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123d ANNUAL REPORT

of the

NEW YORK STATE MUSEUM AND SCIENCE SERVICE

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July 1, 1960—June 30, 1961



NEW YORK STATE MUSEUM AND SCIENCE SERVICE

MUSEUM BULLETIN NUMBER 387

The University of the State of New York

The State Education Department

Albany, N. Y., 1962

THE UNIVERSITY OF THE STATE OF NEW YORK

Regents of the University

With years when terms expire

1968	EDGAR W. COUPER, A.B., LL.D., <i>Chancellor</i>	- - -	Binghamton
1967	THAD L. COLLUM, C.E., <i>Vice-Chancellor</i>	- - -	Syracuse
1963	MRS. CAROLINE WERNER GANNETT, LL.D., L.H.D., D.H.	- - - - -	Rochester
1974	DOMINICK F. MAURILLO, A.B., M.D., LL.D., Sc.D., M. and S.D.	- - - - -	Brooklyn
1964	ALEXANDER J. ALLAN, Jr., LL.D., Litt.D.	- - -	Troy
1966	GEORGE L. HUBBELL, Jr., A.B., LL.B., LL.D., Litt.D.	Garden City	
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1975	EDWARD M. M. WARBURG, B.S., L.H.D.	- - - - -	New York
1971	J. CARLTON CORWITH, B.S.	- - - - -	Water Mill
1969	JOSEPH W. McGOVERN, A.B., LL.B., L.H.D., LL.D.	New York	
1965	ALLEN D. MARSHALL, A.B., LL.D.	- - - - -	Scotia

President of the University and Commissioner of Education

JAMES E. ALLEN, Jr., Ed.M., Ed.D., LL.D., Litt.D., Pd.D., L.H.D.

Deputy Commissioner of Education

EWALD B. NYQUIST, B. S.

Associate Commissioner for Cultural Education and Special Services

HUGH M. FLICK, Ph.D., LL.D.

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.

Contents

	PAGE
Museum Advisory Council.....	iv
The Staff	v
General Statement	1
Accomplishments of the Surveys	22
The Museum	31
Special Services	61
Publications	69
Appendices	71

Museum Advisory Council

1961	ARTHUR A. DAVIS.....	Rochester
1962	VINCENT J. SCHAEFER.....	Schenectady
1963	W. STORRS COLE.....	Ithaca
1964	FREDERICK J. DOCKSTADER.....	New York
1965	WILLIAM C. STEERE.....	New York

The Staff

State Museum and Science Service

WILLIAM N. FENTON, *Assistant Commissioner*

ANTHROPOLOGICAL SURVEY

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

BIOLOGICAL SURVEY

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

GEOLOGICAL SURVEY

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

State Museum

VICTOR H. CAHALANE, *Assistant Director*

CURATORIAL

ROGER L. BORST.....Senior Curator (Geology)
CHARLES E. GILLETTE.....Associate Curator (Archeology)
CLINTON F. KILFOYLE.....Associate Curator (Paleontology)
JAMES W. MANLEY.....Associate Curator (Interpretation)
EDGAR M. REILLY, JR.....Associate Curator (Zoology)
STANLEY J. SMITH.....Associate Curator (Botany)
JOHN A. WILCOX.....Associate Curator (Entomology)

EXHIBITS

EDITH FROELICH.....	Museum Technician (Temporary)
LEWIS E. KOHLER.....	Museum Technician
LOUIS J. KOSTER.....	Senior Museum Technician
ROBIN D. ROTHMAN.....	Museum Technical Apprentice
THEODORE P. WEYHE.....	Museum Exhibits Designer

SCHOOL SERVICES

JUDITH A. DRUMM.....	Museum Instructor
MARY JANE STAUCH.....	Museum Instructor (Temporary)
JANET L. STONE.....	Museum Education Supervisor

LIBRARY

EILEEN COULSTON.....	Librarian, Junior Scientist
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CLERICAL

MARGARET BASSOTTI.....	Stenographer
MARION B. BENDER.....	Clerk
MARYELLEN CANFORA.....	Typist
JOAN A. CREECH.....	Stenographer
JOSEPH T. KILLEA.....	Mail and Supply Helper
ROSELLE LITHGOW.....	Clerk
VERA McMILLEN.....	Senior Stenographer
MARJORIE R. SCHMIDT.....	Principal Clerk
MARY C. STEARNS.....	Stenographer
EILEEN A. WOOD.....	Senior Stenographer

GUARDS

JAMES CARROLL.....	Museum Guard
JOHN C. CUNNINGHAM.....	Museum Guard
FRANCIS J. LYNCH.....	Museum Guard
WILLIAM C. ZIMMER.....	Museum Caretaker

PHOTOGRAPHER

JOHN A. HELLER.....	Museum Photographer
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MAINTENANCE

NELSON D. POWERS.....	Maintenance Helper
JACOB SMALLENBROEK.....	Carpenter
JAMES WIEDEMANN.....	Maintenance Man (Carpenter) (Temporary)

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 ended June 30, 1961. The activities which are covered by the 123d Annual Report are best expressed in the words of the individual reports of the scientists, curators, and others on the staff. I was granted a professional development leave for 6 months from September to March. I thank Dr. Hugh M. Flick, Associate Commissioner, and Victor H. Cahalane, Assistant Director, for discharging my responsibilities for that period. I shall, therefore, use this opportunity to summarize a decade of accomplishments of the Science Service in research, as they were reported to the Commissioner and to the Regents at their June 1961 meeting. I shall also outline some major needs and point the way for the next decade.

The Establishment

Throughout the reports runs a note of jubilation over the long-awaited removal to and establishment of the exhibits and scientific staff in the new laboratory facilities on the ninth floor of the wing and the equipping of these laboratories with the latest devices for new kinds of research. We also gained new quarters for the Museum library and a science seminar room which, as we predicted, has been in nearly constant use, if not by us, then by other units of the State Education Department. The new facility has contributed greatly to staff morale and, for the first time, summer work in air-conditioned laboratories has competed favorably with field work. Checking out and calibrating the new instruments in the Geological Survey laboratories was a first step toward an increased emphasis on the geochemical aspects of the research program. There has also been a marked increase in visitors from mining and oil companies, staying several days to consult records. Noticeable in the anthropology laboratory is an expanse of table space for laying out the research collections, this year from two sets of excavations. Washing and cataloguing of archeological and paleontological collections now proceeds independently in separate Museum facilities that have been created in old Museum offices where research no longer goes on in the huddle of collections. The three branches of biology have independent laboratories for research, ranges for systematic collections in the Museum, and work

space. These improvements are bound to affect the productivity of the staff, they should enhance the quality of work accomplished, and contribute to the improvement of the educational program of the Museum.

Accessions Policy

The State Museum Advisory Council assisted with the development of a policy on acquisitions.

The Problem. The trend of recent gifts to the State Museum has made us wonder what the accessions policy of the State Museum in the future should be. The problem is: Should the collections in the State Museum be limited to New York State material?

Historical Background. The New York State Museum has a long tradition of research and collecting beyond the State boundaries.

1. Historical Considerations. The history of the research policy and of the accessions policy of the State Museum go hand-in-hand. Persons familiar with the long history of this establishment are aware of the great and continuous tradition of research and publication, commencing with the scientific surveys of the State in 1836. These surveys were supplemented by the collecting of the cabinets of antiquities which resulted in the first scientific contribution of merit in Lewis Henry Morgan's reports on articles furnished to the Indian collections in the third and fifth reports to the Regents. That we have important firsts in paleontology and geology, in botany and entomology, and in anthropology is well known in the scientific community. From the beginning, the program has been research—and it has been both basic and applied.

It should not be overlooked that the great research tradition by 1926 had produced four members of the National Academy of Sciences elected from our staff: L. H. Morgan, James Hall, John M. Clarke, Rudolf Ruedemann. Until 1836, when the State Museum was founded, the collections grew up as documentation of research and exploration. For a long time these collections were stored throughout the city, but with the erection of the State Education Building in 1912, an exhibit program was envisioned which posed problems of inclusion and exclusion. The materials that had been collected for research were not altogether suitable for exhibit; the space available in the new Museum posed questions of limits.

Up until the time we moved into the present facility in 1912, the outlook of the scientists and their work was expanding. Clarke prefaced his annual report of 1905 with the remark that, if researches were confined to the State's boundaries, "we should soon suffer from provincialism and intellectual strabismus," but it is interesting to observe that in the same

year when Andrew Draper organized the Education Department, his definitions of policy imposed limitations on the Museum and the activities of its scientists. He said, "It does not purport to be a general scientific museum but a repository of natural resources of the State" and by 1912 Clarke himself was to admit that this policy had some merit. The Regents Journals and our annual reports are silent as to whether this policy was imposed by consideration of space or the strong will of a great administrator.

The record of private benefactions during the period of Clarke's administration is notable. The famous Indian groups, so much beloved both by school children and mature citizens, were entirely built with private funds and several important collections and scientific reservations were acquired in the same way. There is, therefore, ample precedent for private bequests.

In summary, the historical position seems to reflect a conflict between broad research interests which are world-wide on the part of the scientific staff, and space and financial limitations which are State-centered.

2. Foreign Material in the State Collections. In most of the fields of science represented in the State Museum, foreign material (originating outside of New York) is important.

The paleontology collection contains considerable material from Europe; there is also some from South America, the Falkland Islands, and Asia Minor (Syria and Turkey). Fully two thirds of the 100-foot-long corridor adjacent to Orientation Hall is from continents other than North America. Most of the total collection is eastern North American. Of the non-New York fossils, we have considerable amounts from Maine and Gaspé; lesser quantities come from Nevada, Oklahoma, Iowa, and many other States.

The herbarium has much important material from the southeastern United States and a good deal from eastern Canada. Lesser numbers of sheets originated in Nevada (Charleston Mountains) and California. Many mosses are European. We have other collections of plants from Europe, Asia, South America, Africa, and a few from Australia.

In entomology, the Lintner, Hill, and Corning collections of lepidoptera are world-wide. They have many, especially smaller, forms from Europe, and large moths and butterflies from Asia, Africa, and northern South America; several dozen are Australian. As a result of Felt's work on gall midges, the collection includes material from southern Asia. We have few insects from the United States outside of New York.

About three double archeology cabinets are filled with objects from the Southwest Pacific and the United States Southwest, and with Eskimo

and Plains Indian material. We also have minor collections (chipped stone implements) from South Africa, Egypt, and Eire.

Foreign collections are required by the scientist who is working with a group of animals, plants, or fossils, few or none of which are limited by the State boundaries. They are needed for many different reasons, including comparisons, and for checking on published descriptions if the scientist is a systematist. Almost invariably the scientist needs additional information which he can obtain only from study of the specimens themselves. Sometimes the specimens can be borrowed from other institutions; sometimes the use of such material is limited and the research is handicapped by restrictions which would not be imposed if the material were in full control of the borrower (i.e., in his own collection). If an institution has a specialist on its staff, it usually acquires collections in the field of his interest from the entire range of the group—not merely from within a narrow geographic territory. Thus, the State Museum has brought together graptolites (for Ruedemann); gall midges (for Felt), and fungi (for Peck) from a wide area (sometimes world-wide). Thereby these scientists, and the Museum, acquired a world reputation in natural science.

To summarize, a research museum must be prepared to furnish its specialists with material without regard to artificial or political boundaries. Some of this material may be borrowed for short-term use; some may be needed over a long period of time and perhaps must be acquired permanently.

Re-Examination of Policy in Light of Current Demands. Given the present world situation, our commitments abroad, and the interests of New York State citizens, there is now a clear need to reflect the interest of residents of upstate New York in the rest of the world. The real question of educational policy is whether the State Museum can fulfill its mission as an arm of the Education Department if it shall be more restricted in its outlook and in the scope of its collections.

Advice has been obtained from two disparate bodies. First, the problem was outlined last April to the State Museum Advisory Council. Following their original comments, the council members were asked to vote on alternate propositions and their opinions will be given in some detail later. Secondly, because this type of problem is not unique to the New York State Museum, the general problem was placed on the agenda of the May meeting of the Association of Directors of Science Museums and thoroughly discussed by that group. It was helpful to learn that while collections of African trophies have been resisted in most *research* museums, the rapid extinction of African game mammals makes such gifts more acceptable now than formerly. The tax aspects of the problem

are usually adjusted between the donor and the Internal Revenue Service on the basis of an independent appraisal which is secured and paid for by the donor.

Comment: Two factors, which are interrelated, must be considered. First and foremost is the scientific and educational value of the material in any proposed donation. In general, the standards of the State Museum have always been high and should be so maintained. The second consideration is the space and other physical facilities as well as the human skills which are required to house and care for the specimens. Museums have definite limitations in plant and staff. The present quarters of the State Museum, though not ideal, are by no means fully utilized, and the Regents and the Department are pressing for more modern and more adequate facilities. It is generally agreed that any collections which are potentially useful to research or education are worth accepting.

(A recent donor has indicated informally that he not only intends to make available to the State Museum over a period of years the trophies and pelts resulting from his African expeditions, but he would like to establish the collection in an African Room, pay the cost of publishing an illustrated catalogue with much supplemental information, and to endow the collection in other ways.)

The advice of the State Museum Advisory Council is best summarized in the following statement by one of its members:

"I feel that the New York State Museum should not be wholly provincial but that its accessions of materials from outside of New York State or over the whole world should be at the discretion of the Museum rather than what is thrust upon them. The decision of the Museum to accept or to collect materials from outside the State should be based on such positive considerations as whether or not they will be of real use in the scientific research of some staff member or whether or not they would make attractive displays for school children and the lay public."

General Considerations. What kind of State museum will satisfy the needs of the people of New York State during the coming years? Should it be limited to a collection of State artifacts? Or should it take cognizance of the fact that we are living in an age whose scientific and philosophical frontiers are expanding beyond the limits of earth's continents and oceans out into celestial space? The museum which fails to recognize this advance in the thinking and concepts of its public will sink into a limbo of forgotten and archaic institutions.

The answer for the State Museum is to move with—or, better, in advance of—this trend in the thinking of the modern world.

Comment: In its discussions of the maintenance of a balance between provincial collections and a broader program of research and education, the State Museum Advisory Council was divided on the question—how wide should our horizons be? Doubt was expressed that the State Museum and Science Service, if it is to limit its horizon to New York State, will be able to maintain its former pre-eminence in the community of science. This is particularly true in the face of the Department's extension of curriculums to include non-Western areas.

Comment by council members was extensive and varied, but it may be reduced to the following propositions on which unanimity was reached:

- a. The test of an acquisition should be in a forecast of its possible use for study or exhibit. Only gifts which have scientific or educational value should be accepted.
- b. The acquisitions policy should be broad enough to satisfy the educational needs and provide cultural opportunities for students at every level of education.
- c. An acquisitions policy must depend completely upon the willingness of the State or the doners to support the gifts properly. If this support is not forthcoming, the Museum should decline offers of collections that require increased support.
- d. The State has a definite responsibility to honor the interests of an enlightened citizenry by finding maintenance and operation funds for matching truly distinguished bequests of valuable scientific or educational material that will enhance public education.
- e. An acquisitions policy should authorize the Assistant Commissioner and staff to conduct the Museum's activities in the broadest possible manner consonant with the interests of its public.

Recommended Accessions Policy. In the light of the foregoing discussion, the following accessions policy was recommended for the New York State Museum. The collections should contain the following categories of materials, arranged in order of priority:

- a. Collections and exhibits on the natural history and resources of the State, and collections and exhibits illustrating the relationship of man to these resources from prehistoric times to the present.
- b. Comparative collections from surrounding States and Canada that illuminate the first category.
- c. Collections from the rest of the world which illustrate and illuminate the distribution and place in nature of New York materials.
- d. Materials illustrative of the expanding scope of science, including any material which is needed to give the visiting public a properly balanced understanding of the rest of the world.

Final Considerations. The State Museum is held in affection by many citizens, particularly those who were educated in upstate New York. It is both a State museum and a local and regional museum. Many school children of upstate New York do not have an opportunity to visit the great museums of New York City and the State Museum is "their" institution.

With this in mind, we recommended to the Regents for their consideration and approval the above broad outlines of a workable acquisitions policy for the State Museum. This policy must be broad enough to satisfy the educational needs and provide cultural opportunities which would not otherwise be available to school children and many adults in upstate New York.

Commissioner's Committee on Museum Resources

One of the recommendations of the April 1960, meeting of the State Museum Advisory Council was the creation of a Committee on Museum Resources to consider ways and means of making a minimal museum service available to every citizen of the State and ascertaining ways of broadening the support of existing museums to sustain and expand the educational programs which now have a wider audience of visitors than is provided for in the present narrow base of municipal tax support. The Regents and the Commissioner, aware that museums can extend opportunities for learning and cultural enrichment beyond the schools, and mindful of their success with library programs of service, expect the committee to come up with a definition of what is a museum, to ascertain and justify the basic museum needs of our society, to establish criteria by which museums may qualify as educational institutions, and to develop criteria which may be used for apportioning State aid. They are further to ascertain and recommend how museum resources can be extended to areas of the State that are not now served by museums and devise a formula for covering these extended services. The committee held its first meeting in Albany, February 27. To date, its accomplishments have been to adopt a statement of minimum standards and a working definition of museums.*

* Working Definition of Museums, adopted by CCMR, May 11, 1961.

"... the word 'museum' means and shall be deemed to mean a nonprofit permanent establishment located in the State of New York, open to the public and administered in the public interest, for the purpose of conserving or preserving, studying, enhancing by various appropriate means and, in particular, organizing and exhibiting to the public for its delectation and instruction objects and specimens of cultural and educational value, including artistic, scientific, historical and technological material. Botanical gardens, zoological gardens, aquariums, planetariums, historic houses and historic sites which meet the requirements set forth in the preceding sentence also shall be deemed to be 'museums' within the meaning of that word as used in this Constitution." (From section 2, article II, Constitution of New York State Association of Museums, 1/13/61.)



The Commissioner's Committee on Museum Resources held its first meeting in Albany on February 27, 1961.

New York State Association of Museums

A second outgrowth of the recommendations of the April 1960 meeting of the State Museum Advisory Council was the formation of the New York State Association of Museums, which would act for and on behalf of existing museums to advance the programs under study by CCMR. The association has ratified a constitution, elected officers, created a council that has held three meetings to do its business, is actively recruiting members, and will apply to the Regents for a charter. The State association includes the membership of CCMR, and it has co-operated with the Council on the Arts. The association is also concerned with standards and with professional ethics, and it seeks to advance museums as educational and cultural institutions.

The Museum

Last year a decline in attendance was reported. This year, public attendance jumped to an estimated 220,000 visitors, an increase of about 50 per cent over the previous year. Of this number, 30,838 were mainly school children in organized groups. Tours were improved by the addition of an attractive classroom which, for the first time, provides space for live animals and demonstration material separate from the staff office. School loan service was expanded and about 7,000 educational items were sold at the information desk. Exhibits in Biology Hall were revised and improved; three new displays were completed and installed in Paleontology Hall, and four others were in production at the end of the period.

State Science Service

Accomplishments of the present year are summarized under the headings of the surveys. Publication is a reasonable indication of staff productivity. Three bulletins were published, including the 122d Annual Report for the year ended June 30, 1960. In addition, the staff contributed to a variety of professional journal titles that appear in the annual bibliography, "Outside" Media.

The Anthropological Survey. The State Archeologist reports field excavations on three sites in continuation of a program of settlement pattern studies of which the Garoga site at Ephratah is an important prehistoric Mohawk townsite that was made available to us through the generosity of a private citizen, Wilford E. Sanderson, Loudonville. Work in ethnology was limited to a museum study of wampum belts by a graduate student.

The Biological Survey. Biological research moved ahead in three main fields:

At the Brookhaven National Laboratory on Long Island, the hay fever pollen studies were continued with a new 4-year grant of \$169,300 from the National Institutes of Health. An important accomplishment was the discovery of a new and simpler method for producing ragweed pollen out of season, so that at a given time there would be no ragweed pollen in the air except that from the known source.

In entomology, gypsy moth studies were continued along with studies of the punkies in the Adirondacks which for the first time are sufficiently known to work out controls. Encephalitis studies continued being assisted by the collection of samples of small mammal blood and bird spleens along with various biting insects, chiefly mosquitoes. The latter project was carried on co-operatively in facilities supplied by the duck research laboratory and the New York State Department of Health.

The first volume of the *Bird Handbook* is in press.

The Geological Survey. The major research emphasis of the Geological Survey for the past few years culminated in 1961-62 in the final compilation of the new State Geological Map, the first since 1901. Of individual projects, special interest attaches to geological recommendations by the State geologist, leading toward the establishment of a nuclear service center in western New York, and the completion of four manuscripts for publication by individual scientists.

Fifteen Years of Accomplishments. The heads of the surveys and Museum and the Assistant Commissioner appeared before the Regents at their June meeting and reported current researches and status of the collections in the perspective of a decade and a half of accomplishments. Established by the State Legislature in 1945 (section 235, Education Law), to serve all departments and the residents of the State by engaging in research of benefit to the government and the people, the service has attracted a competent staff, their listed achievements are impressive, their co-operative services have more than paid for their maintenance, and they have performed acts of cultural, educational, and scientific leadership. Gradually the organization has settled into three areas of endeavor. As a staff we are probably proudest of the 100 or more graduate students whom we have assisted to become scientists. The citizen reader will pardon us, we trust, as we count a few coups, for the taxpayer is entitled to know what has been done with the appropriations.

Staff. By all standards, this is a competent, and somewhat distinguished staff. Of 49 members in the combined State Museum and Science Service personnel, 28 are of professional grade. In academic attainment, among scientists, curators, and administration, we count 12 doctors of philosophy (Cornell 4, Harvard 2, Columbia, Johns Hopkins, Universities of Massachusetts, Michigan State, Rochester, and Yale one each), and nine others have the master's degree. In honors, Phi Beta Kappa claims 5, and 12 adhere to Sigma Xi. Of honorary degrees and citations, we know of three. Fellowships in learned societies are too numerous to count. *American Men of Science* lists 13, and *Who's Who in America*, 2. Since 1954, annually the State has been represented at international scientific congresses held throughout this hemisphere and in western Europe by participants from at least one of our scientific disciplines. Attendance at these meetings is the more significant since the State has not seen fit to pay the transportation of its scientists and they have had to compete nationally for a place on the United States delegations and for travel funds from the National Science Foundation. If New York State could arrange to underwrite the participation of its scientists at international meetings, it would help enlarge the country's delegations and free places for scientists from colleges and universities that do not have travel funds. It is always a source of wonder to foreign nationals, particularly those of France and the Soviet Union, why a "rich" country like the United States can afford to send so few to such gatherings. The point is that New York has something to contribute and something to gain. Scientific phenomena—be they fossils, insects, plants, peoples, or ideas—have a world-wide distribution. We can no longer afford to live and work within political boundaries.

Major Achievements of Science Service

1. Research

- a. Establishment of universal standards for the preparation of life histories of birds and a standard color chart. *Handbook of North American Birds*, R. S. Palmer (Ed.), Yale Univ. Press, vol. 1 (in press)
- b. Contribution to *Treatise on Invertebrate Paleontology* on fossils of unknown affinity (Fisher)
- c. Stratigraphic correlation charts for Devonian and Ordovician (Rickard)
- d. State Geological Map (Broughton and associates). [The first since 1901]
- e. Inventory of air-borne pollen and fungus spores of New York State (Ogden)
- f. Improvement of techniques for sampling of pollen and studies of its travels (Ogden and associates at Brookhaven National Laboratory)

The botany laboratory is typical of the facilities provided for in the Science Survey in the annex.



- g. Biology and control of blackflies (Collins, Jamnback, Stone). Work done in New York State has world-wide implications.
 - h. Application of method of sequential sampling to insect outbreaks (Connola)
 - i. Profiles of salt wells and deep gas wells in New York State (Kreidler)
 - j. The pioneer effort in settlement pattern studies in the northeast (Ritchie)
 - k. Morphology and lexicon of the Seneca language (Chafe). [The first of the surviving Iroquoian languages to be described systematically]
 - l. Demonstration of true relationship between Cherokee and Iroquois cultures, members of the same language family who have suffered independent but comparable careers in contact with white civilization (Fenton). Science Service personnel organized, conducted, and contributed four papers to a symposium held at a national meeting in 1958, and edited proceedings for publication by Smithsonian Institution in 1961 (Chafe, Fenton, Lounsbury, Ritchie).
2. Co-Operative Service
- a. Building up of substantial reference collections in the State Library in anthropology, botany, entomology, geology and paleontology, and zoology. Staff regularly scans book lists and recommends purchases as a reciprocal service to State Library.
 - b. In co-operation with the Interdepartmental Committee on Rabies, demonstrated that disease rabies is largely confined to known reservoir hosts; its presence in small mammals of the northeast has proved negative. State Museum has acquired comprehensive collections from two regions (Connor, Palmer)
 - c. Co-operation with the State Office of Atomic Development and other research institutes on clearance of projects and location of waste disposal sites (Broughton)
 - d. Co-operation with the New York State Department of Commerce in location of industrial mining plants: Wollastonite plant of Cabot Mineral Company, Willsboro; Northern Lightweight Aggregates, Watervliet; Atlantic Cement Company, RAVenna (Broughton and associates)
 - e. Development of techniques for appraisal and assessment of mining properties.
 - f. Identification of human remains for State Police Laboratory, Bureau of Criminal Investigation (Gillette, Ritchie).
3. Acts of Cultural, Educational, or Scientific Leadership by Staff
- a. With the assistance of National Science Foundation, called and held Second Conference of Directors of Systematic Collections—which led to a series of similar national conferences of the heads of some 25 research museums to identify resources for research, to improve research facilities, and to exchange information on administrative matters. This movement led to formation of the Association of Directors of Science Museums, which meets now annually on the eve of the American Association of Museums convention.

- b. Members of the staff have accepted leadership roles and held office in national learned and scientific societies, and meetings of these groups have come to Albany.
 - c. The annual *Geological News Letter* communicates the comings and goings and current research of geologists of New York State.
4. Major Administrative Accomplishments
- a. Reorganization of State Museum and Science Service into Museum and three surveys.
 - b. Reduction and modernization of the fleet of field cars and improvement of scheduling and cost accounting.
 - c. Planning and removing to new wing of laboratories and conference room.
 - d. Monthly staff seminars.

The Present Pattern of Support. The distribution of Museum and Science Service expenditures over the past 4 fiscal years, for which the figures have been developed (chart 1), shows an over-all rise from \$300,000 to \$500,000. The largest increase is made up of mandated increases in salaries, but these increases, in part, reflect reclassification of some positions to higher grades. In contrast to other categories, the

CHART 1

Distribution of Museum and Science Service Expenditures

	1955-56	1957-58	1959-60	1951-62
Total salaries	\$251,500	\$278,800	\$317,400	\$343,200*
Maintenance and operation	11,800	18,200	22,700	21,200
Printing	3,000	16,000	8,700	20,000
Total Museum	266,300	313,000	348,800	384,400
Science Service	35,000	38,000	40,000	45,000
Research grants		12,000	12,400	49,300
Total	\$301,300	\$363,000	\$401,200	\$478,700

* Before new raise.

research appropriation for the Science Service has not increased proportionately; it has hovered at \$40,000. The appearance of research grants is noteworthy and their increase is spectacular, suggesting that our scientists are more successful in getting support from foundations in national competition with the community of science than we are in getting research support from State sources.

The trend of these expenditures is more evident when projected on a bar graph, which shows the rise during 7 years and the proportion of categories and their relationship (chart 2). The steady state of Science Service appropriations is most evident.

Another way of viewing the distribution of Museum and Science Service expenditures for the reporting year 1961-62, may be seen in the pie

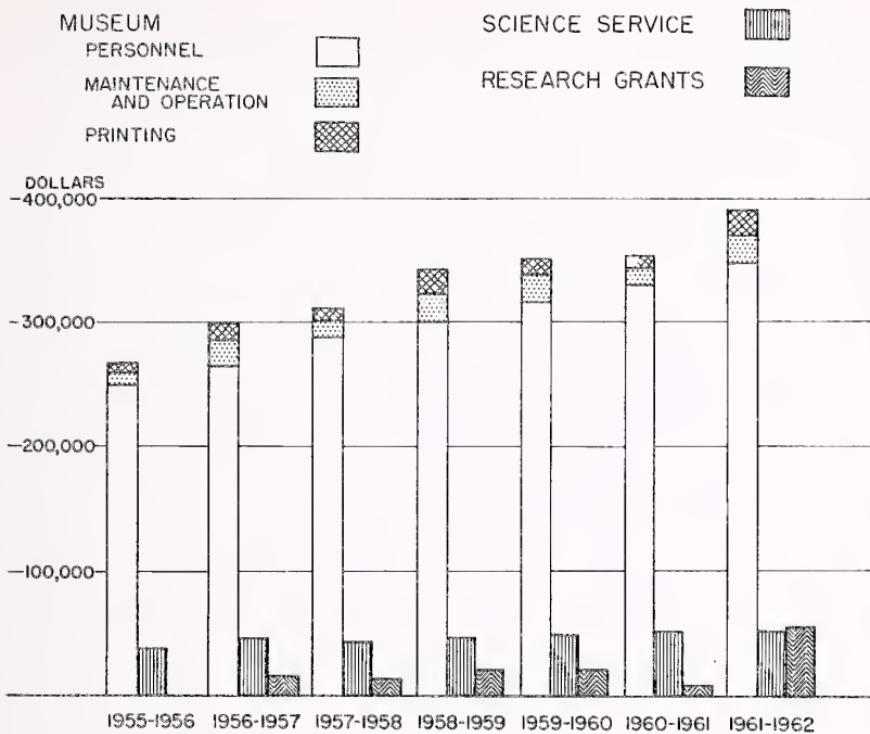


Chart II

chart (chart 3). Research grants have overtaken the Science Service appropriation and surpassed it.

Major Needs

1. Time To Think. The Commissioner and Regents smiled at the suggestion that a research staff which is encapsulated in an operating agency devoted to programs in public education should even consider the need of free time to think. Nothing could be more serious. In the Science Service, research is the program, and in the Museum the curators are always working at some branch of systematic science as they catalogue and handle materials. Just as Thoreau said that man is the only creature that ruminates as he walks, so the curators are constantly thinking, or should be, as they work with collections. For the past several years they gave a great deal of time to planning the use of space—new laboratories, new ranges made over from vacated offices, and the storage of collections so that they can be retrieved quickly for study or for exhibit. Now they have these new facilities, and the staff needs a breather to utilize them. The new laboratories are equipped with X-ray diffraction camera and spectrograph which portend new kinds of research. New projects must

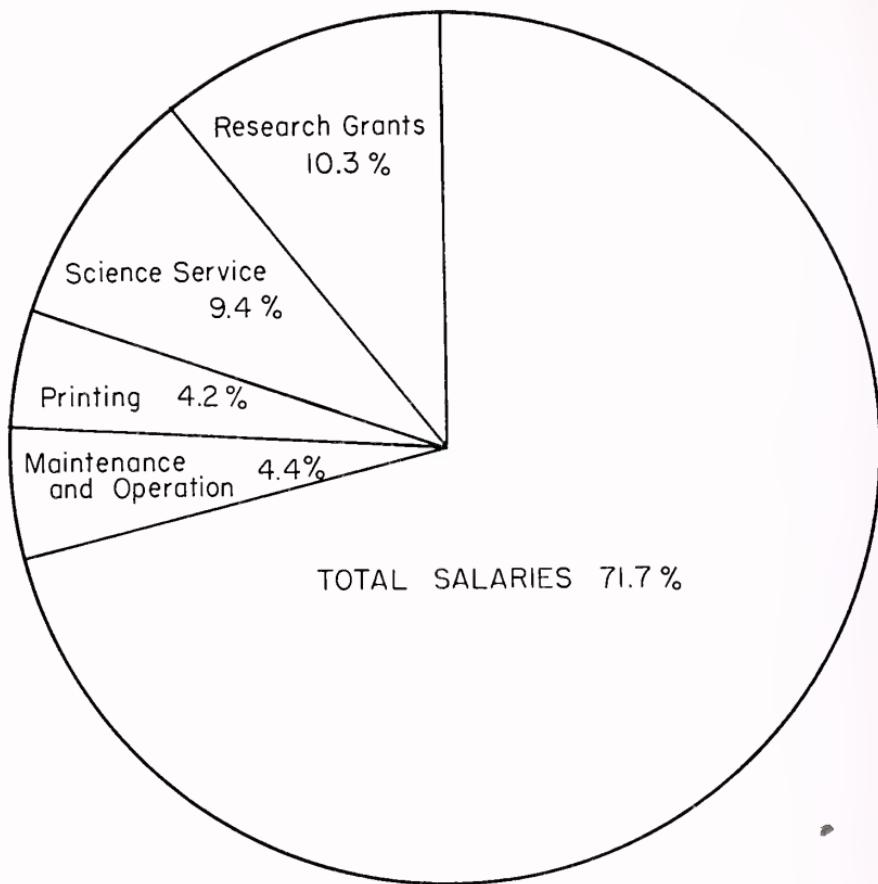


Chart III

be conceived, designed, tried, and put into operation. We are in a period of transition from the older methods of natural history observation to methods of quantitative and qualitative analysis. Are computers going to be available? What are their potentialities? Must we continue to catalogue in books and on cards, but one step beyond the mediaeval monks? Are better cataloguing methods available or capable of being adapted?

2. Improved Salary Position for Professional Staff. Productive scientists and curators who publish attract the attention of the learned world, and with the shortage of people qualified to teach in universities, they are bound to get offers to teach, or to do research in laboratories in other States. It is important and vital, therefore, that we keep ahead of the market. It is also important to the morale of professional personnel in the Education Department that scientists who are years beyond the doctor of philosophy degree in the arts or sciences be classified at least

equal to subject matter specialists in the other Bureaus of the Department. Administrative responsibility is only one factor; complexity of work and the training for it should count for more.

3. Budget Needs. Other budget needs are comprised of the necessity for a one-third increase in research funds of the Science Service. The pace of appropriations has not matched the rate of inflation, and were it not for the enterprise of individual scientists who have successfully sought funds for their personal research projects, we would be much worse off. Grants from the National Research Foundation, the National Institutes of Health, and from private sources now account for half of our research budget. This is fine. Administratively, it presents difficulties; grants impose new demands on our Department business office that are only partly compensated by payment of overhead that comes with the fund. It also removes the direction of research from the top to the extremities of the organization.

The newly fitted laboratories have raised our equipment inventory, conservatively, to over \$100,000. Assuming that instruments depreciate and become obsolete and have a life span of 10 years, our annual equipment allotment, to enable us to keep our present inventory up to date and replace depreciation losses, is estimated at not less than \$10,000.

An enlarged scientific and professional staff imposes new demands for travel funds, to accomplish field work in the State, and to attend scientific meetings out of State. The latter facilitate important exchanges of information, e.g., reporting findings and learning new developments.

A productive scientific and educational staff creates new demands for printing funds. Besides the bulletins, which now number 390, we should return to the publication of scientific memoirs—tall, thick quartos with large plates and running to 500 pages. One of these would quite exhaust our present annual printing budget of \$10,000. But such definitive works are quite within the competence of our staff. It is worthy of note that House's *Wild Flowers of New York*, which first appeared as Memoir 15 (2 parts, 1923), has sold 100,000 copies of the first edition reprinted by Macmillan, and a second reprinting sold out at \$15. A third reprinting is imminent, to be priced at \$17.95. There is indeed a market for fine natural history books.

Graduate Student Honoraria Program, 1947-1961. The following table which summarizes the number of awards granted (150) represents an expenditure of less than \$50,000 for the training of 107 young individual scientists. Where they come from, the disciplines represented, and the results of their training is graphic enough. The number of papers of publishable grade probably exceeds the number in our records, and of

greater significance is what has become of the people: 2 are on our staff, 33 are teaching in colleges and universities the length of the land, 13 are in industry, 16 are primarily still engaged in research, and a good proportion were still in graduate school at the time of tabulation:

Graduate Student Honoraria Program 1947-1961

Total number of awards granted: 150 awards to 107 individuals (some are renewals up to 3 years). Amount: \$48,390

1. Sources of students:

Columbia University	23	Rensselaer Polytechnic	
Cornell University	58	Institute	4
Dartmouth College	1	St. Bonaventure University	1
Harvard University	4	The St. Lawrence University	1
Massachusetts Institute of Technology	1	State College of Forestry	5
Michigan State University	3	Syracuse University	10
Mount Holyoke	1	The University of Buffalo	2
New York University	5	University of Chicago	2
Ohio State University	2	University of Michigan	4
Princeton University	4	The University of Rochester	12
		Yale University	7

2. Disciplines represented:

Anthropology	9
Botany	19
Entomology	4
Geology & paleontology	81
Zoology	37
	150

3. Results:

Publications:	
a. Official media (SM&SS)	13
b. Outside media	17
	30

Where located presently:

a. SM&SS staff	2
b. Teaching	33
c. Industry	13
d. Research	16
e. Other	7
f. Graduate work	26
g. Unknown	10
	107

There is universal enthusiasm for this program among college and university faculties because it offers students an opportunity to pursue

research of their own choice at a time when they are not yet eligible for national fellowship programs. Each student has a sponsor from his own university faculty, and he works under the supervision of one of us. This provides him with a professional experience and it keeps us in touch with coming students. It also keeps our staff on their toes.

The enthusiasm of university faculties is shared by the State scientists and the Assistant Director, who read all of the petitions regardless of field, rank order them, and then, as a committee of the whole, vote the awards. The agreement is amazing. We are often more perceptive and objective about the other man's field. All of us have been saved embarrassment by the process. There have been few failures. We like to remember the hits.

Long-Range Needs

Not having a museum or research journal of our own, we presently contribute to a variety of scientific and professional journals. Our own press does not contain all of the writings of our staff. In science, right of discovery depends on priority of publication, and fields of learning move so rapidly that to avoid revisions and outdated, prompt publication is essential. The staff is free to submit to other outlets. Commercial publishers might be approached to publish for and on behalf of the State Museum and Science Service. Both the American Museum of Natural History and the Metropolitan Museum of Art have publishing arrangements with commercial publishers. The advantages to be derived from various publishing services, from better printing, and from finer book-making would result in better looking books, prompter publication, and wider circulation. University presses and publishers generally advertise their books and have access to a wider market. Their books get reviewed; government documents rarely are noticed.

The need for clerical, secretarial, and subprofessional help for the curators and the scientific staff cannot be overemphasized. The ladies we have as secretaries do wonders, and they have learned the requirements of their specialized tasks working in the several scientific offices of the surveys and the Museum. Some part-time help is available from nearby colleges and universities, and we employ a few graduate students from the State University Colleges. More graduate majors in the natural sciences would be desirable, and their availability will await upon the expansion of graduate training in the area. Albany is not yet Ann Arbor, Berkeley, Cambridge, or Chicago.

An acquisitions fund for the Museum is very much desired. We are presently able to purchase, when they come on the market, only the most

urgently needed individual scientific specimens for some one of the scientists who needs them for his research. Such purchases come out of Special Supplies and Expenses, an already overburdened fund out of which we also purchase materials for maintenance of the collections, operations of the curators and education staff, exhibits construction, and all other materials needed for operation of the Museum. Involved as we are in exhibits renovation, we cannot slow the pace of construction for displaying collections that we already possess in order to acquire additional collections. As it is, the pace of renovation is barely perceptible from the viewpoint of the staff, although the total effect achieved in 7 years is quite startling. But we should be collecting for the future. Good New York collections come on the market occasionally, and by the time we can scrounge around and find the funds, or get a special appropriation, they are gone. The need is for a general fund "for the increase and care of the State's collections."

The pattern of recent gifts to the State Museum suggests the possibility of securing free funds donated to the Regents of the University of the State of New York for this purpose. It would be amiss not to acknowledge the princely gift of specimens of African mammals by Dr. and Mrs. W. Brandon Macomber which they acquired on our behalf during expeditions to East Africa in recent years. The acquisition of this material is particularly fortunate and timely since the fauna of Africa is rapidly disappearing and such fine specimens will not be obtainable for exhibit in the indefinite future. Some of these treasures have already come into the possession of the Museum and will be put on view in the near future. Others, including New York State and North American specimens, will come to us over the years. This type of bequest makes it possible for the State Museum to afford the school children of upstate New York, who but rarely visit the museums of New York City, glimpses of the flora, fauna, and ethnography of areas that are now occupying a place in the textbooks of biology and social studies. Non-Western studies are destined to claim more of the student's attention in the next few decades.*

A New Museum Facility

The need of a new museum facility with adequate parking for visitors is always with us. The design and location of any museum facility should reflect its functions, and the functions of the State Museum are expanding to fulfill needs that are being identified by the Commissioner's Committee on Museum Resources. These needs are essentially for State aid to existing museums and to provide museum services to areas of the State now

* William C. Sayres, *The Non-Western World in New York State Higher Education*. The University of the State of New York, The State Education Department, Division of Research in Higher Education, Albany, 1961.

lacking such educational opportunities. The Commissioner and the Regents have communicated to the Governor's Temporary State Commission on the Capital City an awareness that such a new State Museum center would contribute greatly to the cultural life of the area and that it ought to be provided for in plans for the future. The location of such a center will depend on its use. It should be where people are; this means where they can come by car and park. It should be accessible to university students and to their faculties; it should be easily reached by school children. It must be located where it will best serve the citizens of the entire State. These requirements must receive careful consideration in the planning for the establishment of a new center of State government in the capital district. A new State Museum would be the nucleus of a cultural center which will enhance the cultural life of the city and will go far to make the capital a mecca for tourists.

Staff Changes

James F. Davis, scientist (geology), was appointed provisionally February 23, 1961. He succeeded Leo Hall who had filled the position temporarily until October 5, 1960. Pending civil service examination results, provisional appointments were given Robin D. Rothman April 6, 1961, as Museum technical apprentice and James W. Manley July 28, 1960, as associate curator (interpretation). Robert E. Funk received permanent appointment February 9, 1961, as junior scientist. September 8, 1960, Maryellen Canfora replaced Emily W. Dixon, who retired August 1, 1960, as typist; on October 6, 1960, Vera McMillen became senior stenographer in the position formerly held by Margaret G. Slater, who advanced to another unit of the Department.

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

Accomplishments of the Surveys

Anthropological Survey

DURING THE SUMMER OF 1960 work was continued on the Maxon-Derby site, near Jordan, N.Y., an early Owasco village which provided a radiocarbon date of A.D. 1100. Four oblong houses with lines of hearths along the walls were uncovered, measuring up to 61 feet in length and 27 feet in width, probably prototypical for Iroquois structures. Following this, a week was spent at the late prehistoric Mohawk village site of Garoga in Ephratah, N.Y., where nine large storage pits containing refuse and charred corn were found. This work was preparatory to a full season's work in 1961. Also, during the spring of 1961 further excavations were conducted at the Bent site, a station of a newly discovered archaic culture near Schenectady.

In the laboratory all data on settlement pattern studies for 1957-60 were processed, analyzed, and written up to date. The State archeologist also prepared a manuscript on "Highway Construction Archeology Salvage" for a symposium of A.A.A.S. in New York City and for later publication in *Archeology*. There were 282 local or out-of-town visitors, including professional colleagues and amateur archeologists, to the new laboratory.

Biological Survey

To summarize, the hay fever pollen studies were continued with a new 4-year grant of \$169,300 from the National Institutes of Health. An important accomplishment was the discovery of a new and simpler method for producing ragweed pollen out of season, so that at a given time there would be no ragweed pollen in the air except that from the known source.

Gypsy moth studies included the first testing on a large scale of a possible biological control method employing a microbial spray derived from a gypsy moth larval pathogen. Results are not yet known, but the data encouraged additional work. Punkie studies in the Adirondacks during the previous season produced sufficient biological data so that practical control tests were made of chemically treated screens against the adults and of spot treatments of the previously unknown larval breed-

ing areas. The encephalitis studies proceeded according to plan and included the collection of small mammal blood samples and bird spleens as well as larval and adult biting flies, chiefly mosquitoes. The collections of July and August 1960, with those of June 1961, yielded some 1,368 mosquitoes of 17 different species, which were processed for viruses by the duck research laboratory and the New York State Department of Health laboratory.

The small mammal survey on the Tug Hill Plateau of Lewis County was completed and Dr. Connor moved to Long Island in the fall of 1960 to set up the mammal survey in that area, where it was co-ordinated with the encephalitis virus survey. The *Bird Handbook*, Vol. 1, is going through Yale University Press and work continues on subsequent volumes.

Field Research by Projects

BOTANY

Pollen spectra of bog and lake sediments. The Crusoe Lake project was completed, pending revision of the manuscript and final preparation of diagrams and maps. There were 25 samples of shell material, screened from bulk samples, sent to Yale University for oxygen—18 paleo-temperature studies.

From four additional sites, 110 sediment samples were taken in connection with the project initiated to determine the extent of the advance of Valders Ice in New York State. The views of glacial geologists differ markedly and it is felt that the method of pollen analysis can shed some light on this and the associated Two Creeks problems. Fifty slides were prepared for study from the samples of the three most promising sites and about one third of these were analyzed. Pollen reference material was taken from 20 plants recently collected by the curator of botany and from 12 mounted herbarium specimens.

Distribution and ecology of Long Island lichens. Begun as a Student Honorarium project, work was continued by Irwin Brodo under the direction of Dr. Imshaug of Michigan State University. The greater part of the summer was devoted to making comprehensive lichen collections over the entire island. Over 95 areas were sampled and more than 2,000 collections made. A series of transplant studies were initiated, involving both ground and tree-dwelling lichens. A new technique was devised for making corticolous lichen transplants. The new method enabled controlled transplant experimentation to be done for the first time

with bark-dwelling species. One article has been published, another is in press, and others are in preparation.

Tagging and sampling ragweed pollen. Supported by a U.S. Public Health grant and in co-operation with Brookhaven National Laboratory, the technique of labeling ragweed pollen with radiosulfur was tested to determine its usefulness as a practical tool in dispersion studies. An alternate technique of producing ragweed pollen several weeks before the regular season by daily covering of plants in the field for 1 week with light-tight cloth to increase the periods of darkness proved to be successful. A second method, which accomplishes the same result without covering, was in use during the 1961 growing season and will be described when perfected. Dispersion studies were begun with preseason and in-season ragweed pollen, using a grid of 72 samplers plus check samplers. For 50 days, 171 samplers were in operation, yielding over 5,000 samples. These are being analyzed, correlated with meteorological data, and graphed to show the travels of ragweed pollen under various weather conditions, over varied topography, and through dense forest. Samplers were operated at selected levels on two meteorological towers. Several new designs of sampling devices were built and tested. The more promising ones were tested on tree pollens during May. One thousand plants of giant ragweed (*Ambrosia trifida*) were treated in the greenhouse to cause early pollen shed and transplanted to two fields (2 miles apart) for dispersion studies. Studies were begun on the study of the dispersion of corn (*Zea mays*) pollen. An additional grant supports this project for 4 more years.

Check list of grasses of New York State. In the course of exploring and collecting for vascular plants in general (see next project), 75 specimens, representing 57 numbers, were collected by the curator of botany. Common species were recorded on all trips and detailed observations on critical complexes in the genera *Festuca*, *Poa*, *Agrostis*, and *Panicum* were continued. Four days were spent at the National Herbarium in Washington, D. C., checking nomenclature, types, and problems in several genera. The final manuscript is in preparation.

Survey of vascular flora of New York State. Special trips were made to western New York, northern New York, and Long Island. Specimens were collected and sight-records made in the following counties: Albany, Cattaraugus, Columbia, Dutchess, Essex, Franklin, Genesee, Greene, Monroe, Montgomery, Niagara, Orleans, Oswego, Rensselaer, Schenectady, Suffolk, Ulster, Warren, Washington, Westchester. The collection of vascular plants of Onondaga County at Syracuse University was reviewed.

ENTOMOLOGY

Biology and control of Culicoides (punkies), third year. Detailed taxonomic studies of both the adult and immature stages showed that there were several undescribed North American species in the *obsoletus* group. These are described in a completed manuscript "The Taxonomy of North American *Culicoides* Related to *obsoletus* (Meigen) (Diptera, Ceratopogonidae)" by H. Jamnback and W. W. Wirth. Studies of seasonal changes in population, feeding habits, influence of weather on adult activity, and habitats in which the immature stages are found were continued.

Survey of arthropods in Adirondack streams. As a followup on blackfly control projects, 351 square-foot samples were taken from riffles in Adirondack streams. The numbers of arthropods, their weight, volume, and composition are currently being compared to see if significant differences occur between the different streams. A number of treated streams sampled from between 1950 and 1952 were resampled in 1961. The differences are being analyzed.

Eastern encephalitis survey on Long Island. Approximately 1,368 arthropods that feed on man were collected and prepared for virus testing through June of 1961. These included approximately 17 species of mosquitoes, three species of *Culicoides*, and five species of tabanids. Preliminary studies of the host preferences of mosquitoes were made, particularly those abundant near sites where encephalitis occurred in 1959.

Gypsy moth—ecological studies. Data from the biological studies at Glenville were used to construct life tables to show what per cent of the population succumbed to each of the various factors which caused mortality. The object of these tables was to furnish a better understanding of the causes of the rise and fall of gypsy moth populations, so as to be able to determine factors which might be manipulated in such a way as to maintain low population and avoid spread. The possible role of small mammals, and other features of sparse populations, became the subject of more intensive study; if the gypsy moth can be maintained at the sparse or low level, artificial control measures will not be needed.

Gypsy moth—control. By the spring of 1961 the technique of handling the bacterium *Bacillus thuringiensis*, a pathogen of Lepidopterous larvae, had been brought to the point of field testing. The State Conservation Department and the Northeastern Forest Experiment Station (U. S. Forest Service) collaborated with the State Science Service

in laying out the plots. Conclusions could not be drawn until the completion of data taking in the next report period, but much was learned as respects techniques and how to plan future field work. Egg mass counts made in the fall in plots sprayed from the air in June 1960 confirmed the preliminary results indicated in the last annual report.

White pine weevil—tests. The results of control tests with a portable mist blower, described in the last report, when data were incomplete, as "very promising," confirmed the first impression. Observations in the fertilized plots, completed in the present report period, continued to show no indication of improvement as respects weevil attack.

European pine shoot moth. Tests made in June 1960 and described in the last annual report were evaluated in the fall of 1960 from counts of damaged tips.

Beech scale. Summaries compiled during the present report period of data collected during the previous 10 years in the study plots in the Catskill Mountains indicated that trees attacked by the scale alone could tolerate the insects but that when fungi invaded the trees, because of or through the scale wounds, as high as 65 per cent mortality occurred.

Identification and classification of leaf beetles (*Chrysomelidae*). This work is a continuation of projects described in more detail in previous annual reports. The curator of entomology has been actively engaged in revising the North American Galerucinae with appendiculate tarsal claws; redescribing the genotypes of American genera of Galerucinae; cataloguing the American Galerucinae, and, with M. W. Sanderson, revised the grape *Colaspis* genus. *Maecolaspis*.

The second project, although more recent in its inception, became a necessary preliminary to other leaf beetle projects when it became apparent that much of the published literature, even descriptions of genera, is extremely poor. Results of this phase of the curator's work will affect almost all other manuscripts.

ZOOLOGY

Small mammal survey. Collecting was continued on the Tug Hill Plateau (Lewis County) through August 19, 1960, then was transferred to Long Island where active field work began on September 21, 1960. The Tug Hill data include: catch of small mammals, 1,424; skins with skulls, 367; skeletons, 103; skulls only, 178; 38 species recorded; individual data sheets filed for 1,065 specimens. Also, 15 species of amphib-

ians and reptiles and 135 species of birds were observed on upper level of plateau. Fleas were saved, for identification by A. H. Benton.

Field work was begun on Long Island September 21, 1960. Two main objectives of the work are: (1) to obtain a collection of mammals in this area of rapid human population expansion, and (2) in co-operation with the New York State Department of Health, to collect mammal and bird material for a study of eastern encephalitis and other zoonoses. For these studies, bird spleens and mammal blood samples were collected, preserved, and shipped to the State Health Department's Division of Laboratories and Research in Albany for processing. To date, most of the small mammal work has been conducted in eastern and central Suffolk County; eventual coverage of western Long Island and outlying islands is planned. Mammals collected on Long Island as of June 30, 1961, included 605 specimens of 17 species; 161 skins with skulls; 43 complete skeletons; and 130 skulls without skins.

Geological Survey

The major research emphasis of the Geological Survey for the past few years culminated in 1961-62 in the final compilation of the new State Geological Map, the first since 1901. All staff members participated in setting up and calibrating instrumentation in the new laboratories. This was the first step toward an increased emphasis on geochemical aspects of the entire research program. Individual projects of especial interest included:

Geological recommendations, planning, and supervision of an exploration program for a nuclear service center at Riceville, in western New York

Completion of a chapter on "Small Conoidal Shells of Unknown Affinities" for the *Treatise on Invertebrate Paleontology*, and of correlation charts for the Cambrian and Ordovician Systems in New York State

Investigations into the Precambrian of New York, through field research, field trips, and map compilation leading to a future publication on the *Precambrian of the Northeast United States*

Completion of a manuscript for a compilation of *Selected Deep Wells and Areas of Gas Production in Western New York*, a companion volume to *New York State Museum Bulletin 373*

Completion of a correlation chart for the Devonian System in New York State

Compilation of statistics for the increasing activity in wells drilled for gas in the State. Natural gas production reached the highest point since 1946.



The State paleontologist photographs a fossil in the new geology laboratory.

Field Research

Field work of permanent employees completed reconnaissance mapping for the following 15' quadrangles: Old Forge, McKeever, Big Moose, Number Four, Lassellsville, and portions of Childwold and Santanoni. (Y. W. Isachsen)

At the request of the State Department of Labor, as a geological consultant W. Lynn Kreidler visited the Cayuga Rock Salt Company at Myers, N. Y.

Approximately one month was spent checking contacts in Devonian rocks in connection with the State Geological Map. (L. V. Rickard)

Approximately 150 visits were made to exploratory and field wells for the purpose of collecting drilling, production, and geological data, and to collect drilling samples. Also 38 meetings of the Northern Gas and Oil Scouts Association were attended and approximately 150 additional visits were made to companies, individuals, and areas of geological interest in connection with the work of the Wellsville office. (A. T. Van Tyne)

The curator of geology began an investigation of the clay minerals present in Upper Silurian and Lower Devonian rocks of the central Hudson Valley. The object of this investigation is to present data on the mineralogical, textural, and chemical composition of the rocks and such conclusions regarding their origin as seems justified from the analytical data.

Field Work of Temporary Personnel

Lawrence B. Cline, of Rensselaer Polytechnic Institute, extended the field investigations of the Silurian and Devonian limestones in southern Herkimer County under the direction of James R. Dunn and L. V. Rickard.

Taconic Geology of Eastern New York

Donald Potter, of Hamilton College, concluded his mapping in the Hoosick 15' quadrangle during the summer of 1960.

Upper Devonian Rocks of Central and Eastern New York

Dr. Robert Sutton, of The University of Rochester, continued his investigations of the Upper Devonian rocks of central and eastern New York. Daniel Twigg mapped the Corning 15' quadrangle and Frank Fletcher did reconnaissance mapping in several quadrangles in the Catskills. Mr. Fletcher was employed during the field season of 1960 to expand this work.

Glacial Geology of Western New York

Mapping of Pleistocene surficial deposits has been essentially completed west of the Genesee River, under the direction of Ernest H. Muller of Syracuse University.

Geological Mapping in the Tarrytown Quadrangle

Dr. Leo Hall, of Union University, began detailed mapping in the Ossining and White Plains $7\frac{1}{2}'$ quadrangles. This will provide further information on the detailed structure of the New York City group.

Laboratory Work

Approximately \$60,000 worth of new instruments was purchased for the Geological Survey laboratories. Most of these were to implement the work in geochemistry, although certain items were for use in the paleontological research and in the general activities of the survey. Messrs. Broughton, Isachsen, and Rickard assisted in the planning for and installation and adjustment of this equipment. Major items included a Saltzman projector for enlargement and reduction of maps, charts, photographs, and other types of illustrations; a Jarrell-Ash 3.4 meter emission spectrograph with a versatile source unit; a North American Phillips X-ray diffractometer and fluorescent equipment.

Under the direction of Arthur Van Tyne, temporary employees were hired who accomplished cutting 3,350 samples from field collection bags and storing them in envelopes. The total footage of well samples cut was 28,500 feet. An additional 27,000 feet of samples was collected during the year. Total sample intake during the year was more than 55,000 feet.

Office Activities

Preparation of the final compilation of the State Geological Map was completed during November, December, and January by Messrs. Broughton, Fisher, Isachsen, and Rickard. Color samples and patterns for the 160 map units were also chosen at this time and hand-colored sheets prepared for guidance of the photoengraver. Since that time, blueprints of engraved maps and color proofs have been received periodically. These have been corrected, edited, and returned to the lithographer.

The Museum

General

A MAJOR MUSEUM PROBLEM—shortage of useable working and storage space—was greatly relieved late in 1960. The exhibits preparation laboratory, after decades in a series of small, ill-ventilated rooms which were most inconveniently located with respect to the exhibit halls, was moved to carefully designed, well-equipped quarters in the annex. Although the floor area allowed for little expansion, the layout arrangement, storage capacity, air and light control, and such facilities as a modern paint-spraying booth now permit the staff to work with much greater efficiency. The exhibits design laboratory, instead of being two floors and a hundred feet horizontally distant from the preparation rooms, has been placed directly across the corridor in the new wing. This proximity saves untold steps and permits much closer collaboration between design and execution, as well as mutual use of equipment. Location of these functions immediately off Biology Hall and on the same level as all of the public viewing areas is another great convenience. All except the very largest exhibits can now be constructed in the laboratories and wheeled to their places of installation in the exhibit halls, instead of the parts being carried precariously down roundabout stairways and then assembled behind screens. The large “stockade” in Biology Hall, which has served for years as a poorly lighted, dusty, and noisy assembly area, is no longer essential for the preparators. Instead, when the series of biological exhibits is modernized, this space can be returned to public use.

Another very important result of the opening of the wing was the release of nearly 8,000 square feet of space in the main building. Some of these rooms had been devoted to Museum exhibits activities (see above); the majority had been occupied by the State Science Service until it moved to the ninth floor of the wing. Almost all of the released space (7,000 square feet) was turned over to the Museum curators for offices, laboratories, and ranges for the accommodation of collections. This enabled the staff to remove many specimens from corridors, exhibit halls, and odd corners scattered through the building, and to assemble them in an orderly fashion within rooms which can be secured. All shelving and cabinets which became surplus through the equipping of the wing were set up in the ranges, and a large number of cabinets



Since the completion of the facilities in the new wing, some of the old offices in the museum have been converted to storage space for the collections. The curator of archeology sorts material prior to cataloguing.

containing archeological and ethnological material were removed from Morgan Hall for use by the curator of archeology. Although much of this equipment is makeshift and the quantity is inadequate, it has permitted the curators to make good progress toward placing the collections in orderly, convenient arrangement.

A third segment of the Museum program also was aided substantially by the new facilities in the wing. Since its establishment in 1947, the education section had been limited to one room. The difficulty of combining administration, teacher study, program preparation, and laboratory and live exhibits with class instruction in one room measuring 24 by 26 feet can be imagined. As the number of visiting school classes increased and required the services of three instructors through more than half the year, difficulties multiplied. When the exhibits design laboratory was moved to the wing, in September 1960, this room, 15 by 40 feet, was converted to a classroom. Floor tile was laid; the walls and ceiling were painted by the Department staff, numerous fixtures were built by the Museum carpenters, and equipment for maintaining aquatic and terrestrial animals was installed. The result is an attractive, well-lighted room which is large enough for various phases of the program. Need is beginning to be felt, however, for one or two additional meeting places in order that overly large classes may be split up for better instruction, and to permit handling more groups which arrive at the same time.

The Museum education staff has taken full advantage of their new facilities. Through the experience and imagination of the supervisor, Janet Stone, a stock of specimens and live animals has been gathered and, with the help of the instructors, maintained in orderly and good condition. Class instruction has been improved, relations with teachers and schools have been promoted, and the lending service to groups and schools has been expanded. The selection of items for sale at the information desk in the foyer has given the public a wider range of educational material. Incidentally, it is with satisfaction that we report the return to the Regents' Fund of the amount which was advanced to the Museum for the purchase and maintenance of a stock of sales items. The activity can now maintain itself on the revolving fund which has accumulated during the past 2 years from the modest profits of the enterprise.

We anticipate some strengthening of the education program with assistance from Federal funds appropriated under the National Defense Education Act. The additional money should make it possible to greatly expand services to children and for postgraduate instruction of teachers. The usefulness of this type of aid has been limited, unfortunately, by restrictions in both the Federal and State systems of operation and only a fraction of the potential aid has been realized. Furthermore, services



Horsetails, ferns, and a large dragonfly dominate a restoration of a carboniferous forest, another new exhibit in Paleontology Hall.

to school classes could be expanded and improved if it were possible to spread the visitations more evenly through the school year and to set up lessons later in the day. Because of factors such as travel safety and daily school schedules, it appears that little help can be expected in this direction.

After the steady upward trend in visitor use of the exhibit halls from 1956 through 1958, the 17 per cent decrease in 1959-60 was surprising. Our counts for 1960-61, however, show that this decline was only a temporary—and unexplainable—aberration. A sampling of the attendance on 84 of the 324 open days during the last year gave a total estimated visitation of 220,000 persons. This figure compares favorably with that of 145,000 for the previous year and 177,600 in 1958-59. Average daily attendance in 1960-61 was 654, a figure which is actually depressed by the relatively low average of 433 visitors on the 14 Sundays between Memorial Day and Labor Day, when the exhibit halls are kept open for the supposed benefit of tourists. The tendency for the public to turn to other types of attractions (principally the outdoors) on summer Sundays has been reflected in the visitor counts at the State Museum for several years. It raises a question as to the advisability of adhering to the traditional Sunday openings. It would be desirable to determine if more persons would take advantage of such educational opportunities in early spring and autumn than during the fine weather of our short northern summers.

Some steps were taken to improve visitor comfort and safety. Several large and attractive benches were made by the museum carpenters and placed in the exhibit halls. New and more efficient fans were obtained prior to the summer season; they proved effective in moving fresh air into the main section of the building which is tightly sealed off from the outdoors. New metal sash windows and screens were installed by the Department in Biology Hall and, for the first time in history, it became possible to admit fresh air to the museum without also admitting pigeons, starlings, and sparrows. In a conference of Museum education and guard staffs and the building superintendent, procedures were established for use in case fire or other emergency makes it essential to quickly evacuate the exhibit halls. The addition of the annex has provided two new avenues of escape from the Museum and greatly increased the public safety factor in Biology and Paleontology Halls. A review of accidents in the Museum carpentry shop, which was made by the Department personnel officer, led to agreement on participation of our carpenters and exhibits personnel in a series of safety programs to be held next year.

The normal program of the curators was necessarily curtailed by the move and expansion into new space, but future work will of course be

greatly facilitated. The zoology collections benefited particularly and will be much safer and more accessible for research than in the past. The services of a museum expert, Henry Thurston, were obtained to assist the curator of zoology in putting the skeletal and birds' eggs collections into order and to make study skins of the numerous birds which are picked up dead and donated by the public during the spring migration season. Such technical and semitechnical assistance is badly needed by all of the curators if the latter are to give adequate attention to their professional duties. Some increase in Museum funds for temporary services, and the availability of Title III (NDEA) funds for exhibits personnel, has made it possible to obtain more help of this type for the curators during 1960-61.

The herbarium, which was relocated in the north end of Biology Hall during the previous year, received its final touches early in the period covered by the present report. It was considered fitting to inaugurate the new facility by holding a Symposium on Plant Exploration in New York State. The session, which was called in October, was expanded to include a tea, dinner, and open house. The curator of botany was general chairman, with a committee consisting of the Assistant Director of the Museum, the head of the Biological Survey, and the State botanist. Invitations were sent to botanists at various institutions across the State and to other interested individuals. About 150 persons attended the 2-day session. The symposium, moderated by the curator of botany, had presentations on the subject in the fields of fungi (Dr. Clark T. Rogerson, curator of cryptogamic botany, the New York Botanical Garden), algae (Dr. George J. Schumacher, professor of biology, State University, Harpur College at Binghamton), bryophytes (Dr. Edwin H. Ketchledge, Jr., State University, College of Forestry at Syracuse University) and vascular plants (Dr. Robert T. Clausen, professor of botany, State University, New York State College of Agriculture, Cornell University). The State botanist arranged for the dinner, at which the speaker was Dr. William C. Steere, director of the New York Botanical Garden. Dr. Steere presented a general summation and some suggestions of his own. The papers are being prepared for distribution. It is hoped that this symposium will be followed by similar meetings, perhaps held annually, of active workers in the floristics of New York State.

Throughout its history, the State Museum has benefited by a multitude of gifts from many individuals, organizations, and fellow institutions. These donations have been in the form of material objects and of money for projects or programs. Whether large or small, the sum total has contributed materially to the standing of the Museum in the world of science. 1960-61 was no exception, with more than 30 sources donating

several thousands of specimens. The gifts ranged from small dead birds, perhaps bedraggled past redemption but retrieved from roadsides by school children, to a carefully prepared series of a thousand vascular plants from Henry F. Dunbar of Kingston. An outstanding and unusual gift was 22 specimens of African mammals, which came from Dr. and Mrs. W. Brandon Macomber of Albany. This material ranged from a superb elephant head to an entire dik-dik (the world's smallest antelope). All were beautifully mounted. The material is available for the study and enjoyment of adults. When turned over to the State Museum, it will make possible a compact exhibit on the rapidly vanishing fauna of Africa. Through acquisition of the specimens, the Museum will be enabled to teach graphically the natural history of an important geographic unit in which New Yorkers have a deep interest but little direct knowledge.

Much of the progress in the exhibits modernization program during 1960-61 was not apparent to public view. One of the four displays, which were not in place when the new section of Paleontology Hall was opened last year, was constructed and installed. This exhibit was a somewhat detailed explanation of brachiopods and was the result of many hours of planning by paleontologists Rickard and Fisher and of color diagraming by the exhibits designer. (See illustration, p. 38.) In other fields, the program was devoted to planning, designing, and beginning construction on numerous projects. The next year should see a number of exhibits, some of which have been in process for a year or even 2 years, completed and unveiled to public view.

Other planning for the modernization of Paleontology Hall, was suspended throughout most of the calendar year 1960 by the assignment of the State paleontologist to full-time work on the State Geological Map. It was given a great impetus, however, in 1961 through National Defense Education Act (Title III) funds. The services of a paleobotanist, David C. Roberts, formerly of the Cleveland Natural History Museum, and of a geologist, Kenneth Hasson of Schenectady, were acquired. By the end of the year, exhibit plans had been developed in sufficient number to keep designers and preparators busy well into 1961-62. NDEA funds also made it possible to employ a succession of Antioch College, Ohio, students, under the College's Cooperative Work Program, as assistants to the Museum's exhibits staff. These students have brought considerable talent and artistic ability to their jobs and have made material contributions to over-all progress. The NDEA appropriation has also been a welcome addition to our regular budget for supplies and materials for the construction of exhibits. Unfortunately, the Federal funds cannot be used for purchase of badly needed tools and equipment with which to do the work.



The reconstruction program in Paleontology Hall continued through the year. This exhibit displays a variety of brachiopods, an abundant fossil marine invertebrate.

At the end of the year, a major exhibit on the relationship between geology and surface topography of the State was practically ready for installation in Orientation Hall. Background material for labels was written by the curator of geology, and information for the subsurface formations which are shown on six models was contributed by the State geologist and members of his staff. This exhibit is the second of seven displays covering the science fields of the Museum which will be explained in Orientation Hall.

Considerable time was devoted to renovating old exhibits in archeology-ethnology and biology. A major project was rehabilitation of the Iroquois bark house. This structure, when completed in 1917, had been a highly interesting and instructive exhibit. Unfortunately, many original furnishings had been stolen or had been removed to save them from loss and the house was practically barren. Accordingly, the inappropriate fence which had failed to keep out marauders was replaced by a "stockade" in which a large glass window was set. The house itself was given extensive repairs and numerous furnishings, either originals or copies, were installed. The State Conservation Department aided materially by turning over the skins of deer, black bear, beaver, and other furbearers for the bunks, and wings of wild turkey, which the Indians would have stored for use in making arrows and in ceremonies. Other items will be added, including the effigy of a child tending the fire, but the bark house is already a primary feature of the Museum's education program. Under guidance of an instructor, groups of about a dozen children are allowed to enter the house and are told there about Iroquois daily life. This is an impressive experience for many of our younger visitors.

A long-planned feature, the Little Theater, was built by the Museum carpenters. Plans and general supervision were furnished by the State Architect's office. The structure, which fronts on the north side of Orientation Hall, is a handsome piece of cabinetwork. Its automatic projector and translucent screen will be used for demonstrations of subjects which are difficult to show in conventional exhibits, such as development of animals or plants, methods of scientific or other technical processes, or museums of the State. At the end of the year, the facility was awaiting the assembly of a series of slides on the work of the State Museum and Science Service and revision of the electronic controls in the automatic projector.

News items on holiday openings or closings of the exhibit halls, accounts of several new exhibits, receptions of science congress award winners, etc., were run by the Albany press. On arrangement with the Albany Chamber of Commerce, information folders were furnished to the manager of the Hudson River Day Line Steamship Company for the

use of passengers on the two holiday excursions which were run between New York City and Albany. Co-operation was extended to Albany radio station WROW in taping 2 half-hour programs in the exhibit halls and also concerning the preparation of exhibits; the programs were broadcast on a Sunday evening series. Pictures of State Museum exhibits were furnished to the Mohawk-Hudson Council on Educational Television for use in a program on WRGB, Schenectady.

During the 6-month absence of the Assistant Commissioner on sabbatical leave, the Assistant Director was charged with numerous administrative responsibilities which are normally undertaken by the former. The Assistant Director also represented the organization at the convocation during the fiftieth anniversary observance of the College of Forestry at Syracuse University. He made several trips to the American Museum of Natural History and the U. S. National Museum to confer with various staff members and to arrange for consulting services, specimens, casts, and other advice and materials for use in the State Museum's exhibits program. On request, an inspection was made and advice given on the care or disposal of scientific collections and exhibits in the biology department of State University College of Education at Cortland and the Allen-Steinheim Museum at Alfred University.

Curatorial Activities

Archeology

The greater share of the curator's time was consumed in the various activities attendant upon the move of the Anthropological Survey to offices in the new wing, and the establishment of an anthropological range in space vacated by the Geological Survey in the old building. In preparation for this move, the distribution of artifacts from dismantled exhibits to storage was completed and the collections of the Anthropological Survey were temporarily stored in cramped quarters in the exhibit area of Morgan Hall. The rechecking of these collections and their storage in the new range area is progressing. The movement of collections from the former offices to the range has been completed.

Near the end of the year, the installation of a sink in one of the range rooms completed the establishment of a laboratory area. The cleaning, drying, and hardening of artifacts can now be accomplished within a much smaller space. This establishment for the first time of a contiguous range, laboratory, and cataloguing area has resulted in much greater efficiency. Materials can be brought in from the field and processed with a minimum of movement from place to place. Certain problems of com-

munication between the 4th floor of the old building and the 9th floor of the wing will, in turn, be solved.

Routine curating of the collections made by the Science Service at the Maxon-Derby, Hunters Home, Kelso, Chamberlain, Garoga, and Bent sites was done.

As part of a project of gathering information on Lewis H. Morgan, those items from his collection which have not been pictured heretofore were photographed. A microfilm of Morgan's journals, borrowed from The University of Rochester, was searched for notes pertinent to the Indians of New York State and enlarged prints were made of those pages.

Several additions were made to the site record files and more progress was made on the central negative files.

R. Arthur Johnson of the New York State Archeological Association asked for and received assistance in the excavation of several skeletons on a local Indian site. These skeletons were subsequently donated to the State Museum by Mr. Johnson.

The curator continued to assist Mrs. Donna Taylor in her study of wampum belts by taking X-ray films to the State Health Department laboratories to be processed and in making prints from the films. The Esopus Treaty Belt, borrowed from the county of Ulster for this project, was cleaned, reconditioned, backed with a linen support, and returned to the Senate House Museum. Other co-operative work included identification of miscellaneous human remains for the Bureau of Criminal Investigation, New York State Police; comments on the cause of certain cut marks on horse bones for Ernest Muller of Syracuse University; supplying data on New York sites to the National Park Service Historic Sites Survey; and many other requests for information answered in person, by telephone, or by mail.

Botany

An inventory of the entire collection was started. Specimens are being listed under date of collection, place of origin, and name of collector. This inventory is now 20 per cent finished. A detailed report will be presented on completion. The curator was assisted for several weeks by two temporary employees, Melinda Everett and Mrs. Frances Carr.

Materials from institutions and 37 individuals were presented in exchange or as gifts (see pp. 47-48). These accessions are classified as follows:

	FUNGI	ALGAE	BRYOPHYTES	VASCULAR PLANTS	TOTAL
New York State ...	1,789	27	559	1,084	3,459
Out-of-State	125	0	179	215	513
Total	1,914	27	738	1,299	3,972

Collections by the curator were as follows:

New York State ...	592	1	1,214	269	2,076
Out-of-State	11	0	0	0	11
Total, all sources	2,517	28	1,952	1,568	6,059

The most notable accessions were 221 specimens of various classes of plants collected in northeastern New York State by Orra A. Phelps; 319 specimens of various classes, mostly from New York State, collected by Theodore C. Baim; 2,426 specimens of all divisions of plants, mostly from Suffolk County, collected by Roy Latham; 275 specimens of lichens and bryophytes (all authentically named) from the National Herbarium of Canada.

During the fiscal year, 6 (probably) new members of the known fungus flora of the State were found, in addition to 4 species of lichens which were reported for the first time in the State by Irwin H. Brodo, recipient of a student honorarium. As in previous years, some of our mosses were identified by A. Leroy Andrews, Ithaca, N. Y. On the basis of this and other identifications, the following numbers of additions are made to the data for the State check list of mosses: District 3 (vicinity of Saranac Lake), 2; District 6 (vicinity of Lockport), 2; District 8 (vicinity of Oswego), 2; District 10 (vicinity of Indian Lake), 2; District 11 (vicinity of Warrensburg), 1; District 13 (vicinity of Olean), 1; District 14 (vicinity of Dansville), 1; District 17 (vicinity of Middleburg), 1; District 20 (vicinity of Ellenville), 3; District 21 (vicinity of Poughkeepsie), 2; District 22 (vicinity of Orient), 2; District 23 (vicinity of Montauk), 1, and District 26 (vicinity of Riverhead), 4. Two species and two varieties were added to the known moss flora of the State. The curator has continued copying records from authoritative literature. This, combined with field work and study of recent accessions, has added the following numbers of species and subspecies of vascular plants to our county lists.

Albany	2	Greene	3	Richmond	2
Allegany	3	Herkimer	2	Saratoga	42
Bronx	1	Lewis	1	Schenectady ...	5
Broome	48	Livingston	17	Schuyler	5
Cattaraugus	4	Monroe	6	Seneca	2
Chemung	2	Montgomery ...	1	Steuben	10
Chenango	7	Nassau	1	Suffolk	7
Columbia	6	Niagara	41	Tioga	1
Delaware	2	Onondaga	196	Ulster	19
Dutchess	10	Ontario	7	Warren	13
Erie	2	Orleans	12	Wayne	38
Essex	3	Oswego	23	Wyoming	10
Franklin	18	Otsego	1	Yates	3
Genesee	28	Rensselaer	2		

Included in these records are 10 new species for the State of which 8 are escapes from cultivation and 2 are native species.

Entomology

In addition to the routine maintenance of the collections, the special project of transferring portions of the collections from cardboard boxes to glass-topped wooden drawers was continued. Some of the exotic moths and butterflies were transferred.

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

Approximately 250 requests for information were made to the curator of entomology. Most of these called for the identification of a particular insect and means of control if it was likely to become a pest. Requests were made by telephone, by mail, and in person.

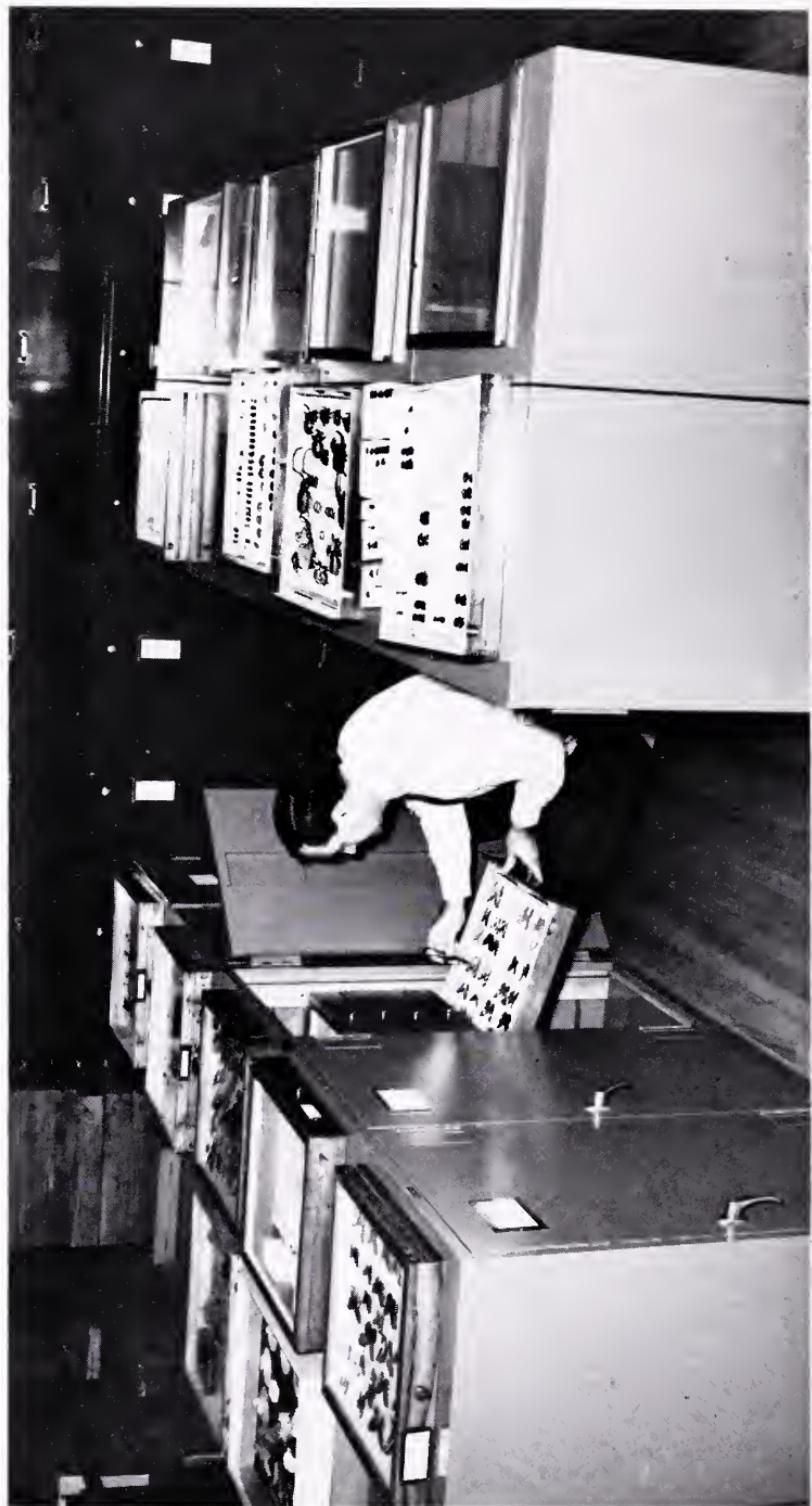
Geology

One hundred thirty specimens from the New York State systematic mineral collection were catalogued. Approximately 650 sets of New York rocks and minerals were assembled for sale at the Museum information desk. The curator supervised this work, which was accomplished by student help.

Sixty-nine visitors requesting samples or information were received during the year. Approximately 330 rock, mineral, and ore samples were identified for the public and/or colleagues. Ninety-one of these samples were identified using X-ray techniques, thereby adding significantly to our file of standard X-ray reference films. Five days were spent in the field collecting samples for laboratory study and other purposes.

Public requests for information are listed by subject matter and number of requests answered:

State geology	85
State mineralogy	50
Miscellaneous	75
Copies of leaflet No. 10, <i>Rocks and Minerals of New York State</i> , sent to school children and teachers	238
Rock samples of anorthosite with descriptive information sent to school children	320



Larger storage areas have made the systematic collections more accessible.

Paleontology

The contents (175 specimens) were removed from several exhibit cases, and the material was catalogued and stored. One hundred and seventy-four new type specimens were added to the type collection, and cards for these were entered in the type catalogue. Three hundred and seventeen specimens were treated to stop or prevent disintegration. Collections containing approximately 470 specimens were packed for shipment. Three hundred and forty entries were made in the locality and accession records, and 3,141 specimens were ticketed with locality numbers. The acquisition of additional storage cases permitted rearrangement of the type collection (11,403 specimens) to allow for the insertion of future additions. The type collection, which previously had been stored in 528 drawers, now occupies 660 drawers. One hundred and thirty-one drawers of fossil specimens, required by the staff of the Science Service in connection with impending studies, were transferred from the Museum to the annex. Seventy-seven drawers of specimens were shifted as part of the planned revision of the study collections. As usual, a considerable amount of time was spent in keeping the type catalogue up to date. The State paleontologist and the senior scientist (paleontology) collected and turned over for accessioning a total of 3,125 fossil specimens from 72 localities in the State.

Assistance was given to the following visiting scientists who desired to study portions of the collections: Edward J. Buehler, The University of Buffalo (fossil parasites); Joseph G. Emielity, Milwaukee Public Museum (fossil echinoderms); Gerald Galvin, Massachusetts Institute of Technology (fossil brachiopods); James Grierson and Francis Hueber, Cornell University (fossil plants); William Kreuger, Jr., Rice University, Houston, Tex. (lithological specimens); Father Yvon Pageau, Fordham University (Gaspé fossil fish); Donald Zenger, Dartmouth College (fossils from the Guelph formation).

Approximately 150 fossil specimens were identified for some 51 visitors, and information on fossils and fossil localities was transmitted to a number of correspondents.

Zoology

Most of the collections were moved and rearranged. The fish specimens were assigned to the series of rooms on the sixth floor which had been occupied by the exhibit preparation section; the bird, mammal, and

herpetological collections were grouped in the former zoology office; and birds eggs, mollusks, and skeletal material were placed in the old archeology office. The last three collections were reviewed and catalogued by Henry Thurston, temporary assistant curator, who also made study skins of numerous birds which were brought to the Museum by the public.

Catalogue entries now total 20,345, representing 936 new items of about 1,400 separate specimens. The most significant were 444 specimens obtained by Paul Connor through the Small Mammal Survey. These specimens were all sorted into the collection, properly cleaned, poisoned, and numbered.

Map files on New York State animals were further enlarged and new data added. Mapping of bird distribution for the *Handbook of North American Birds* continued. About one third of the curator's time, starting in October, was devoted to two NDEA (Title III) projects, one on ecology based on the beaver exhibit, and one on mammals of the State for teachers and students in the field and museum.

Letters and phone calls from the public, concerning animals of the State, came in at an average rate of two a day and were promptly answered. The common meadow mole or mouse did considerable damage to private lawns and gardens as well as to farmers' fruit trees during the winter, resulting in many queries through the mails. At the request of the editor of *The Conservationist*, State of New York Conservation Department, 10 letters to the editor were answered for publication in that magazine. A visit was made to Hamilton College, Clinton, N. Y., to advise on disposition of the college's collection of birds and mammals.

Accessions

The State Museum was the recipient of the following donations by generous friends:

Archeology

Indian stone tools	Harold Secor, Savannah, N. Y.
Photographs and manuscript of St. Regis Reservation	John J. Honigmann, University of North Carolina, Chapel Hill, N. C.
Fragment of an Indian pipe	Louis Follett, Schuylerville, N. Y.
Seminole Indian jacket	Hon. Caroline Simon, New York City
Prints of Joseph Brant and Red Jacket	Purchased
Indian pottery and skeleton	R. Arthur Johnson, Latham, N. Y.
Skeleton of an Indian dog	Bobby Walsh, Watervliet, N. Y.
Wooden spoon and stone samples	Iona Waterman Bedell, Castleton, N. Y.

Botany

Plants, mostly from New York State (319)	Theodore C. Baim, Schenectady, N. Y.
<i>Drosera rotundifolia</i> from Franklin County	Eugene Barker, Crown Point, N. Y.
<i>Arctostaphylos uva-ursi</i> from Albany County	Victor H. Cahalane, Delmar, N. Y.
Plants, mostly from New York State (6)	George R. Cooley, Rensselaerville, N. Y.
<i>Achillea millefolium</i> from Connecticut	Henry F. Dunbar, Kingston, N. Y.
Flowering plants from Schenectady County (3)	Melinda Everett, Niskayuna, N. Y.
Vascular Plants from New York State (2)	Mildred E. Faust, Syracuse University, Syracuse, N. Y.
Lichens from the Adirondacks (45)	Frederick J. Hermann, Beltsville, Md.
<i>Hydnaceae</i> from Albany County (4)	Dr. and Mrs. Robert D. Glasgow, Albany, N. Y.
Flowering plants from Delaware County (34)	Anna E. Jenkins, Walton, N. Y.
<i>Petasites hybridus</i> from Westchester County	Mrs. E. W. Kelly, Pound Ridge, N. Y.
Mosses from New York State (62)	Edwin H. Ketchledge, Jr., State University, College of Forestry at Syracuse University
<i>Penstemon laevigatus</i> , var. <i>digitalis</i> , from Albany County	Lewis E. Kohler, Slingerlands, N. Y.
Plants, mostly from New York State (2,426)	Roy Latham, Orient, N. Y.
Mosses from western New York State (38)	Donald M. Lewis, New York State Museum
<i>Poria rubens</i> from Warren County (2)	Josiah L. Lowe, State University, College of Forestry at Syracuse University
Sphagnum from New York State (69)	Herbert M. Mapes, Richmondville, N. Y.
Plants from Suffolk County (3)	Eugene C. Ogden, New York State Museum
<i>Swillus</i> from Franklin County	Miss Maria Pantadou, Ottawa, Ontario, Can.
Grasses from northeastern North America (2)	Laverne Pechuman, Lockport, N. Y.
<i>Helotiales</i> from Albany County (2)	Robert T. Penoyer, Owensboro, Ky.
Plants from New York State (221)	Orra A. Phelps, Wilton, N. Y.
<i>Pimpinella major</i> from Westchester County (5)	A. T. Poffenberger, Montrose, N. Y.
Plants, mostly from New York State (21)	Edgar M. Reilly, Jr., New York State Museum
Mosses from Livingston County, New York (3)	Richard W. Reilly, Geneseo, N. Y.

Plants from southeastern United States (8)	Clark T. Rogerson, New York Botanical Garden, New York City
Plants from western New York State (20)	St. Bonaventure University, St. Bonaventure, N. Y.
Plants, mostly from New York State (86)	Clara Schultz, Bemis Heights, N. Y.
<i>Scirpus peckii</i> from Cattaraugus County	Ernest H. Schuyler, University of Michigan, Ann Arbor, Mich.
<i>Polyporus cinnabarinus</i> from Greene County	Margaret Slater, Albany, N. Y.
Bryophytes from Ulster County (27)	Daniel Smiley, Lake Mohonk, N. Y.
<i>Lactarius thyinos</i> from Michigan	Alexander H. Smith, University of Michigan, Ann Arbor, Mich.
<i>Picea</i> from Washington County (2)	Ralph H. Smith, New York State Conservation Department
Plants from eastern New York State (32)	Henry Thurston, Travis Avenue, Montrose, N. Y.
<i>Rhinanthus crista-galli</i> from Rensselaer County	Mrs. Alvin G. Whitney, Delmar, N. Y.
<i>Coleosporium</i> from Albany County (2)	James Wiedemann, Glenmont, N. Y.
Plants from New York State (40)	John A. Wilcox, New York State Museum
<i>Pottia davalliana</i> from Ontario, Can.	Harry Williams, Millbrook, Ontario, Can.
Plants from North America (275)	National Herbarium of Canada, Ottawa, Ontario
Vascular plants, mostly from the northeastern United States (199)	United States National Herbarium, Washington, D. C.

Entomology

Plant galls (50)	Roy Latham, Orient, N. Y.
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Geology

Pyrrhotite specimens, Brant Lake, N. Y.	Ray Davis, Chestertown, N. Y.
Shale with fine-grained pyrite veinlets	Mrs. Robert T. Folmsbee, Castleton-on-Hudson, N. Y.
Massive triphylite, Palermo Mine, Stoneham, N. H.	William H. Hallenbeck, Kinderhook, N. Y.
Pyrite from Cretaceous lignite beds, Appleby Beach, L. I.	Y. William Isachsen, Delmar, N. Y.
"Sunstone" in Pegmatite	Richard C. Johndy, Lake Placid, N. Y.
Siderite Crystals included in limestone, Cherry Valley	Charles W. Mitchell, Canajoharie, N. Y.
Quartz Crystals	Henry Rauch, Voorheesville, N. Y.
Quartz Crystals	John E. Relyea, Voorheesville, N. Y.

Diopside with chondrodite and graphite in marble, Newcomb; fergusonite specimen and allanite with cyrtolite and lanthanite, southeastern Adirondacks; serpentine (chrome antigorite) Wood's Chrome Mine, Wakefield, Pa.; pyromorphite Wheatley Mine, Phoenixville, Pa.; and sphene crystal, French Mountain, Warren County, N. Y.	Elmer Rowley, Glens Falls, N. Y.
Groutite crystals (first New York State occurrence and second world occurrence) Taleville; tirodite specimen (first United States occurrence), Taleville, and jordanite specimen, Balmat	Curt G. Segeler, Brooklyn, N. Y.
Plumose muscovite with chlorite, Wilton, N. Y.	Peter Schultz, Stillwater, N. Y.

Paleontology

Fossil plant from Oneonta sandstone, Oneonta, Otsego County	William Cower, Oneonta, N. Y.
Fossil coral type specimen (171) consisting of 96 thin section slides and 590 pieces of sectioned specimens from Coeymans limestone, New York State; fossil coral from Coeymans limestone, Munns, Madison County	William A. Oliver, Jr., United States Geological Survey, Washington, D. C.
Trilobites from New Scotland limestone, Feura Bush, Albany County (2)	Bradford Parke, Delmar, N. Y.
Thin section slides of our type fossil bryozoa (20)	Mrs. June R. P. Phillips Ross, Illinois State Geological Survey, Urbana, Ill.
Fossils from Arkona shale, Arkona, Ontario, Can. (10)	Charles Southworth, Thedford, Ontario, Can.
Trilobite from Hamilton beds, Brookfield, Madison County	Henry Thurston, Montrose, N. Y.
Fossil gastropod from Beekmantown limestone, Glens Falls, Warren County; fossil from Manlius limestone, Perryville, Madison County	George Toung, New York State Bureau of Soil Mechanics, Latham, N. Y.

Zoology

African mammals, mounted (22)	Dr. and Mrs. W. Brandon Macomber, Albany, N. Y.
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Bird specimens (21)	Mrs. Arlene Brown, Hudson; Donald Collins, Delmar; Elizabeth Feldhusen, Catskill; Ralph Kent, Albany; Orra Phelps, Wilton; Eleanor Radke, East Chatham; Helen F. Smith, Rensselaer; Hope L. Smith, Rensselaer; Henry Stevenson, Albany; Henry Thurston, Montrose, (all New York State locations)
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Donations

Duplicate and other materials which were excess to needs were donated to schools, co-operating institutions, and individuals which expressed need for them:

Archeology

Duplicate projectile points	Joffre Coe, Chapel Hill, N. C.
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Geology

Collection of Adirondack rocks (8)	Geology Department, George Washington University, Washington, D. C.
Collection of rocks and minerals (24)	Shaker High School, Newtonville, N. Y.
Rock and mineral samples (8)	Wentworth Institute, 550 Huntington Avenue, Boston, Mass.
Quartz crystals (Little Falls diamonds)	Television station WRGB, Schenectady, N. Y.

Paleontology

Fossil plants (4)	Denver Museum of Natural History, Denver, Colo.
Fossil specimens (9)	Patricia Louie, Manito, Ill.
Fossil specimens (12)	Peggy Petell, Bancroft, Idaho

Exchanges

Archeology

Wooden pestle for a beaded bag	Kenneth Mynter, Claverack
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Loans

The following loans were made on request of the schools or other institutions and of scientists.

Archeology

Typical New York Indian Pottery
sherds (22)

Richard Johnston, Royal Ontario
Museum, Toronto, Can.

Botany

Type specimens of *Agaricales* (3)

State University, College of Forestry at
Syracuse University, Syracuse, N. Y.

Authentic specimens of fungi (9)

University of Michigan, Ann Arbor,
Mich.

Specimens of fungi (38)

New York Botanical Garden, Bronx
Park, New York City

Dasyscyphus (1)

State University, New York State

Lichens (42)

College of Agriculture at Cornell
University, Ithaca, N. Y.

Plants (20) and rangemaps (8)

New York State Conservation
Department, Albany, N. Y.

Authentic specimens of *Ascomyctetes*
(12)

Whiteface Mountain Authority,
Wilmington, N. Y.

Type specimen of *Boletus frustulosus*
Pyrenomyctetes (3)

National Fungus Collections, Beltsville,
Md.

Geology

Collection of rocks and minerals (22)

New York State Conservation

Collection of fluorescent minerals (7)

Department, Albany, N. Y.

Collection of single crystals (7)

Charles Goldberg, Nassau, N. Y.

Mary Michaels, Albany, N. Y.

Paleontology

Type specimens of fossil brachiopods
(12)

Thomas W. Amsden, Oklahoma
Geological Survey, Norman, Okla.

Fossil specimens (131)

A. J. Boucot, Massachusetts Institute
of Technology, Cambridge, Mass.

Type and nontype specimens of fossil
corals (12)

T. H. Clark, McGill University,
Montreal, Can.

Type and nontype specimens of fossils
(36)

Robert H. Denison, Chicago Natural
History Museum, Chicago, Ill.

Type specimens of trilobites (15)

E. A. Frederickson, University of
Oklahoma, Norman, Okla.

Type and nontype specimens of fossil plants (15) and 33 reels of microfilm on fossil plants	James D. Grierson, Cornell University, Ithaca, N. Y.
Type specimens of eurypterids (12)	Carol Heubusch, Buffalo Society of Natural Sciences, Buffalo, N. Y.
Type and nontype specimens of fossil corals (56)	Dr. William A. Oliver, Jr., United States Geological Survey, Washington, D. C.
Mammoth and mastodon bones (4)	Joseph T. Pickett (for West Sand Lake Methodist Church), Averill Park, N. Y.
Type and nontype specimens of fossil bryozoa (177)	June R. P. Phillips Ross, Illinois State Geological Survey, Urbana, Ill.
Type specimens of fossil corals (3)	William J. Sando, United States Geological Survey, Washington, D. C.

Zoology

Mounted birds and animals (22)	Public Schools, Schenectady, N. Y.
Mounted birds and animals (30)	Rensselaer County Junior Museum, Troy, N. Y.
Bird study skins (40)	Alan Devoe Bird Club, Chatham, N. Y.
Snakes (3)	University of Arizona, Tucson, Ariz.
Bird study skins	The St. Lawrence University, Canton, N. Y.

Museum Exhibits

Planning and Design

Through assistance provided by the NDEA (Title III), the program was expedited through acquisition of the services of two planners, David Roberts and Kenneth Hasson.

The more important accomplishments were the completion and installation of brachiopod and coelenterate exhibits for Paleontology Hall and construction of three temporary exhibits in Orientation Hall. Several other exhibits were begun, and that fact, plus the addition to the staff of two planners, promises that a larger number of exhibits will be completed in the coming year than were finished in 1960-61.

Planning for the future included the addition to the prospectus for Paleontology Hall of an evolution exhibit, a protochordate exhibit, and a fossil skeleton for the center of the hall, as well as some modifications of projected displays which should increase the beauty and educational value of the series.

Preparation

The removal of the preparation laboratory from its old quarters to the ninth floor of the new wing was the most notable event covered by this



The Museum technician uses the paint-spray booth in the new preparation laboratory to color a plastic leaf for an exhibit.

report. Because of the quantity, complexity, and varied nature of supplies, equipment, storage material, and work in progress, much time was required merely to prepare for the transfer. Reorganization following the move was a long-drawn-out process, due to the fact that many installations were not as specified or were incomplete. At the year's end, nearly 11 months after moving, there were still incomplete items of importance which kept a good part of the laboratory in a state of temporary disorganization.

In addition to the two permanent preparators, five other workers were employed for varying lengths of time. Two of these assistants were Antioch College students, whose services were obtained for approximately 3 months each through co-operative arrangements with the college placement service.

The State relief map of New York State was completely washed and more than 2 weeks were required to make repairs and refinish it. Extensive repairs were made on the Gilboa Forest exhibit. Leakage in the waterfall was corrected; the pool was repaired and refinished; and overhead lighting arrangements were reconstructed and amplified with noticeable improvement to the display. (Due to the deterioration of basic structures in the pool and rockwork, as well as in background and accessories, an increasing amount of repair work is becoming necessary. It will undoubtedly be essential, when time and personnel are available, to reconstruct this exhibit completely or in large part.) Lighting fixtures in the white-tailed deer group were replaced and the light wells were cleaned in this exhibit as well as the black bear group. Models of five marine animals—three dolphins, a leatherback turtle, and a shark, all suspended from the ceiling in Biology Hall—were washed and refinished. A mounted bison head and two pairs of locked elk antlers were cleaned and restored before being mounted on new panels to eliminate the awkward iron supports formerly used to suspend them. All frog and turtle specimens on exhibit were renovated and provided with new bases. Poor specimens were replaced by new ones wherever necessary. The fossil glass sponge slab in the Hall of Ancient Life was damaged and required restoration. All six of the Iroquois groups were cleaned and a number of repairs were made. The four Indian burials in the same hall were also extensively repaired and renovated.

The Clark Reservation relief model was cleaned, repaired, and much of the surface was refinished. The model of a salt mine, also in Geology Hall, was provided with new elevator cages and cables.

One of the major projects of the exhibits preparation staff was the construction of a new Naples Tree. The old restoration, made almost half a century ago, was dismantled and a new trunk was constructed somewhat

larger in diameter than its predecessor. This was necessary because of the aluminum pipe required to house the fluorescent lighting fixture, which will illuminate the fossil itself when the reconstruction is in place. Wood and iron branches were replaced with light conduit piping and artificial foliage was attached to them. When the detailed modeling of the trunk is completed, the tree will be assembled in the foyer in front of the fossil which has been erected against a pillar at the entrance to Geology Hall.

A major renovation project was carried out in the Iroquois bark house. Considerable time was devoted to cleaning, repairing, and restoring the extremely fragile sheets of elm bark covering roof, walls, and sleeping platforms, and a number of artificial bark slabs were made to fill gaps. Fresh basswood bark was collected and used to replace all old bindings inside and outside the structure. Platforms were reinforced and repaired. The floor area under the platforms was resurfaced with cement and colored to match the central floor. Nine beavers, a raccoon, a wildcat, and seven black bearskins were prepared for furnishing the house. Four replicas of bird traps and three of gourd dippers were also made, as were several pumpkins and tumplines with burden carriers. Objects from the collections, as well as much advice, were contributed by the curator of archeology. Artificial ears of corn were cast and mounted on the natural braided husks; a turkey wing was mounted for "use" as a brush. Finally, a full-size replica of a deerskin was made on which the exhibit label was lettered.

Eight new exhibits in paleontology and geology and their status at the close of the year were as follows:

- Sedimentary rocks—about half completed
- Coelenterates—completed and installed
- Brachiopods—completed and installed
- Bryozoans—plasteline model completed
- Cephalopods—completed and ready for installation
- Permian desert—specimens prepared
- Armored fish—nearly complete
- Geology of New York State—nearly complete

Numerous shorter jobs were performed. It was necessary to recast in more suitable material a number of paleontological models which had been made on contract. Specimens of beach pea and black cherry were reproduced for inclusion in the Indian foods exhibit. A mold was made of wall ornamentation in Biology Hall and over 80 feet of castings were produced for the renovation of the entrance corridors. Skulls of a leopard, an African buffalo, and two lions, as well as two giraffe neck vertebrae, were cleaned for future exhibit material. Casts of a fossil beaver skull and mandibles were made and packed for shipment to Germany. A femur,



Exhibits are carefully designed to be both attractive and educational. Here, in the new laboratory, an explanation of the "Uses of Fossils" is being prepared for Paleontology Hall.

several vertebrae, and rib fragments of a mammoth found near Kitchewan were prepared for a temporary exhibit in Orientation Hall. Plans for constructing and venting a fumigation chamber in the herbarium area were drawn up.

The chief preparator gave talks and demonstrations on the preparation of museum specimens to several groups; these included students from the State University College of Education at Oneonta, the State University College of Education at Albany, and the Elsmere Grade School.

Renovation

To replace the old picket fence, a "stockade" was built around the Indian bark house. A new lighting scheme was devised and installed to give the effect of light filtering through the smoke hole in the roof and to illuminate the front of the house. The stockade effect was extended around the alcove by the use of light and shadow projected on the wall. A major label was painted on a simulated deerhide and a title in imitation bark was placed on the stockade. In Biology Hall, new lighting was installed in the mammal cases. Preliminary plans were drawn for the renovation of the snake, salamander, and turtle exhibits. Over 200 labels and over 100 plastic egg mountings were completed for the synoptic series of birds. New labels and frames were made for the salt mine exhibit in Geology Hall and colors were selected for the renovation of mineral cases by the Museum guards.

New Projects

The brachiopod exhibit, planned last year, was completed and installed and the explanation of coelenterates was practically finished. The Devonian ("armored fish") diorama was designed, a scale model was made, construction plans were drawn, and a case was built. The Permian exhibit and its case were designed, and a painting for the background was executed by Matthew Kalmenoff of the American Museum of Natural History. Specimens for the Permian case were acquired from the American Museum and the Harvard Museum of Comparative Zoology.

Designs and a model were made for the *Bryozoa* exhibit. A model was made for the sedimentary rocks exhibit and its case was designed, built, and textured. Preliminary plans and designs were made for the "uses of fossils" and Protistid exhibits; labels were written and specimens were chosen for both. Labels were prepared and silk-screened onto the temporary façade for the Carboniferous coal swamp and Silurian dioramas. Preliminary sketches and planning were completed for the evolution exhibit which will be built at the entrance to Paleontology Hall. The base structure and lighting for the Naples Tree exhibit were designed.

A scale model was made for the projected exhibit on bird illustration in science and planning of the display was in process at the close of the year. Construction drawings for the cases were completed. Research for the history of man exhibit was mostly completed and a "family tree" was prepared as a composite of recent thinking on the subject. Casts to be used in the display were chosen.

The Little Theater in Orientation Hall was built and a unit was constructed to hold the projector in proper alignment with the screen. Slides for a "museum-at-work" show were chosen and titles were designed and photographed in color, but actual operation of the theater was deferred past the end of the year due to lack of wiring.

A photographic display, "Anatomy of Nature," was designed and installed, including labels and a poster. Two science award displays were arranged, labelled, and opened to the public—one on snowflakes by student Richard Woods, Scotia, and the other on mathematical probability by student Wesley Hallock, Valhalla. A temporary exhibit was designed and executed for the mammoth bones discovered near Ossining.

Complete arrangements, layout, and construction details were planned with the photographer and material was ordered for the new darkroom. One hundred and twenty Fuertes bird paintings, removed from the walls of the rotunda, were photographed. Other jobs for various offices of the State Museum and Science Service included mounting photographs and maps and making posters, charts, drawings, and a pamphlet cover design. Additions to the equipment of the Museum included design and construction of radiator covers, design of benches for the exhibit halls, and design and drawings for carts for moving specimens and other materials between halls, ranges, and offices.

The exhibits designer spent 2 days studying exhibition techniques at the American Museum of Natural History and the Guggenheim Museum in New York City. He and his assistant attended a 3-day Tecnifax seminar in Springfield, Mass., on visual communications. The exhibits planner spent 2 days at the Harvard Museum of Comparative Zoology gathering information for the history of man exhibit, Permian diorama, and surveying sources of specimens for the projected vertebrate evolution exhibit.

The Public

After dropping 17 per cent from the figure for the previous year, attendance in 1960-61 jumped 50 per cent above that for 1959-60. Sample counts of visitors were made on 84 of the 324 days that the exhibit halls were open. Estimated attendance during 250 workdays, based on the sample of 52 counting days, was 175,250. Estimated visitation on 52 Saturdays, computed on a 10-day sample, was 32,000. Actual attendance

on 8 holidays was 6,144 and that of the 14 Sundays between Memorial Day and Labor Day when the Museum was open was 6,057. Total estimated attendance for the year was 220,000, as compared with 145,000 in 1959-60, and 175,000 in 1958-59.

The highest daily count was made on Wednesday, August 24, 1960, when 1,475 visitors were tallied; the next largest, 1,381 visitors, was attained on Washington's birthday, 1961. The poorest record was made Saturday, December 17, 1960, when attendance was only 350. The daily average for the entire year of 324 open days was 654. The comparable figure for the previous year was 466.

The Department nurse was called to attend a total of 21 visitors who required some medical assistance. Twenty of these cases were school children who were ill or had fainted, mostly in the hall of Indian groups where ventilation is still poor. The one serious occurrence was on August 9, 1960, when an elderly woman visitor suffered a heart attack in Orientation Hall. After emergency treatment by the nurse, the visitor was moved in a wheel chair to a relative's automobile.

The Museum guards have continued to carry out their duties faithfully and efficiently and have performed numerous helpful services beyond the strict confines of their job descriptions. It was still necessary to cover cases in Geology and Paleontology Halls with large sheets of plastic during heavy rainstorms. Also, the ceilings of the Indian groups were covered with large sheets of plastic in order to protect these dioramas from more extensive damage.

The total volume of sales at the sales desk increased somewhat, as compared with business of the previous year. The guards continued to operate this desirable service although, unfortunately, it sometimes requires the presence of two or more persons at the desk when the exhibit halls are crowded with visiting school classes. The assistance of a saleswoman-receptionist would be helpful.

"CHANCE" MORE THAN A GAME

Mathematical
Xyloxyu
Probability

ST. MARY'S

Life Insurance



genetics



Law of Heredity
Homozygous

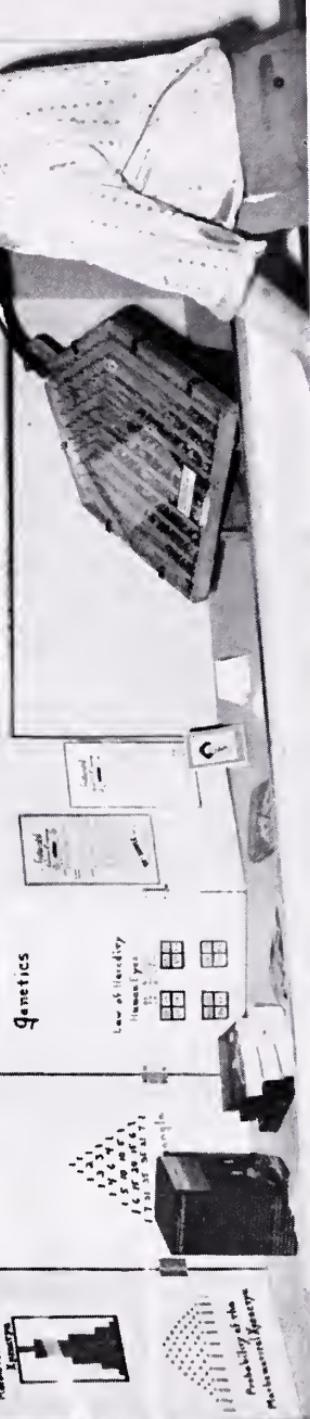


HONORS

Wesley Hallock

...for superior work
in the field of
MATHEMATICAL PROBABILITY

The Education Department of New York State



A young visitor examines Wesley Hallock's science fair exhibit on "Mathematical Probability."

Special Services

Museum Interpretation—Education Program

THE POSITION OF ASSOCIATE CURATOR (interpretation), established some time ago, was filled early in the year by the appointment of James W. Manley. His main assignment was to develop programs to enhance the effectiveness of the Museum's contacts with the schools and the public.

In October a request was submitted for a Federal grant of \$32,500 to enable the staff to prepare publications, conduct in-service training for teachers, and to develop exhibits designed to strengthen instruction in science as called for by the provisions of Title III, NDEA. Expenditures totalling \$32,025 had been approved by the end of the fiscal year.

The program honoring winners of regional science congresses was continued, and forms and procedures were developed to facilitate supervision of the program. Wesley Hallock, 14, of Valhalla High School, exhibited his project on mathematical probability starting in March. Another outstanding project which was recognized by the Museum was a demonstration on making snow crystals by Richard Woods of Scotia.

New services to teachers were described in a small exhibit which was displayed in Rochester at the winter meeting of the Science Teachers Association of New York State.

A Clearing House of Research in Education (CHORE) was established during the year by the New York State Educational Research Association. The curator agreed to serve as a registrar and maintain files on current research in Museum education.

Late in 1960 a committee was appointed by the Commissioner to develop a state-wide plan to improve and expand museum services to education. The curator, as staff secretary, worked to support the efforts of the committee. The curator also took on the job of collecting information about museums to be included in a new Department handbook of educational resources. Assisted by Mrs. James Davis, a temporary appointee, he prepared a questionnaire for use in securing the necessary data from museums and related institutions in the State.

During the year, at the request of the personnel office, the curator conducted brief monthly orientation sessions on the Museum and Science Service for new employees of the Department. He also arranged a 2-hour training session for new building guards and elevator operators.

In June the curator attended a 1-week Management Training Institute at Boulder, Colorado. Sponsored by the American Society for Public Administration, the institute provided a wealth of information on practices and trends in public administration. It also re-enforced the conviction that the museum profession can profit by adopting modern methods of organization and management and that education can profit by placing greater emphasis on training personnel to take advantage of automation.

Since the position of associate curator (interpretation) was new—and one which transcended earlier organizational patterns—it provided an excellent opportunity to consider an “ideal” interpretative program for a museum which is an integral part of a State education department.

Instruction for Visiting Groups

Total group attendance was 30,838, an all-time high (1,165 more than in 1958-59). Of the 25,463 children visiting in school groups, 71 per cent were given instruction. Of those receiving instruction, 64 per cent of the teachers and pupils came for a specific lesson; 22 per cent came for a lesson covering two topics; 14 per cent came for a general tour. Data for 846 groups show that 70 per cent came from a 50-mile radius of Albany; 26 per cent from a distance of 50 to 150 miles; 2 per cent from over 150 miles; 2 per cent from outside the State.

Tours continued to be adapted by the instructors to the requirements of the individual class. However, more emphasis was put on the structured lesson-tour designed to introduce, clarify, or survey a topic for the benefit of the teacher as well as the students. The tours improved in quality; tours averaged 15 minutes longer and demonstration material was used more frequently. The staff had more background and spent more of their total working time in instruction. Curators and scientists were consulted by the instructors when necessary to insure accuracy of the information presented to school classes.

Tour facilities were improved by the addition of an attractive classroom for demonstrations. The classroom also provides space for live animals and demonstration materials. The newly furnished Iroquois bark house was opened for Indian tours. Classes and teachers have responded most enthusiastically to both these innovations.

Space, especially classroom space, is limited to the extent that the staff is unable to schedule a classroom demonstration for every tour group. School visits to the Museum are limited to certain hours because of bus schedules. Therefore, our facilities are crowded during the optimum 4 hours in the middle of the day and largely unutilized during the remainder. As a result, the teaching load per staff member has been heavy;

research, publications, and testing have suffered. Due to this overload, it was necessary to refuse 43 requests for tours during May and June.

With regret, nonschool tours were discouraged by the staff in order to allot more time to school tours. As a result, tours for nonschool groups dropped by 25 per cent. A request by the Girl Scouts Council of Albany to develop classes for their troops was necessarily refused.

In-Service Training

Under the impetus of limited space and Federal support, more emphasis was placed on teacher training. The In-Service Training Program is designed to supply teachers with information and techniques to teach certain science topics. Resource material is sent to the teacher and teaching techniques are demonstrated to her during an extended lesson tour at the museum. In April, a qualified instructor was added to the staff (under NDEA funds) to develop an in-service training course in conservation of natural resources. The supervisor is developing a similar course in rocks and minerals. As a result of an announcement in the *Bulletin to the Schools*, seven teachers registered for the program.

Three highly successful teacher workshops were held in co-operation with the Capital Area School Development Association: Care of Animals in the Classroom (attendance 23), and Paleontology-Fossil Life in New York (attendance 47—two sessions). Participants were provided with reference materials and bibliographies.

Related Activities

CONFERENCES AND MEETINGS

The Museum education supervisor visited the following museums to study their educational programs: Boston Children's Museum, Philadelphia Academy of Science, Exhibits Museum at Ann Arbor, Mich., and Museum of the City of New York. She attended a 1-week seminar on Iroquois culture at Cooperstown. The Museum education supervisor and the Museum instructor visited the American Museum of Natural History and the Museum of the American Indian to study exhibits, loan service, and programs for visiting school groups.

The supervisor and NDEA instructor attended several meetings on teaching machines.

PUBLICATIONS

The educational leaflet *Rocks and Minerals of New York State*, prepared by the curator of geology, was reprinted in book form and 2,500



A geologist demonstrates equipment to Wesley Hallock, a science fair winner, during a tour of the new laboratories

copies were distributed. The curator of geology and the Museum education supervisor collaborated on a descriptive label to accompany rock samples sent in response to requests. "Science Reference for Teachers," a list and order form for educational leaflets, was prepared and mailed to elementary school principals of the State. The resulting orders were handled by the Museum education supervisor and the Museum instructors. Approximately 11,400 leaflets were distributed and 15,000 were reprinted.

Articles and announcements appeared in the *Bulletin to the Schools* to stress the museum lesson, to publicize rock and mineral loan sets, and to announce the In-Service Training Program. The seasonal letter to the legislature advertising tour service for groups was distributed.

The Museum instructor spent approximately one third of her time preparing an educational leaflet on the mammoths and mastodons of New York, to be published next year.

LENDING

The Museum education office took over from the curators the school loan collections and expanded the service; 14 sets of fossils, 6 sets of Indian artifacts, and 100 rock and mineral sets were loaned to teachers and librarians. Available statistics for the last, the only one advertised, show that each set was used by an average of 173 students. One set of large rocks and mineral specimens was prepared for loan to a new school museum. It is estimated that the Museum education supervisor spent about 1 hour a day on the preparation and handling of lending materials. Fiberboard mailing cases will facilitate mailing and checking in the future. Nevertheless, student and/or secretarial help is needed to check and process the material once the sets are designed and created.

MUSEUM SALES DESK

Total sales increased more than 10 per cent over those of the previous year—from \$3,258.25 in 1959-60 to \$3,740.86 in 1960-61. With ample funds available for carrying on the operation, the loan made by the Board of Regents 2 years ago to start the project was repaid. Less popular items were dropped and were replaced by materials which, it is hoped, will be more widely useful.

The sales list of items sold at the information desk:

- 631 Mineral kits
- 395 Gem stones
- 1,851 Books and pamphlets
- 4,014 Dinosaur models
- 132 Cards and note paper
- 765 Kits of fossils, brontosaurus, mastodons, beadcraft, card games
- 15 Bird records
- 39 Hummingbird feeders

Museum Library

Because new space assigned to the library functions in the annex was considerably smaller than the quarters which had been occupied in the main building, many periodic files and nonscientific and/or outdated books were transferred to the gifts and exchange section of the State Library. Pertinent periodical files were turned over to the Biological and Geological Survey offices. Also the Clarke and Goldring collections and the USGS map folios and atlases were transferred to the Geological Survey. All publications of the United States and Canadian Geological Surveys and State Geological Surveys were placed in dead storage. Files of publications (since 1950) of adjacent State surveys were kept available in the Museum library. Sectional steel bookcases were collected to hold the remainder of the Museum library in the new quarters. Considerable elimination and rearranging were necessary to fit the holdings into the reduced facilities.

The usual routines and services of the Museum library continued and are summarized as follows:

Accessions	3,357
Transfers to State Library, Gifts and Exchange..	3,458
New books received (gifts)	6
New books received (purchases).....	57
New periodical subscriptions	2
Recommendations of staff (for purchase by State Library) searched by Museum librarian	300 (approx.)
Interlibrary loans	50
New exchanges initiated	6
Honoraria reports received	6
Mailing list additions	26

Innumerable changes were made on the periodical routing lists from the Museum and State Libraries. All Museum library items out on loan to nonstaff members were recalled and a policy was adopted stringently curtailing such loans. Binding was negotiated for approximately 132 items. Damaged Museum bulletins in staff offices were replaced with useable copies.

Reference work increased considerably during the year due to preparation of the new State Geological Map, research papers in progress by staff members, and the numerical increase in the staff of the Museum and Science Service. A research paper on the Rossie ironworks was prepared for the Canadian Department of National Defence. The bibliography of references in geology was kept current and a bibliography of Museum publications in limnology was prepared for Clifford O. Berg, New York State College of Agriculture at Cornell University.

Correspondence with other museums, libraries, scientific organizations, etc., increased considerably. The Museum librarian was responsible for mailing the 1959-60 Annual Report to 180 individuals and institutions.

During a personal trip to Europe, the Museum librarian visited prominent museums on an official assignment to study their organization and to locate manuscript material for research being conducted by the Assistant Commissioner.

Photography

A total of 116 requests for services were processed during the year. This work resulted in 423 black and white photographs made, 1,067 negatives processed from field photographs, and 1,811 prints and enlargements made from the preceding. In addition, 294 projection slides were prepared, 353 color photographs were taken, and 44 special enlargements were made.

The work included both field and office assignments and was distributed throughout the various sections of the organization as follows: (1) Archeology—lantern slides from negatives loaned by Rochester Museum of Arts and Sciences; archeological field collections and borrowed material were photographed; color photographs of the Morgan Collection were made at the request of the University of Michigan Press to illustrate a new volume. Prints were made from X-ray negatives for the Iroquois wampum belt project. (2) Biological Survey—photographs of pollen-collecting devices at Brookhaven National Laboratory; botanical specimens photographed to illustrate an article; photographs of devices used to test the effectiveness of insecticides on punkies; drawings of taxonomic details of punkies reproduced and photographs made to illustrate articles on eastern encephalitis; pictures of black fly, beech scale, and white pine weevil; reproductions of maps prepared for *Handbook of North American Birds*, and field photographs processed for survey of small mammals. (3) Geological Survey—maps and charts of gas well locations and underground gas storage areas reproduced; slides made for lecture on “Fossils of Uncertain Biologic Affinities”; photographs taken of recently discovered mammoth bones from Westchester County; type specimens photographed in lieu of loaning specimens. (4) Exhibits Section—photographs of renovations to rotunda corridor and of new exhibits.

Color photographs were made of several paintings donated to the Museum. Illustrations were prepared for Graduate Student Honorarium announcements. A State Science Fair award winner was photographed with his exhibit.

Requests for photographic services by the Department included: oath-of-office ceremonies for members of the Board of Regents; presentation of

portrait of ex-Chancellor Brosnan to Board of Regents; publicity photographs for public relations unit of Commissioner's office; personnel retirements and merit award ceremonies.

Moving of the Science Service staff to new quarters in the annex made available two rooms adjoining the present darkroom. These rooms are being converted to a camera room or studio and a second darkroom. This will make it possible for the scientific staff and exhibits personnel to proceed with photographic processes related to their activities.

Publications

During the year, four Museum bulletins (including an annual report) were printed. They totaled 309 pages of text and 61 plates and maps. One item of 13 text pages and 2 maps was reproduced by multilith. Members of the staff published 18 articles, papers, and notes in "outside" journals, bulletins, books, and encyclopedias. Their writings, when printed, totaled approximately 230 pages.

At the close of the year, three manuscripts were in press although only one had made progress through the publisher.

Publications

STATE MUSEUM AND SCIENCE SERVICE

- 1961 122d Annual Report of the New York State Museum and Science Service, July 1, 1959 - June 30, 1960. N. Y. State Mus. & Sci. Serv. Bull. No. 385, 68pp. 9 pl.

Borst, R. L.

- 1960 Rocks and minerals of New York State. Educational Leaflet Series No. 10. 16pp. 2 maps

Connor, P. F.

- 1960 The small mammals of Otsego and Schoharie Counties, New York. N. Y. State Mus. & Sci. Serv. Bull. No. 382, 84pp. 15 fig.

Ritchie, W. A.

- 1961 A typology and nomenclature for New York projectile points. N. Y. State Mus. & Sci. Serv. Bull. No. 384, 119pp. 36 pl.

Schumacher, G. J., Smith, S. J. & Stewart, M. M.

- 1961 Biology of the Allegany Indian reservation and vicinity. N. Y. State Mus. & Sci. Serv. Bull. No. 383, 98pp. 4 tab. 1 fig.

IN "OUTSIDE" MEDIA

Brodo, I. M.

- 1961 A study of lichen ecology in central Long Island, New York. Am. Midl. Nat. v. 65, pp. 290-310

Cahalane, V. H.

- 1960 Deer, the antlered tribe, and the American cats. Wild Animals of North America, pp. 54-93 and 202-217. Natl. Geographic Society, Washington, D. C.

Collins, D. L.

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& Raynor, G. S.

- 1960 Field evaluation of ragweed pollen samplers. Jour. of Allergy, v. 31, pp. 307-316

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- 1960 Mushrooms—to eat or not to eat. The Conservationist, v. 15, (August-September), pp. 22-26. New York State Conservation Department

Appendix A

1961 Graduate Student Honoraria Recipients

ANTHROPOLOGY

KARAS, FAITH E.—The University of Buffalo Iroquois material culture of Buffalo Creek Reservation, 1780-1840.....	\$ 360
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ENTOMOLOGY

CARTER, GEORGE F.—New York State College of Forestry at Syracuse University Use of insecticides to control pests and protect fauna from injury.....	600
HARD, JOHN S.—New York State College of Forestry at Syracuse University Biology and ecology of the pine bark weevil, <i>Pissodes approximatus</i>	600

GEOLOGY

BURTNER, ROGER L.—Harvard University Regional study of rocks and sedimentary structures of Catskill "delta" of southeastern and south central New York.....	540
CONNALLY, G. GORDON—Michigan State University Field data for reconnaissance map of the glacial drift of western Finger Lakes region.....	600
DAVIS, BRIAN T. C.—Princeton University Mapping St. Regis 15' quadrangle.....	720
HILLS, ALLAN—Yale University Detailed study of Precambrian rocks of Glens Falls quadrangle.....	720
NEWMAN, WALTER S.—New York University Pleistocene history of Long Island.....	480
SHAW, FREDERICK C.—Harvard University Reinvestigation of Chazy trilobites.....	360
	\$4,980

Appendix B

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

American Anthropological Association, Minneapolis, Minn.—Ritchie*

American Association for Advancement of Science, annual meeting, New York City—Stone

American Association of Museums, annual meeting, Detroit, Mich.—Fenton

American Association of Physical Anthropologists, Columbus, Ohio—Gillette

American Committee for International Wildlife Protection, New York City—Cahalane

American Folklore Society, annual meeting, Philadelphia, Pa.—Fenton*

* Read formal paper.

- American Geological Institute, Syracuse University—Isachsen
American Institute of Mining Engineers, St. Louis, Mo.—Broughton
American Mosquito Control Association, Los Angeles, Calif.—Collins
American Society for Public Administration, Management Training Institute,
Boulder, Colo.—Manley
American Society of Mammalogists, Urbana, Ill.—Connor
Association of Directors of Science Museums, Cranbrook Institute, Bloomfield
Hills, Mich.—Fenton
Atmospheric Science Research Center, Albany, N. Y.—Cahalane, Fenton
Botanical Society of America and American Society of Plant Taxonomists, Stan-
ford University, Palo Alto, Calif.—Ogden*
- Charles Horton Peck Mycological Forays (Paul Smiths and Quaker Bridge, N. Y.)
—Smith
- Commissioner's Committee on Museum Resources (Albany and Blue Mountain
Lake)—Cahalane, Fenton, Manley
- Commissioner's Staff Conference, Diamond Point, N. Y.—Fenton
- Conservation Education Association Conference, Oneonta, N. Y.—Cahalane,
Drumm, Manley, Stone
- Convocation of Fellows, the Rochester Museum of Arts and Sciences, Rochester—
Fenton
- Eastern States Archeological Federation, Toronto, Ontario, Can.—Gillette
- Encephalitis Conference, New York State Department of Health, New York City—
Collins, Connor
- Entomological Society of America, Eastern Branch, annual meeting, New York
City—Collins, Connola
- Entomological Society of America, annual meeting, Atlantic City, N. J.—Collins,
Jamnback, Wilcox
- Forest Insect Conference, New York State College of Forestry at Syracuse Uni-
versity, N. Y.—Collins
- Gypsy Moth Research Conference, Forest Insect Laboratory, U. S. Forest Service,
New Haven, Conn.—Collins, Connola
- Insecticide Conference, Agricultural Experiment Station, Geneva, N. Y.—Collins
- Interdepartmental Committee on Pesticides, Albany, N. Y.—Collins
- International Congress of Entomology (11th), Vienna, Austria—Collins*
- Interstate Commission on Lake Champlain Basin, annual meeting, Stowe, Vt.—
Broughton
- Iroquois Research Conference (13th), Yale University, New Haven, Conn.—
Fenton*
- Lake Superior Institute of Geology, annual meeting, Fort William, Ontario, Can.—
Davis
- National Association of Geology Teachers, Hamilton, N. Y.—Broughton, Isachsen
- National Science Foundation, Washington, D. C.—Isachsen
- New England Intercollegiate Field Conference, Rumford, Me.—Isachsen
- New Jersey Mosquito Extermination Association, Atlantic City, N. J.—Jamnback*
- New York State Archeological Association, Van Epps-Hartley Chapter (Fonda
and Schenectady, N. Y.)—Gillette
- New York State Archeological Association, annual meeting, Cooperstown, N. Y.—
Fenton, Funk, Gillette, Ritchie
- New York State Association of Museums Council, Buffalo, N. Y.—Fenton

* Read formal paper.

New York State Department of Agriculture and Markets, Bureau of Plant Industry, Geneva, N. Y.—Collins
New York State Department of Conservation, Bureau of Forest Pest Control, Saratoga Springs, N. Y.—Collins, Connola*
New York State Convocation on Educational Research, Albany, N. Y.—Manley, Stone
New York State Geological Association Meeting, Rensselaer Polytechnic Institute, Troy, N. Y.—Borst, Broughton, Davis, Drumm, Fisher, Manley, Rickard, Stauch, Stone
New York State Science Teachers Association (Science Congress Committee), Rochester, N. Y.—Manley
Northeastern Anthropological Conference, The University of Buffalo, Buffalo—Fenton, Gillette
Northeastern Forest Pest Council and Shade Tree Conference, Boston, Mass.—Collins, Connola*
Northeastern Mosquito Control Association, Waltham, Mass.—Jamnback*
Outdoor Educational Leadership Conference, New Jersey State School of Conservation, Stokes State Forest, Branchville, N. J.—Manley, Stone
Paleontological Research Institute, Ithaca, N. Y.—Fisher, Rickard
Pennsylvania Geological Field Conference, Lancaster, Pa.—Isachsen
Queen's University Biological Station, Blackfly Symposium, Chaffey's Lock, Ontario, Can.—Jamnback
Society for American Archaeology, Columbus, Ohio—Funk, Ritchie*
State Interagency Committee on Recreation Conference (9th)—Cahalane
New York State College of Forestry, at Syracuse University, Conservation Problems and Research in New York—Cahalane, Collins
State University of New York, Agricultural Experiment Station, Geneva, Advisory Council—Fenton
Syracuse University, Syracuse, Biology Seminar—Ogden
Tecnifax Corporation, Holyoke, Mass., Nineteenth Seminar—Workshop in Visual Communication—Cahalane, Manley, Rothman, Weyhe
Tree Wardens, Arborists and Utilities Conference, University of Massachusetts, Amherst, Mass.—Connola*
Wildlife Conference, Suffolk County Mosquito Commission Headquarters, Yaphank, N. Y.—Collins

Appendix C

Co-operative Work (Service) : Talks given by the staff of State Museum and Science Service to various groups:

Adirondack Mountain Club, Albany Chapter—Cahalane, Reilly, Stone
Alan Devoe Bird Club, Chatham—Smith
Albany Academy for Girls—Reilly
Albany Toreh Club—Ritchie
Altamont Elementary School—Reilly
American Association of Geology Teachers—Broughton, Fisher, Isachsen
Athens Garden Club—Reilly

* Read formal paper.

Bernard's Bay Lions Club—Jamnback
Blue Mountain Lake Association—Jannback
Boy Scout groups—Reilly
Burroughs Nature Study Club—Cahalane
Cobleskill Institute—Rickard
College of Saint Rose—Wilcox
Colonie High School Commencement Address—Fenton
Columbia County 4-H Club—Reilly
Columbia High School Science Fair, Judge—Reilly
Delmar Rotary Club—Cahalane
Durham Center Museum, Charter Presentation—Cahalane, Fenton
D.A.R., Fort Crailo, Rensselaer—Fenton
Eastern New York Science Fair, Judge—Reilly
East Greenbush Garden Club—Reilly
Extension Service Garden Club—Reilly
Girl Scouts, Brownie Scout Troop #90—Gillette
Gloversville Kiwanis Club—Collins
Joint Legislative Committee on Interstate Cooperation—Broughton, Kreidler
Lake Dunmore Association—Jamnback
New York State Archeological Association, Cooperstown—Ritchie
New York State Archeological Association, Morgan Chapter, Rochester—Ritchie
New York State Department of Health—Collins
New York State Teachers Association, South Nassau Zone, Earth Science Section
—Isachsen
Niskayuna Kiwanis Club—Collins
Northern Appalachian Basin Geological Society—Van Tyne
Oneida Town Board—Collins
Pennsylvania Oil Producers Association, Bradford District—Van Tyne
Potsdam State College—Ritchie
Poughkeepsie High School—Isachsen
Roberson Center Museum—Ritchie
Sanitarians Meeting, Mineola—Collins, Jamnback
St. Agnes School—Ritchie
The University of Rochester—Fisher
Wenner-Gren Foundation Award Dinner, New York City—Fenton
WROW Television—Cahalane

Appendix D: Co-Operating Agencies

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

Adirondack Museum
Albany Medical Center Hospital
Allen-Steinheim Museum, Alfred University
American Association of Museums
Brown University
Buffalo Society of Natural Sciences
Canadian Department of Agriculture, Forest Biology Laboratory
Capital Area School Development Association
Chicago Natural History Museum
Conservation Forum
Dartmouth College
Denver Museum of Natural History
Dudley Observatory
Durham Nature Center
Executive Department, Division of State Police, Bureau of Criminal Investigation
Fordham University
Hamilton College
Harvard University: Gray Herbarium, Museum of Comparative Zoology, and Peabody Museum
Illinois State Geological Survey
Joint Legislative Committee on Interstate Cooperation
Massachusetts Institute of Technology
McGill University
Memorial Hospital
Milwaukee Public Museum
National Audubon Society
Nature Conservancy
New York Botanical Garden
New York State Archeological Association
New York State Association of Museums
New York State Council on the Arts
New York State Department of Agriculture and Markets
New York State Department of Commerce
New York State Department of Conservation
New York State Department of Health
New York State Department of Social Welfare
New York State Department of State
New York State Department of Labor
New York State Department of Public Service
New York State Department of Public Works
New York State Executive Department
New York State Farm Bureau Association
New York State Teachers Association
Oklahoma Geological Survey
Paleontological Research Institution
Rensselaer Polytechnic Institute
Rice University
Royal Ontario Museum
Schenectady Museum
Science Teachers Association of New York State
State University of New York, College of Agriculture at Cornell University

State University College of Education at Albany
State University College of Education at Cortland
State University College of Forestry at Syracuse University
State University of New York, Duek Disease Research Laboratory, Eastport
Suffolk County Mosquito Control Commission
Syracuse University
United States Department of Agriculture
United States Department of Health, Education and Welfare
United States Geological Survey
United States National Museum
The University of Buffalo
University of Leeds, Leeds, England
University of Massachusetts
University of Michigan
University of North Carolina
University of Oklahoma
University of Toronto, Ontario, Can.
Yale University
Whiteface Mountain Authority

Appendix E: Professional Affiliations

Adirondack Mountain Club, Albany Chapter, vice-chairman; Committee on Clean Trailsides and Roadsides, chairman—Cahalane
American Committee for International Wildlife Protection, vice-chairman—Cahalane (re-elected)
American Folklore Society, president—Fenton
American Institute of Mining Engineers, member of Board of Directors—Broughton
American Mosquito Control Association, editor—Collins
American Ornithologists' Union, editor of *Handbook of North American Birds*—Palmer
Capital District Geologists, program chairman—Isachsen
Conservation Assembly of Berkshires, 2d vice-president—Reilly
Defenders of Wildlife, vice-president—Cahalane (re-elected)
Eastern New York Botanical Club, vice-president and program chairman—Smith
Educational Research Association of New York State, registrar—Manley
Entomological Society of America, Eastern Branch, program chairman—Collins
Northeastern Forest Pest Council—Collins, vice-chairman; Connola
Northeastern Forest Tree Improvement Committee, member for New York State—Collins
Paleontological Research Institution, trustee—Fisher
Round Table of Naturalists and Scientists, member of Board of Directors—Reilly
Sigma Xi, president, Albany Club—Fisher
Society of American Foresters, New York Section, member of Committee on Forest Insects and Diseases—Connola

New York Botanical Garden Library



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