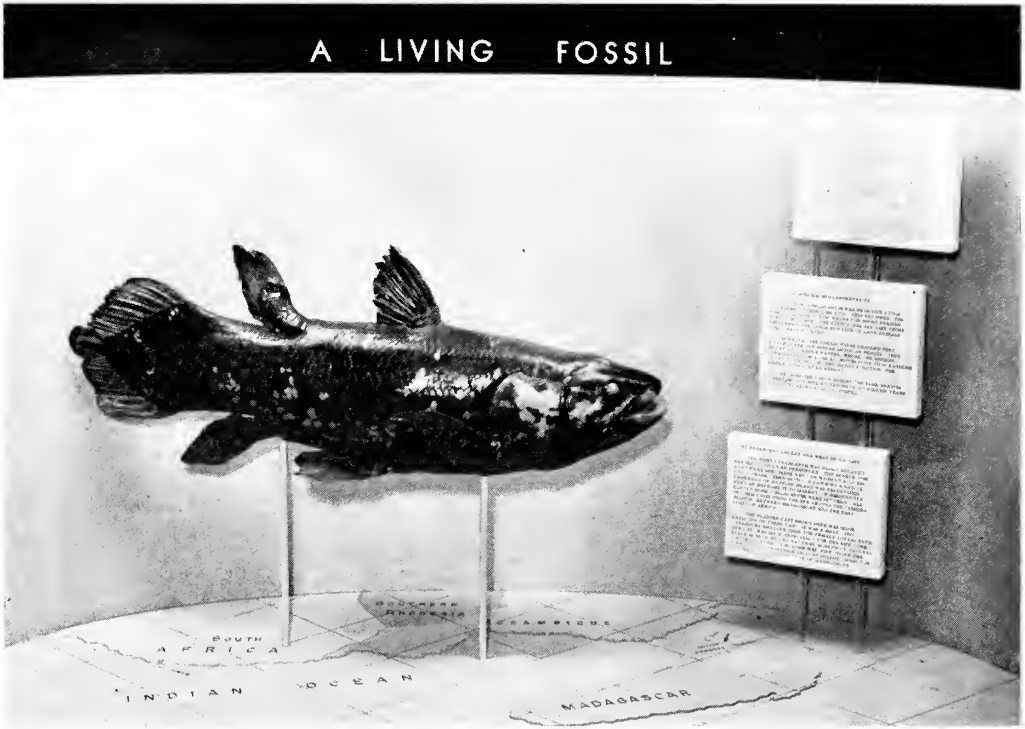
The senior scientist (paleontology) completed the preliminary draft of a new correlation table for the Devonian sedimentary rocks of New York State. Several unusual methods for increasing the amount of information shown on correlation charts of this type have been developed. He also spent approximately two months in an analysis of modern stratigraphic terminology in an effort to clarify them and to determine their proper and consistent usage in staff publications.

The scientist (geology) carried on the collection and compilation of all New York State mineral production data for 1956–57. He also assembled a spectrograph on loan from the New York State Department of Health. In connection with his study of the geology of the Goshen and Greenwood Lake quadrangles, he examined over 50 thin sections under the petrologic microscope.

Office Activities and Administration

The State Geologist carried on extensive recruitment activities to fill the job vacancies. Memorandums were submitted to the Joint Legislative Committee on Interstate Cooperation concerning the provisions of proposed legislation dealing with the conservation of oil and gas, offshore drilling activities and the underground storage of petroleum products and radioactive and chemical wastes. The State Geologist and the senior scientist (geology) attended a conference in New York City on December 17 called to consider this legislation. As chairman of the Mineral Resources Subcommittee of the New York-Vermont Interstate Committee on the Champlain Basin, the State Geologist prepared a report on the mineral resources for the September meeting. The relation of geology and mineral resources to private and State-owned property was considered for the Real Property Bureau of the State Department of Law and for the State Board of Equalization and Assessment. Acting on the advice of the senior scientist (geology), the State Geologist approved a number of oil and gas leases which were negotiated between the State Conservation Department and private industry. He and the State Paleontologist reviewed the problems in connection with the new law requiring issuance of permits for collection of archeological and paleontological specimens on State-owned land. The annual contract between the U. S. Bureau of Mines and the Geological Survey concerning collection of mineral production statistics was negotiated and approved. Conferences were held with geologists representing the Geological Surveys of adjoining states in order to assure mutual boundaries on State geologic maps now in preparation. Copy for the new geologic map of North America was reviewed and corrected by the State Paleontologist and State Geologist.

The senior scientist (geology), while attending a meeting in Pittsburgh, visited well-cutting libraries of the Pennsylvania Geological Survey, and afterward proposed a long-range plan for storage of well samples both in the Museum and in Wellsville with a view to future consolidation and reduction of collections.



A cast of a Coelacanth was obtained from the National Museum of Natural History in Paris. A living "relic" which has survived virtually unchanged since the Devonian, the fish is one of the most important scientific discoveries of recent time. Related forms undoubtedly lived in New York State, but they died out in the Mesozoic era.

The Museum

General

AMONG THE HIGHLIGHTS OF THE YEAR were the installation of new exhibits on diamonds, fossil plants, Theodore Roosevelt as a Conservationist and the Coelacanth as a "living fossil." The large mastodon exhibit and adjacent life history displays were completed and dedicated, and a number of improvements were made in old exhibits. A regional exhibit on spring birds was installed, using some 90 renovated specimens and many new drawings and labels. Two Salons of Nature Photography were accommodated and several series of notable paintings and photographs were displayed on short-period loans from the owners.

Because of adverse winter weather and the epidemic of Asian flu, the number of school children visiting the Museum in organized groups declined about 10 percent as compared with the total of the preceding year. Nevertheless, attendance at guided tours increased 16 percent because a larger staff was available for instruction. The total number of visitors to the exhibit halls (adults and children) also increased, from approximately 112,000 in 1956–57 to more than 130,000 in 1957–58.

For the first time in several years, the results of research by the staff were published promptly. A backlog of manuscripts was eliminated and current work appeared in a total of 1,238 text pages and 234 plates, tables etc. in State Museum publications. In addition, numerous papers by the Staff appeared in other media.

Studies were made by the Assistant Director of exhibits, educational programs and administration methods at Carnegie Museum, Redpath Museum, Peabody Museum (Yale), American Museum of Natural History, "Atoms for Peace Exhibit" (at Union College, Schenectady), Smithsonian Institution, Dartmouth Natural History Museum, Reading (Pa.) Museum, Pennsylvania State Museum, Virginia Museum of Fine Arts, North Carolina State Museum, Geology Museum of the University of South Carolina, Charleston (S.C.) Museum, Cape Hatteras Museum, Norfolk (Va.) Museum of Arts and Sciences, Mariners' Museum, Yorktown Battlefield Museum and First Colony Museum (Jamestown Island). The curator of geology made a study of the new Geology Hall at the Royal Ontario Museum, Toronto.

In turn, the State Museum was visited by representatives of the Smithsonian Institution, Royal Ontario Museum and the National Museum of Canada who were seeking advice regarding exhibits.

Interviews were given and publicity was written for the use of local newspapers and State agencies including the Commerce Department concerning museum protection problems and on temporary, loan and permanent exhibits.

Considerable time was spent assembling information for an exhibit on natural resources of the State for eventual installation in Orientation Hall.

A policy to govern the lending of scientific material and the conditions under which loans will be made was worked out with all curators cooperating.

As in previous years, material assistance to the exhibits renovation program and the improvement of "housekeeping" in the Museum was given by the Building Superintendent and his staff. This help included painting, plastering, electrical work, contributed guard service and better cleaning and maintenance of the halls.

Curatorial Activities

Archeology

The curator of archeology answered the requests of more than 140 visitors to the office. These inquiries included a great diversity of matters. such as the identification of bones brought in by the New York State Police Bureau of Criminal Investigation; counseling a college student on bibliographies of Iroquois studies; itemizations of the requirements for a career in archeology to high school students; advice to amateur archeologists on the excavation of sites; opening the collections for study by visitors; and the many identifications of cultural and nonartifactual materials brought in by the general public. Other similar inquiries were answered by mail.

Cooperation with the State Archeologist was continued through discussions of culture sequences, the systematic sorting of artifacts according to levels and features by reference to the catalogs of the particular sites and assistance in proofreading papers and reports and checking charts. Assistance in identification was given in the project of mapping the known finds of beveled adzes in the Northeast.

The usual routine duties of caring for the collections occupied the greatest part of the curator's time. Collections from Museum excavations on the Bates and Getman sites were accessioned. cleaned, repaired and cataloged.

Two more steel storage cases were received and the collections of cornhusk masks and rattles were transferred to them. The boxing of archeological specimens in dust-tight containers continued as the analyses were completed.

In February 1958, Wendell S. Hadlock of the Farnsworth Museum, Rockland, Me., was engaged for a two-week period in repairing a canoe received as a donation from Howard R. Sargent of Claremont, N. H. The curator assisted Mr. Hadlock in making the major reconstructions of the framework and later completed the work according to Mr. Hadlock's instructions. A thick coating of shellac was then removed so that the carved designs were visible.

The project of dismantling the older exhibits in Morgan Hall was continued with the establishment of a temporary range in the west end of the hall. The work on the item catalog of the study collections was suspended during these operations and will be resumed when the reorganization of the storage area is completed.

A total of 98 lantern slides were bound and added to the collections. The site record files were maintained with the addition of new site listings.

Botany

The State Botanist turned over 46 specimens of California Lichens and 12 specimens of fruiting *Leucobryum glaucum* to the Herbarium. Several other institutions and individuals donated specimens or sent them in exchange (see appended list). All these resulted in the following totals for accessions:

	New York State	Elsewhere	Total
Fungi	1,103	46	1,149
Algae	3	0	3
Mosses and liverworts	1,447	0	1,447
Vascular plants	2,011	20	2,031
Totals	4,564	66	4,630

Entomology

With the assistance of Thomas Watthews, science research assistant, the transfer and rearrangement of the pinned collection of beetles (Coleoptera) were nearly completed. In this project, specimens are removed from obsolete cardboard boxes and placed in National Museum type drawers. During the year approximately 40,000 specimens were transferred.

Many insect specimens were collected by the curator of entomology and by Messrs. Connola, William Smith and Jamnback. However, of these only a few related to special projects of the entomology office have been mounted and placed in the reference-study collections. Most will be stored dry or in alcohol until an assistant is available to mount and label them.

Geology

The cataloging system designed by former curator Kurt Servos was put into use and 151 specimens from the collection of New York State minerals were cataloged. In addition, special catalogs of the meteorite collection, the collection of dressed building stones and the soil samples of the 1820 surveys by Amos Eaton of Albany and Rensselaer Counties were made.

The material stored in Geology Hall was surveyed and a record made of the contents of the 1,392 drawers. It is now possible, even though the vast bulk of the geology and mineralogy collections is as yet uncataloged, to locate any specific material from those collections.

As a first step toward evaluating the collection of New York State minerals and guiding future additions to it, a catalog was made listing all mineral species represented in the collection, their localities, and all notable New York State localities mentioned in the literature.

Seventy-four boxed sets of New York State rocks and minerals were sent to 22 schools in the State and 52 schools in other States.

Paleontology

In the course of caring for the collections, type numbers were changed from fractional number system to serial number system on 975 exhibit specimens. The contents (815 type specimens and 730 exhibit specimens) were removed from eight Museum exhibit cases and the material was cataloged and stored. With the assistance of William McClennan, the large *Climactichnites* trail slab was taken apart and the parts not replaced on exhibition were numbered and stored.

Fifty-three new type specimens were added to the type collection and cards for same entered in the card catalog of type specimens. Twenty accession entries were made in the locality and accession records and 70 specimens were ticketed with locality numbers. As usual, a considerable amount of time was spent in keeping type catalog card data up to date.

Zoology

Five hundred eleven specimens, mainly mammals and birds' eggs, have been cataloged and another 201 specimens are in the process of being cataloged and sorted into the general collection. At this date the State Museum's zoology collection contains 18,341 cataloged items representing about 180,000 individual specimens. The most notable acquisitions in the field of zoology came from Dr. Brandon Macomber of Albany, who donated 19 specimens of African birds and mammals and the skulls

of 5 bears and a wolverine from Alaska, and Mr. and Mrs. G. M. Tucker of Albany, who donated a collection of Florida seashells for use in exchange and exhibition.

Accessions

A considerable number of items were received during the year. Unless otherwise noted as purchases, these objects were donated. The items and donor or source are as follows:

Archeology

Potsherd	Howard I. Becker, Rexford, N. Y.
Flint samples from Indiana and West Virginia	Carnegie Museum, Pittsburgh, Pa.
Birchbark canoe (purchased)	Charles E. Congdon, Salamanca, N. Y.
Skeleton from Ripley Site	Jordan Christensen, Corry, Pa.
Calumet	Robert E. Dodds, New Rochelle, N. Y.
Iron axhead	R. C. Flagg, Castleton-on-Hudson, N. Y.
Potsherds and 2 skulls	Lester Laird, Savannah, N. Y.
Projectile point	A. E. Leighton, Mattituck, N. Y.
Algonquin basket and bag	Franklin C. Lindley, Pittsfield, Mass.
Indian baskets (3); scrapbooks (4)	Mrs. A. C. Parker, Naples, N. Y.
Steatite samples	Maurice Robbins, Mass. Arch. Soc., Attleboro, Mass.
Cornplanter mask and drum (purchased)	Sam Grey Wolf, Hamilton, Ohio
Birchbark canoe	Howard Sargent, Claremont, N. H.
Warclub (in memory of Comdr. A. G. Scott, USN)	Mrs. A. G. Scott, Schenevus, N. Y.
Potsherds	Harold Secor, Savannah, N. Y.
Steatite samples	Arthur Staples, Segreganset, Mass.
Potsherds	Lloyd A. Wilford, Univ. of Minn., Minneapolis, Minn.

Botany

Sphagnum (N.A.) (2)	Dr. A. LeRoy Andrews, Ithaca, N. Y.
Fungi (8); *Bryophyta* (9) *Tracheophyta* (13)	Theodore C. Baim, Schenectady, N. Y.
Dicotyledoneae (56)	John W. Charlton, Gloversville, N. Y.
Cyathus stercoreus	Richard Comins, West Hoosick, N. Y.
Anthopsida (24) from Alabama	George Cooley, Rensselaerville, N. Y.
Fungus; Bryales (10)	Dr. Gertrude E. Douglas, Feura Bush, N. Y.
Lichenes (38); *Carex hirta*	Dr. Frederick J. Hermann, Beltsville, Md.
Fissidens exilis	Dr. Edwin Ketchledge, Syracuse, N. Y.
Fistulina hepatica	Lewis Kohler (Museum Staff)
Rhododendron maximum	F. Lambert, Seneca Falls, N. Y.

Rhododendron periclymenoides; Hymenochaete	Dr. Josiah Lowe, Syracuse, N. Y.
Fungi (3)	Herbert Mapes, Watervliet, N. Y.
Aesculus glabra	Edwin Oberwager, Old Chatham, N. Y.
Fungi (14); *Bryophyta* (306); *Selaginella rupestris* (3)	Dr. Orra A. Phelps, Wilton, N. Y.
Perilla frutescens	Ralph H. Rose, South Kortright, N. Y.
Fungi (8); *Bryopsida* (4)	Mrs. Clara Schultz, Bemis Heights, N. Y.
Dryopteris fragrans	E. M. Shields, Haines Falls, N. Y.
Cladonia	Mrs. Grace C. Smith (Museum Staff)
Fomes annosus (4)	William Smith, N.Y.S. Conservation Department
Tracheophyta (3)	Dr. R. Eliot Stauffer, Rochester, N. Y.
Rubus laciniatus	Mrs. Howard Thayer, Boonville, N. Y.
Phlogiotis helvelloides	Theodore P. Weyhe (Museum Staff)
Bryophyta (70)	Dr. W. T. Winne, Schenectady, N. Y.

Geology

Silicified wood with uranium mineralization, Jackpile Mine, Laguna, N. Mex.; Metahewettite, Grants, N. Mex.	The Anaconda Co., Grants, N. Mex.
Kyanite with quartz and pyrite, South Carolina	Commercial Ores, Inc., Clover, S. C.
Galena, sphalerite, marcasite, calcite (8), Oklahoma	Eagle-Picher Company, Cardin, Okla.
Chalcopyrite with sphalerite and galena, Colorado	Idarodo Mining Co., Ouray, Colo.
Fluorescent calcite on indurated gravel, Clemons, N. Y.	Jerome Lapham, Glens Falls, N. Y.
Ore samples, containing magnetite, pyrite, uraninnite, Warwick, N. Y.	Ramapo Uranium Corp., Warwick, N. Y.
Calcite (2), Warrensburg, N. Y.	George W. Robinson, Jr., Glens Falls, N. Y.
Large quartz crystal, Saratoga, N. Y.; fluorescent calcite, Clemons, N. Y.	Elmer Rowley, Glens Falls, N. Y.

Paleontology

Plaster casts of 12 type fossils (figured 1843 by Prof. F. deCastelnau now on deposit Museum National d'Histoire Naturelle, Paris)	Dr. A. M. Ehlers, University of Michigan, Ann Arbor, Mich.
Eurypterid and 12 fossils, central and western New York	Willard P. Leutze, Ohio State Univ., Columbus, Ohio
Petrified wood, Upper Triassic, Petrified Forest, Ariz.	Mrs. Maddaugh, Candor, N. Y.
Fossil starfish (12), Cooperstown, N. Y.	Dr. Monroe A. McIver, Cooperstown, N. Y.

Zoology

Saw whet owl	Capt. Contreras, Albany Air Reserve Center
Short-eared owl	Mrs. Juanita Cook, Castleton-on-Hudson, N. Y.
Richardson's owl	Charles Mayhood, Jr., Watertown, N. Y.
Birds and mammals (19), Africa; bear skulls (5); wolverine skull, Alaska	Dr. Brandon Macomber, Albany, N. Y.
Birds (4)	Mrs. D. Radke, East Chatham, N. Y.
Birds (3)	Mrs. Fred Smilow, Red Roek, N. Y.
Seashells, Florida	Mr. and Mrs. Gilbert M. Tucker, Albany, N. Y.

State Lists

The transcribing of current reports in the literature and other work has resulted in the following numbers of additions of species and subspecies to our record of vascular plants for the counties noted:

Albany	15	Franklin	10	Rockland	67
Allegany	3	Fulton	10	St. Lawrence	13
Bronx	26	Greene	14	Saratoga	5
Cattaraugus	187	Hamilton	10	Schenectady	19
Chautauqua	8	Lewis	3	Schoharie	4
Chemung	2	Livingston	1	Steuben	1
Clinton	15	Montgomery	2	Tioga	2
Cortland	1	Orange	2	Tompkins	1
Delaware	79	Otsego	5	Ulster	18
Dutchess	17	Putnam	1	Warren	2
Erie	7	Queens	1	Washington	1
Essex	22	Rensselaer	8		

Five taxa of vascular plants were added to the records for New York State. Four of these were casual weeds. The fifth was made by the reidentification of the showy weedy *Bidens polylepis*, Blake, previously identified as *B. trichosperma*, Mx., otherwise known as a rare native in the State.

Activities of botanists have also produced the following numbers of additions to the degree-quadrangles of the checklist of mosses of the State:

District	2 (vicinity of Ogdensburg)	6
	4 (vicinity of Plattsburgh)	3
	6 (vicinity of Lockport)	2
	9 (vicinity of Lowville)	2
	10 (vicinity of Speculator)	1
	12 (vicinity of Jamestown)	1
	13 (vicinity of Buffalo and Allegany State Park)	5
	16 (vieinity of Unadilla)	3
	17 (vicinity of Middleburg)	2

It should be noted that most of the collections of bryophytes made this year await identification. As previously emphasized, the services of a mycologist on the staff are greatly needed. The curator continues to collect fungi as time permits, but must await the pleasure of his colleagues at other institutions for many identifications. Much assistance in identification has been granted by junior scientist Donald M. Lewis.

During the current season, collections of *Albugo ipomoeae-panduratae*, (Schw.) Swing., and *Ustilago davisii*, Liro, were made by the curator of botany in Allegany State Park, from which Dr. Denison reports the finding of *Cylindrosporium corni*, Solheim. These three are new to the State. The following are new host records:

Sphaerotheca macularis, (Wallr. *ex* Fr.) Cooke, on *Potentilla intermedia*, L., and *Aureolaria virginica*, (L.) Pennell; Epichloe typhina, (Pers. *ex* Fr.) Tul., on *Bromus pubescens*, Muhl.; *Phragmidium potentillae*, (Pers.) Karst., on *Potentilla simplex*, Mx.; *Uromyces junci-effusi*, Syd., on *Juncus brevicaudatus*, (Engelm.) Fern.

Dr. Clark T. Rogerson, curator of mycology, New York Botanical Garden, New York City, kindly identified a large series of specimens of fungi, mostly of the curator's collecting, in the groups in which he specializes. The following notes are of interest:

Tilletia commelinae, Komarov, has not hitherto been reported for North America.

Four other species have not been reported for New York State:

Puccinia virgata, Ell. & Ev., *P. oenotherae*, Vize; *Ustilago cilinodis*, Savile; *Davisiella elymina*, (Davis) Petrak. Fifteen host records are new for North America; 36 more are new for New York State.

Loans

Material from the collections of the State Museum and Science Service were loaned as follows:

Archeology

3 rattles, wooden spoon, war club, tomahawk, clay pot and Indian skull	Bethlehem Central Schools, Delmar, N. Y.
14 glass slides of archeological subjects	Bronson Museum, Attleboro, Mass.
9 stone bowl fragments	E. J. Carter, Clayton, N. Y.
String of wampum beads	Miss Eleanor Hall, Albany, N. Y.
12 duplicate archeological specimens	Red Mill School, Rensselaer, N. Y.

5 duplicate ethnological specimens; 20 archeological specimens for special exhibit	Rensselaer County Junior Museum, Troy, N. Y.
26 ethnological specimens for special exhibit	Schenectady Museum, Schenectady, N. Y.
16 projectile points; 5 pottery sherds; 1 pipe bowl fragment	Scotia High School, Scotia, N. Y.
Photograph of interior of Bark House	Theodore Roosevelt High School, Binghamton, N. Y.
2 ethnological specimens; 8 archeological specimens	Women's Alliance of Unitarian Church, Albany, N. Y.
1 mask; 1 grinding stone and muller; 1 tomahawk pipe and 1 snapping turtle rattle	Woodard, Voss & Hevenor, Albany, N. Y.

Entomology

Silkworm exhibit and set of slides	Blue Creek School, Latham, N. Y.
Exhibit of insects	Colonie Village School, Colonie, N. Y.
Exhibit of forest pests	New York State Conservation Department, Albany, N. Y.
Silkworm exhibit	Rensselaer County Junior Museum, Troy, N. Y.
Small collection of moths and butterflies	Vincentian Institute, Albany, N. Y.

Geology

12 New York State minerals	Bethlehem Central Junior High School, Delmar, N. Y.
7 minerals	Joseph F. Connors, Averill Park, N. Y.
20 economic rocks and minerals	Rensselaer County Junior Museum, Troy, N. Y.
10 New York State minerals	South Glens Falls Central High School, South Glens Falls, N. Y.

Paleontology

44 fossils	Alfred University, Alfred, N. Y.
47 fossils	Massachusetts Institute of Technology, Cambridge, Mass.
4 trilobite types	Museum of Comparative Zoology, Cambridge, Mass.
5 types and 9 other specimens of brachiopods	Museum of Paleontology, Ann Arbor, Mich.
5 graptolite types	University of Illinois, Urbana, Ill.
13 graptolite types	University of Oklahoma, Norman, Okla.
30 fossil bryozoan types; 21 other types	U. S. National Museum, Washington, D. C.
53 fossils	Woods Road School, North Babylon, N. Y.

Zoology

Mounted animals	Altamont Central School, Altamont, N. Y.
Mammals and reptiles	American Museum of Natural History, New York, N. Y.
Birds and fishes	Cornell University, Ithaca, N. Y.
Mounted animals	Draper School, Schenectady, N. Y.
Mounted animals	Columbia High School, East Greenbush, N. Y.
Mounted animals	Guilderland Central School, Guilderland, N. Y.
Mammals and reptiles	Queens College, Flushing, N. Y.
Varying hares (3)	U. S. National Museum, Washington, D. C.

Donations

Archeology

13 duplicate archeological specimens	Stony Brook Museum, Suffolk, N. Y.

Paleontology

34 fossils	Boy Scouts of America, Syracuse, N. Y.
4 photographs and 2 rubber molds of trilobites	Geological & Paleontological Institute, Bonn, Germany
35 fossil specimens; 14 rubber casts of fossils	Queens College, Flushing, N. Y.
4 fossil pelecypods	Pennsylvania State University, University Park, Pa.
19 fossils	South Otselic Central School, South Otselic, N. Y.
5 specimens and 4 rubber molds of fossils	University of Colorado, Boulder, Colo.
Eurypterid	University of New Hampshire, Durham, N. H.

Exchanges

Additional material was received for the collections as the result of exchanges with other institutions:

Trillium sessile (Louisiana)	Bailey Hortorium, Cornell University, Ithaca, N. Y.
Ruby in chrome zoisite matrix, Southern Rhodesia	C. D. Woodhouse, Goleta, Calif.

Professional Activities and Services

Some idea of the participation of the staff of the State Museum and Science Service in the community of science, the scope of service rendered to the lay public and the extent of cooperation with various professional, State and lay institutions may be gleaned from scrutinizing the lists of these bodies. The staff attended, took part informally, organized symposiums, presided or read formal research papers at nearly 50 professional conferences and meetings (Appendix B). But they were even more active in diffusing and interpreting their findings, addressing some 54 groups by various media including television (Appendix C). The number of cooperating agencies (Appendix D) totals 41.

Museum Exhibits

MODERNIZATION OF THE EXHIBIT HALLS PROCEEDED, although the rate of progress was slow in relation to the size of the task that must be done. The large number of small but time-consuming repairs and "touchup" jobs and the preparation of several temporary exhibits for special occasions made material inroads on the program. It is realized by all who are concerned with the problem that more hands will be required to update the exhibits within a reasonable period of time.

In the two areas which are now undergoing overall revision, material progress was made. This is the foyer, where the information desk was constructed, a large exhibit on fossil plants was installed and a wood railing was made to replace the old brass barrier for the Gilboa Forest reconstruction. The new railing included a lectern-stand for a back-lighted label. As a result of these improvements in the entrance area, the visitor receives a better first impression of the Museum. The only major projects remaining to be done are the construction of a floor directory—resting bench, new Naples Tree restoration and coatroom with other reception facilities at the rear of the information desk.

While temporary exhibits have improved the appearance of Orientation Hall, only the first of seven permanent displays was in progress at the end of the year. This is to be an explanation of the structure of the earth, with an "exploded plug" to show the strata from the surface to center. A new shell to house the exhibit has been built in place in the hall and a 24-inch model of the earth has been prepared and made ready for painting. Fluorescent paints and "black light" will be used to give the effect of the planet in space. Elsewhere in Orientation Hall, an automatic projector has been purchased and numerous slides on natural

history subjects have been prepared for future picture-stories in a theater which is to be constructed. Also, a general plan was submitted for cases around the rotunda well to house traveling exhibits and prize-winning Science Fairs displays.

In Paleontology Hall, which has been partially cleared for reconstruction of exhibits, the large mastodon display was completed and dedicated on May 9, 1958. The exhibits of mammoth and mastodon life histories and the refurbished model of the Cohoes pothole, which round out the large Ice Age scene, were also finished during the year. A new exhibit of Climactichnites was prepared from the best part of the old slab and was placed on view. Planning for the entire Paleontology Hall was done by the State Paleontologist, and layout and arrangement of the housings for new exhibits were under way by the exhibits designer at the close of the report period.

Among the more significant of the great number of exhibits projects which required the services of the designer, the preparation staff or other persons during the year were the following:

In the field of geology an exhibit on diamonds was created with the help of the General Electric Company. While the emphasis was on the artificial production of industrial stones (including a 25-carat cluster in a special stand which was donated by GE) considerable information concerning the natural mineral was incorporated. A display of thin rock sections, using old photomicrographs, was under construction at the close of the year.

Considerable rearrangement of cases was carried out in Geology Hall, permitting the elimination of some excess exhibit material and a few cases. The project included the moving of a glacier-scratched rock slab which required repair and refinishing. The relief model of the Clark Reservation was repaired and partially refinished and was provided with a new and briefer label.

Eight Iroquois false faces from the collections were reproduced and at the close of the year were ready for installation in the appropriate house in the Hall of Indian Groups. It is believed that the addition of these masks will provide considerable interest and additional information for the exhibit on the False Face Ceremony.

Much additional work was done in Morgan Hall by consolidating and simplifying exhibits, in storing material which was removed from the cases and in planning for the contemplated move to the halls adjacent to the Indian Groups.

A majority of the time of the exhibits preparation staff was spent on biological material. The major project was the creation of a habitat group depicting life at a beaver pond. The group was completed during 1958. One of the tasks which provided a major interruption to prog-

ress on the beaver pond exhibit was rehabilitation of the Peck collection of mushrooms. These reproductions had become extremely soiled by atmospheric dust and had suffered from the effects of excessive heat. The fungi were cleaned and restored as well as possible and were reinstalled in a much improved setting. Their case was refinished inside and out and was given a modern facing and fluorescent lighting. Casts of a number of local species of frogs, toads and turtles were repaired for future use in the educational and exhibits program. Sculptures of the puma and the pleistocene beaver by Henry Marchand were repaired and reestablished on a pedestal in Biology Hall, where it is hoped they will be less subject to damage by the public.

Eight exhibits of insects were prepared by the curator of entomology. Material donated by Mr. and Mrs. Gilbert Tucker of Albany was incorporated in a new display of molluscs which was planned and assembled by the curator of zoology. The latter, in conjunction with the museum education supervisor and the exhibits staff, brought many of the mounted birds into an exhibit of the spring birds of the Albany region.

Special and temporary exhibits, most of which consisted of material or objects lent to the State Museum, were set up and displayed during the year. While a few of these displays have been mentioned previously because they involved considerable work by the exhibits staff and the curators, they are included in the following record:

Molluscs, their morphology and relationships

The function of councils in Iroquois Government, featuring five of the Iroquois national wampum belts and the rollcall cane lent by Cranbrook Institute of Science, installed especially for the annual meeting of the American Ethnological Society

Theodore Roosevelt Centennial Exhibit, which included items lent by the Smithsonian Institution, Theodore Roosevelt Association, the U. S. Department of the Interior and Edward Cohen of Albany

Bird Songs, a display of color transparencies plus field-recorded bird songs, lent by Cornell Laboratory of Ornithology

Horns and Antlers, a story-telling display of photographs by W. J. Schoonmaker

Miniature mammals, nearly 100 small-scale models of various mammals sculptured by Louis Paul Jonas and lent by him

Oil paintings of plants, birds, mammals and other animals by Celia Schwebel

Antarctic paintings by Comdr. Standish Backus, Jr., lent by the Department of the Navy

Original field sketches of birds by Louis A. Fuertes, lent by the American Museum of Natural History

A portion of a temporary exhibit of animals in miniature which was lent by the sculptor, Louis Paul Jonas

A collection of photographs, lent by the Berkshire Museum Camera Club, Pittsfield, Mass.

Prints of color photographs, lent by G. G. Somerville, Pittsfield, Mass.

Photographs of Ontario forests made and lent by Mrs. Martha Ann Kidd, Ontario, Canada

Photographs of scenery and animal life in Mount McKinley National Park, Alaska, made and lent by Warren K. Steenbergh, Three Rivers, Calif.

Photographs of Alaskan scenery and animals, made and lent by Charles Ott, McKinley Park, Alaska

Color reproductions from Arizona Highways Magazine

The Fourth and Fifth Salons of Nature Photography, conducted by the State Museum

Cooperative Services

MOST OF THE SERVICES rendered to other institutions by the Museum staff are enumerated in Appendix D. Other work has been performed and assistance has been received from numerous sources. Among the miscellaneous but frequently significant items are the following:

Advice and cooperation of the Science Teachers Association was obtained in planning a program for stimulating interest in the natural and physical sciences on the part of high school students. This will involve bringing prize-winning students at Regional Science Fairs to Albany for brief get-acquainted trips and displaying their exhibits in the State Museum for periods of four months. Also, the curator of zoology served as judge at the Eastern New York Science Congress and for Science Fairs at Columbia High School, East Greenbush.

The local musicians union (A.F.L.) arranged to give four concerts on Sunday afternoon in July, playing in Orientation Hall.

The Division of State Police contributed study and advice for better protection of property and equipment in the Museum.

The Smithsonian Institution, the Theodore Roosevelt Association and Edward Cohen of Albany lent material used by or collected by Roosevelt, and the Department of the Interior contributed photographs, for a special exhibit commemorating the 100th anniversary of the birth of the famous President.

Dr. Robert H. Wentorf of General Electric Research Laboratory and Dr. Vincent Schaefer of the Munitalp Foundation contributed technical advice on an earth model for an exhibit on the earth and its structure which is being installed in Orientation Hall.

A new label and housing were made for the field exhibit of fossil tree stumps at the Ashokan Reservoir and presented to the New York City Water Commission for placement.

Arrangements were made with the South African Information Office and N. W. Ayer Sons in New York City to borrow models of famous diamonds and photographs for an exhibit of diamonds in Geology Hall.

Conferences were held with the Museums Committee, New York Section of the Society of American Foresters, and with staff members of the College of Agriculture at Cornell University, regarding a natural resources exhibit for Orientation Hall.

Upon request, advice was contributed to the Rensselaer County Children's Museum regarding educational program and funds.

U. S. National Museum, Washington, and the University of Minnesota Museum of Natural History mounted and contributed several insectivorous birds for installation in habitat group of life at a beaver pond, now under construction.

The Public

Although heavy snowstorms reduced the visitor attendance during the months of January-March, total visitation in the exhibit halls increased almost 20 percent as compared with that of the previous year. Through an oversight, the once-weekly counts which were instituted in July 1956 were not taken during July, August and September (1957), when visitation is normally much larger than during the cold weather months. The annual attendance of 1957–58, on the prorata basis of the 37 counting days, was 130,765. An estimated total, adjusted for the undoubtedly heavier travel in July-September, may therefore approach 140,000 persons.

As usual, some vandalism occurred in the exhibit halls and other public areas. Cases were scratched or carved, statuary was broken, a leather cushion was slashed and scribbling was done on walls and material, such as rocks, on exhibition. Defacements were obliterated as soon as each case was found, with the objective of preventing the suggestion of vandalism from passing to later visitors. It is believed that this policy, with the better maintenance and upkeep of halls and exhibits, is having a beneficial effect. In areas of the museum which have been completely renovated and modernized, practically no damage has occurred.

Special Services

Program for Educational Groups

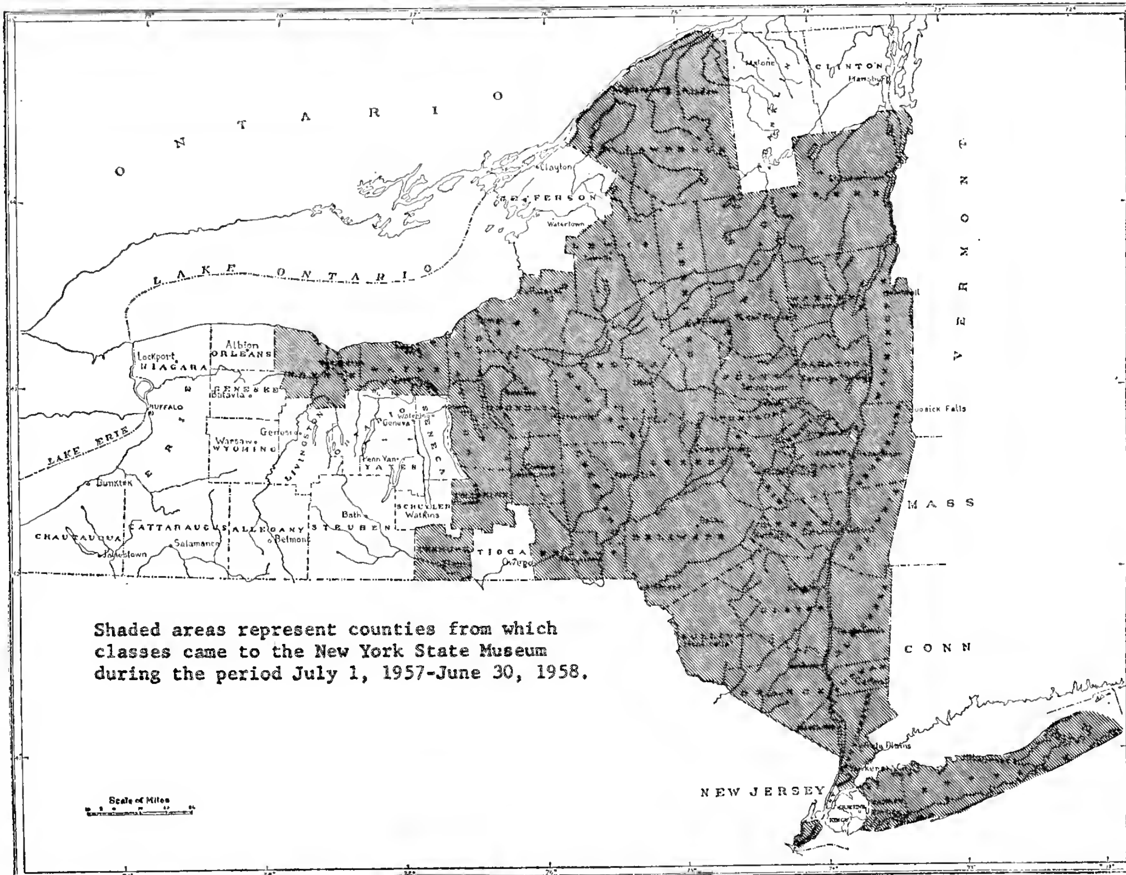
THE MUSEUM EDUCATION PROGRAM has continued its policy of providing visiting classes with a firsthand opportunity to see, touch and examine objects that children have been learning about in school. Generally, each museum instructor is assigned not more than 20 students. The emphasis during the museum lesson is to correlate selected museum exhibits and specimens with the course content and with the grade level of the child. We have found that the discussion type of lesson is most successful. Each child is encouraged to participate and to ask and answer questions; fallacies and misconceptions are cleared up and an interest in and better understanding of science are established.

Among other problems, the Asian flu epidemic during the fall months resulted in the cancellation of guided tours for one thousand students in October. Furthermore, numerous classes did not make their annual trip to the Museum because of the pressure of the shortened school year. Other classes postponed their trips to the spring months, thereby intensifying the usually heavy spring influx of classes. In addition, a measles and scarlet fever epidemic and the heavy winter snows resulted in many cancellations. Lack of adequate parking space, poor ventilation in the Museum halls and need for more modern exhibits still remain as pressing problems.

Educational Group Instruction

Primarily as a result of the Asian flu outbreak and heavy snows, attendance of organized educational groups to the Museum declined from 28,277 in 1956–57 to 25,190 in 1957–58 (an 11 percent decrease). However, the number of students receiving guided tours rose from 14,106 in 1956–57 to 16,319 in 1957–58 (a 16 percent increase) due to the availability of a full staff to instruct most classes desiring tour service.

Eighty-six percent of those visiting the Museum in organized groups were students. The remaining 14 percent were from such nonschool organizations as Scouts, 4-H groups, church clubs and resident and day camp groups. Distribution by category and services is shown in the following tables:



Shaded areas represent counties from which classes came to the New York State Museum during the period July 1, 1957-June 30, 1958.

School Group Analysis

GRADES	TOTAL ATTENDANCE	TOURS		INTRODUCTORY TALKS	
		NUMBER	ATTENDANCE	NUMBER	ATTENDANCE
K, 1–3.....	2,877	105	2,431	—	—
4–6.....	9,015	319	7,090	3	188
7–9	8,157	189	5,174	1	26
10–12.....	899	13	421	1	31
Multigraded...	117*	25	18**	—	—
Unclassified....	107	4	50	—	—
College.....	549	11	196	—	—
Adult Education.....	—	—	—	—	—
	21,721	666	15,380	5	245

* Teachers only; balance of attendance included in proper grade divisions. Multigraded refers to groups composed of a mixture of grades not fitting into one of the categories listed above.
** Teachers only; balance of attendance has been apportioned to proper grade division.

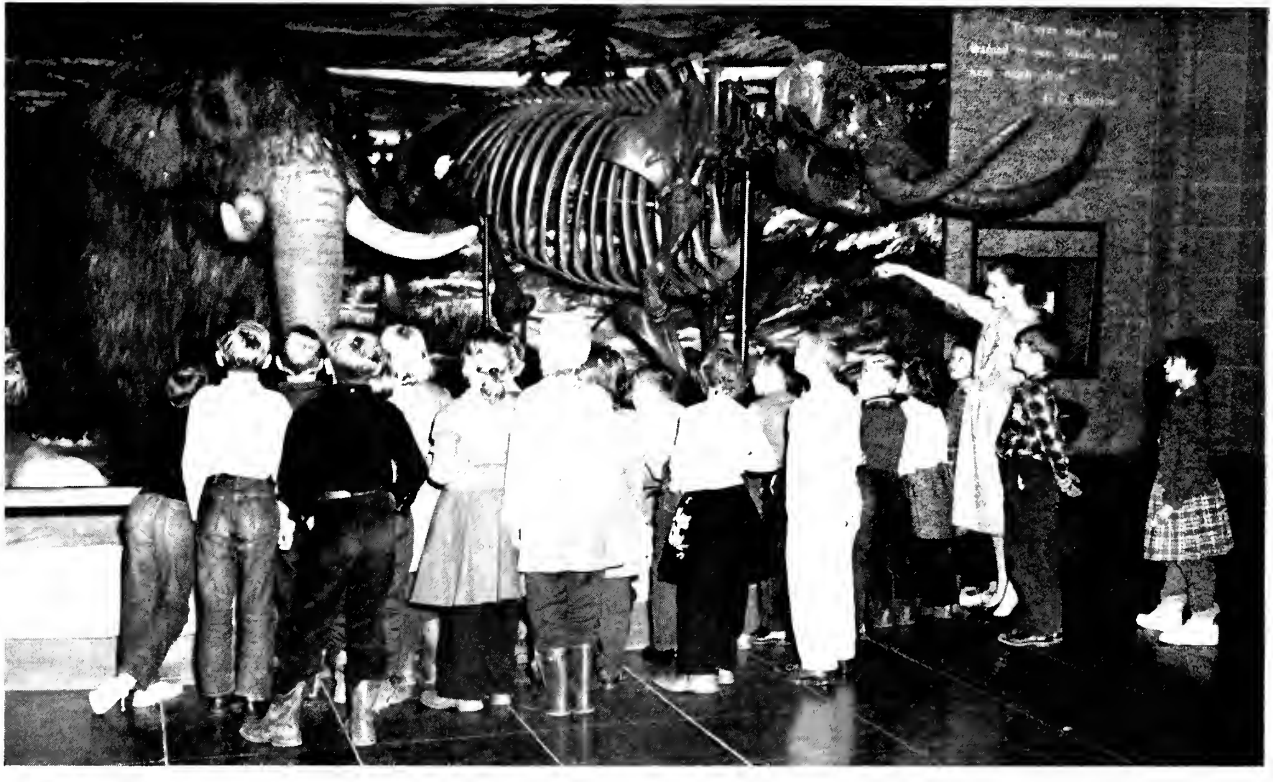
Nonschool Group Analysis

	NUMBER OF GROUPS	TOTAL ATTENDANCE	TOURS		INTRODUCTORY TALKS	
			NUMBER	ATTENDANCE	NUMBER	ATTENDANCE
Youth...	129	3,055	30	643	—	—
Adult....	19	414	17	296	3	58
	148	3,469	47	939	3	58

School groups visiting the Museum came from 41 counties of New York State and from Massachusetts, New Hampshire, Pennsylvania and Vermont. Most of the groups came from within a 50-mile radius of Albany; however, there was an unusually good representation from Dutchess, Herkimer, Oneida, Onondaga, Otsego, Ulster and Westchester Counties. During March 1958, school group attendance was 3,500: 450 of these students came from Westchester County and 800 from Onondaga County. The shaded areas on the map (p. 54) show the counties of origin of visiting school groups.

Related Activities

A list of the tour services available to classes visiting the Albany area was published. As part of the Department's Guard and Elevator Operator Training Course, the Museum education supervisor organized sessions in which all guards and elevator operators had an opportunity to meet some of the staff and learn of the services of the State Museum and Science Service. Because the response of the guards to the training



One of the 666 school groups which were conducted through the exhibits by members of the Museum education staff during the year.

session was excellent, a similar but more technical orientation series was organized for the Museum guards.

A morning workshop was held in September for 30 teachers from schools in the third supervisory district of Albany County. The topic under discussion was "Making Your Museum Come Alive." The staff of the Education Section outlined the services of the Museum and how these services could best be utilized. They also pointed out highlights of the Iroquois Indian exhibits.

The Instructor was engaged in preparing a selected bibliography of books for children and adults relating to the scientific fields. The part-time assistant prepared a popular, detailed history of the New York State Museum and Science Service.

As a new policy, moderately priced publications of nonprofit organizations were sold at the Information Desk. Although the selection of publications was necessarily limited, public interest in this service was good. The sales total was:

150 Booklets on insects
95 Booklets on dinosaurs
59 Copies of children's books
55 Boxes of note paper
50 Publications on the American Indian
20 Subscriptions to *The New York State Conservationist*

Museum Library

DURING THE PAST YEAR, service to the staff was increased. Many new books and periodicals were obtained through the New York State Library. The routing lists for periodicals from the Museum and State Libraries were revised and enlarged.

The Museum librarian continued work on the preparation of a checklist of State Library holdings of material on the Iroquois Indians. Progress was made in clearing old files and rearranging the contents of the stacks.

During the past year, 3,276 items were accessioned in the Museum Library. Most of these were periodicals and have been added to the files. New books which are not included in the above figures are: *French-English Science Dictionary* by DeVries, *Guide to Reference Books* by C. M. Winchell, *America's Natural Resources* by C. H. Callison, *The Future of Arid Lands*, an American Association for the Advancement of Science Symposium, and *The Earth's Story* by Gerald Ames and Rose Wyler in cooperation with the American Museum of Natural History (which donated the volume). The Museum Library also acquired the

Curator, a new quarterly publication of the American Museum of Natural History.

Honoraria reports received by the Museum Library include: *A Preliminary Report on the Precambrian Geology of the Putnam, N. Y. Quadrangle* by Richard H. Berry and a map entitled *Salina outcrop—Utica Quadrangle* by Willard P. Leutze.

Photography

THE CATALOGING of the negatives in the unified files continued, and a number of requests for negatives required the services of the curator of archeology.

The Museum photographer processed 125 approved requisitions during the fiscal year. This work resulted in the following: 367 black and white photographs taken directly, 1,179 negatives processed from field photographs and 3,856 prints and enlargements made from the preceding. In addition, 107 color photographs were taken, 97 projection slides were prepared and 83 special enlargements were made for television shows and new exhibition material.

The subject matter varied extensively ranging from photographs of Indian relics, plants, insects and damage caused by them to plants, fossils, minerals, animals and museum exhibits during process of and after completion of construction, identification photographs for fieldworkers, spectrography and preparation of special prints for television shows. In addition, a considerable amount of copy work was undertaken on drawings, charts and maps for slide preparation, field mapping and illustrations for forthcoming scientific reports.

Various other assignments throughout the year included photographing new exhibit material received and collections lent to other museums. In addition, photographs were taken or processed for special projects being carried on by Museum officials, the Department and the Board of Regents, including Convocation and ground breaking for the new addition to the Education Building.

Publications

A major advance in this field was made by the publication during 1957–58 of approximately 1,238 pages of text and 234 plates, figures, maps and tables as Museum Bulletins, an Annual Report and two miscellaneous items. A backlog of manuscripts, some of which had been awaiting publication for years, was practically eliminated.

Progress was made in creating more orderly storage for the large stock of published material on hand for sale. Stock was removed from three storage areas (one of which was used to enlarge the crowded carpenter shop) and added to other storerooms. One large stockroom for all sales publications is badly needed. Efforts are continued to publicize the existence of older material, with the result that some items have been reduced or even sold out.

At the close of the year, 12 technical manuscripts were in preparation by members of the staff while 2 papers had been completed and awaited submission to the printer. Of the manuscripts still in the writing stage, 1 was in the field of archeology, 1 in botany, 3 in entomology, 2 in geology, 1 in paleontology and 4 in zoology.

Detailed illustrations are a necessity for scientific articles. Here the curator of entomology is preparing such a drawing for a publication which makes easier the identification of leaf beetles.

Publications

State Museum and Science Service

1958 119th Annual report of the New York State Museum and Science Service—July 1, 1956–June 30, 1957. N. Y. State Mus. & Sci. Serv. Bull. 370. March 1958. 60pp. 9 pl.

Connola, D. P., Walters, W. E. & Smith, W. E.

1957 The development and application of a sequential sampling plan for forest tent caterpillar in New York State. N. Y. State Mus. & Sci. Serv. Bull. 366. Dec. 1957. 22pp. 3 fig. 2 tab.

Fischer, R. B.

1958 The breeding biology of the chimney swift *Chaetura pelagica* (Linnaeus). N. Y. State Mus. & Sci. Serv. Bull. 368. Apr. 1958. 141pp. 23 fig. 6 gphs. 17 tab.

Fisher, D. W.

1957 Mohawkian (Middle Ordovician) biostratigraphy of the Wells outlier, Hamilton County, New York. N. Y. State Mus. & Sci. Serv. Bull. 359. July 1957. 33 pp. 6 pl. 2 maps.

1957 Lithology, paleoecology and paleontology of the Vernon shale (Late Silurian) in the type area. N. Y. State Mus. & Sci. Serv. Bull. 364. Nov. 1957. 31pp. 2 fig. 3 pl.

Johnsen, J. H.

1958 Preliminary report on the limestones of Albany County, New York. N. Y. State Mus. & Sci. Serv. May 1958. 43pp. 4 maps.

Ketchledge, E. H.

1957 Checklist of the mosses of New York State. N. Y. State Mus. & Sci. Serv. Bull. 363. Nov. 1957. 55pp. map.

Kreidler, W. L.

1957 Occurrence of Silurian salt in New York State. N. Y. State Mus. & Sci. Serv. Bull. 361. Oct. 1957. 56pp. 2 tab. 2 pl.

MacClintock, P.

1958 Glacial geology of the St. Lawrence seaway and power projects. N. Y. State Mus. & Sci. Serv. March 1958. 26pp. 13 fig. 1 pl.

McVaugh, R.

1958 Flora of the Columbia County area, New York. N. Y. State Mus. & Sci. Serv. Bull. 360. Apr. 1958. 400pp. 81 fig.
Index—Appendix to flora of the Columbia County area, New York. N. Y. State Mus. & Sci. Serv. Bull. 360A. pp. 403-433.

Ogden, E. C.

1957 Survey of airborne pollen and fungus spores of New York State. N. Y. State Mus. & Sci. Serv. Bull. 356. July 1957. 62pp. (A Preliminary Report)

Ritchie, W. A.

1958 An introduction to Hudson Valley prehistory. N. Y. State Mus. & Sci. Serv. Bull. 367. Jan. 1958. 112pp. 5 fig. 32 pl.

Stewart, D. P.

1958 The Pleistocene geology of the Watertown and Sackets Harbor quadrangles, New York. N. Y. State Mus. & Sci. Serv. Bull. 369. April 1958. 79pp. 7 fig. 10 pl.

Tesmer, I. H.

1957 Sample study and correlation of three wells in Chautauqua County, New York. N. Y. State Mus. & Sci. Serv. Bull. 362. Nov. 1957. 20pp.

Wilcox, J. A.

1957 A revision of the North American species of Paria Lec. (Coleoptera: Chrysomelidae). N. Y. State Mus. & Sci. Serv. Bull. 365. Dec. 1957. 45pp. 3 pl.

In "Outside" Media

Cahalane, V. H.

1958 Katmai—a wilderness to be guarded. National Parks Magazine. Jan.-Mar. 1958, pp. 10–15. 1 map, 3 pl.

Fenton, W. N.

1957 Factionalism at Taos Pueblo. Smithsonian Institution, Bur. of Amer. Ethnol. Bull. 164. Anthrop. Pap., No. 56, pp. 297–344. 2 pl.

1957 (Ed.) Seneca Indians by Asher Wright. Ethnohistory 4 (4): 302–321.

1957 Long-term trends of change among the Iroquois in *Cultural Stability and Cultural Change.* V. F. Ray (ed.). Proceedings 1957 Ann. Spring Meeting of American Ethnological Soc. (at Ithaca) pp. 30–35. Seattle

Fisher, D. W.

1958 *Polylopia* Clark, an Ordovician Scaphopod. Jour. Paleo., v. 32, No. 1, pp. 144–146, 1 pl. Jan. 1958

1958 Ancient fishes of New York. The Conservationist, pp. 22–28, 35, Feb.-Mar. 1958. 1 chart, 1 map, 5 fig. 1 pl.

Jamnback, H.

1957 A first record of *Simulium (Eusimulium) congareenarum* (D. & S.) from New York, with descriptions of the male, female, pupa and larva. Ann. Ent. Soc. Amer., 50 (4): 395–399. July 1957

———— & Wall, W. J.

1957 Control of salt-marsh *Tabanus* larvae with granulated insecticides. Jour. Ec. Ent., 50(4): 379–382. August 1957

1958 A sampling procedure for *Culicoides melleus* (Coq.) (Diptera: Heleidae) with observations on the life histories of two coastal *Culicoides*. Mosquito News 18(2): 85–88. June 1958

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Kreidler, W. L.

1957 Let's take a look at New York's geology. Oil & Gas Journal, v. 55, No. 40, Oct. 7, 1957

1957 Oil and gas developments in New York State, 1956. National Oil Scouts & Landmen's Association, v. XXVIII, 1957. Yearbook, pp. 587–598

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1958 Exploratory drilling in 1957. A.A.P.G., v. 42, No. 6, June 1958

Palmer, R. S.

1957 (Review of) Arctic birds of Canada, by L. L. Snyder. Bird Banding, 28(4): 246–247. Oct. 1957

Reilly, E. M.

1957 Weathering the winter. New York State Conservationist, v. 12, No. 2, pp. 23–26. Oct.-Nov. 1957

1958 Turtles of New York. New York State Conservationist, v. 12, No. 6, pp. 22–27. June-July 1958

Ritchie, W. A.

1958 The Paleo-Indian in the Northeast. Bulletin of the Mass. Archeol. Soc., v. XIX, No. 2, pp. 21–22. Attleboro. 1958.

1958 Archaeology: Western Hemisphere. Encyclopaedia Britannica, Book of the Year, pp. 49–51. 1958

1958 The development of aboriginal settlement patterns in the Northeast: a progress report. Eastern States Archeological Federation. Bull. No. 17, pp. 9–10. 1958

1958 (Review of) The Adena people, No. 2, by W. S. Webb and R. S. Baby. Ohio Hist. Quarterly, pp. 156–159. July 1958

Wall, W. J. & Jamnback, H.

1957 Sampling methods used in estimating larval populations of salt-marsh tabanids. Jour. Ec. Ent., 50(4): 389–391. August 1957

Appendix A

1958 Graduate Student Honoraria Recipients

		Botany	
DONAHUE, EUGENE H.	St. Bonaventure University	The distribution and ecology of the Bryophytes on the conglomerate rocks in the unglaciated area of southwestern New York State	$360
DURKEE, LAVERNE H.	Syracuse University	Pollen analysis of lake and bog sediments	480
*SLYSH, ANTON R.	State University College of Forestry	Taxonomy of the genus *Peniophora* (Family Thelephoraceae) in New York State	360
		Entomology	
HARTENSTEIN, ROY	State University College of Forestry	The effects of DDT and Malathion upon soil arthropods in coniferous and hardwood habitats	540
		Geology	
*BERRY, RICHARD H.	Yale University	Detailed mapping and petrologic analysis of the Precambrian complex in the southeastern Adirondacks	480
CONNALLY, G. GORDON	University of Rochester	Statistical analysis of the heavy mineral assemblages in the glacial moraine deposits in western New York	240
HERMAN, HOWARD	Rensselaer Polytechnie Institute	Mapping the pre-Pleistocene geology of the Tomhannock 7.5 quadrangle	420
HUEBER, FRANCIS M.	Cornell University	Fossil plants from the late Devonian Onteora formation	240
*KOTHE, KENNETH R.	Cornell University	Geologic map and written report of the Schunemunk quadrangle	360
ZENGER, DONALD H.	Dartmouth College	Bedrock mapping of the Cooperstown 15-minute quadrangle	600
		Zoology	
GOODWIN, ROBERT E.	Cornell University	Specific behavior of the Black Tern, *Chlidonias niger surinamensis*	240
HARTSHORNE, JAMES M.	Cornell University	Development of vocalization in the Eastern Bluebird (*Sialia sialis*)	360
SEIDEL, DONALD R.	Cornell University	Evaluating age of the chipmunk, *Tamias striatus lysteri*, through a study of skeletal changes from birth to old age	480
			$5,160

* Renewal.

Appendix B

Conferences and professional meetings in which the Museum and Science Service Staff participated.*

Adirondack Mountain Club, Annual Meeting—Cahalane
Adirondack Museum Opening, Blue Mountain Lake—Collins, Fenton
American Academy of Allergy, Research Council (Pollen and Mold Subcommittee)—Ogden
American Anthropological Association, Chicago—Fenton
American Association for the Advancement of Science, Annual Meeting, Indianapolis—Templeton
American Association for the Advancement of Science, Parliament of Science, Washington, D. C.—Fenton
American Association of Museums, Annual Meeting, Charleston, S. C.—Cahalane
American Ethnological Society, Albany—Fenton, Gillette, Ritchie
American Geological Institute—Broughton
American Institute of Biological Sciences—Ogden
American Institute of Mining Engineers—Broughton
American Mosquito Control Association—Collins, Jamnback
American Ornithologists Union, 75th Annual Meeting—Palmer
Conference of Directors of Research Museums of Natural History, Philadelphia, Pa.—Fenton
Conference on Archaic and Adena, University of Kentucky—Ritchie
Eastern States Archeological Federation—Gillette, Ritchie*
Entomological Society of America—Collins
Entomological Society of America, Eastern Branch—Connola
Federation of New York State Bird Clubs, Inc.—Palmer, Reilly
Geological Society of America—Staff of Geological Survey
Hall of Fame Convocation, New York University—Fenton
Huyck, E. N. Preserve, Advisory Committee—Palmer
11th Conference on Iroquois Research, Red House—Fenton, Gillette
Interdepartmental Rabies Committee—Collins, Palmer
Interstate Oil Compact Commission—Kreidler
Liberty Hyde Bailey Centennial—Ogden, Smith
Linnaean Society of New York—Palmer
Massachusetts Archeological Society—Gillette
Mohawk-Caughnawaga Museum—Gillette
National Parks Association, Executive Committee and Annual Meeting—Cahalane
New York Conservation Council—Cahalane
New York State Archeological Association—Fenton, Gillette, Ritchie*
New York State Geological Association (Field Conference)—Staff of Geological Survey
New York State Health Conference—Ogden
Northeastern Forest Pest Council, Boston—Collins, Connola

* Read formal paper.

Northeastern Forest Pest Council, Canada—Connola
Northeastern Mosquito Control Association—Collins, Jamnback
Northeastern Weed Control Conference—Ogden
Northeastern Wildlife Conference, Montreal—Palmer
Northeast Museums Conference, Montreal—Administrative and Exhibits Staffs
Society for American Archeology—Ritchie*
Society for Pennsylvania Archeology—Gillette
Society of American Foresters, Annual Meeting—Cahalane, Connola
State Science Congress, 7th Annual Meeting—Cahalane
Village Superintendents Conference, Saranac Lake—Fenton
White Pine Weevil Conference—Collins, Connola
XIIth International Ornithological Congress, Helsinki—Palmer

Appendix C

Cooperative Work (Service) : Talks given by the staff of State Museum and Science Service to various groups.

Adirondack Mountain Club, Albany Chapter—Cahalane
Albany Institute of History and Art—Koster
American Society of Plant Taxonomists—Ogden
Botanical Society of America (Paleontology Section)—Ogden
Brown University, Anthropology Class, Providence, R. I.—Fenton
Burnt Hills Garden Club—Smith
Capital District Mineral Club—Broughton, Fisher
Central New York Archeological Society, Auburn—Ritchie
Chatham Center School—Reilly
Chatham Women's Club—Reilly
Chenango Valley Archeological Society, Norwich—Ritchie
Cornell University (Summer Institute for Teachers of Botany)—Smith
Daughters of the American Revolution, Oneonta—Fenton
Eastern New York Botanical Club—Smith
East Greenbush Methodist Church—Fenton
Elmira Audubon Society—Schoonmaker
Federated Men's Garden Club of New York—Collins
Fortnightly Club of Hudson—Reilly
Genesee County Federation of Historical Societies (Nundawaga Society for History and Folklore, Penn Yan)—Fenton
Guilderland Central School—Reilly
Hendy Avenue School, Elmira—Schoonmaker
Kinderhook Garden Club—Reilly
Kentucky, University of (Seminar in Archeology)—Ritchie
Lebanon Springs Garden Club—Reilly

* Read formal paper.

Michigan, University of (Seminar in Botany)—Ogden
Montreal Branch of Canadian Authors, Montreal—Fenton
New Century Club, Cobleskill—Fenton
New Principals Conference, State Education Dept.—Fenton
New York State Archeological Association:
1. Auringer-Seelye Chapter, Lake George, N. Y.—Ritchie
2. L. H. Morgan Chapter, Rochester, N. Y.—Ritchie
3. Van Epps Hartley Chapter, Albany, N. Y.—Ritchie
New York State Health Conference—Ogden
New York University (Seminar in Archeology)—Ritchie
North Country Garden Club, Locust Valley, N. Y.—Cahalane
Ontario Archeological Society, Toronto, Canada—Ritchie
Paige School, Schenectady—Schoonmaker
Paleontological Research Institution—Fisher, Rikard
Park Museum (Indian Hall Opening), Providence, R. I.—Fenton
Phi Beta Kappa (Associated Chapters), Schenectady—Ritchie
Progress Club of Delmar—Ogden
St. Peter's Guild, Albany—Fenton
Society for Public Administration, Albany Chapter—Fenton
State College of Forestry Assembly, Syracuse—Fenton
State Teachers College, Albany—Reilly
State Teachers College (Panel discussion), Albany—Cahalane
Suffolk County Historical Society, Stony Brook—Ritchie
Veterans Administration Hospital, Albany—Broughton, Ogden
Warwick Chamber of Commerce, Warwick—Offield
White Plains Garden Club—Reilly
Womens Art Society, Montreal—Fenton
WRGB Television Studio, Schenectady—Cahalane, Gillette, Ritchie

Appendix D: Cooperating Agencies

A common 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 governments of U. S. 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. By no means complete, the list indicates ranges of cooperative activity.

Adirondack Museum
Aero Service Corporation
American Association of Petroleum Geologists
American Cynamid Co., Carbon & Carbide Chemicals Corp.
American Ornithologists Union
Brookhaven National Laboratory
Canada, Department of Agriculture, Ottawa
Cornell University, Department of Agricultural Engineering and College of Agriculture
Eastern New York Botanical Club
Fort Ticonderoga Museum
Geotechnical Corporation
Kansas State College
London School of Hygiene and Tropical Medicine
Mining World
National Geographic Society
New York Botanical Garden
New York State Department of Agriculture & Markets
New York State Department of Conservation
New York State Department of Public Works
New York State Health Department
New York State Police Laboratory: Identification Branch
Niagara County Coroner
Niagara Frontier Park Commission
Pennsylvania Railroad (Letchworth State Park)
Philip Schuyler High School
Royal Botanic Gardens (England)
St. Bonaventure University
State University, College for Teachers, Albany
State University, College of Ceramics
State University, College of Forestry
State University, Harpur College
Suffolk County Historical Museum

Syracuse University
U. S. Fish & Wildlife Service
Universite de Lyon (France)
University of Colorado
University of Illinois
University of Massachusetts
University of Michigan
University of Tennessee
WGY Farm Forum of the Air