

New York State Museum Bulletin

Published by The University of the State of New York

No. 284

ALBANY, N. Y.

December 1929

NEW YORK STATE MUSEUM

CHARLES C. ADAMS, *Director*

TWENTY-THIRD REPORT OF THE DIRECTOR OF THE DIVISION OF SCIENCE AND THE STATE MUSEUM

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ALBANY

THE UNIVERSITY OF THE STATE OF NEW YORK

1929

THE UNIVERSITY OF THE STATE OF NEW YORK

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*New York State Education Department
The State Museum, March 13, 1929*

*The Honorable Frank P. Graves
President of the University and
Commissioner of Education*

SIR: I beg to submit herewith the report of the Director of the State Museum for the period from July 1, 1927, to June 30, 1928.

Very respectfully

CHARLES C. ADAMS

Director

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THE LEGAL STATUS OF THE NEW YORK STATE MUSEUM

All scientific specimens and collections, works of art, objects of historic interest and similar property appropriate to a general museum, if owned by the State and not placed in other custody by a specific law, shall constitute the State Museum. [*Education Laws*, § 54.]

The Librarian of any library owned by the State, or the officer in charge of any state department, bureau, board, commission or other office may, with the approval of the Regents, transfer to the permanent custody of the State Library or Museum any books, papers, maps, manuscripts, specimens or other articles which, because of being duplicates or for other reasons, will in his judgment be more useful to the state in the State Library or Museum than if retained in his keeping. [*Education Law*, § III5.]

THE FUNCTIONS OF THE STATE MUSEUM

"The Museum is the natural scientific center of the State government; it is the natural depository of all the material brought together by the state surveys; it is the natural custodian of all purely scientific state records; it is the natural center of the study of the resources of the State as a political unit; it must maintain its capacity for productiveness in pure scientific research—pure science has been the justification of the State Museum from the beginning of its history. * * * In brief, the distinctive sphere and scope of the State Museum corresponds with the scientific interests and welfare of the people within the geographic boundaries of the State.

"The truest measure of civilization and of intelligence in the government of a state is the support of its institutions of science, for the science of our time in its truest sense is not the opinions or prejudices, the strength or weakness of its votaries, it is the sum of our knowledge of nature with its infinite applications to State welfare, to State progress and to the distribution of human happiness."—*Henry Fairfield Osborn, an address delivered at the dedication of the New York State Education Building, October 15, 1912.*

THE FUNCTIONS OF A MUSEUM

"A museum is an institution for the preservation of those objects which best illustrate the phenomena of nature and the works of man, and the utilization of these for the increase of knowledge and for the culture and enlightenment of the people.

"In addition to local accessories, the opportunity for exploration and field work are equally essential, not only because of considerations connected with the efficiency of the staff * * * but in behalf of the general welfare of the institution. Other things being equal, exploration can be carried on more advantageously by the museum than by any other institution of learning, and there is no other field or research which it can pursue to better advantage.

"To aid the occasional inquirer, be he a laboring man, schoolboy, journalist, public speaker, or savant, to obtain, without cost, exact information upon any subject related to the specialties of the institution; serving thus as a 'bureau of information.'

"A museum to be useful and reputable must be constantly engaged in aggressive work either in education or investigation, or in both.

"A museum which is not aggressive in policy and constantly improving can not retain in its service a competent staff and will surely fall into decay.

"A finished museum is a dead museum, and a dead museum is a useless museum."—*G. Brown Goode, formerly assistant secretary, Smithsonian Institution.*

Museum Committee of the Board of Regents

Wm Leland Thompson, *Chairman*
William P. Baker
William Bondy

State Museum Staff

Charles C. Adams Ph.D., D.Sc.....*Director of the Museum*
Rudolf Ruedemann Ph.D.....*State Paleontologist*
David H. Newland B.A.....*State Geologist*
Robert D. Glasgow Ph.D.....*State Entomologist*
Chris A. Hartnagel M.A.....*Assistant State Geologist*
Homer D. House Ph.D.....*State Botanist*
Sherman C. Bishop Ph.D.....*Zoologist*
Jacob Van Deloo.....*Secretary of the Museum*
Noah T. Clarke.....*Archeologist*
Winifred Goldring M.A.....*Associate Paleontologist*
Kenyon F. Chamberlain.....*Technical Assistant*
Edwin J. Stein.....*Technical Assistant*
Walter J. Schoonmaker.....*Technical Assistant*
Arthur Paladin.....*Technical Assistant*
William L. Lassiter.....*Technical Assistant*
Clinton F. Kilfoyle.....*Technical Assistant*

Honorary Curators

William L. Bryant.....*Honorary Curator of Fossil Fishes*
Benjamin W. Arnold.....*Honorary Curator of Ornithology*
Harry S. Peck.....*Honorary Curator of Minerals*

Temporary Scientific Appointments

R. J. Colony M.A.....*Assistant Geologist*
Nelson C. Dale Ph.D.....*Assistant Geologist*
A. F. Buddington Ph.D.....*Assistant Geologist*
Allen C. Tester Ph.D.....*Assistant Geologist*
L. W. Ploger M.S.....*Assistant Geologist*
Aretas A. Saunders Ph.B.....*Assistant Zoologist*
F. W. Emerson Ph.D.....*Assistant Botanist*



Figure 1 New York State Education Building
On the upper floors is the home of the New York State Museum

NEW YORK
BOTANICAL
GARDEN

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CHARLES C. ADAMS, *Director*

TWENTY-THIRD REPORT OF THE DIRECTOR OF SCIENCE AND THE STATE MUSEUM

FOREWORD

The State Museum is a fact-finding and educational organization devoted primarily to the study of the natural resources of the State in relation to man. As a result of its 90 years of accumulated records, field and laboratory studies and publications, it has become the leading state bureau of information on those resources falling within its field. The work of the Museum is therefore statewide. Its surveys and investigations cover the geological, natural history and the biological resources of the State, and its collections include as well valuable historical materials. It is important to emphasize these aspects of its work, because visitors to the museum exhibits and casual observers are liable to think that its exhibits are the most important part of the Museum, rather than its staff, its statewide researches, its publications and its reference or study collections.

This report covers the fiscal year from July 1, 1927, to June 30, 1928. It follows the policy inaugurated in the preceding report of restricting its field to administrative matters and to the discussion of broad Museum and scientific policies.

A BRIEF OF THE YEAR'S WORK

The outstanding activities of the geological staff, during the past year, were surveys of the geological and mineralogical resources of the Hammond, Oswegatchie, Schunemunk and Randolph quadrangles, and of the Capital District area, including the four quadrangles of Albany, Troy, Cohoes and Schenectady. Special and important reports have been prepared on sands and gravels of the State in relation to highways and to construction, and on the gypsum

FEB 15 1930

industry of the State, whose annual output is valued at over \$16,000,000, has been studied carefully and a comprehensive report has been prepared on it. A report was also printed on the salt deposits of the State. These studies indicate the character of certain economic problems receiving attention. D. H. Newland has returned to the staff after several years' absence.

Botanical studies have been continued in the vicinity of Newcomb, in the Tug hill and Oneida lake regions, and on the plant ecology of the Allegany State Park. Plans for a popular account of the fleshy fungi of the State were started through the cooperation of the following persons: Dr Howard Kelley of Johns Hopkins University, Dr C. H. Kauffman of the University of Michigan Herbarium, and Charles M. Winchester sr, of Albany, N. Y., and by their presentation to the Museum of a handbook prepared by L. C. C. Krieger. Valuable additions have been made to the herbarium, and special progress has been made in mounting the accumulated mass of plant materials.

After 32 years of efficient service to the State, Dr E. P. Felt, State Entomologist, retired March 1, 1928, and has taken up private work. His successor is Dr Robert D. Glasgow, who came from the University of Illinois, where he has long been engaged in entomological work.

The zoological activities have been devoted largely to progress on certain reports on spiders, reptiles and amphibians. A preliminary study was made of the habits of the common skunk, an animal of great importance from the standpoint of agriculture and the fur industry.

The archeological, and particularly the historical collections, have received special attention. The work on the former has been devoted to continuing the cataloging and arrangement of the study series. The historical collections have been increased by large and valuable materials from the old Shaker settlement, which Albany county acquired. Important additions to the Admiral C. D. Sigsbee and Admiral W. P. Potter Spanish War collections have been received. Several temporary exhibits have been made of these and other materials, supplemented also by loans. These exhibits included one of Revolutionary antiques, Spanish War objects, also the Admirals Sigsbee and Potter materials; and later certain objects from the Shaker collection. These exhibits have aroused much interest and appreciation on the part of the public. To commemorate the 30th

anniversary of the sinking of the "Maine," on February 15, 1928, a special exhibit was made.

Cooperative activities with other state departments have been carried on with the Attorney General's Office, Conservation Department, Department of Agriculture and Markets, and also with the Buffalo Society of Natural Sciences and the University of Buffalo, as well as with federal bureaus and other institutions.

The museum has continued to furnish about \$200,000 worth of educational recreation to the people of the State and their numerous summer guests, totaling about 200,000 visitors.

COOPERATION WITH STATE AND OTHER ORGANIZATIONS

The varied accomplishments of the staff and the long accumulated files, records and collections of the Museum place it in a position to cooperate with many agencies devoted to these resources, involving industrial, economic and educational activities, and with the federal officials, including the following:

- 1 United States Bureau of Mines and the Bureau of Census, Washington, D. C. On the annual census of mineral statistics.
- 2 New York State Department of Agriculture and Markets. Cooperative experiments on the control of the corn borer.
- 3 New York State College of Agriculture, Cornell University. With Professor C. R. Crosby, on the study of spiders.
- 4 New York State Department of Conservation. The Director is a member of State Council of Parks.
- 5 State Department of Law, Office of the Attorney General. Cooperation with Office of Land Titles on the purchase of mineral lands in the Adirondack and on other legal problems.
- 6 Buffalo Society of Natural Sciences, Buffalo, N. Y. Cooperation on the conduct of the Allegany School of Natural History in the Allegany State Park.
- 7 Board of Water Supply, City of New York. Cooperation on the installation of the field exhibit of the Gilboa Fossil trees.
- 8 University of Buffalo, Buffalo, N. Y. The Allegany School of Natural History is affiliated with the University of Buffalo.
- 9 Colgate University, Department of Geology and Geography, Hamilton, N. Y. Cooperation on a geological survey of the Hamilton Quadrangle.

- 10 Capital District Sesquicentennial Exhibit. Special Museum exhibit prepared on Revolutionary War, in cooperation with the Office of the State Historian, The Albany Public Library and the Albany Institute of History and Art.
- 11 Cooperation within the Education Department: State Library, exchanges of Museum publications; Archives and History Division; Department Editor, on the publication of Bird and Arbor Day numbers of the Bulletin to the Schools.
- 12 Doctor Reudemann has cooperated with more than 30 geologists in the preparation of a two-volume Geology of North America.
- 13 Dana Natural History Society. Cooperation on a lecture on birds to Albany school children, on Bird Day.
- 14 American Society of Mammalogists. The Director was a member of two committees, one on wild life sanctuaries and the other on the study of life histories of mammals.

ALLEGANY SCHOOL OF NATURAL HISTORY

(Figs. 2, 3, 4)

The first session of the school began on July 5 and closed August 31, 1927. In the conduct of this school, the Museum cooperated with the Buffalo Society of Natural Sciences and the Allegany State Park Commission. The Park Commission has provided a group of excellent school buildings and student cabins for this school. The object of the school was to give a kind of outdoor instruction not possible in regular urban colleges. This was the first school of this particular kind in the State and it supplements, in an important manner, the customary laboratory work of other schools and colleges. The State Museum was responsible for the educational policies of the school. The supervision of the camp and the provision for lodging, board etc., for the school were in charge of the Buffalo Society of Natural Sciences. Chauncey J. Hamlin, president of this society and a commissioner of the Allegany State Park, was the active champion of this school. Dr R. E. Coker of the University of North Carolina was its director. The session was very successful. Published accounts, in addition to the printed Announcement, on the work of the school are the following:

- Coker, R. E.** 1928. Studying Nature Out-of-Doors. School and Society, 27:598-601
- Coker, R. E.** 1928a. An Outdoor School of Natural History. The North Carolina Teacher, 4:381-82
- Alexander, W. P.** 1928. Nature Study in the Allegany School of Natural History. Hobbies, 9:3-12

The school has served as a field base for several members of the Museum Staff, who have been conducting geological and natural history surveys of the park region. As a result of this cooperation the following *Handbooks* have been published by the Museum:

- No. 1 Lobeck, A. K.** 1927. A Popular Guide to the Geology and Physiography of Allegany State Park. 288p.
No. 2 House, H. D. & Alexander, W. P. 1927. Flora of the Allegany State Park Region. 225p.
No. 3 Bishop, S. C. 1927. The Amphibians and Reptiles of Allegany State Park. 141p.

During the summer of 1927 Professor Allen C. Tester began a geological survey of the Randolph quadrangle, which includes an important part of the park. It is an extension of the studies of the physical features of the region begun by Professor A. K. Lobeck.

Aretas A. Saunders prepared a report on Bird Song, and Norman Taylor, curator of plants, Brooklyn Botanic Garden, began an ecological survey of the vegetation of the park region and has prepared a Handbook on The Vegetation of the Allegany State Park.

RELATION OF THE MUSEUM TO SCHOOLS AND COLLEGES

The careful records of the custodian or guide show that about 200 groups or classes of students and pupils visited the Museum during the year. Unfavorable weather during May and June reduced the number somewhat below that normal for that season. The following counties were represented: Albany, Rensselaer, Columbia, Greene, Saratoga, Montgomery, Washington, Schenectady, Herkimer, Sullivan, Oneida, Dutchess and Essex. The classes from the cities averaged about 40 pupils, and from the rural sections about 20. College and school attendance reached about 5500 students.

Frequent requests come to the Museum for the loan of specimens for school use, as well as for printed matter. Requests are also made by school officials, libraries, history and art organizations for advice and help in the care of their collections or for school museums. Unfortunately with our present limited funds and staff there is very little that can be done to aid.

The relation of the Museum to the school system is not limited to the visitors to the exhibits, because in addition there is the extensive distribution of the colored plates of birds and wild flowers, which continues unabated. Cooperation with the Department Editor on the Bird Day and Arbor Day Bulletin to the Schools, and with the Dana Natural History Society on a public lecture on birds for

the Albany school children, are examples of some of the ramifications of assistance to the school system of the State.

MUSEUM ATTENDANCE

The location of the Museum on the top floor of the Education Building, and the absence of signs on the exterior of the building indicating that the State Museum is located in it, combine to reduce the attendance below what could be expected if it were located on the first floor. Nevertheless there is an attendance of about 200,000 each year. Even with our present attendance, and allowing two hours for the average visit, at the rate of 50 cents an hour, this represents \$200,000 worth of educational recreation furnished free to the public.

INFORMATION AND PUBLICITY

There has continued the usual amount of general correspondence and requests for information on the natural resources of the State, on plant and insect pests and on historic objects. Many visitors come in person to bring specimens and to seek information and Museum publications. Unfortunately the limited funds for traveling expenses discourage the staff from making lecture engagements. Five speakers have reported 18 lectures, however, reaching nearly 3000 persons, covering seven counties—Albany, Allegany, Fulton, Monroe, New York, Queens and Tompkins. Six lectures were given out of the State and reached nearly 1000 persons. A number of press notices were prepared on the temporary historic exhibits, the Allegany School of Natural History, on important gifts, and on the periodical cicada or "seventeen-year locust."

CONDITION OF THE EXHIBITION HALLS, EXHIBITS AND COLLECTIONS

The general condition of the exhibits and collections is fairly satisfactory considering our crowded exhibits, offices and the lack of adequate storage facilities. There are notable additions to the collections, as shown in the List of Accessions. The most important additions are as a rule those secured by the staff in the course of their work, and by donations. Only a few purchases have been made, and a few exchanges. Some of the duplicates have been presented to other educational institutions. The exhibition halls have been considerably improved.

Recent calculations indicate that the herbarium now contains about 64,000 specimens, and the insect collection is now estimated to contain about 190,000 specimens.

The lack of additional space and limited funds for new exhibits have halted that phase of development. The Museum Lecture Hall has been converted into a room for temporary historic exhibits. The importance of many recent accessions has fully warranted these temporary exhibits, to which reference is made later.

PRINTING AND PUBLICATIONS

"After all it is the written word that lives."

—*Dr W. M. Beauchamp.*

A fact-finding organization like this Museum maintains its standing in the scientific world and among scholars largely upon the quality and quantity of its research and educational publications. The statewide and worldwide demand for the publications of this Museum is based upon this reputation. A large and very influential factor in building up the State Library, and particularly the Legislative Reference Library, is the exchange of the publications of the State Museum for similar publications from other states, which conduct surveys of the natural resources, including the natural history surveys, and are concerned with the practical relation of plants and animals to our gardens, fields and forests.

In addition to the advantages just mentioned, that accrue from active publication, it is wholly impossible for a Museum to retain a really competent staff without reasonable facilities for publication.

Adequate funds for publication have been lacking for several years, so that the accumulation of manuscripts has become serious. Some of the reports have been on hand for many years. The delay in publication is an injustice to the authors and wasteful since the public does not get the full benefit of the money already spent by the State for the preparation of manuscripts.

The work of inventorying and arranging the stock of publications continues, and it will require, at the present rate of progress, a few years more to list fully and arrange these publications. There are constant requests for these volumes and many are regularly sold, the funds from which go to the State and are not available for the Museum, even for printing. A gift of \$500 toward printing has been keenly appreciated and has hastened a publication that would otherwise have been considerably delayed.

In connection with publishing there is always a considerable amount of work, revising, arranging illustrations and editing reports and other publications. The responsibility for this falls upon the secretary, working of course with the authors and others concerned. This work has been well done.

PHOTOGRAPHY AND DRAFTING

In the illustrating of scientific publications photography has to a large degree replaced drawing. Naturally, as a result of this, photographic work occupies much of the time of the photographer and draftsman. The field workers in their surveys now receive photographic equipment and supplies, and their films and negatives are sent to the Museum for development and for printing. This is materially improving the quality of the negatives and the photographs. At the same time it is greatly improving the completeness of the record accompanying them—a feature so frequently neglected.

In December 1927 a card record was started for this kind of work, and to July 1, 1928, Mr Stein had made 85 drawings, 216 negatives, 491 photographic prints, 82 enlargements of photographs, 39 lantern slides and 157 exhibition labels. This work is increasing so rapidly that additional facilities and assistance are needed for current work, and little time is available to catalog the collections.

HISTORICAL COLLECTIONS AND EXHIBITS

In the first Annual Report of the Regents in 1847 reference was made to the historical collections which began to accumulate in 1843. These collections have continued to come in, in spite of our limited quarters for their storage and exhibition, until the problem has become very serious and the safety of the collections is even threatened. In 1901 the State Fair Commission transferred to the Museum a collection abandoned by the State Agricultural Society, and these and more recent additions have built up a valuable collection illustrative of the early industries and the history of notable personages.

During the summer and fall of 1927, Mr Leo Doody, Albany county commissioner of charities, generously turned over to the Museum many objects from the reputed oldest Shaker settlement, recently acquired by Albany county for the Ann Lee Home. Mr Stein, the Museum photographer, made a photographic survey of the buildings and grounds to preserve a record of them before the county plans

for the home were carried out, involving the remodeling of some of the buildings and the demolishing of several others. The Shakers had conducted a variety of industries here, including seed and herb growing, and a canning business; and on account of their long residence at this place, their original church having been built in 1791, numerous old objects had accumulated about the farm that are today of considerable historic interest and value. The Museum collection now comprises a very large number of objects, including looms, spinning wheels, several herb presses, handmade objects of wood and metal, old glass and stoneware and a series of samples of herbs in their original packages. It is doubtful if there are many such collections in the museums of this country. Antique collectors show little interest in most of these homely objects, and yet they are of undoubted historic value.

In order to stimulate interest in the historic collections a series of temporary exhibits was conducted during the year, including loans, as well as objects belonging to the Museum. Thus in September, in cooperation with the Capital District Sesquicentennial Committee, a Revolutionary War Exhibit was displayed in the Museum Lecture Room. This included household objects, such as lanterns, candle molds, Betty lamps, coverlets and wooden moldboard plows.

The second exhibit in this series was in commemoration of the thirtieth anniversary of the sinking of the battleship "Maine," in Havana harbor, Cuba, on February 15, 1898. This displayed articles pertaining to Rear Admiral Charles Dwight Sigsbee, who commanded the "Maine" at the time of the explosion; to Rear Admiral William Parker Potter, who was a member of the court of inquiry appointed to investigate the blowing up of the battleship; and to the late President Theodore Roosevelt.

The Sigsbee material is especially interesting to the residents of the Capital district since Admiral Sigsbee was a native of Albany, having been born at 124 Spring street on January 16, 1845. The exhibit is of wider interest also because of Admiral Sigsbee's notable record in the United States Navy, and because of his scientific achievements in improving deep-sea sounding apparatus which have attracted worldwide attention. Personal and scientific articles were included in the exhibit. There were several autographed photographs of Admiral Sigsbee, a facsimile of his telegram to the Secretary of Navy announcing the explosion of the "Maine," publications written by him on deep-sea dredging, sounding apparatus invented or perfected by him, and his book on the "Maine." The deep-sea

apparatus was lent to the Museum by the United States Coast and Geodetic Survey. Most of the items in the Sigsbee collection have been given to the State Museum by Mrs Nellie G. Gunther of New York City, who is preparing a biography of Admiral Sigsbee.

The Potter collection is the property of the State Museum, having been presented by his daughter, Catherine E. B. Potter of Whitehall, N. Y. This exhibit includes a Spanish rifle, bayonet, a cartridge belt, a Spanish officer's sword, a revolver, fuses for shells, all from the battle of Santiago; also machetes, sabres, a dagger, cartridges and shrapnel, a large brass shell, a fragment of the ventilator of the flagship "New York," which was struck by a shell, some Spanish silver dollars from the wreck of the Spanish battleship "Oquendo," and some relics of the "Maine" rescued by divers. The collection also includes photographs of Admiral Potter, medals awarded to him, and his swords. There is also a beautiful loving cup presented to the admiral by the citizens of Whitehall. It was the gift of this Potter collection which led to this exhibit.

The Roosevelt collection was lent to the Museum for this exhibit through the active interest and cooperation of Kermit Roosevelt, and Librarian Robert W. G. Vail of the Roosevelt House Library and Museum in New York City. It included several photographs of Theodore Roosevelt as a rough rider, the uniform which Colonel Roosevelt wore in the battle of San Juan hill, the rifle which he used during the Cuban campaign and the bugle carried by Sergeant Fred W. Weintraube during the charge up San Juan hill.

One feature of special interest was the loan of a very fine portrait in oil of Admiral Sigsbee by a leading artist, George R. Boynton of New York City. This is a large canvas, one of the three existing portraits of the admiral made from life.

A very interesting six-foot model of the "Maine" was presented to the Museum by Philip H. and William W. Jones, whose brother, the late Harry F. Jones, constructed it at the age of 17 years. This added materially to the interest of this exhibit.

Following the Spanish War anniversary exhibit, a third temporary exhibit, largely by means of loans, was made of old glass, pewter, quilts and coverlets, including also a part of the Shaker collections. The old-fashioned quilts, patched and pieced, were made a special feature. Lighting, cooking and heating utensils were well represented. This exhibit was intended for only a few weeks' display, but public interest was so marked that the exhibit was allowed to remain open for several months.

These temporary exhibits have clearly demonstrated the active interest in historic collections and the urgent need of new exhibits in the Museum. Had we the staff and the storage facilities it would be an excellent procedure to practise a definite system of rotation of the exhibits, in order to give them a freshness that is now impossible.

These temporary exhibits called forth numerous offers of historic objects for sale, but no adequate provision has ever been made in the budget for such purchases. The Museum needs funds for that specific purpose, as well as a full-time curator to care for these collections.

SCIENTIFIC STAFF AND ITS ACTIVITIES

(Figs. 8, 9, 10)

One of the main objects of a museum organization is to provide favorable conditions and facilities to attract and hold an able, scientific and scholarly staff. The members of the scientific staff are expected not merely to keep up with the advance of science and in the allied and dependent arts, but to lead in their respective fields. This necessitates first-class men and women and they must be equipped with modern facilities. It is false economy for the State to be satisfied with anything below such a standard.

In addition to the usual office, administrative and curatorial routine, the scientific staff has in the main devoted itself to the following problems and projects:

Geology. Doctor Ruedemann has continued his lifelong studies toward a monograph of the fossil graptolites of North America, and some preliminary reports have been published. He has completed his report and the field work on three of the four quadrangles which comprise the capital district—Albany, Troy, Schenectady—and only Cohoes remains to be completed. He has also made substantial progress in assembling and editing a comprehensive four-volume treatise on the Geology of North America. More than 30 authors are contributing to the work.

Miss Goldring has continued her field studies on mapping the Berne and Albany quadrangles, has made preliminary studies of new fossil plants, and has begun a study of the stratigraphy of the Devonian, in relation to correlation problems. She has completed the manuscript of her Handbook on Paleontology for Beginners and Amateurs.

On August 1, 1927, D. H. Newland, after an absence from the staff since August 1920, returned to it and began at once a revision of a special report on gypsum deposits and the gypsum industry of the State, a subject to which he had given much careful study. On account of the extensive use of gypsum in modern construction, the use of this mineral has grown to such a magnitude that it is today the most valuable mineral product in the State; an annual value in excess of \$16,000,000. This report is the only up-to-date account of this valuable resource and industry, and is one which clearly illustrates the close relation of scientific studies and certain important industries.

Mr Newland and Mr Hartnagel, working in cooperation with the Bureau of Census and the Division of Mineral Resources of the United States Geological Survey, conduct a statistical survey of the mineral production and development for each calendar year. This work has been carried on for many years and contains facts of much value to numerous industries and to other departments of the State Government. They have also considered an urgently needed report on the underground water resources of the State. Mr Hartnagel has also devoted some time to a report on oil, with W. L. Russell, and another on gas, with Professor Henry Leighton.

Mr Newland, cooperating with the Committee on Sedimentation of the National Research Council, prepared a brief report on the Stratigraphy of the Salina Formation, which was transmitted to the committee. Mr Newland began a comprehensive economic study of the limestones of the State. The Museum has had no report on this subject since 1900, and a new survey of the entire field is now desirable. The services of a chemist are urgently needed in connection with this kind of study and for other phases of the work of the Museum.

Professor Nelson C. Dale has continued his field work on the Oswegatchie quadrangle; Professor Allen C. Tester began his study of the Randolph quadrangle; Dr A. F. Buddington continued field work on the Hammond quadrangle; Professor R. J. Colony on the Schunemunk quadrangle; Dr Burnett Smith on the Skaneateles quadrangle; and Professor L. W. Ploger has begun a study of the Cattaraugus quadrangle.

Plants. Doctor House has nearly completed his field studies of the plants of the township of Newcomb, Essex county, along the southwestern part of the Adirondacks. A preliminary draft has been made of his report. Very little study has been made of

this part of the Adirondacks. His report (with W. P. Alexander) on the flora of the Allegany State Park has been published as Museum Handbook 2. The flora of the park region had not previously been critically studied, and the Handbook has proved particularly valuable at the Allegany School of Natural History. Doctor House also made some progress on his report on the Oneida lake region. Neil Hotchkiss has continued his field studies and the revision of his report on the vegetation of the Tug hill region, west of the Adirondacks. This is probably the least studied, from the standpoint of natural history, of any large area in this State. Plans were made for a study of the plants at the eastern end of Lake Ontario jointly by Mr Hotchkiss and Doctor House.

The value of the herbarium is shown in part by the requests made for aid in the determination of the names of plants. During the past year 108 persons have received aid of this character, and 2800 specimens have been determined for these persons.

Insects. Doctor Felt learned, during his studies of the control of the gypsy moth, that the winds were a factor whose influence needed to be better understood. The influence of winds upon the dispersal of injurious insects is a subject which has received very little attention. This subject was taken up seriously by means of direct observations, made on top of the Education Building, as well as by especially devised kites, in order to learn to what height insects were carried or had flown. These studies resulted in a valuable collection, and a report is in preparation on the results of these investigations.

Corn borer investigations were carried on in cooperation with the State Department of Agriculture and Markets. This imported pest is very seriously injurious to early sweet corn and demands a careful study of control measures if the corn crop is to be intelligently protected.

Doctor Felt prepared a popular guide for the study of insects for publication as a Handbook. We have no similar popular guide, so that it is sure to be of great value to beginners and to teachers.

Doctor Felt, after 32 years in the service of the State, retired on his pension March 31, 1928. He had been State Entomologist since 1898, except during 1923-24 when he was allowed a special leave to work for the State Conservation Commission on the gypsy moth control experiments. Elsewhere reference will be made to

Doctor Felt's long and valuable service to the State and to the State Museum.

Doctor Felt's successor is Dr Robert D. Glasgow of the University of Illinois, where he had for many years been engaged in teaching and in entomological research along economic lines. Knowing the importance of the corn borer in the State, on his way East Doctor Glasgow visited all of the important federal and state centers of activity in Ohio which are actively engaged in the study of controlling the borer and began work with the latest results in mind.

In going over the insect collection it was found that, like the storage of our valuable publications and historic objects, the insect collection has, for lack of adequate funds, been housed in cases many years out of date and are exposed to serious injury by museum insect pests. This collection is an essential part of the equipment of an entomologist. It requires many years to build up such a collection and it is very unwise to neglect for a relatively small sum to protect what has already cost the State many thousands of dollars to accumulate. This collection numbers about 190,000 specimens and is of great scientific and educational value.

Animals. Doctor Bishop reports that he has completed about three-fourths of a detailed report on the status of our knowledge of the amphibians and reptiles of the State. This work has been under way for several years and will be a valuable contribution. A second important paper is nearly half done on the life histories of the salamanders of the State.

Aretas A. Saunders, working in the Allegany State Park, prepared a report on Bird Song which will be published as a Handbook. This is a comprehensive study of bird song based on many years of careful field studies.

Mr Schoonmaker has continued his field studies of the mammals of the vicinity of Albany.

Archeology. Mr Clarke has continued his work of sorting, cataloging and indexing the Indian collections. This has been urgently needed and is making the collections more available. The priceless wampum belts, the bequest of which by the estate of Mrs John Boyd Thacher was announced in the last report, have been placed on exhibition.

History. A combination of events has favored the rapid growth of the historic collections. In the past no one has been officially responsible for the care of these collections, and it is much to Mr Hartnagel's credit that he has through many years volunteered to look after this material. With the return of Mr Newland to the

geological staff it was possible to assign a part of Mr Hartnagel's time to the care of the historic collections. He has been materially aided in this by the very intelligent and enthusiastic assistance of William L. Lassiter, who devoted much attention to making the temporary exhibits successful.

RETIREMENT OF DR E. P. FELT

(Figs. 8, 9)

Dr E. P. Felt began his services as Assistant Entomologist September 14, 1896, and was promoted to Acting State Entomologist, and State Entomologist in 1898. This position he held to March 31, 1928, a period of 30 years. In 1923-24 he was allowed to leave to work for the State Conservation Department on the control of the gypsy moth.

Doctor Felt has conducted very important investigations on economic and scientific entomology, which are recognized throughout the country and abroad, and he has maintained the reputation of the office of State Entomologist as one of the most important positions of its kind in America. His investigations and publications include, in addition to the usual routine and the valuable and attractive exhibits in the Museum, prolonged studies of forest and shade tree insects, insect pests of the fields, gardens, orchards and forests, as well as those concerned with public health. He prepared 22 annual reports on the insects of the State. He is a leading authority on forest and shade tree insects and gall midges, both of which groups are of great economic importance. He built up a collection of 25,000 specimens of gall midges, making it the most valuable one in the world. For 20 years he has been the editor of one of our leading entomological magazines, the *Journal of Economic Entomology*. He was the entomological editor of the *Country Gentleman* from 1898 to 1911. For many years he has cooperated with the State Department of Conservation on the control of forest insects and on the gypsy moth, and with the State Department of Agriculture and Markets, as well as the two state agricultural experiment stations and the United States Bureau of Entomology at Washington.

By his retirement the State Museum loses an able, industrious and loyal official who departs with the best wishes of the Museum Staff.

The Regents at the meeting on April 26, 1928, voted:

That the Board of Regents accepts with regret the resignation of Dr E. P. Felt, and herewith records its appreciation of the faithful and efficient service rendered by him for more than 30 years.

HONORS TO DOCTOR RUEDEMANN

By WINIFRED GOLDRING, M.A.

Associate Paleontologist, New York State Museum

(Fig. 10)

On the evening of May 8, 1928, the staff of the New York State Museum gave a dinner in the Venetian Room of the De Witt Clinton Hotel to honor Dr Rudolf Ruedemann, State Paleontologist, for his election to the National Academy of Sciences on April 24th.

There were 30 persons present including, besides the majority of the Museum staff and their wives, Dr Frank P. Graves, Commissioner of Education, and Mrs Graves, Regent William Leland Thompson, chairman of the Museum committee of the Regents; and the Honorable Benjamin Walworth Arnold, honorary curator of birds. Mrs Ruedemann was present as guest of honor with Doctor Ruedemann.

Regent William Leland Thompson was toastmaster. He dwelt upon the high attainments of Doctor Ruedemann and the signal honor which he had brought not only to the State Museum, but also to the Education Department, and even to the city of Albany. He touched upon Doctor Ruedemann's long years of service to the State and pointed out that there was at the dinner one guest for each year of that service. He also told how the Regents were working for a State Museum building with adequate room, adequate equipment and an adequate staff, adequately recompensed.

Doctor Graves declared that we were paying tribute to Doctor Ruedemann not only for this honor that had come to him, but also for the fineness and sincerity of character of the man himself, pointing out that he had carried into his private life the unswerving honesty and high ideals manifested in his work. Doctor Graves emphasized the extreme exclusiveness of the group to which Doctor Ruedemann had been elected. His talk was concluded with a short discussion of the low salaries paid to the Museum staff and the difficulties encountered in attempts to obtain increases. Then at his proposal all the guests drank to the health and long life of Doctor and Mrs Ruedemann.

Doctor Adams, Director of the State Museum, gave the concluding address. He spoke of Doctor Ruedemann's attainments as a scientist, the high regard in which he was held by scientists both as a scientist and a man, and his long period of loyalty and devotion

to his work and thereby to the State. He mentioned that Doctor Ruedemann is of German birth and that the other leading invertebrate paleontologists in the country—Foerste, Schuchert, Ulrich—while not foreign born, bear German names. Doctor Adams emphasized the fact that only through having connection with such a research institution as the State Museum could the Education Department ever have such an honor come to it. Then he named those in Albany besides Doctor Ruedemann who have been honored with membership in the National Academy of Sciences: Dr Joseph Henry, Dr James Hall, Dr John M. Clarke and Dr Lewis Boss. Three of the five members from Albany were connected with the State Museum—Doctor Hall, Doctor Clarke and Doctor Ruedemann. Doctor Ruedemann is the only living member in Albany.

After the remarks Regent Thompson, in behalf of the staff of the State Museum, including the honorary curators, presented Doctor Ruedemann with a watch and chain as a souvenir of the occasion and the high esteem in which he is held by the staff. The watch was engraved on the inside of the back of the case: "Presented to Doctor Ruedemann by the staff of the New York State Museum in commemoration of his election to the National Academy of Sciences. May 8, 1928."

The presentation of the gift was followed by an informal reception to Doctor and Mrs Ruedemann.

The Regents at their meeting, April 26, 1928, voted:

That the Board of Regents hereby expresses its appreciation of the signal honor that has been conferred upon Doctor Ruedemann, State Paleontologist, in his election to membership in the National Academy of Sciences.

ANNUAL FINANCIAL AND STATISTICAL SUMMARY

The following financial and statistical summary has been prepared to meet our own needs and to make it available for others. The need of this is evidenced by frequent requests for this information, not only from other states but also from abroad.

The period of this report covers the fiscal year from July 1, 1927, to June 30, 1928.

THE MUSEUM BUDGET

The following budget does not include the cost of heat, light, janitor service, orderlies (watchmen), carpenters, painters and elevator men. Certain supplies also, are furnished by the Education Department, such as postage, stationery, express, freight, drayage in part, telegraph and telephone, and are therefore not included in

the budget. Gifts of funds, in addition to that derived from the state appropriation, are indicated.

The traveling expenses have been budgeted, so that each member of the scientific staff is able to plan his work to the best advantage. As rapidly as possible it is hoped to extend this system to all expenditures.

APPROPRIATIONS AND FUNDS FOR FISCAL YEAR

(July 1, 1927-June 30, 1928)

APPROPRIATIONS

Salaries:	
Administrative staff	\$9 000 00
Scientific staff	29 340 00
Scientific assistants	6 560 00
Clerical, labor etc.....	8 700 00
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Total salaries	\$53 600 00
Equipment and supplies.....	5 000 00
Temporary services (scientific).....	3 000 00
Traveling (of which not to exceed \$200 is available for out-of-State travel)	2 300 00
Printing	8 000 00
Special fund for Sunday opening.....	1 020 00
<hr/>	
Total appropriation	\$72 920 00

GIFT FUNDS

Gift for printing (not yet expended).....	\$2 000 00
Gift for printing	500 00
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Total Museum budget.....	\$75 420 00

DIRECTORY DATA

Name of Museum: New York State Museum.

Location: Albany, New York, U. S. A.

Name of Director: Charles C. Adams.

Name of Secretary: Jacob Van Deloo.

Date of founding: The Museum is the outgrowth of state surveys begun in 1835; formal organization of the Museum was in 1843.

Open to the public: Open week days from 9 a. m. to 5 p. m., and Sundays from 2 to 5 p. m. from October 4 to April 25, 1925-26: 30 days; from October 3 to April 26, 1926-27: 30 days.

Total number of hours open to the public for the year.....	2 518
Number of members on scientific staff.....	9
Number of clerical employees and others.....	13
Number of part-time employees	9
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Total staff	31

Salary schedules, 1927-28:

Director	\$6 000
Secretary	3 000
Scientific professional staff.....	\$1 620 to 4 250
Technical assistants (nonprofessional grade).....	1 380 to 2 000

Hours and vacation:

Hours of work a week.....	36¾
Vacation allowance comprises 24 working days of 6¾ hours, and all legal holidays.	

FINANCIAL STATUS OF THE STATE MUSEUM, 1912-1928

In order to orient and summarize the financial status of the Museum, a study of the finances for the period from 1912 to June 30, 1928 has been made. It was in 1912 that the Museum moved into its present quarters in the Education Building. Some of the outstanding conclusions to be drawn from the tabulation, covering a period of 16 years, are the following:

1 Total salary increases were from \$35,340 to \$49,960, an increase of \$14,620, and with almost no increase in the number of members on the staff. This is an increase of about 30 per cent, during which the cost of living has increased about 75 per cent. This is not the normal growth for a rapidly expanding and prosperous State. During this interval private universities have conducted the greatest campaign for endowments ever known in the history of education.

2 The Museum has had a printing budget since 1926 of \$8000, and prior to that there had been a great accumulation of unpublished manuscripts. The funds provided are wholly inadequate to meet the present current needs, with no provision for catching up on the earlier accumulation.

3 Equipment and supplies, traveling expenses and expert scientific service funds, were lumped from 1912 to 1916, and remained at \$10,000. The cost of all of these has increased greatly. To date the Museum has had no automobiles and yet it is expected to conduct efficiently statewide geological and natural history surveys.

4 In 1917, for equipment and supplies and traveling expenses there was allotted by the Department \$7000, and for expert scientific services there was appropriated \$3000.

5 Between 1918 and 1920 the funds allotted for equipment and supplies were \$5000 and for traveling expenses \$2000 except in 1920 when there was an increase of \$300 for traveling; by appropriation the scientific services continued at \$3000.

6 *For the 10-year period from 1918 to 1928 there has been no increase for equipment and supplies or for expert scientific services, and only \$300 for traveling expenses, which was made in 1920. Certainly this has been a stationary period.*

7 The Sunday opening guide services were contributed free by the staff to the public from 1912 to 1916, when the sum of \$2500 was appropriated. This amount remained stationary until 1926, when it was increased \$1000 and of this amount, \$1020 was allotted

by the Department to the Museum staff for their services, and the remainder was used for compensation of other Department members concerned with the Sunday opening of the Education Building.

8 For 16 years there has been no large important or steady advance or increase in the funds available for the State Museum.

To interpret these facts in terms of practical conditions, let us consult an editorial in the *New York Times* for February 8, 1928, which stated: "That present living costs are more than 50 per cent above 1913 * * * the actual cost of living in the United States to have risen 74.4 per cent above 1913, in December 1918, and 116½ in June 1920, and to have been 73.4 above the pre-war level in the middle of 1927. Now comes a confirmatory computation by the New York Federal Reserve Bank * * * thereby reaching the conclusion that the present average level of prices is 73 per cent above that of 1913."

With this emphatic decline in the purchasing power of the dollar it is strikingly evident that the Museum appropriations and allotments for salaries have been so small that there has been in reality a *very decided relative decline in terms of the cost of living*. As a result of this the staff, not the State, has continued largely to maintain the high standard in the output of the Museum. There has been an extensive accumulation of unpublished reports. The funds available for equipment and supplies, traveling and temporary expert scientific services, have not advanced (only \$300 for traveling) in 16 years beyond \$10,000. For the Sunday opening of the Museum the funds remained about stationary.

The budget of the Education Department for the present fiscal year is over \$83,000,000, and in 1912 it was over \$8,000,000. When we consider that out of the current total budget for the Department of Education, the State Museum received only about \$75,000, it is seen how very little relatively is devoted to the Museum. In New York City the city government for 1928 appropriated to the semi-public American Museum of Natural History for maintenance the sum of \$434,000. In Buffalo, the second city in size in the State, the city appropriates for the work of the Buffalo Museum of Science, also conducted by the semipublic Buffalo Society of Natural Sciences, the sum of \$149,000. Rochester allows a budget of \$66,000 for its local Municipal Museum. The richest State in the Union provides its State Museum a budget of \$75,000—and it is supposed to conduct statewide activities on that basis.

Recently Dr Herman C. Bumpus stated regarding the State Museum of New Mexico: "The State now appropriates annually \$25,000 to the maintenance and operation of the museum—a very generous amount, considering that there * * * is at present no considerable state wealth. If the State of New York, with fifty times the assessed valuation of New Mexico should be equally generous it would appropriate \$1,250,000 annually for the State Museum in Albany." The per capita cost of the State Government in New York State for 1927 was \$12.73 and for New Mexico \$12.63.

SUMMARY

Some of the outstanding conclusions shown by the preceding summary are:

1 There has been a decline in financial support of the State Museum since 1912, during a period of unprecedented growth of other public museums in the State. It has been undernourished for many years.

2 The prestige of the Museum has been maintained during this prolonged lean period largely by the exploitation of the staff, who have stayed on with the Museum in spite of the inadequate salaries. The better men of the staff correspond in ability and professionally with the professors of our larger and better universities and research institutions, and yet the disparity in the salaries is glaringly apparent.

3 A second factor that has helped to prevent the deterioration of the Museum during this lean period has been gifts of funds to the Museum for the purchase of valuable objects and for the scientific reservations.

4 That the Museum has not been a parasite on the Education Department is shown by the fact that the Museum funds have not been increased, and therefore it has not been maintained at the expense of any other phase of the work in the Education Department.

5 During the interval that the Museum funds have been relatively stationary, the funds of the Department have increased enormously, and there has been no corresponding additional support for the Museum.

NEEDS OF THE STATE MUSEUM

The preceding chapters on the past and present financial conditions of the museum and the proposed new Museum building state clearly the essentials of the situation. These facts may be summarized as follows:

1 The present budget of the Museum of about \$75,000 is on a scale no larger than almost any alert municipality, of a population

of about 200,000, might well support, and yet the State Museum is expected to conduct statewide surveys and research on the natural resources which serve as the basis for the major prosperity of the State. In the near future this budget should be increased to \$250,000. The Museum exhibits alone are furnishing free about \$200,000 worth of educational recreation, not only to the people of the State, but to thousands of their summer visitors.

In addition to this service there is the technical and expert advice furnished by personal conferences and by correspondence to other state officials, to schools and colleges and to the various industries, as well as by means of numerous publications, which reach thousands of readers.

The State has never provided automobiles for the Museum staff and yet their work is statewide. At present even second-hand automobiles in good condition would be welcome gifts to the Museum.

2 The second major need is a new Museum building, built on a scale to provide for an adequate and dignified display of the natural features of the State, its industries, its history and its development.

3 In concluding these remarks on the needs of the Museum based primarily upon legislative support, attention of the friends of the Museum is called to the fact that gifts up to 15 per cent of net income and all *bequests* to the Board of Regents of The University of the State of New York, *in trust* for the State Museum, are exempt from federal taxation, under the Federal Revenue Act of 1918.

PROPOSED NEW STATE MUSEUM BUILDING

(Figs. 11, 12)

For many years the overcrowded condition of the Education Building, which houses exclusively the Department of Education, and for which there is no provision for expansion in the new State Office Building, has emphasized the need for a new and distinct building for the State Museum. Several space-demanding obligations have been placed by the Legislature upon the Department and there has been no expansion of the present building. The State Museum, at present housed upon the upper floors of the building, has been undergoing normal growth for 16 years, so that today the exhibition space, offices, laboratories and storage rooms are so greatly overcrowded as to interfere seriously with the efficiency and safety of the Museum.

In the past several proposals have been made to solve this problem, including an addition on the northeast corner of the present

building. The latest official plan, however, was that of the Legislative Commission entitled "Report of the Commission Created Under Chapter 232 of the Laws of 1924 on a State Office Building For Albany to Governor Alfred E. Smith and to The Legislature of the State of New York, January 27, 1925." (Legislative Document No. 71, 1925.) This commission consisted of William S. Hackett, chairman, Sullivan W. Jones and James R. Watt. Since this report was printed the State has acquired and built a State Office Building on the site proposed at that time for a new State Museum building, thus leaving the only other site, the one that had been suggested for the Office Building, facing on State street and opposite the Education Building. On this site they advised: "To insure adequate light and air in such a building and to give it a set-back from the street which becomes its dignity, it should not cover more than 60 per cent of the total lot area." Accompanying their report was shown on a map the location and plan for the Capitol Park Area which provided for a Civic Center which would be a great credit to the State. The State Architect also presented a drawing depicting a building which would fit into such a distinctive center and be in keeping with the other buildings of this striking quadrangle (figure 12).

The Commission further stated: "The State Museum, now occupying space in the Education Building, is pressing increasingly for room to expand. The museum exhibits now in the Education Building can not be displayed to best advantage because of inadequate floor space. This institution is of vast and growing importance as an educational agency in the State. The State Museum can not be satisfactorily and economically accommodated in an administration or business building. Adequate provision must be made for its certain continued growth and expansion.

"The space now occupied by the State Museum in the Education Building is urgently needed by the Education Department to relieve its own overcrowding. In the Education Building, as in the Capitol, corridor space has been pressed into service as offices, and the temporary inflammable partitioning for that purpose constitutes a fire hazard which threatens the safety of specimens and collections, records, books and manuscripts of the greatest intrinsic and historic value. Their loss or damage would be irreparable."

"The Commission recommends that a new building be provided for the exclusive use of the State Museum, and that for this purpose the State of New York purchase as a site the entire frontage on Swan

Street between State Street and Washington Avenue to a depth of approximately 200 feet." [This is the site now occupied by the new Office Building.]

"With respect to the manner in which the recommended developments should be financed, in view of past experience with similar projects under the method of annual appropriations, the Commission recommends that the funds required be provided through the sale of State bonds."

MUSEUM ACCESSIONS FOR THE YEAR

Accessions are new additions to the Museum. These are classified into the following groups:

- 1 By donation; objects presented to the Museum
- 2 By exchange; for other Museum materials etc.
- 3 By purchase; payment from the Museum budget
- 4 By the staff; collected by the staff during official duties of any kind
- 5 By transfer, from other state departments or other divisions of the State Government, as provided by law.

Gifts to scientific and educational institutions are listed at the end of this section.

BY DONATION

- Albany County, through Leo Doody, commissioner of charities, Albany, N. Y.
Large collection of objects from the Church Family of Niskayuna Shakers, Albany, N. Y.
- Alexander, W. P., Buffalo Society of Natural Sciences, Buffalo, N. Y.
16 plants, Allegany State Park, N. Y.
- Beals, Mrs A. T., 2929 Broadway, New York City
4 mosses, New York
- Blackie, Rev. William R., Hillsdale, N. Y.
106 Paleolithic specimens, France
- Cleaves, Howard H., 1848 Washington av., New York City, and
Lewis, Harrison F., 34 Grosvenor av., Ottawa, Canada
46c plants, Quebec, Canada
- DeMeur, Anne, Albany, N. Y.
Starling, Albany, N. Y.
- Dobbin, Frank, Shushan, N. Y.
315 plants, Washington county
- Eaton, Professor Harry N., Syracuse, N. Y.
Peridotite dike specimens from DeWitt Reservoir, near Syracuse, N. Y.
- Ferguson, W. C., 37 Atlantic av., Hempstead, N. Y.
220 plants, Long Island
- Genung, Wilber A., Ellis Hollow, Ithaca, N. Y.
Slab of sandstone, Ellis Hollow, N. Y.
- Geoco, Joseph, Albany, N. Y.
12 volcanic rocks, Mount Etna, Sicily
Celestite from Sicily
- Green Hill Mining Company, through J. H. McLearn, Gouverneur, N. Y.
30 specimens of actinolite and titanite, Gouverneur, N. Y.
- Gunther, Mrs Nellie G., New York City
Collection of objects formerly belonging to Admiral Sigsbee

- Harper, Francis S., College Point, N. Y.
155 plants, Adirondacks and Hudson Highlands
- Hartnagel, C. A., Albany, N. Y.; Nevel, W. D., Andover, Me., and Westover, M. F., Schenectady, N. Y.
25 specimens of tourmalines and associated pegmatite minerals, Rumford, Me.
- Haynes, Caroline C., Highlands, N. J.
27 hepaticae, Little Moose Lake, N. Y.
- Haynes, Dr Myron W., Keuka Park, N. Y.
Limonite, Ironwood, Mich.
- Howe, Dr J. D., Pittsfield, Mass.
A collection of letters from Dr Charles H. Peck to Dr E. C. Howe; also letters to Dr E. C. Howe from prominent botanists of his generation
- Hubbard, Mrs Murray, Albany, N. Y.
Fossil fish, Green River shale, Wyoming
- Johnson, F. W., Buffalo, N. Y.
150 plants, Western New York
- Jones, Phillip H., and William W., Plattsburg, N. Y.
Model of the battleship "Maine," made in 1898.
- Jones, W. W., Albany, N. Y.
100 clear crystals of tremolite, Fullerville, N. Y.
- Jordan, Charles, Rensselaer, N. Y.
Collection of birds and mammals, New York
- Latham, Roy, Orient, N. Y.
68 plants, Long Island, N. Y.
- McAvoy, John, Rensselaer, N. Y.
Robin, Rensselaer, N. Y.
- McDonald, Mrs John, jr, Corinth, N. Y.
Specimen of *Sanguisorba canadensis*, Corinth, N. Y.
- Matthews, W. A., 56 Lansdale st., Rochester, N. Y.
85 plants, Western New York
- National Gypsum Company, Clarence, N. Y.
Collection of clear gypsum crystals, Clarence, N. Y.
- Nieder, B. T., Lynn, Mass.
2 fused quartz, Lynn, Mass.
8 crude quartz, Maine
- Öpika, Prof. A., Tartu (Rev), Esthonia
Etched graptolites, Kohtla, Esthonia
- Peck, Harry, Menands, N. Y.
Vesuvianite, var. Californite and chromite, Transvaal, South Africa
Vorhauserite, Franklin, N. J.
- Perkins, Dr Anne E., State Homeopathic Hospital, Helmuth, N. Y.
278 plants, Western New York
- Poe, Hannah Rankin, New York City
3 Mahikan splint baskets, Watervliet, N. Y.
- Potter, Catherine E. B., Whitehall, N. Y.
Relics of the Spanish-American War from the collection of Admiral William P. Potter
- Reid, Mrs Adelaide S., Bristol, Conn.
17 hand-carved articles made by Thomas Reid during the Civil War
- Saunders, A. A., Fairfield, Conn.
Specimen of *Doellingeria infirma*, Allegany State Park, N. Y.
- Smith, Professor E. C., Schenectady, N. Y.
Oldhamia radiata in slab of Cambrian shale, Penobscot County, Me.
- Spicer, Mrs Le Grand, Troy, N. Y.
Objects from Niskayuna Shaker Settlement, Albany, N. Y.
- Stahl, John J., Albany, N. Y.
50 specimens of copper ores, Colo.
40 pound mass of galena, Ward, Colo.
Galena with barite and threads of native silver, Ward, Colo.
- Stevens, John H., South Orange, N. J.
Specimen of *Spirifer acuminatus*, from Catskill Creek, near East Durham, N. Y.

- Tyler, Louis D., Middletown, N. Y.
16 ferns, Orange county
- Underwood, Jag G., Hartland, Vt.
Specimen of *Ophrys australis*, new to Vermont
- Van Allen, Mrs Charles H., Albany, N. Y.
Earthen jar, jug and pitcher, made about 1850
Grass hat, Alaska
Wood dipper and wood scoop, Oniskethau, N. Y.
- Van Schaik, B. L., Long Island State Park Commission
Sample of first mingling of the waters at the opening of Cape Cod Canal
- Wheeler, Frank C., Binghamton, N. Y.
Platt-Griffin loom, Binghamton, N. Y.
- Yates, Mrs George A., New Lisbon, N. Y.
81 archeological specimens, Otsego County, N. Y.
- Younghans, Rev. A. C., Albany, N. Y.
Screech owl, Albany, N. Y.

BY EXCHANGE

- Fernquist, C. O., Spokane, Wash.
15 specimens of minerals, Setters, Idaho; Spokane, Wash.
- Gray Herbarium, Harvard University, Cambridge, Mass.
139 plants, Eastern United States
- Florin, Dr Rudolf, Stockholm, Sweden
20 fossil plant remains
- Frère Marie-Victorin, University of Montreal, Montreal, Canada
78 plants, Quebec, Canada
- Hamilton College, Clinton, N. Y.
Cast of *Ammonites giganteus* and an *Ammonite* from England
Cast of mastodon skull
- Haynes, Dr Myron W., McMinnville, Oregon
17 polished and unpolished specimens of thompsonite, from shore of Lake Superior
- Syracuse University, Syracuse, N. Y.
33 Ordovician and Silurian fossils
- Weyland, Dr H., Elberfeld, Germany
3 plant remains from Honseler beds at Kisberg near Elberfeld, Germany

BY PURCHASE

- Briggs, Thomas, Arden, N. Y.
Wildcat, Arden, N. Y.
- Reinhard, E., Buffalo, N. Y.
9 fossils, near Buffalo, N. Y.

BY MUSEUM STAFF

- Adams, Charles C., Albany, N. Y.
3 worked chert fragments, Lewis, N. Y.
- Bishop, S. C., Albany, N. Y.
Collection of reptiles and amphibians, New York
- Chamberlain, K. F., Albany, N. Y.
8700 insects collected
- Clarke, Noah T., Albany, N. Y.
Colored cast of stone lamp, Fish creek, Cook inlet, Alaska
- Felt, E. P., and Chamberlain, K. F., Albany, N. Y.
4200 insects collected
- Glasgow, R. D., and Chamberlain, K. F., Albany, N. Y.
700 insects collected.
- Hartnagel, C. A., Albany, N. Y.
20 specimens Clinton oolitic hematite, from mine of Clinton Metallic Paint Company, Clinton, N. Y.
10 specimens of volcanic rock from Stark's Knob, near Schuylerville, N. Y.
6 specimens of rose quartz and feldspar from quarry Bedford Mining Company, Bedford, N. Y.

Kilfoyle, C. F., Albany, N. Y.

Hyolithellus from the Cambrian shale, Rensselaer County, N. Y.

Newland, D. H., Albany, N. Y.

2 PostCambrian peridotite dike, from Eel Weir dam near Ogdensburg, N. Y.

Series of Precambrian and Paleozoic limestone, Warwick, Goshen and Chester, N. Y.

Granite specimens, Whitelake, Forestport, N. Y.

Paladin, Arthur, Albany, N. Y.

15 skulls of mammals from various localities in New York

Schoonmaker, W. J., Albany, N. Y.

Collection of mammals, reptiles and amphibians, New York

BY TRANSFER

Office of the State Historian, through Dr A. C. Flick, Albany, N. Y.

Framed photostat letter by George Washington, dated Philadelphia, March 16, 1795

Letter from Governor Alfred E. Smith, transmitting a hand-written message from Her Majesty, Queen Marie of Roumania, to "New York, The Empire State"

2 medals commemorating the inauguration of George Clinton

Herkimer medal commemorating the Sesquicentennial Anniversary of Fort Dayton

Conservation Commission, Albany, N. Y., through Dr Emmeline Moore

Collection of fish from the Oswego river system

Soft-shelled turtle

GIFTS TO INSTITUTIONS

Bryn Mawr College, Bryn Mawr, Penn.

40 Graptolites from various localities

Cornell University, Ithaca, N. Y.

Gilboa fossil tree stump

Gerth, Dr H., Leiden, Holland

Black and white print of Gilboa group

Honness, George, New York City

Sepia print of Gilboa exhibit

Lille University, Lille, France

7 Gilboa fossils

Merriman, Thaddeus, New York City

Sepia print of Gilboa exhibit

Mount Holyoke College, Holyoke, Mass.

Sepia print of Gilboa exhibit

10 prints of Gilboa stumps, seeds etc.

University of Cincinnati, Cincinnati, Ohio

Gilboa fossil tree stump

University of Rochester, Museum of Natural History, Rochester, N. Y.

Gilboa fossil tree stump

Wellesley College, Wellesley, Mass.

Gilboa fossil tree stump

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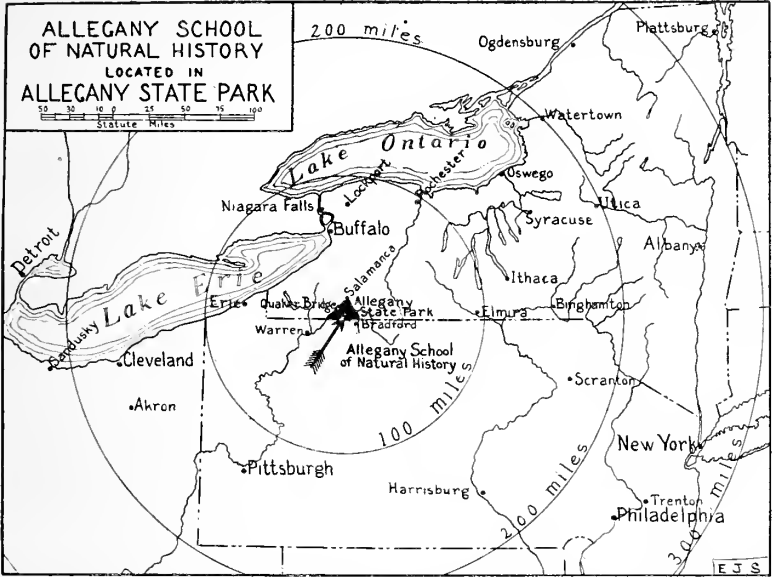


Figure 2 Map showing location of the Allegheny School of Natural History



Figure 3 Site of the Allegheny School at the shore of the lake, and hidden among the trees

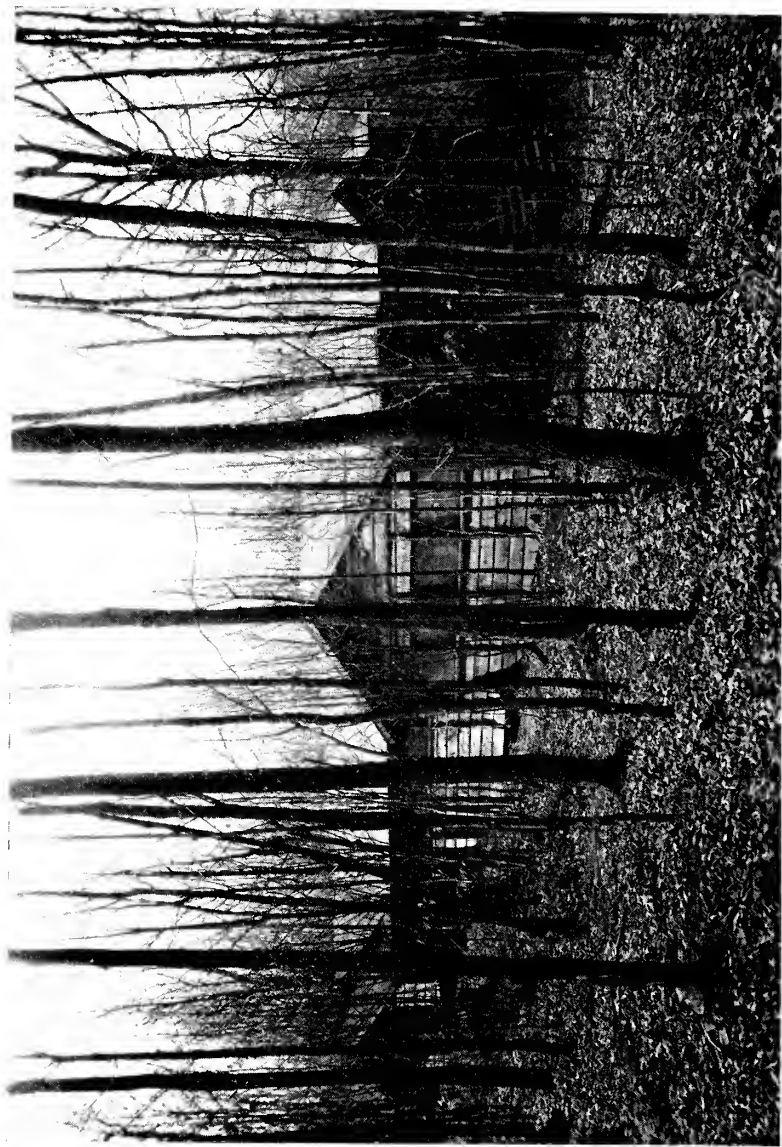


FIGURE 4 The dining hall, Allegheny School of Natural History, Allegheny State Park



FIGURE 5 One of the old dwellings at the Shaker settlement near Albany, N. Y.

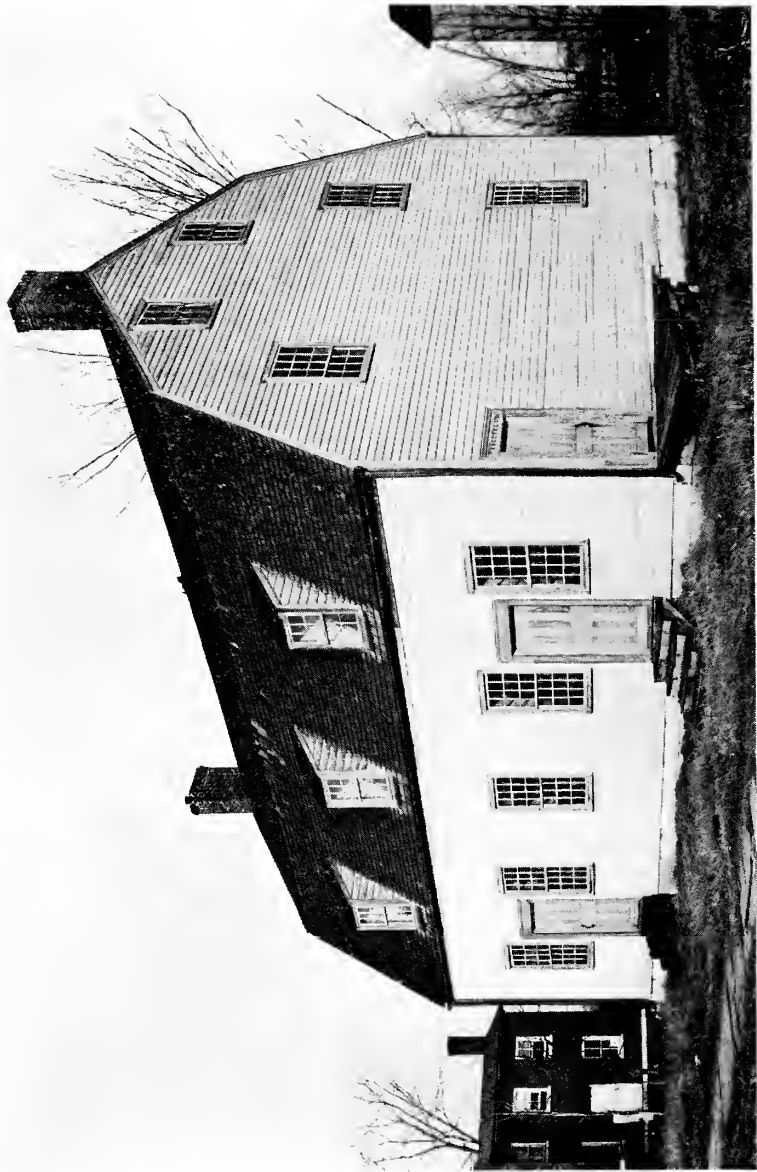


FIGURE 6: Old church at the Shaker settlement near Albany, N. Y. Built in 1791, now destroyed

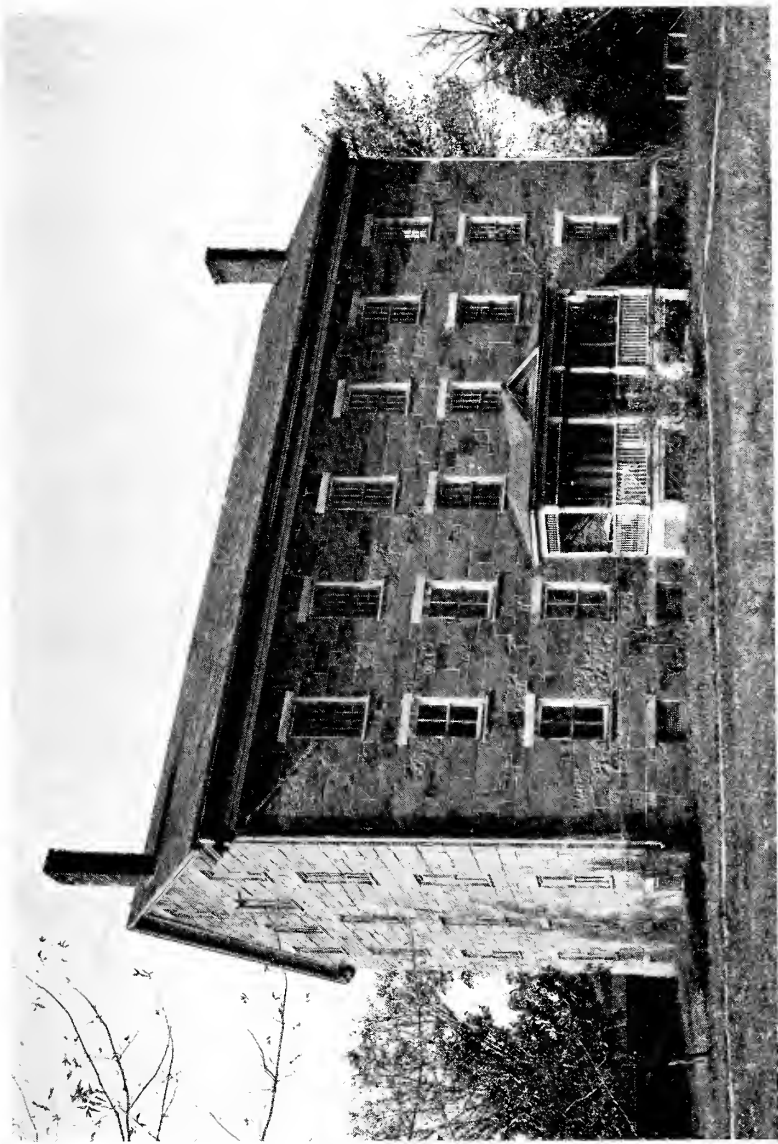


FIGURE 7 A stone house at the Shaker settlement near Albany, N. Y. Now destroyed

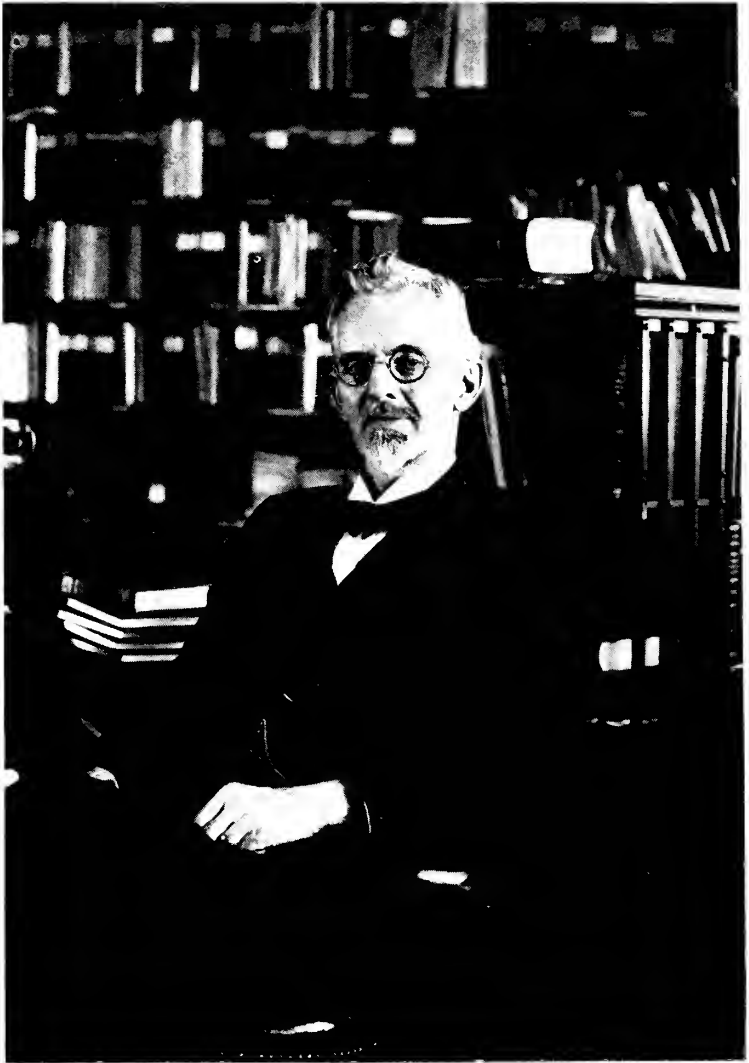


FIGURE 8 Dr Ephraim P. Felt, former
State Entomologist of the State Museum staff



FIGURE 9 The laboratory of Dr. E. P. Felt, former State Entomologist, at the New York State Museum



FIGURE 10 Dr Rudolf Ruedemann,
State Paleontologist, New York State Museum

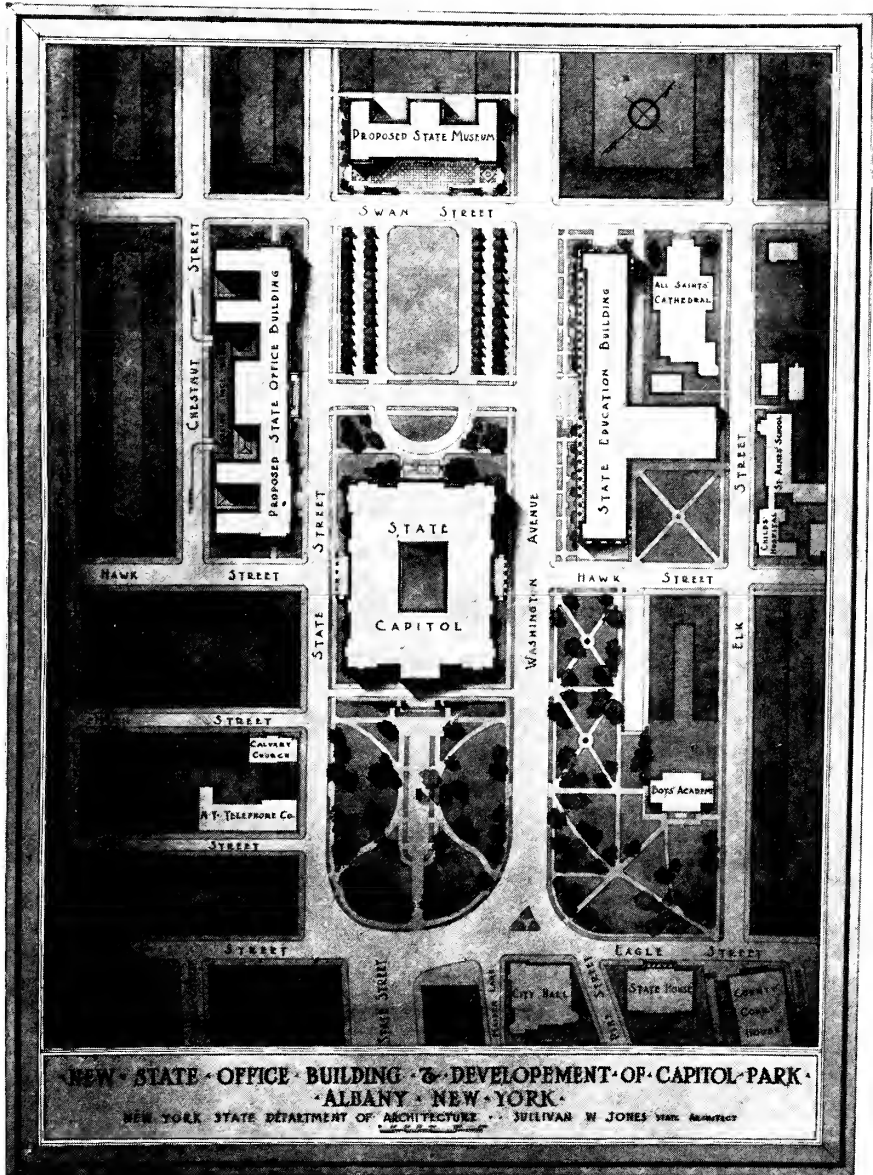


FIGURE II Development of Capitol Park, as proposed by the Legislative Commission, showing location formerly suggested for the new State Museum Building. It is now suggested that the Museum Building be placed on the site indicated for the State Office Building in the above diagram.

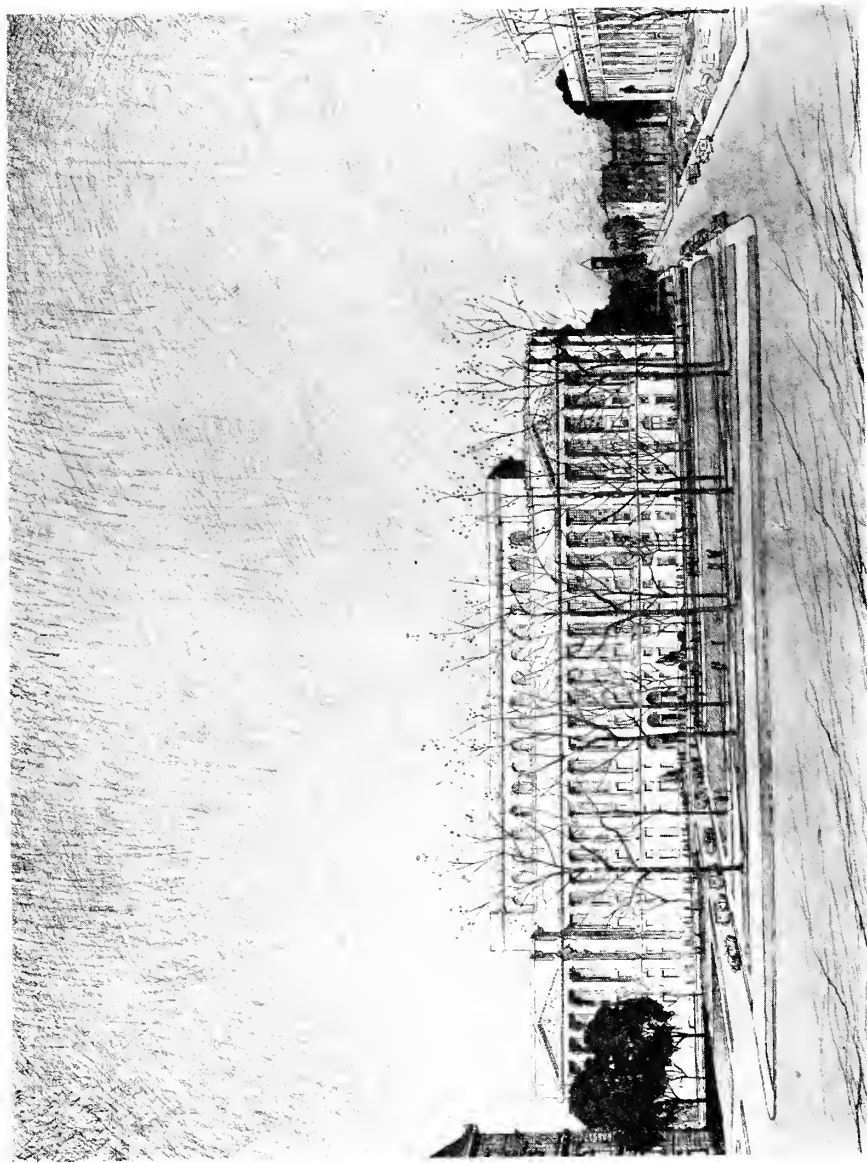


FIGURE 12 Architect's drawing of the type of building proposed by the Legislative Commission as suitable for the site of the new State Museum Building

AN OUTDOOR EXHIBIT OF THE GILBOA FOSSIL TREES

By WINIFRED GOLDRING M.A.

Associate Paleontologist, New York State Museum

The New York State Museum through the cooperation of the New York City Board of Water Supply inaugurated in the spring of 1927 a new type of exhibit for this State—a roadside exhibit of specimens of fossil tree stumps near the spot where they were taken from the rocks at Gilboa in the Catskills (Schoharie county). In particular, the Museum owes this exhibit to the interest and efforts of three engineers connected with the New York City Board of Water Supply: Thaddeus Merriman, chief engineer; George G. Honness, department engineer; and Sidney K. Clapp, assistant engineer. Mr Clapp supervised the collection of the stumps from various places, the setting up of the group and the placing of the labels provided by the State Museum. To these three men the State Museum is under obligations for favors in the past, as well as the present. Provision has also been made to have the group watched by the police on duty so that it will not come to harm through vandals or over-enthusiastic souvenir collectors.

This exhibit of the Gilboa fossil trees is situated on New York City ground in lower Gilboa near the junction of the Lower Blenheim-Gilboa road with the road from Gilboa to Grand Gorge (figure 13). Near-by is the filled-in quarry, Riverside quarry, from which the greatest number of the fossil trees were obtained and where specimens are still available. The group is just within the fence bounding the city property and can be plainly seen from passing cars. A large-lettered label placed close to the fence can be easily read from a car standing in the road (figures 14, 15). The exhibit proper occupies a space roughly 20 feet by 4 feet and the stumps are set in a cement base thick enough to be unaffected by the action of frost. The stumps have been so arranged that the undersides of the bases are visible in some cases. Around the cement base is a narrow grass plot and in back of the group is a semicircle of evergreens which with a few years' growth will form a very effective background. Between the background of evergreens and the group, is a second detailed label for the benefit of those who are more interested (figure 16). This label was made by pasting on a beaver board background the pages of a popular article on the Gilboa fossil forests that appeared

in the *Scientific Monthly*, June 1927 (Winifred Goldring: "*The Oldest Known Petrified Forests*"). This article gives many illustrations of the details of these fossil trees and in addition has a picture of the restoration of the fossil forests which may be seen in the State Museum. The label was waterproofed and framed under glass. The large-lettered label is weatherproof, since it was lettered with black oil paint on a white background covered with three coats of oil paint.

For the benefit of anyone who might some time wish to make use of such outdoor labels, it might be well to explain how the printed label was waterproofed. A thick coating of waterproof cement was spread on the part of the frame against which the glass rested and the glass was pressed firmly down onto it. Any good waterproof cement will do. The cracks between the glass and the frame were also filled with cement. Next, the edges of the label and the face for about one-quarter of an inch in from the edges were thickly coated with the cement, and the label was pressed down upon the glass and thereby sealed to it. The cracks between the label and the frame were filled in with cement and the back of the label was shellacked two or three times. Finally, the frame was backed with a board the same thickness as the frame, the back being screwed on. If this back can not be made from one piece of board, the boards composing it should be fitted together with tongue and groove. Across the top a rooflike extension about four inches wide was attached to throw the water away from the glass in times of heavy rains and thus give additional protection. In spite of all precautions the changes in weather during the first winter caused the frame to spread at the corners. To protect the label, the cracks formed were filled in with a black elastic roofing cement which blended in with the black oil paint of the frame. This roofing cement was at this time also applied as a putty where the frame met the glass to prevent the slightest possibility of a leak. Any roofing cement will serve the purpose.

This outdoor exhibit has already attracted the attention of hundreds of visitors to the region. When the new state roads are completed and the spot is more accessible, the story told by the fossil tree stumps and the accompanying labels will reach many times that number every year.

The fossil forests of Gilboa are of Upper Devonian age, which means, as we now reckon time, that these trees are about 300,000,000 years old. In those ancient times the present Catskill mountains formed the low shore-line of a shallow sea with the con-

tinental land to the east and extending far into the present area of the Atlantic. These forests grew along this low swampy shore line and were three times submerged through changes in the sea level, which gave us the three horizons of fossil stumps found today in the rocks around Gilboa. The fossil stumps were found in coarse sandstone with their bases resting in a bed of shale, black or greenish-black in color and representing the original mud in which the trees grew. The coarse sandstone indicates a rapid destruction and burial of the trees along the shore. Later the forests crept down from the higher land again to the new shore to be destroyed a second and even a third time.

These Gilboa trees in general must have resembled the tree ferns of the tropics today, and also of the ancient Carboniferous and Upper Devonian times. They do not, however, belong to this group, but were higher types—seed ferns—standing in a position between tree ferns and higher seed plants. They probably reared themselves to heights of at least 25 to 40 feet and bore at their summits crowns of fernlike leaves at least six to nine feet in length, on the tips of some of which were borne the seeds. The bases were bulbous and buried in the mud for some distance; and they were provided with a system of radiating roots. The greatest interest in these forests is that they are the oldest known to science.



FIGURE 13 The roadside State Museum exhibit of fossil trees at Gilboa, N. Y.



FIGURE 14 Roadside exhibit of fossil trees at Gilboa, N. Y., showing arrangement of descriptive placards

OLDEST KNOWN FORESTS

These fossil trees were exposed by the operations of the New York City Board of Water Supply (1920-1926). Three separate forests were uncovered. They represent the most ancient of forests and the trees are the oldest known on earth. The trees, known as *Eospermatopteris*, were tree ferns bearing seeds, a type now extinct, and they grew in the shore muds of the late Devonian sea west of the present Catskill Mountains, a few hundred million years ago.

See restoration of this fossil forest in the State Museum at Albany. Consult the other label with illustrations.

This exhibit is made by the New York State Museum through the cooperation of the New York City Board of Water Supply.

FIGURE 15 Description of the Gilboa fossil trees, from the placard in foreground of roadside exhibit



ACCESSION SYSTEM OF THE NEW YORK STATE MUSEUM

By S. C. BISHOP Ph D., *Zoologist, New York State Museum;*
Chairman, Museum Committee on Accessions

In giving consideration to methods of accessioning additions to the collections of the State Museum, the committee has kept in mind the necessity of providing, so far as possible, a simple elastic system that will furnish the office of the Director with current records of accessions and at the same time keep intact the existing catalogs of each division.

The method of accessioning additions to the collections here proposed and recommended by the committee appears to be the only one applicable to all the diverse activities of the institution. Since it is necessary to deal with a wide range of biological and historical materials, absolute uniformity in regard to details of cataloging is impracticable. It is the unanimous opinion of the committee that details of cataloging must be in large part controlled by conditions prevailing in each subdivision of the Museum. At the same time, all accessions should be recorded and the records arranged in available form. The committee seems to have provided for this function and herewith submits a report covering the details.

THE ACCESSION CARD

It is suggested that accession cards be numbered serially and issued to each division of the Museum from the office of the Director. The card provides for a record of the character of the accession, the date it was received, the source (whether by gift, collection, loan etc.), and the department in which it is housed. Under the department heading, space is provided for the insertion of the department's catalog number.

The accession card further provides, under the side heading, "Reference," for records of correspondence or notes accompanying the accession. Space is reserved for additional pertinent memoranda under the side heading, "Remarks."

Briefly summarized, the accession card as proposed furnishes a permanent record for the office of the Director and a duplicate of this for the office of the department issuing the card. When the department's catalog number is added to the accession card, any specimen under any accession may be located immediately.

Description of Card. Cards should be 4 x 12 inches marked with an impressed line to facilitate the separation into two standard 4 x 6 inch cards (see below). The cards should be so printed that when folded along the impressed line a carbon sheet may be used and a duplicate record obtained.

Accessions Card

No.....

Character

Received

From..... Address.....

Reference

Source

Gift..Purchase..Exchange..Loan..Collection..Transfer..

Division

Arch..Bot..Ent..Geol..Hist..Min..Pal..Zool..

Cat. No.....

Remarks

SUPPLEMENTARY REPORT

Supplementary reports on methods of recording specimens in each major division of the Museum are appended herewith. They are statements of the methods employed in keeping records of individual specimens. It is obvious that the proposed accession system can be used in conjunction with these existing systems.

Accessions in archeology. The plan, as set forth by the committee on the accession system, is acceptable to this division of the Museum. Under this system, the accession number, as provided by the printed card, will be recorded in the accession book of this office so as not to confuse it with the present system of serial numbering of individual specimens. In turn, the serial number of each specimen will be recorded on the accession card under the heading "Archeology," as provided for that purpose.

NOAH T. CLARKE

Archeologist

Accessions in botany. *Specimens of Ferns and Flowering Plants.* 1 Specimens from New York State, if not accompanied by individual labels are labeled to indicate where and by whom collected with date of collection and collector's field number, if any. As soon as the specimens are determined as to species, they are entered upon the distribution maps, which automatically constitute a catalog of the specimens of that species in New York State in the herbarium. The name and date upon the labels serve sufficiently to connect the specimen with the accession card.

2 Specimens from outside of New York State are similarly accessioned and then labeled if not already accompanied by labels, and as soon as determined systematically distributed into the herbarium, but not entered on the distribution record cards. The name and date on the labels serve as sufficient connection with the accession for all practical purposes.

Cryptogamic collections (mosses, lichens, fungi, algae) are to be accessioned separately, even if, as in rare cases, they accompany lots of ferns or flowering plants. As in the case of flowering plants, every specimen, if not already labeled, is labeled with full data as to locality, collector, date and collector's field number, if any, and the record of the specimen is entered upon the record card for that species as soon as the material is determined. Record cards for this group are 4x6 inch index cards bearing at the top the name of the species and other bibliographical information such as important synonymy, etc.

Cryptogamic material from outside of New York State is to be separately accessioned and labeled as above, and when determined, distributed into the herbarium, but only certain critical or otherwise important records from them are entered upon the index cards.

Type specimens. Types should undoubtedly bear a serial number connected with a card catalog of type specimens, and as large as the undertaking appears to be, will eventually be carried out in the state herbarium. In the future such cards should of course bear the accession number and all other data connected with the specimen. This, however, is merely as a matter of record connected with an object of importance and is impractical when dealing with accessions usually of more than ten thousand individual specimens of plants received in the course of each year. If and when any specimen later becomes a type it can be given a type number. Its label shows when, where and by whom collected, which is all the record required for scientific purposes.

In this connection it must be recognized that in the citing of specimens to represent distribution, to fix type descriptions, to illustrate morphological features, or other published record, the only items of interest to the scientific reader and to succeeding investigators are (1) the locality, (2) the date, (3) the collector's name and the field number, if any, and (4) the institution in which the specimen is located.

Biological material can never be arranged in a collection numerically and be accessible for systematic scientific investigation. It can be arranged systematically only by groups or geographically by regions, and the latter must be regarded, except in unusual circumstances, as merely a temporary arrangement. Hence to carry accession numbers on the individual labels of thousands of specimens constituting several lots of accessions serves no practical purpose and should not become an added burden to the routine of scientific investigation.

H. D. HOUSE

State Botanist

Accessions in entomology. Accession numbers have never been used on specimens in the collections of the department of entomology. A uniform locality label, bearing locality, date of collection, and "N. Y. S. Coll.," is placed on each specimen as received. When a specimen has been identified it is placed in the collection under the proper name label. If the identification has been made by a specialist the name of the specialist making the determination is indicated on the name label. In some cases the collector's name

is placed on the specimen, but this has not been uniformly carried out. In the office of the Entomologist there is a series of books called "A" books. Insects of special interest, such as reared specimens or specimens obtained as the result of special studies and experiments, are given a number in these books, under which notes and data of special interest are recorded. A number corresponding to the one in the book is then placed on the specimen. These "A" numbers now run from A-1 to A-3530.

K. F. CHAMBERLAIN

Assistant Entomologist

Accessions in geology and mineralogy. When a specimen is received for the geology or mineralogy collections, the necessary data are entered on an index card. Reference is also made on the card to any correspondence relating to the accession. A label for the specimen, corresponding as nearly as practicable to the one on the index card, is filed with the specimen. When a specimen is placed on exhibition this fact is noted on the index card. The accessions in general geology, economic geology and mineralogy do not bear distinctive numbers. In large special collections such as the 6 and 10 inch building cubes, a special or manuscript card catalog is used, containing numbers to correspond with the painted numbers on the specimens.

In the collections in geology and mineralogy the specimens not needed for study are placed in the drawers under the exhibition cases. Both the collections of New York State minerals and the general collection of minerals from without the State are arranged and exhibited according to Dana's system of numbering. The accessions, therefore, naturally go to their proper storage places. For storage of large specimens, special records are made as to where they may be found.

In the case of historical objects a number or tag containing a number which corresponds to the number on the descriptive catalog card is attached to each specimen. As in the case of other accessions, reference is made on the index card to correspondence.

Annually, or when called for, a list of accessions is submitted for the Director's Report.

C. A. HARTNAGEL

Assistant State Geologist

Accessions in paleontology. All specimens of fossils, whether donated, collected or obtained by exchange, receive a locality number which serves also as an accession number and is entered in the accession book. New York State material and material from

other states are marked with numbers on yellow paper. The two collections are numbered in separate series. The number is given to all the specimens that come from one formation and one locality. When there are only a few specimens from several formations in a locality, one locality number is given to the whole collection and a label giving the formation name is glued on the specimen. Under the locality number in the record book is entered full information concerning the specimen: whether obtained by collection, exchange, donation or purchase, with the name of the person or institution concerned, the formation, locality and number of specimens, and any other facts that may be of interest.

In addition to the locality number the types bear a type number printed on green paper, and the number is accompanied by a star or asterisk indicating whether or not the species was first described from our type. There is a type catalog which gives all the essential information regarding the type, including the place of publication.

It was formerly the custom to print the locality and type numbers, at intervals, in the Director's Report. This custom unfortunately was abandoned but it should be revived as it served as a permanent record which could never be lost or destroyed.

It is proposed by this division in the future to enter the locality and type numbers on the accession cards, as a cross reference, but it is not feasible to put the accession card number on the specimens in addition to those we already have.

WINIFRED GOLDRING

Associate Paleontologist

Accessions in zoology. In the division of zoology specimens as they are received, are cataloged as follows:

1 Individual specimens (or groups of specimens when of the same character and from the same source) are given a serial number in the accession book of the department.

2 In conjunction with the accession book separate card catalogs are maintained for each of the major divisions in vertebrate zoology and for the most important invertebrate groups.

3 Individual specimens (or groups of specimens when of like character and from the same source) each bear separate labels giving information that is essential, and in addition the accession number.

Following each number in the accession book is given necessary information concerning a specimen. The number assigned each specimen in the accession book is also carried by the individual cards in the catalog and by the individual specimens.

S. C. BISHOP

Zoologist

THE RELATION OF FIELD EXCURSIONS TO THE ACTIVITIES OF LOCAL MUSEUMS

By CHARLES C. ADAMS PH.D.

"Museums may serve three objects. They may be institutions designed to furnish healthy entertainment, they may be intended for instruction and they may be intended for the promotion of research."—*Franz Boas*.

"There's no music like a little river's; it plays the same tune (and that's the favorite) over and over again, and yet does not weary of it like men fiddlers. It takes the mind out of doors; and though we should be grateful for good houses, there is, after all no house like God's out-of-doors. And lastly, sir, it quiets a man like saying his prayers."—*Robert Louis Stevenson*.

"The beauty of the world has never been of great pith or moment to mankind. Its admirers are few, its destroyers are many . . . Will he never learn that happiness is not a matter of possessions, and that mental content, joy of heart, a love of loveliness, are more potent factors in human well-being than naval power or commercial gain."—*John C. Van Dyke*.

Local museums, by force of circumstances, are generally required to encourage all possible methods of arousing interest in their aims and needs. As a result of these conditions, recreation, instruction and investigation, each in turn, demands attention from the curator. Much of that which goes under the name of educational work in museums is more truly described as recreative, a fact which shows that the two phases are not always clearly distinguished, or even distinguishable. Libraries are not founded for instruction merely, but recreation as well, and a similar view is developing concerning the function of museums and their activities. The educational work of local museums usually consists of their exhibits, guidebooks and lectures, but by a large part of the public, the exhibits and lectures are treated as a means of recreation as well as of instruction. Museum lecture courses generally aim at variety rather than the continuous development of any subject. The same features characterize the occasional or annual outings or excursions which some museums conduct. These field excursions have not been, in the past, a prominent feature in the activities of museums, but as museums are becoming more intimately related to local needs, this phase seems destined to grow extensively. The writer has been particularly interested in the relation which field excursions may have to museum work, and the aim of this paper is to discuss some phases of this problem which have come up frequently in practical museum work.

As museums come to realize that they have already adapted themselves more or less consciously to the demands of the public for recreation, they will not be so likely to look disparagingly upon excursions which are conducted with recreation as an avowed purpose. Most curators have a distinct liking for and familiarity with the out-

door world, particularly the curators of natural history museums. For this reason, if they have sufficiently varied interests, they are in a position to stimulate appreciation of the natural features of their region—its scenery, its streams, its lakes, its forests etc.—not so much from the standpoint of the collector or the naturalist as from an esthetic and humanistic viewpoint. The excursionist may look upon the trip as recreation, the curator as the beginning of a training to appreciate a first-hand knowledge of nature, which even if it leads no further, justifies itself completely. If, however, other interests spring from this soil and the excursionist returns to the fields or to the museum with a new interest in the other activities of the museum, such excursions are doubly justified.

Much depends upon the spirit in which such an excursion is conducted. A visit to favorable localities is not in itself an assurance of success, for the excursionists must learn to cultivate a frame of mind favorable to the best results. The appreciation of scenery, sunsets, clouds or sounds is not an instantaneous process, but one of growth.

Most successful excursions of the general class are the "Saturday Afternoon Walking Trips" conducted by the Playground Association of Chicago. These excursions are carried on by the cooperation of members of the Geographic Society of Chicago, Illinois Chapter of the Institute of Architects, Woman's Out-Door Art League, Illinois Audubon Society, Chicago Library Club, faculties of the Northwestern University and the University of Chicago, and many other organizations. These excursions have been very successful and show clearly that there is an opportunity, largely undiscovered by museums, which shows how common ground may be found among a large variety of people whose interests at first thought suggest little in common. With the growth of our cities there should be a corresponding growth in these excursions. The aims and plans of these admirable excursions deserve to be known among curators. The following quotation is from the announcement of these walks:

In the vicinity of Chicago there are many tracts of woodland of great natural beauty which can be reached with slight expenditure of time and money. The lake shore with its ravines at the north and forest-covered sand dunes at the south, the three rivers, the wooded hills and the open country—all these offer facilities for recreation and relief from city life that, for the most part, are neglected.

It is felt that there are probably many persons who, for lack of time, or awed by the perplexity of routes offered by 29 radiating railroads, have not ventured forth to enjoy the beauties of nature that lie profusely scattered at the very gates of the city; and that a series of walks, led by guides who are familiar with the regions visited, and who have solved the riddle of the time-

tables, will at least serve the purpose of an introduction to Chicago's really beautiful environment.

To this end, you are invited to any or all of the walking trips scheduled below. The excursionists will be under no obligations to join the Playground Association. There will be no fees except those collected with the car fares on each trip.

SATURDAY, MAY 30th (MEMORIAL DAY)—ALL-DAY OUTING

The Dunes

Take special train on the Lake Shore & Michigan Southern Railroad, leaving La Salle Street Station at 9.30 a. m., Englewood at 9.45 a. m., arriving at Millers, Indiana, at 10.30 a. m. Returning, special train will leave Millers at 5 p. m., arriving at Englewood at 5.45 p. m. and La Salle Street Station at 6 p. m.

Between Millers and Lake Michigan is the best opportunity to study the sand dune that is offered near Chicago. The dunes here reach a height of 150 feet or more and are covered with a thick forest growth. The effects of their resistless movement may be observed in forests in actual process of being submerged and again in the dead stumps of trees left behind as the dune has slowly shifted forward under the influence of the wind. The "dead end" of the Grand Calumet river will be passed. Few places offer such material for the study of geography in the making.

To the botanist, this territory is of equal interest, as the flora of the East, West and South have here a common meeting ground.

Take luncheon, canteen or bottle of drinking water and tin cup.

Take waterproofs. Rubbers are not needed as the ground is sandy and rain is immediately absorbed.

A wagon will be provided to carry lunch boxes and extra clothing.

The party will walk two miles to the shore of the lake where luncheon will be eaten. The leaders of the party will build fires and prepare coffee for all. No other fires will be permitted.

After luncheon the party will break into several groups for walks of varying length, all meeting at Millers at 5 p. m.

The dunes and the dense vegetation make this country very confusing to one unfamiliar with it. To avoid becoming lost it will be well to keep in sight of the leaders and to follow their directions carefully.

Nothing but a heavy downpour on the morning of the start need deter anyone from going. A rain the night preceding would but make the sand the more compact, and walking the more easy.

If intending to take this outing, please notify by postcard Alexander M. Wilson, 51 La Salle st., Chicago.

Length of walk, 4 miles to 8 miles, as preferred. Expense \$1.

Leaders: Jens Jensen, Miss Amalie Hofer, William Hard, Graham R. Taylor, Alexander M. Wilson.

In the practical conduct of excursions so much depends upon the leaders and upon the localities visited as to deserve fuller discussion. That the leader of a party and his assistants know the region thoroughly is assumed. In the case of the recreative excursion, the more that can be made of the natural history resources and scenic effects, within reasonable bounds, the better for the interests of the museum. Sounds, as well as scenes, should be carefully considered. The sounds of galloping waves, falling waters, the winds in the trees and the songs of birds are to be carefully guarded if they are to be appreciated. Sounds, as well as scenic features, are often most advantageously considered in small parties, but with proper

foresight many distractions may be warded off, and leaders can often do much to control such circumstances. In case of large excursion parties, some executive ability is needed and this element must be given due weight in the selection of the leader or of some of his assistants.

In observational and collecting excursions, still other qualities are needed in the leader. The guides should have, in addition to a general grasp of the situation, detailed knowledge along certain lines. Several guides may be necessary if the diversity of interests and the extent of the field is large. Each line of special interest may be conducted advantageously as a separate party.

When its aim is clearly defined, the first important step for an excursion has been taken. Considerable caution should be exercised in making a selection; very often too much is attempted. In general, it seems better to attempt less and to do this satisfactorily than to undertake in a single excursion a subject which really warrants several excursions. To maintain simplicity and definiteness of aim, some tact is occasionally necessary. The easiest and shortest route may take the party past some distracting feature which will divert attention from the main aim. Such features should be anticipated and avoided as much as possible, even if the route must be changed. Explanatory excursions, taken out of their proper order, have similar unfavorable effects, as the continuity of an explanation is one of its most important features.

In recreative excursions, proximity to water, lakes, streams, sea-shore and other similar natural features, is very desirable and furnishes an opportunity to cultivate an acquaintance with the effects of moving water and other agencies, which may be made to interest large numbers of persons. The plants and animals of such situations are capable of similar interesting treatment. Where water bodies and streams are not available, forests or such topographic features as hills, mountains, cañons, glens and caves may offer other suitable localities, because of their novelty and scenic features. Historical localities may occasionally be utilized to advantage. From the museum standpoint, it is desirable to emphasize the natural features of the region, to cultivate a first-hand knowledge of them and an appreciation of their cultural value. Such excursions may also be strengthened by supplementary reading.

A second and more frequent form of excursion is the ordinary collecting excursion. This is the favorite of the amateur naturalists and from the ranks of this class of excursionists have perhaps come

the largest number of museum curators. The collecting instinct, so useful and essential in a curator, has a chance to develop under supervision on these excursions. The museum may do much for these excursionists through encouragement and guidance. It may also help some of them to carry their work to a stage beyond that of pure collecting and lead them to a practical realization of the local problems and how to investigate them.

Many collectors have developed the habit of collecting as a pastime, and although their excursions take the form of a collecting trip, yet they are primarily recreative rather than educative. Such individuals show how the different kinds of excursionists may overlap and intergrade into one another. These collecting excursions have had, and will continue to have, an important influence upon the growth of museums. These have formed the nuclei about which most of our older museums have grown up, and much of their early growth consisted in the concentration of such collections.

Well-trained collectors are an important element in the development of large and important museum collections. The training of a collector furnishes an experience so valuable in museum work as to make it almost essential to a natural history curator. So important is this factor that I note with surprise that Mrs Cornelius Stevenson makes no mention of field work in her course of training for curators. This, from my point of view, would be a very serious defect in the training of those who have to deal with natural history collections. In my own experience, I have found that volunteer collectors, largely trained through collecting and observing excursions as amateurs, may give very efficient aid to museum expeditions. As examples of the results of these methods, reference is made to the reports on two museum expeditions: "An Ecological Survey in Northern Michigan" and "An Ecological Survey of Isle Royale, Lake Superior." The museum in this way is not only serving its public and training collectors, but is also improving the quality and quantity of its own expeditions and collections.

Museums have given little attention to the production of local guide books. By the cooperation of collectors and museums, local surveys may also be made. These can serve as scientific surveys and form a basis for guidebooks for the study of the local natural history resources. Such books will do much to improve the efficiency of museum excursions as well as to help the individual excursionist. Most of the local studies which will serve as aids and guides for excursionists have been prepared by the physiographers and geog-

raphers. It is fortunate that they have blazed the trail so well, as may be seen by an examination of the references accompanying this paper. The best local guidebook with which I am acquainted, and a model one in many respects, is that edited by Grabau and Woodman on the natural history of the vicinity of Boston. There may be advantages in having more than one kind of a guidebook, so that information about different kinds of excursions can be kept distinct and yet easily accessible.

Some of the same localities can be utilized by the observational and collecting excursions as are used by the recreative ones. In such excursions the localities visited may well be taken up in some definite or systematic order, so that the observations made will have the advantage of some natural grouping of affinities, even though little more than a mention of it is made at the time. In conducting these excursions there is generally a marked tendency to cover too much ground, so that more concentrated attention upon a smaller area becomes irksome. In general, however, the better the locality, the less serious is this difficulty. The earlier excursions may well be allowed to cover more ground, and as the momentum of interest increases, the area may be limited and work made more intensive. As interest increases it will often tend to specialize upon certain subjects or upon certain groups of plants and animals. The younger members may well specialize and train their collecting instincts. For my part, it seems that only a very few need to make private collections. There is a marked tendency for excursions to become almost pure collecting trips, but I believe this tendency should be discouraged and more attention should be given to careful observation, comparison and even description of the conditions or organisms in different localities. In the recreative excursions, the taking of notes by the excursionists is generally undesirable, and in collecting excursions, it will be difficult to secure careful ones. In fact, I have found note-taking to be one of the most difficult habits to develop in excursionists. In general, excursionists do not wish to stop and think over what they have seen and then carefully record their observations and conclusions. This seems to be very generally true of collectors and yet I feel that this is not only desirable for the best collecting but is essential in the training of a field naturalist, and, I may add, of a curator of natural history. It is perhaps undesirable to emphasize this on the early excursions, and only when sufficient interest and momentum have been developed should this receive more attention.

To secure the best results from the observational excursion, the work must be individual rather than confined to the leader or a few of the more wide-awake members, while the others go along as passengers, as it were. To insure individual work, it may be necessary to break up the party into groups small enough so that each may receive some individual attention. Full equipment for collecting or study will do much to favor individual activity.

A third form of excursion I have called explanatory. This is the excursion intended primarily not to collect specimens but to collect explanations, or for the purpose of interpretation. Its relation to other excursions may in some ways be compared with the relation which ordinary synoptic exhibits bear to complex modern groups in our museums; the synthetic element is to predominate over the analytic. In a certain sense many excursions may be considered as explanatory, but the usual form of a collecting excursion certainly does not belong in this group or even those excursions which deal primarily with analytical details. The explanatory excursions which I have in mind deal with general and complex relations, treated from a synthetic standpoint. They are intended to develop general conceptions of outdoor relations. This form of excursion has been greatly neglected by a large number of our educational institutions, and particularly by museums.

In the explanatory excursions the selection of the leader, the localities and the order of their study is of the utmost importance. Generally speaking, this is the most difficult kind of excursion to conduct successfully. It is desirable that the localities visited should be taken up in such an order as to show the stages in the development of the subject which is being interpreted. Even many very elementary subjects, when presented in this way have a new interest and charm, and really never grow uninteresting; such are the active agents of nature—the rolling waves, running waters, a brook, the responses of vegetation and animals to their conditions of life. A study of such activities is best taken up in a developmental order and any departure from this is made at a serious sacrifice, even with experienced persons. The perfect continuity of the processes studied should be one of the most distinctive features of this kind of excursion.

These excursions assume more preparation on the part of the excursionist, and it will be found to be a form of mental food most easily digested by the strong. Some system of careful note-taking seems to me an essential in this work, at least for the average person.

Such excursions will not appeal to the masses and are not planned for them, except in the simpler phases.

As a part of this series, I should be inclined to include a field study of the development of constructive or synthetic conceptions of natural phenomena. The interrelations of forces and the interrelations of organisms may be considered for their bearing upon general problems and conceptions. The struggle for existence can best be learned in the field. But how many have ever attended an excursion devoted to the study of this problem?

After the excursion has been made and good results have been secured, they need to be cared for as a regular part of curatorial duties so that the interest and momentum which have been developed will not be starved through lack of nourishment. I do not intend to discuss this phase further than to indicate that this aspect of the work must form an essential part of any comprehensive plan.

The excursions represent only a part of the recreative or educational work of a museum, and a part which can not be replaced by exhibits, lectures or any amount of reading. Excursions, properly planned and executed, will add much to the interest taken in the lectures and exhibits and will lead to more intelligent reading. Last, but not least, they will cultivate a genuine love for the outdoor world and its beauty and help, in these days of sensational amusements, to make more general a healthful and better recreation for a large number of people. The educational phase of such excursions must be planned upon a truly scientific basis and should be so conducted as to afford some training in the scientific method, because in so far as museums are educational, they must realize these ideals.

From the preceding discussion, we may conclude that an ideal series of excursions for a local museum would consist of a series, each complete in itself, and ranging from those intended primarily to be recreative, to the collecting and observational, and on to those which are primarily explanatory of the local problems or of the general principles of science. In this manner the greatest numbers of the public may be reached and their interests recognized, and the confusion which results in attempts to combine several kinds of excursions into a single one avoided. In time, some excursionists will naturally graduate from one series to enter others, but this does not argue in favor of combining the different kinds of excursions. It is desirable to allow each kind to retain its identity and serve its natural function.

I do not understand that museum exhibits are intended to be so entirely satisfying that the visitor has no desire to become acquainted with outdoor nature, so with lectures and exhibits there should be abundant chances for the museum visitor to become directed to the out-of-doors. In general, museums are the local institutions which are best organized, interested and qualified to undertake such work, although there are important exceptions to this rule.

REFERENCES

The following list of references will perhaps prove suggestive for those planning excursions along recreative and educational lines. Completeness is not attempted.

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 This exemplifies the educational resources of a limited area from the standpoint of the physiographer.
- Carman, J. E.**
 1909 The Mississippi Valley Between Savanna and Davenport. Ill. Geol. Surv., Bul. 13
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- Comstock, J. H.**
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All of Gibson's books will arouse interest and direct it toward the beautiful which is to be seen in the animal and plant world. The artist and the naturalist can here find common ground.
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Goldthwaite, J. W.

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Grabau, A. W. & Woodman, J. E. Editors

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Martin, J. O.

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Meyers, Ira B.

- 1908 *Field-Work and Nature-Study.* The Elementary School Teacher 8:225-32, 316-26, 381-92
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Orr, William

- 1901 *An Outline of Eight Excursions for the Study of Physical Geography and Geology of Springfield and Vicinity.* City Library Association, Springfield, Mass.

Salisbury, R. D. & Alden, W. C.

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& Atwood, W. W.

- 1900 *The Geography of the Region About Devil's Lake and the Dalles of the Wisconsin.* Wis. Geol. and Nat. Hist. Surv. Bul. 5
Illustrates the possibilities to be found in local studies. One of the best.

Smith, Robert

- 1900 *Home Lore; Plant Associations and Their Distribution.* Jour. School Geog., 4:287-95
Shows the value of studying the local plant associations. Deserves to be better known.

Trafton, Gilbert H.

- 1905 *Laboratory and Field Exercises in Physical Geography.* Chicago
Contains an excellent list of references on field work in physical geography, on pages 83-85.

Van Dyke, John C.

- 1901 *The Desert. Further Studies in Natural Appearances.* New York
The arid regions also have their advantages for the field excursionist.
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J. C. Van Dyke's books will open the eyes of many field workers to a new world of beauty and charm. Every curator of a natural history museum should know this book.
- 1906 *The Opal Sea. Continued Studies in Impressions and Appearances.* New York
A book for the seashore excursionist or a traveler.

SOME OF THE ADVANTAGES OF AN ECOLOGICAL ORGANIZATION OF A NATURAL HISTORY MUSEUM

By CHARLES C. ADAMS PH.D.

In the following discussion I have in mind primarily local natural history museum of limited means, that devote their attention to the study and exhibition of the geology, vegetation and animal life of their state or immediate vicinity. It has been customary in such museums to arrange the geological specimens according to the system of some synoptic treatise or textbook, without regard to the influence of local conditions or environment upon the material. The plant and animal collections and exhibits have received a similar synoptic or taxonomic arrangement. If, however, a comparison is made between the exhibits and the reference collections in such museums, it becomes quite evident that the former, on account of their closer relation to the public, have responded more quickly to their interests and needs. It is therefore quite natural to expect that it will be in the exhibits that we first find a marked departure from the synoptic and taxonomic ideas toward ecological phases; at least this seems to be true with regard to plant and animal exhibits. At this point let us clearly bear in mind that ecological relations are those which relate organisms causally to their complete environment. It is of interest, however, to note that at present a marked change in this direction is to be seen in ethnological exhibits, where the influence of the environment upon the culture of peoples is clearly recognized. It is apparent that the general principles and methods of display along ecological lines have already reached a fair degree of development and are easily accessible, so that they need only correlation and adjustment in order to be applied systematically to the ecological problems of a local natural history museum. To be sure, there are many points of detail to be worked out, especially with regard to the storage and indexing of the collections, the correlation of the work of the museum staff etc., but these are problems which can be solved as the occasion arises.

THE IDEA AND ITS APPLICATION TO EXHIBITS

So far as known to the writer, no local museum has been developed or organized primarily along the lines here suggested, and although many of the elements have long been in use they have not been correlated as here outlined. The subject will be taken up in the following order: first, the geology, because it involves the gross

environment; next, the vegetation; and finally, the animal life. The primary or dominant idea or ideal in the following suggestions briefly stated is, that all *processes* of the physical conditions, the vegetation and the animal life should be completely and *genetically* correlated. The soils, rocks, minerals, topography, plant and animal societies, and even human affairs, are so intimately related and correlated that any important change will in time change all. This may seem at first glance to form such a maze of complexities as to reduce all phenomena to chaos rather than to order. To make these ideas clearer it is therefore desirable to present them in more concrete form, and yet avoid too much detail. First let us consider the application of this plan to the geological problems.

Geology. The local geology should be considered in a broad sense so as to include the soil, rock structure, physiography and geography of the region. Palaeontology would be secondary here and receive full treatment in connection with the history of the local biota.

Physical processes should receive treatment first and should be fully illustrated by both specimens and photographs, so far as the vicinity will allow. The local weather should also receive adequate consideration at this place. In the organization of the general geological principles, and for an abundance of suggestions, reference should be made to Van Hise's *Treatise on Metamorphism*, and Chamberlain and Salisbury's recent geology. The local work should be carried out in *much detail*, with numerous specimens, contour and relief maps, photographs etc., so that the public or student can easily receive a good idea of the local physical conditions and of the dominant forces and processes which compose them; for it should be remembered that it is in these features that we find the broad outlines of the local environment not only for plants, but also for animals—including man.

To build up collections and exhibits along such lines will necessitate considerable research, correlation and an assembling of facts and principles which, aside from purely educational and scientific purposes, would of necessity be of much practical value to the state or local community. Certain special subjects would require separate exhibits, such, for example, as the history of life at or within the given locality or area. This is a subject of importance, and of much local interest, and should be fully investigated and displayed.

Vegetation. Building upon the foundation laid by the detailed study of the climate, soils, topography, geography etc., resulting from

the detailed and correlated results of the local geological work, a knowledge of the local physical conditions would be secured which should contribute much toward our knowledge of the forces and processes which have determined the present composition, arrangement and mutual relations of the local vegetation. These features should be mapped, photographed and illustrated by representative specimens, in such a manner as to show clearly their field relations, societies, the principles which control their successional relations and their responses to changes in their environment.

Instead of the usual dried and pressed specimens, which arouse so little interest and are only of restricted utility, all available methods of preservation should be used, and a special effort should be made to preserve them in such a way as to show the relations to their environment, their associates and their life histories. In other words, special collections should be made to show plant societies and their ecological relations. For guiding principles the works of Cowles and Clements should be consulted, as they furnish a wealth of suggestions; but the application of the principles must be worked out for the particular locality and will be sure to furnish abundant opportunity for original investigation. The entire application of these ideas to vegetational exhibits is yet to be worked out. Perhaps the most suggestive exhibits in this country, which will throw light upon these problems, are the economic ones by Millspaugh in the Field Museum of Natural History. In addition to these major vegetational features, exhibits of special problems should be made, such as those of peculiar local interest or of educational value, as the evolution of certain groups of plants, plant associations, plant structures and perhaps some problems of local economic interest.

Animal life. Upon the foundation developed by the combined results of the geological and vegetational work there should be developed a survey of the animal life of the region. This should be continued along lines similar to the other surveys and correlated with them in as much detail as possible. The representative forms of animals, their associations and relations to their environment, should receive detailed investigation and exhibition. The greater complexity of the animal problem over that of the vegetation could be greatly simplified by special exhibits, such as the evolution of animals (a subject sadly neglected in our American museums), growth and development of selected forms, geographical distribution, variation, heredity, seasonal color changes, moulting etc. These are problems of very general interest and should, even at considerable sacri-

fice, be illustrated by the local fauna so far as possible. So far as I have been able to learn this phase has never received in this country the serious attention which its importance merits. In the current literature evolutionary processes are largely illustrated by exotic material, the authors ignoring or being ignorant of that which is near at hand. Certain local interests should also receive special attention, such as the migrating birds, the local fish and game, prominent insect pests etc.

Extensive synoptic collections and endless series of similar (to the public) specimens should be sternly relegated to the background or be placed, such as may be necessary, in drawer cases where the interested student may, if seriously inclined, have access to them.

One of the primary ideas, not only of the animal exhibits but of all kinds, should be to show that the moving power in science is to be found in the intrinsic value and interest of scientific ideas, in addition to their application to practical purposes. We consider the development of scientific ideas as the true measure of a science, and for similar reasons, ideas should determine the existence of every exhibit. Museum exhibits have suffered (among other things) from a poverty of ideas and a superabundance of specimens which show little, and are unintelligible to the public. Harrera of Mexico has expressed the application of such ideas to museums in the following manner: "In the museum of the future the specimen is the lacquey of an idea; whereas, in our present museums ideas are the slaves of specimens."

INFLUENCE UPON COLLECTIONS

The foregoing statements are primarily concerned with the direct influence of an ecological organization of a museum upon the exhibits, while in the present section I wish to emphasize its influence upon the study series or the collections in general. It is quite evident from what has been said that the present collections in local museums are utterly inadequate to furnish material for the ecological exhibits. To develop such exhibits, then, will mean extensive field work and fresh collections with an amount of detailed field notes and observations rarely attempted by the old methods of collecting. One of the weakest points in museum specimens is the small amount of history accompanying each specimen. The older naturalists were satisfied with a label stating "North America," later with "United States," and even now we have thousands of specimens in the museums with only state labels. But this clearly shows the trend of the change

and we are now reaching the place where detailed field notes must accompany each specimen. We may not wish to go to all this trouble, and many will resent it, but there can be no doubt about the ultimate result in this respect. A change in this direction will be in harmony with one of the leading advances in museum methods, and an ecological organization would certainly favor and reinforce such a change.

Taxonomic work and ideals have in the past dominated the biological work in the museums, and most of the large ones even today. The current methods of taxonomy, which appear to some to have long since reached the "point of diminishing returns" so far as many general biological ideas are concerned, do not make the urgent demands for detailed notes on environment relations as does ecological work; and this gives additional weight to the latter. While material collected for ecological purposes will also serve for taxonomic work, the reverse is not so true. Taxonomic work has been dominant. The taxonomic phases do not attract the popular interest; it represents only a limited phase of scientific problems, and yet as valuable as it is, the time is coming when it will become less and less a conspicuous feature in museum work, not by extinction but by the growth of the other, perhaps ecological, phases. The reference series in museums are, as a rule, grouped systematically so that such facts of ecological importance as are contained in such a series are so widely scattered as to escape even diligent search. What will be needed in the future will be at least two series of collections, a taxonomic one and an ecologic one. The latter must be developed at least to the same extent as the former. Much the same reasons may be urged for these two series as can be given for a subject index in a library.

Enough has been said to outline the relation of the suggested organization upon the basal collections—the study series. Still another important phase for consideration is the influence of such a change upon the museum workers themselves.

INFLUENCE UPON THE MUSEUM STAFF

There can be no doubt that one of the brightest features of museum work during the past 13 years has been the great increase in the breadth of view and the responsibilities of museums. With this there has been a marked change in the type of men going into museums, so that today many of our ablest naturalists are to be found in them. Undoubtedly so long as museums were so cramped

financially that workers were doomed to dusting specimens and an almost complete sedentary life many men were repelled by them. As soon, however, as ecological phases, with their consequent field work and expeditions, are made an essential part of museum activity, we may look for still further changes for the better in the character of museum men. In a given field the opportunities available are certainly important factors in determining the character of the men who will enter it. For many kinds of investigations the mechanical grind of regular university hours are not only decidedly disadvantageous but practically forbid the undertaking of many lines of investigation which require continuous or very irregular hours of work; and except for limited periods resident work by such men is usually impossible. With the increased breadth of museums and enlarged opportunities for research the quality of museum men may be expected to improve greatly.

PRACTICABILITY

A few words should be said for the practicability of the above suggestions for ecological organization of a state or local museum. I hardly anticipate much criticism of the geologic features, as that part of the problem is apparently relatively simple, although some geologists might object to geology being subordinated, in a way, for purposes of organization, to a biological scheme; but when it is remembered that by ecology is meant the relation of organisms to their complete environment it seems that with such latitude there should be room for all necessary freedom. At the same time it should be remembered that the classification is primarily based upon *processes*, as the ecological work is all planned upon that principle—an ecological expression being largely one of convenience as its method is perhaps more generally understood than that of processes.

With regard to the vegetation there are greater practical difficulties, but with commercial museums, forestry exhibits and economic botanical exhibits like that of the Field Museum of Natural History, one can not help but believe that all that is needed is a man of botanical resources to solve the difficulties here involved.

With regard to the animals, that part with which I am most familiar, there is no doubt in my own mind as to its feasibility. When one notes the marked ecologic advances in museum methods along some lines—the animal groups and the ethnologic exhibits—it is seen that for exhibit purposes great advances have already been made, although these advances have not yet reached, to an equal degree,

the reference collections; nor have they reached the proportions which we may anticipate during the next few years. I venture to predict that in the near future the ecologic features will become, at least in the newer museums, a very prominent—perhaps a dominant—feature not only in exhibits but also in the research and general activities of museums.

With regard to the reserve or study series of museums much the same remarks hold as for the exhibits. Whenever collections have been made for economic purposes, more or less of the ecological methods of preservation have been followed; this holds for both geologic, vegetational and animal collections. The cataloging, storing and labeling are thus seen to present no innovations, the necessary changes being largely in the nature of such adjustments and correlations as are intended to retain the intimate interrelations of objects and organisms to their environment, because minerals, rocks, plants and animals are all influenced by their environment.

One can hardly doubt that one of the most serious difficulties encountered by museums with limited means in the realization of such plans, will be to find men with enough originality and resources to develop consistently such plans, for while precedent will act as a general guide, many problems will be encountered that will require independent thinking. A museum to develop, in addition to increasing in size, must advance qualitatively as well as quantitatively. A real difficulty is to correlate these two tendencies, because as a rule, they are not combined in individuals, and hence the organization of an institution must recognize this fact. If the quantitative criterion of value is dominant, both collections and facts may be accumulated without a just appreciation of their value and relations, while on the other hand, if a qualitative criterion is dominant, differentiation may take place too rapidly, and sufficient facts will not be accumulated, correlated, and hence only superficial work will be done. For these reasons a museum, or a department of a museum, may find it necessary to secure both types of minds in order to secure the correlated results.

In conclusion, it should be stated that a local museum established upon plans similar to those just outlined could, by a natural growth and with increased resources, develop or spread from its local interests and become general or geographic without any rupture of its system. This is possible only because the basal principles are those of *processes*, and thus in character as universal as energy, from which radiate the entire successions of cause and effect. To make the transi-

tion from the special to the general very little change would be needed in the geological series except that of extension; while for the vegetation the same principles hold and are easily correlated with such a treatment of vegetation in general as that given by Schimper in his *Plant Geography*. In the case of animal life, however, while the same general principles will hold, their application is much more difficult, on account of the complexity of the subject and the lack of any comprehensive treatment of the principles involved. Such a relation as this clearly points to a field for research which can be cultivated to the best advantage only by those associated with museums. Such a transformation, from the local to the geographic, does not imply that plant and animal geography are synonymous with ecology, although there is a very intimate relation, because at the present stage of development ecology receives its best aid from the earth sciences on the one hand and general physiology on the other.

(Reprinted from *Proc. Amer. Ass'n Museum*, 1:170-78. 1908.)

A POLICY FOR STATE HISTORIC AND SCIENTIFIC RESERVATIONS

By CHARLES C. ADAMS D.Sc.

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RESERVATIONS AS MUSEUM EXHIBITS

In the Twenty-second Report of the New York State Museum (Mus. Bul., 279:19-23) attention was called to the loss by the Museum of its scientific reservations or outdoor museums. In the reorganization of the State Government, these were transferred to the State Department of Conservation on January 1, 1927, and the Director of the Museum and the State Historian were made members of the State Council of Parks, within the Department of Conservation. By law there is only one State Museum, and it is the main central state repository for scientific and historic objects, as the State Library is for historic documents, and there should therefore be some form of active cooperation and coordination between this central State Museum and other state historic collections and scientific reservations, which are in fact largely outdoor museums. In a comprehensive system these historic reservations correspond to the scientific reservations formerly possessed by the Museum as outdoor museums, although these historic exhibits do not depend primarily on certain striking and unusual natural features, as in the case of the scientific reservations, but on their association with some human experience of special interest or importance. We should not overlook the fact that even in the case of these historic places the influence of the physical environment determined the location of many historic events.

It is evident that the most approved methods of preservation and of the restoration of these historic and scientific reservations require the latest museum technic, both scientific and historic, in order to prevent the deterioration of the textiles, papers, objects of leather, wood and metal which compose these historic objects. This is also true of the latest methods of displaying such objects.

We also need intelligent, well-formulated policies, careful surveys and inventories of both kinds of reservations, as it is only by such methods that officials will know what they possess and what their obligations involve. Often gross but unintentional blunders are made because the responsible officials fail to make such inventories, or heed them not when warned, about matters with which they are unfamiliar.

Every historic reservation should be given a careful photographic survey covering all important objects, and be provided with a careful and accurate catalog or inventory of the collections, supplemented by full notes and records authenticating the historic collections. Very few of such objects have substantial labels or identifying marks connecting them with the inventory. Priceless objects should be stored with appropriate care, or reproduced when it is desirable to use these objects for exhibit purposes. It is exceedingly difficult to prevent injury and theft of valuable historic or other objects when open to the public, even under careful supervision.

Very few of the state historic reservations have been cared for in the manner customary in a well-managed modern museum, and rarely indeed is the museum administration aspect of these reservations stressed or clearly recognized. It is generally known that historical museums are backward, compared with natural history museums, and too often they are excessively overcrowded and so confused in their arrangement that they appear to be "junk" and are condemned beyond their merits. Many historic objects lack artistic attractiveness, but to some degree this may be counterbalanced by artistic methods of display and by intelligent labeling.

Too often this confusion in historic collections is the result of there being no definite and restricted policy for each special collection or reservation. Each reservation should have a definite and reasonable policy but such local policies can not be well worked out independently of a general state policy. It seems evident that the exhibits at the John Brown Grave Reservation, for example, should be restricted strictly to matters relating to John Brown. There is no reason for making this a general museum or even a local historic museum. The public will go many miles to see the John Brown exhibit, but should they find it cluttered up with all sorts of other materials and with commonplace objects that might be seen at any other place, they will feel that the distinctive features have been lost, and the whole exhibit will lose distinction. The officials in charge should refuse to accept for that reservation collections of Indian relics from Ohio or Arizona, or even from New York State, because they do not belong to that kind of an exhibit.

Of course it will be urged that the custodians must not risk any ill will attending the refusal to accept extraneous objects. It will also be urged that there will be visitors whose only chance to see exhibits will be in such a local exhibit. It should be clearly recognized that these reservations are not intended to be the dumping grounds for

everything that people do not care to keep in their homes. These reservations are not substitutes for other local school or library museums. Only those objects should be assembled at such reservations which are appropriate and contribute to the main purpose, and extraneous materials no matter how attractive should be excluded. It will require tact and possibly a struggle to carry out such a reasonable policy. In many cases the officials, not having thought out clearly the policies for their reservations, have already entangled themselves with obligations and conditional gifts that are almost certain to cause trouble in the future. Public museums of art and natural history have long struggled with these problems, and there is no occasion to repeat all their errors in the development of these reservations, when often they are avoidable. There are a surprising number of persons who will plead for the confused policy and prefer a drifting and indefinite one. When visiting a reservation it is generally an easy matter to recognize how well the officials have worked out and executed a definite policy. As has been said, modern museum methods have passed through certain preliminary stages so that they are now in a position to aid materially in the early organizing stages of these reservations.

The history of these historic reservations is quite varied. For many years before there was any general movement for a unified park system, private citizens and local patriotic and historic societies had secured reservations, although some of the most important sites were for a long time utterly neglected. It was during this period that the American Scenic and Historic Preservation Society furnished active leadership of the greatest importance. It was not, however, until a comprehensive and unified state park program was matured and all reservations and their financial control were centered in the Conservation Department on January 1, 1927, that a new policy became urgent. Again on June 28, 1928 (Laws of 1928, chapter 242, section 673) the Conservation Commissioner transferred the jurisdiction and control of certain of these historic and scientific reservations to various officials and to regional state park commissions. The Seventeenth Annual Report of the Department of Conservation for 1927 (Legis. Doc. 1928, no. 38, p. 114-22) gives a concise summary of the status of these reservations.

It has been stated repeatedly that these reservations are not primarily of recreational importance, but are of historical, scientific and of educational significance as well, and therefore that they should be administered differently. The Department of Conservation, the

State Council of Parks, and the various park officers and commissions, with the exception of the American Scenic and Historic Preservation Society, have in general not given to these reservations the attention which their importance requires. This is quite natural, since those who have worked so strenuously and successfully for the parks are mainly those who are interested in public recreation, rather than in historical, educational and scientific matters. Furthermore, these officials do not have the staff necessary to supervise these reservations adequately.

The five scientific reservations which were acquired by the State Museum, by its former Director, Dr John M. Clarke, were intended, like our National Parks and Monuments, to preserve some natural object for its cultural or educational value. As Doctor Clarke said, "*They have not been taken over for park purposes, but to preserve their natural attractions and unimpaired.*" The outstanding features of these reservations may be summarized as follows:

SCIENTIFIC RESERVATIONS

1 The Clark Reservation. This tract of 185 acres is worthy of conservation as a scientific preserve because it is in a limestone region where there is rapid commercial exploitation and destruction of the wonderful evidences of glacial streams, waterfalls and plunge basins. This is one of the three best of its kind in the State. A second beautiful basin to the east has been destroyed by quarrying, and the third is being acquired northeast of Fayetteville (the Kirkville Green Lakes) by the Central New York Park Commission.

The glacial stream channels, at various levels, the plunge basins of the falls, and Green lake with its overhanging precipitous cliffs, 150-70 feet high, impressively show the power and the duration of the glacial torrents. Geologically and physiographically it is a striking exhibit that attracts geologists even from Europe. As an educational exhibit, readily visited by students and tourists, it can be made very interesting when explained by means of maps and models so that its story can be understood. As it is today, very few of its visitors are able to learn more from it than from any other beautiful picnic grounds.

In addition to this remarkable geologic glacial exhibit, this part of central New York is the native haunt of certain kinds of ferns that are of great scientific interest. Dr H. D. House, State Botanist of the State Museum, has stated that the most remarkable of these is the hart's tongue fern, *Scolopendrium*, which is found in New York State only at Chittenango Falls and near-by at Ferryville. The only other

American localities are in Tennessee and by Owen sound, Ontario. More kinds of ferns are found within the Clark Reservation than in any other equal area in the State. More than 30 kinds have been found in this vicinity. It is also the home of other rare plants, such as the wild purple clematis, *Clematis verticillaris*, the Allegany vine, *Adlumia cirrhosa*, and yellow lady's slipper, *Cypripedium pubescens*, and many other plants that occur on limestone ledges. This is the most unique botanical locality in the State, and under an exclusive recreational plan of administration it has deteriorated. The tract should be enlarged to provide for picnicking and the remainder of the reservation would best be cared for as a wild plant and animal preserve.

Of course to those not interested in such matters, ferns are just so much weeds or grass, just as a Rembrandt is just a "picture" to the unappreciative, but there are those who are interested in the preservation of these rare and interesting ferns and other plants, and numbers alone and popular interest are not the only criterions of value. The haunt of the ferns at the White and Green lakes, to the east, has been destroyed by commercial interests, and it was hoped that this reservation might be a safe refuge for these plants, but this has not been the case.

2 **Chittenango Falls Reservation.** To preserve this beautiful falls, a group of citizens of Cazenovia raised the money and presented this to the State Museum. The scenic features of this reservation are supplemented by its rare plants, as here also grew the rare *Scolopendrium* fern and many other rare ferns which live on limestone cliffs. Here favorable conditions were also found for the water thrush, cerulean warbler, the winter wren and other rare birds which summer here. It is quite evident that this tract resembles the Clark Reservation in its rare biological features and it needs the same sort of supervision. These unique features, and to protect the falls from commercial exploitation, were the original motives that led to the establishment of the reservation. This now includes 120 acres.

3 **Lester Park,** near Saratoga Springs. This reservation is purely of scientific interest. It is an outcrop of limestone in which are imbedded huge fossil plants, which have been planed off and sectioned by the glaciers so that they are exposed as a slice through a cabbage. These fossil plants were marine algae and grew in calcareous colonies, somewhat similar to the formations seen about some of the springs in the Great Basin in Utah. This is the best exhibit of its kind

known in America and is certainly worthy of the modest care needed to preserve and exhibit it.

4 **Stark's Knob**, Schuylerville. This is a hill composed of molten rock which in ages past welled up from below, and is the nearest approach to volcanic rocks which we have in the State. Quarrying for road metal had already removed a part of this hill, when it was salvaged, but the part that remains is truly a valuable exhibit.

In addition to the scientific interest of the place there are also the historic associations, as it was on this hill that General John Stark mounted his small cannon.

5 **Squaw Island**. This is a small island of about one acre in the upper end of Canandaigua lake, which was set aside because of the abundance of "water-biscuits," another form of calcareous deposits formed by fresh-water algae which abound on its shores. The fossils at Lester Park were somewhat similarly formed by marine algae in the geological past. This island is also of historic interest because of its Indian tradition.

6 **New reservations needed**. It should be clearly understood that the five preceding reservations are only a beginning in the series that should be set aside for purely cultural, that is, for scientific, educational and recreational purposes. This series should be worked out with great care. Their preservation awaits funds for their purchase and for their maintenance. There is the possibility also that some tracts could be secured only as trusts, in case public support is unduly delayed, while others would readily fit into the regular state reservation system.

There are a number of localities which are particularly suitable for the new scientific reservations, where samples of primitive nature or objects of special importance are worthy of careful preservation and should be made available to the public under proper conditions. Many of these would not be suitable for parks, but they are of great educational value. A number of these areas are definitely known, and provision should be made for their acquisition in a manner similar to that for the parks and the historic reservations.

A COMPREHENSIVE STATE POLICY

It has now become evident that every reason advanced for the reorganization of the State Government and for the unified organization of the state parks applies with equal force to the unified supervision of the scientific and historic reservations. In spite of the fact that great progress has been made in the development and formulation of park policies, as well as in the training of park officials,

there is much yet to be done, and in the case of the historic and scientific reservations their backward condition can only be remedied by a complete reorganization with the formulation and execution of a new constructive program.

I wish to suggest the following items as a contribution to such a plan: A State Council of Historical and Scientific Reservations; this to consist of 13 members (the same number of members comprising the State Council of Parks), representing

- 1 The State Historian and the Director of the State Museum, of the State Education Department
- 2 The American Scenic and Historic Preservation Society
- 3 The New York State Historical Association
- 4 The New York Historical Society
- 5 The New York Zoological Society
- 6 New York Botanical Garden
- 7 Buffalo Society of Natural Sciences
- 8 Five members at large to be appointed to represent other historic, patriotic and scientific and educational organizations or institutions

This council, like the State Council of Parks, should formulate policies, recommend a unified budget, have general control of all the historic and scientific reservations owned and supported by the State, and should have the same kind of authority for the acquisition of new reservations as is now possessed by the State Council of Parks for new park areas.

The administrative personnel of this council, in order to begin this work, should include the following:

- 1 An executive secretary, with office help
- 2 Historical curator
- 3 Scientific curator
- 4 Engineer and landscape engineer
- 5 Chauffeurs

In addition to the above personnel the budget should provide for the necessary traveling expenses of the advisory council and the staff, and for equipment and supplies, including the necessary automobiles. In case the parks are allowed to become to some degree self-supporting, the same privilege should be accorded these reservations.

As soon as possible a reconnaissance and inventory of all the property should be made, and a plan developed for a technical staff of professional experts who should be employed to put the entire property into the best possible condition, in harmony with modern methods of preservation, display and as objects of study.

SUGGESTIONS FOR A STATE POLICY RELATING TO HISTORIC AND SCIENTIFIC RESERVATIONS

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WHAT ARE THEY ?

During the past 80 years the State of New York has followed the policy of acquiring either by gift or purchase buildings, forts, battlefields and sites of special significance in the history of the State. Imposing monuments have been erected at public expense on battlefields and elsewhere. Places of particular scientific interest have been reserved for the use of the people. Roughly classified these state-owned or state-controlled structures and places consist of:

- 16 historic mansions and buildings
- 3 special museum buildings
- 13 historical museums
- 8 fortresses and fort sites
- 7 battlefields
- 10 historic parks and scientific reservations
- 13 caretaker's cottages, barns, rest houses
- 10 monuments and statues
- 150 minor historic monuments and markers
- 2650 acres of land

The aggregate value of these mansions, forts, museums, collections, cottages, monuments, statues, battlefields, historic sites and scientific reservations would probably exceed \$3,000,000.

HOW HAVE THEY BEEN ADMINISTERED ?

Coming into the possession of the State in various ways, control and administration before 1924 varied widely as follows:

- 5 by local boards appointed by the Governor
- 1 by the State Comptroller
- 1 by the Conservation Department
- 5 by the State Museum
- 3 by the New York State Historical Association
- 4 by the American Scenic and Historic Preservation Society
- 6 by local historical societies
- 6 by local patriotic organizations

This diverse administration prevented the development of any policy. Under this system some were well cared for and others were

neglected. Financial support depended largely upon political influence. Since there was no bureau charged with a careful supervision of the budgetary needs of the various units, the Governor was pestered with visits from local boards and the Legislature was flooded with local bills. The whole system was wasteful, inefficient and unfair.

This chaotic supervision continued until the people were asked to give their approval to a bond issue for \$15,000,000 which would lead to the creation of a unified control of the State's parks, historic places and scientific reservations. When the bond issue was authorized by the citizens of the State, the State Council of Parks was created in 1924 and the historic buildings and sites and scientific reservations were placed under the jurisdiction of that body. For the first time they were given a uniform and unified supervision with a careful scrutiny of their respective budgets, without destroying the advisory service of the various local and state organizations interested in their welfare.

With the reorganization of the State Government in 1927 these historic and scientific possessions of the State were continued under the State Council of Parks, which was placed in the Conservation Department, and the Director of the State Museum and the State Historian were added presumably to give general oversight to them.

It soon became apparent, however, that the major park and recreational activities of the State Council of Parks demanded so much attention that these historic and scientific properties of the State were not given the attention their importance required. Consequently in 1928 on the recommendation of the Conservation Department immediate jurisdiction over them was shifted from the State Council of Parks to the regional park commissions in which they are located.

This arrangement has not proved to be satisfactory. The regional park commissions are interested primarily in the recreational parks and have little time or concern for the historic and scientific places. Furthermore they do not possess the technical staff necessary for educational and curatorial direction in order to make these cultural possessions serviceable to the State.

WHAT IS THE SOLUTION ?

To turn them back to the separate agencies which managed them prior to 1924 manifestly would be no solution of the real problem. The old annoyances would be revived and these valuable properties

of the State would once more become political footballs. No one favors a return to such a policy.

To leave them where they are now in the hands of the regional park commissions would mean indifferent care and more or less neglect. As a result they would continue to be liabilities instead of useful assets.

The only reasonable and satisfactory solution of the problem is to create a new agency to administer them and to develop a policy that will make them useful to the citizens of this commonwealth. Hence it is suggested that there be created by law :

I A State Council of Historical and Scientific Reservations of
II members representing :

- 1 The State Education Department (State Historian and Director of the State Museum)
- 2 The American Scenic and Historic Preservation Society
- 3 The New York State Historical Association
- 4 The New York State Historical Society
- 5 Six members appointed at large to represent other historical, patriotic and scientific organizations

This council would elect its own officers, formulate policies, recommend a unified budget and have general control of all historic and scientific reservations owned or supported by the State.

2 An administrative Bureau of Historic and Scientific Reservations with a permanent office and staff located in Albany.

The Staff would consist of :

- 1 A Supervisor of Historic and Scientific Reservations
- 2 One stenographer
- 3 Such technical full and part-time experts as would be necessary to restore and repair buildings, to care for the grounds, to organize the museums scientifically, and to develop the educational possibilities

HOW MAY THESE HISTORIC AND SCIENTIFIC RESERVATIONS BE MADE CULTURAL AND RECREATIONAL ASSETS TO THE STATE ?

1 The historic and scientific significance of these properties should be developed so that they will tell their story clearly and fully to visitors. Properly managed they would return rich cultural values to the citizens of this State and to outside visitors.

2 The buildings should be put in good repair, furnished in a correct manner, opened to the public at appropriate hours, and displayed

so as to reveal to visitors their history in architecture, in associations with prominent men and women, and in significant occurrences.

3 The museums should be organized scientifically so as to show in sequence the biography of the individual, or the history of the family, or the development of the locality. To this end there should be some correlation with the State Museum for expert guidance.

4 Those reservations that have suitable grounds and are accessible should be improved as parks, provided with comfort stations, walks, drives, recreational facilities and camp sites.

5 A sensible program should be worked out in connection with schools and organizations so that these historic museums, mansions, forts, battlefields, patriotic shrines, monuments, parks and scientific places would become educational and cultural agencies to supplement the library and classroom in the study of history and nature.

6 A Handbook of the Historic and Scientific Reservations of the State with maps, illustrations and full information should be prepared and either distributed gratis or sold to visitors at cost.

7 If it is desirable to make these reservations self-supporting, moderate admission fees might be charged as is now done in some of the recreational institutions associated with the public parks.

AN EDUCATIONAL AND MUSEUM PROGRAM FOR THE LETCHWORTH STATE PARK

By ARTHUR C. PARKER, *Rochester Municipal Museum, Rochester,*
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INTRODUCTION

At the request of the trustees of the American Scenic and Historic Preservation Society, we made a visit to Letchworth Park, July 13, 1926, to consider the "educational possibilities of the park area," including the proposal of an Indian village and garden.

Chauncey J. Hamlin had proposed to Director A. C. Parker, the desirability of relating museums to the parks in their vicinity, as, for example, the American Museum of Natural History cooperates with the Palisades Interstate Park, the State Museum with the Allegany State Park, and as it is proposed that the Rochester Municipal Museum cooperate with the Letchworth Park. Our recommendations are based on these suggestions.

GENERAL EDUCATIONAL PROBLEMS

1 **The park as an outdoor museum.** The whole park may be considered an outdoor museum, and its striking scenic and historical features as special exhibits. The park performs a double function in providing for both education and recreation for the public. It has long been committed to an educational policy by its establishment and maintenance of an arboretum, and also by the museum building (figure 17) and the various historic monuments. With the proposed park enlargement new educational problems will arise. As the major educational problem in the past has been the arboretum, this may involve a change of policy or at least some expansion. The policy adopted is of basal educational importance, as it will definitely and automatically determine also that of the museum (indoor) which should, as it were, in miniature, explain the park as a whole.

The physiography, geology, plants, animals and local historical matter, that are suitable for labeling as outdoor exhibits, should be developed as fully as possible. These should be illustrated also rather extensively in published guides.

2 **The arboretum.** This arboretum is thus today the main educational development of the park. This is the largest public arboretum in the State and is one of the few in the United States. Park author-

ities should probably continue to expand this feature in order to make it a thoroughly modern botanical tree garden. The policy for this should be made so clear that every visitor to the park will get from such a forest garden, the main lessons intended, its aim and purposes. There should be a special circular or leaflet to make these points clear to the visitor, and the field labeling should be made evident to everyone.

There ought to be a new or restated, clear-cut formulated policy, now that, as has been said, plans are being made for a great enlargement of the park, as to the relation of the arboretum to the wild forests of hardwoods in the park area. The natural forest of the region seems to be a mixture of hemlock and hardwood, but the hardwood predominates. This raises the question as to whether or not future planting should be so strongly of conifers, whether in rows or irregularly, or to other changes of policy. These questions of park policy are raised because they influence very strongly any educational program for the park. Miss Bishop's excellent "Guide" to the park, emphasizes the economic aspects of the arboretum and its relation to silviculture, but this seems somewhat foreign to the park, when there are other state agencies, such as the State Conservation Commission, State College of Forestry at Syracuse, and the Forestry Department of the State College of Agriculture at Ithaca, which are concerned largely with the economic aspects of the problem. Is this desirable duplication?

An effort should be made by this park not to confuse the public or other state park officials with regard to their own special arboretum system. To send to other parks young trees not native to them, in the case of other parks which should maintain primarily or exclusively native species, causes confusion and injury. These exotics are desired in a general arboretum but not in other parks. Some confusion has already resulted from shipping exotic trees from Letchworth Park to the Allegany State Park, where the forests should be kept solely of native species of trees. If a definite policy is not practised and confined to its proper field, great confusion will result and much harm may be done. (See figures 20-25.)

3 The museum. The Letchworth Park Museum (see figures 17, 18, 19) should be completely rearranged in order to constitute an index of the park itself, pointing out the natural features and places of historic interest, so that the visitor will know exactly where to go, and will thereby have some previous knowledge of the meaning of the historical, scenic and geological, plant and animal features

of the park. It should be limited exclusively to the park and immediately related matters.

The left wing of the Museum might contain actual specimens of the birds and other animals found in the park, also plant exhibits and a herbarium. The rearrangement of the specimens should be such that the representative habitats of all the living forms will be known and proper emphasis placed on their natural field relations. The geologic, physiographic and geographic features of the park should be illustrated by diagrams, relief models and special exhibits. The relation of the strata and their fossils should also be indicated.

The right wing might be devoted to the historical and archeological collections and be so devised that it will tell a complete story of the aboriginal history of the valley, showing the location of the Indian sites, illustrating the cultural sequences of occupations, and show the personal relics of the notable characters associated with the neighborhood history of the park region.

It is proposed that the Rochester Municipal Museum staff do this reorganizing and installation work, and supply the museum with such of its duplicate material as is consistent with Rochester's ability. It is also proposed that such ethnological and archeological material as does not seem pertinent to the park museum be either stored or exchanged for more valuable and significant material, the exchanges to be handled by a joint committee of the park and Rochester Museum.

Such a rearrangement will make possible an interesting museum which will be an epitome of the park and have highly significant educational values easily grasped by the most casual visitor. In this connection the Museum might avail itself of the cabinet maker of the Rochester Museum, who makes excellent cases, and could do other work of importance in his line.

4 Park library. In the Letchworth residence and in the office room of the museum there are many valuable books. Those in the museum are largely on mental diseases and allied topics. Evidently this is a valuable library which should be located where it can be used to public advantage. This might be given to some state institution where research workers need such a library, or to some medical school. Certainly it ought to be used.

On the other hand, a library is needed in the park if educational work is to be encouraged, and for administrative purposes. Parks are approaching a professional stage and require documents. Most parks suffer because not enough advantage is taken of the expe-

rience and mistakes of others. A carefully selected administrative library would be a good investment. We suggest the establishment, in the museum, of a "nature library" similar to that suggested by C. E. Graves (see "A Plan for a Nature Library." *Library Journal*, 44: 707-10, 1919). Such a library would contain books on natural history, in a broad sense, that will be useful in such a park. This does not involve a large collection of books but a carefully selected one, much of a popular nature, which would interest the general public and would be particularly valuable if the suggested "field station" be developed.

A park library should be properly cataloged and the books and pamphlets marked, and a reading room arranged for their use. This should be a reference, not a loan library.

5 The Indian village and garden. It is proposed that a Seneca Indian village be established on the tract of ground selected after a joint conference on the spot with the superintendent of the park, J. R. Lingenfelter, Secretary Charles A. Van Arsdale, and your committee, this village to embrace at least four different types of Iroquois houses, together with the storage buildings and platforms of such a building, and to be partly flanked by a typical Iroquois stockade. A very substantial bark house is proposed to be erected for housing an Indian custodian and family who will live there under aboriginal conditions and cultivate the garden which is to contain the typical Indian food plants.

The bark and other material for this village would be taken from the trees in the bottomland or from waste trees in the park itself. The lower valley is to be denuded of trees in order to provide for the storage reservoir, thus making an abundance of wood and bark available.

In connection with the construction of this village, Director Parker is to lay out the plans, and he proposes that some of his former field assistants do the major part of the work. He can secure a competent man, well versed in this sort of thing, for about \$50 a week. The other labor supply will have to be met by the park and, of course, the park committee is also to pay the salary of the person who constructs the village. He believes that the whole piece of work can be done for less than \$5000.

6 Field station. If the Rochester Municipal Museum undertakes this work, it will naturally have such an interest in the project that it may desire to make the park its field station or base, and function as its outdoor museum. It is possible that it would want to

organize a field school for the purpose of instructing a group of young people who are in the park, in the history, geology and natural history of the park area. This is fully in accord with the plans now in active operation in Allegany State Park and being fostered by the State Museum and the Buffalo Society of Natural Sciences.

SUMMARY OF RECOMMENDATIONS

Our recommendations may thus be summarized as follows:

1 The idea of an outdoor museum should dominate the park in its educational policy.

2 A reconsideration of the past policy for the arboretum, in relation to the expansion of the park and its wild forests, and its relation to other parks, is also desirable because this will influence the educational program.

3 The reorganization of the museum by the Rochester Municipal Museum, as indicated above.

4 The reorganization of the library and the disposal of the medical and sociological library to other institutions which can use these books to advantage, and the building up of a special park library bearing on the administration of the arboretum, the local natural history, local human history, a working administrative library, and such as might be needed for the suggested "field station."

5 The establishment of the Seneca Indian village and garden at the approved site, near the Long House, by the Rochester Municipal Museum.

6 And finally, it may be desirable to establish a field station for teaching outdoor natural history.

7 The Rochester Municipal Museum should take the leading rôle in this educational work, supplementing it possibly by other institutional aid in the case of the botanical problem involved in the policy of the Arboretum.

July 22, 1926.

POSTSCRIPT

A copy of the preceding report was sent to George B. Sudworth, dendrologist, of the United States Forest Service, at Washington, because he has long been the advisor of the park in its plans for the arboretum. As his letter, dated August 6, 1926, contains much of value, it is given in part as follows:

I have read your and Mr Parker's report on Letchworth Park, and I wish the knit-together purposes now being correlated for New York State parks had been developed when operations were first

begun at Letchworth Park. That there would be, and properly should be, a linking together and coordination of purposes for all the state parks was not thought of at the time. The thought then was to create at Letchworth Park a collection of living trees, in the form of an arboretum and in forest associations that educationally would make it worth while for people to come and see. To make the collection of trees educationally as interesting as possible it was decided to include all native and exotic trees that would grow at the park.

This policy of procedure was not reduced to writing. At a number of conferences the late Dr Charles W Dow (chairman of the board of directors), Overton W. Price (formerly associate forester during Gifford Pinchot's regime), and myself decided that the park planting should represent:

1 Forest formations of economically important conifers and deciduous trees, representing the habits of the species in nature when forming pure or mixed stands.

2 Forest formations arbitrarily made up of conifers and deciduous species in pure and in mixed stands of economically important trees not growing naturally in the same region or country. The idea was to determine for this section of the East what combinations of foreign or native trees could be profitably grown for timber. [See figures 20-25.]

3 Preservation of the virgin natural forest types represented by native species that unaided by man have become established in several localities. To some extent the preservation of these types would necessitate the return of certain missing species by under- and inter-planting.

4 The arboretum, which is not to be placed in any particular locality, and is to be made up of open-grown groups and individual trees planted in sites chosen so far as possible to correspond with the natural habitat of the species. Many of the trees making up the arboretum were to serve also as landscape features where the placing of them is needed for such decorations. In the matter of species to be represented the arboretum is to include species from any part of North America (north of the Mexican boundary) and from any foreign country that would thrive at the park.

The idea was to make it possible to study here any and all trees native to the State, but as far as climatic limitations would permit, trees native to states outside of New York, as well as of foreign countries. It was conceived that such a collection of trees brought together at one place would serve the highest educational purpose.

ADDITIONAL RECOMMENDATIONS

In view of the above information the following additional recommendations are made:

8 That a local botanist be secured to cooperate with Mr Sudworth in these plans. The qualifications for such a man are that he be near the park, so that he can keep in close touch with it; that

if he is not already familiar with various arboreta, he will inform himself, and finally, that he is willing to cooperate with Mr Sudworth in formulating and executing a definite policy for the arboretum, so that it will conform to the proposed park enlargement and to the best interests of other state parks.

9 That the officers of Letchworth Park should be warned against sending out exotic trees, including trees not native to individual state parks, because this confuses the policies of the other parks—which should be devoted exclusively to native trees. (It is by such shipments of trees or seedlings that serious tree diseases—such as white pine blister rust—have been introduced into this country.)

A. C. P.

C. C. A.

September 15, 1926.



Courtesy of Letchworth Park Committee

FIGURE 17 The Letchworth State Park Museum Building



Courtesy of Letchworth Park Committee
FIGURE 18 Letchworth State Park Museum interior, left hall, showing mastodo skull and exhibits of native animals



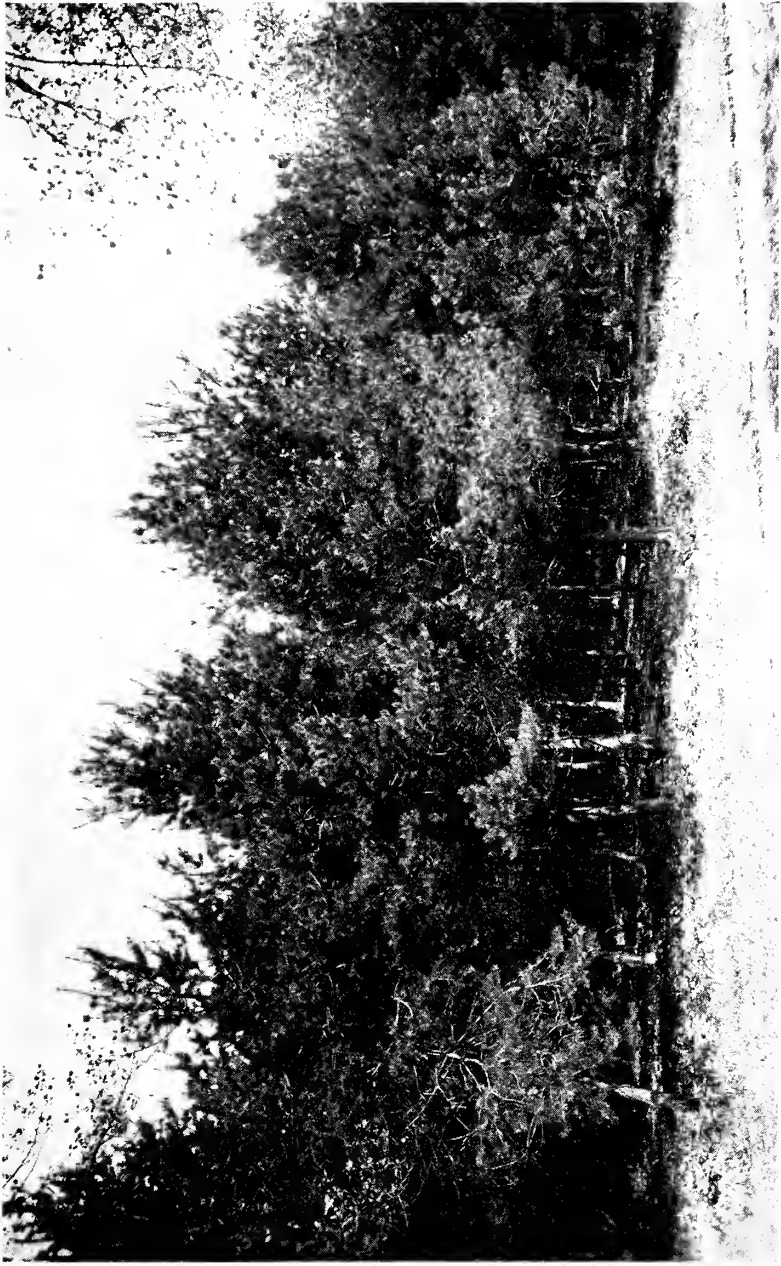
Courtesy of Letchworth Park Committee

FIGURE 19 Interior of Letchworth State Park Museum, right hall, showing exhibits of Indian relics



Courtesy of Letchworth Park Committee

FIGURE 20 Plantation of Colorado blue spruce and red pine made in Letchworth State Park in 1917. Observe that the trees are on a silvicultural rather than naturalistic planting system. The latter is more customary in parks, and the former in commercial forests.



Courtesy of Letchworth Park Committee

FIGURE 21 A plantation of Scotch pine in Letchworth State Park



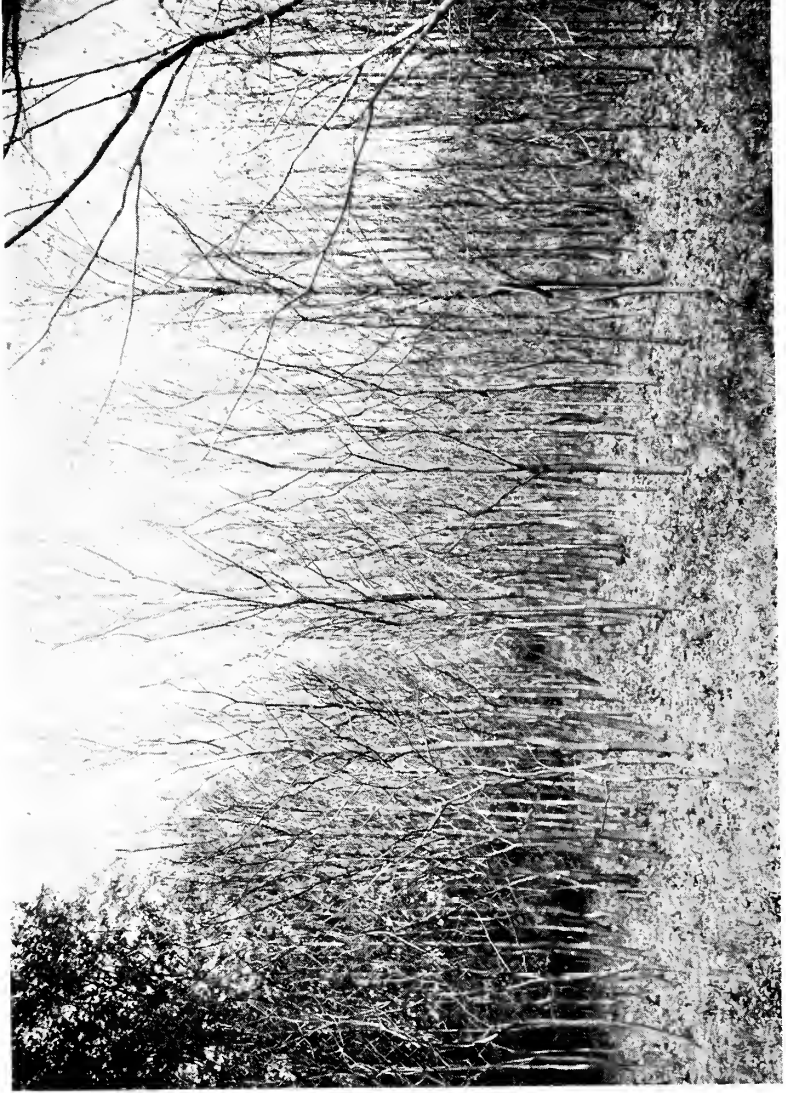
Courtesy of Letchworth Park Committee

FIGURE 22 Interior view of Scotch pine plantation shown in figure 20



Courtesy of Letchworth Park Committee

FIGURE 23 A mixed plantation of Norway spruce and pine in Letchworth State Park



Courtesy of Letchworth Park Committee

FIGURE 24 A plantation of catalpa trees in Letchworth State Park



Courtesy of Letchworth Park Committee

FIGURE 25 A Jack pine plantation in Letchworth State Park

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