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New York State Museum Bulletin

Published by The University of the State of New York

No. 304

ALBANY, N. Y.

May 1935

NEW YORK STATE MUSEUM

CHARLES C. ADAMS, *Director*

TWENTY-EIGHTH 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

1935

THE UNIVERSITY OF THE STATE OF NEW YORK

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*New York State Education Department
The New York State Museum, March 5, 1934*

*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 New York State Museum for the period from July 1, 1932, to June 30, 1933.

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 Law*, § 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*, § 1115.]

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.*

THE VALUE OF RESEARCH

"In the eyes of the world today the reputation of a country does not depend alone on the size of her armaments, the size of her empire or volume of her trade so much as upon the contribution she can make to the progress and happiness of mankind in art, in literature and in science.

"The development of industry depends more or less on the application of new ideas and discoveries in pure science. Successful industrial research is ultimately dependent on the prosecution of research in pure science with the object of adding to our knowledge of the processes of nature, and generally without regard to the practical applications."—*Stanley Baldwin, Lord President of the Council, Opening the Mond Laboratory at Cambridge, England. From the New York Times of February 19, 1933.*

RESEARCH AND EDUCATION

"The future of America is in the hands of two men—the investigator and the interpreter. We shall never lack for the administrator, the third man needed to complete this trinity of social servants. And we have an ample supply of investigators, but there is a shortage of readable and responsible interpreters, men who can effectively play mediator between specialist and layman. The practical value of every social invention or material discovery depends upon its being adequately interpreted to the masses. Science owes its effective ministry as much to the interpretative mind as to the creative mind. The knowledge of mankind is advanced by the investigator, but the investigator is not always the best interpreter of his discoveries. Rarely, in fact, do the genius for exploration and the genius for exposition meet in the same mind. . . . The interpreter stands between the layman, whose knowledge of all things is indefinite, and the investigator whose knowledge of one thing is authoritative. The investigator advances knowledge. The interpreter advances progress. History affords abundant evidence that civilization has advanced in direct ratio to the efficiency with which the thought of the thinkers has been translated into the language of the workers. Democracy of politics depends upon democracy of thought. 'When the interval between intellectual classes and the practical classes is too great,' says Buckle, 'the former will possess no influence, the latter will reap no benefit.' A dozen fields of thought are today congested with knowledge that the physical and social sciences have unearthed, and the whole tone and temper of American life can be lifted by putting this knowledge into general circulation. But where are the interpreters with the training and the willingness to think their way through this knowledge and translate it into the language of the street? I raise the recruiting trumpet for the interpreters."—*Glenn Frank.*

Museum Committee of the Board of Regents

WM LELAND THOMPSON, *Chairman*

JOHN LORD O'BRIAN

WILLIAM BONDY

State Museum Council

ORANGE L. VAN HORNE

BENJAMIN WALWORTH ARNOLD¹

THOMAS D. THACHER

OWEN D. YOUNG

PIERREPONT B. NOYES

State Museum Staff

CHARLES C. ADAMS Ph.D., D.Sc.....*Director of State Museum*

ALVIN G. WHITNEY A. B.....*Assistant Director of State Museum*

RUDOLF RUEDEMANN Ph.D.....*State Paleontologist*

DAVID H. NEWLAND B.A., Ph.D.....*State Geologist*

ROBERT D. GLASGOW Ph.D.....*State Entomologist*

HOMER D. HOUSE Ph.D.....*State Botanist*

CHRIS A. HARTNAGEL M.A.....*Assistant State Geologist*

WINIFRED GOLDRING M.A.....*Assistant State Paleontologist*

DAYTON STONER Ph.D.....*State Zoologist*

KENYON F. CHAMBERLAIN.....*Assistant State Entomologist*

ELSIE G. WHITNEY M.A.....*Assistant State Botanist*

NOAH T. CLARKE.....*State Archeologist*

EDWIN J. STEIN.....*Museum Draftsman and Photographer*

WALTER J. SCHOONMAKER.....*Assistant State Zoologist*

ARTHUR PALADIN.....*Museum Technical Assistant*

(Taxidermy)

CLINTON F. KILFOYLE.....*Museum Technical Assistant*

(Paleontology)

Honorary Curators

WILLIAM L. BRYANT.....*Honorary Curator of Fossil Fishes*

BENJAMIN W. ARNOLD¹.....*Honorary Curator of Ornithology*

HARRY S. PECK.....*Honorary Curator of Minerals*

¹ Died November 8, 1932.

Collaborators

PROFESSOR GEORGE H. HUDSON

DR EPHRAIM P. FELT

Temporary Scientific Appointments

NELSON C. DALE Ph.D.....	<i>Temporary Geologist</i>
MEDORA L. H. KRIEGER M.A.....	<i>Temporary Geologist</i>
L. W. PLOGER M.S.....	<i>Temporary Geologist</i>
TRACY H. GILLETTE.....	<i>Temporary Geologist</i>
ARETAS A. SAUNDERS Ph.B.....	<i>Temporary Ornithologist</i>
A. F. BUDDINGTON Ph.D.....	<i>Temporary Geologist</i>
ROBERT B. GORDON Ph.D.....	<i>Temporary Botanist</i>
FREDERICK T. THWAITES A.M.....	<i>Temporary Geologist</i>
EDWIN C. ECKEL C.E.....	<i>Consulting Mineral Economist</i>
W. L. LASSITER M.A.....	<i>Temporary Curator of History</i>



Figure 1 The New York State Education Building. On the upper floors is located the New York State Museum.

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

By CHARLES C. ADAMS Ph.D., *Director*
New York State Museum

FOREWORD

The New York State Museum is a fact-finding or research and educational agency devoted to the study of the natural resources of the State in relation to human welfare from the scientific, technical, economic, historic and social points of view. In addition to its scientific activities the law provides that the State Museum include within its field, objects of history and art of the State; and furthermore, it conducts a public exhibition museum illustrating all phases of its activity. This work was established in 1836, as the first scientific agency of the State Government. The State Museum is supported by legislative appropriations, donations, cooperation with other state departments or interested groups of citizens.

The present report covers the fiscal year closing June 30, 1933.

After quoting the law defining the duties of the State Museum, Dr John M. Clarke, the former Director of the Museum (1916, Mus. Bul. 187, p. 9) said: "This definition of scope is broad and clear. It is the specific expression of the intent of the people of the State to constitute and maintain not alone a state museum of science, but a state museum of art, a state museum of history and a state museum which may depict any other field of civic and educational concern which in the judgment of the Regents of the University, would be justified by public interest. The spirit of the law where its sentences bear upon the creation of a museum of art and a museum of history is so obvious as to be constructively a command. The wish of the people and the desire of the Board in regard to this expansion of the actual museum nearer to the ideal of the museum expressed in the law have become a matter of record. It is then to be understood that the existing science museum of the State represents the development of only one phase of what should be, and what within the implied intention of the law is to be, the State Museum."

A SUMMARY OF THE YEAR'S WORK

In spite of the reduction of funds for all kinds of operating expenses, the major activities of the State Museum have been continued, although on a reduced scale, except keeping open the exhibition halls to the public on Sundays. The statewide scientific and economic surveys and special studies of the natural resources have been continued, and the historical and industrial collections have maintained a moderate growth. In the interests of economy the Museum was closed on Sundays, as was done during the preceding fiscal year. Protests were received from the parents of school children and from others, including those who were unable to visit the Museum on week days. It has been interesting to observe that these protests came from many whose appreciation previously had not been articulate. This is the third season of interruption of Sunday opening since 1917-18, when the policy of making a definite appropriation for the expense of keeping open the public exhibition halls on Sunday was inaugurated.

The scientific and economic studies of the geological and the economic mineral resources have been continued on the following quadrangles: Santa Clara, Russell, Oriskany, Indian Lake, Schunne-munk, Morrisville, Randolph, Cattaraugus, Berne, Catskill, Clyde and Sodus Bay. The regular annual compilation of the mining and quarry statistics has been continued in cooperation with the United States Bureau of Census and the United States Bureau of Mines. A report on the oil and gas resources of the Allegany State Park has been published, and also another paper on the methods of recovery of oil by means of flooding the strata with water. A study of the ground water of the Allegany State Park was begun, and further studies were made of the history of the mineral industries of the State.

The state biological survey of the plants and animals of the Allegany State Park has included an intensive local study of the birds and the natural vegetation; and reports on these studies are nearing completion. The studies of the plants in the vicinity of Oneida lake and on the shore of Lake Ontario have likewise been continued. Progress is being made on the handbook on the ferns and their allies. The handbook on the fungi is in galley proof.

An intensive study of the life history and habits of the bank swallow was begun, as well as a local study of the birds of Washington Park, Albany. A local study of the mammals of Rensselaer county has been continued. Dr S. C. Bishop is con-

tinuing his work on a report on the reptiles and amphibians of the State, as well as certain studies of spiders which were begun when he was a member of the Museum staff.

Cooperative economic entomological studies have been continued with the State Department of Agriculture and Markets; the State Conservation Department; the Westchester County Park Commission; the General Electric Research Laboratory, Schenectady, N. Y.; with the narcissus bulb growers on Long Island; and with the State Health Department, at the Hospital for Incipient Tuberculosis at Ray Brook in the Adirondacks, on the experimental control of black flies and mosquitoes.

In the field of archeology and history additional information has been secured on the character of private local Indian collections, and some progress has been made on the systematic examination of the study collections of the Museum. The Shaker and Medical History collections have continued to expand, and Handbook 15, by Dr E. D. Andrews, on the Shaker industries has been published. This study was based, to an important degree, on the Shaker collection of the State Museum.

Attendance at the Museum exhibits has declined materially because of the decrease in the number of summer tourists and the closing of the exhibits on Sundays. A careful estimate of attendance for the year gives about 155,000 visitors—the lowest point reached in many years. The annual Sunday attendance formerly reached about 40,000; during normal economic conditions the annual attendance reached about 200,000 visitors.

The proposal for a new State Memorial Museum building has unfortunately not made progress, but the unemployment situation and a program of federal or state public works may yet provide funds for it. This would give considerable employment and is a kind of work which should be undertaken at this time.

COOPERATION WITH STATE AND OTHER ORGANIZATIONS

The general economic depression, with its unemployment, has stimulated cooperative activities as never before. The State Museum has been eager to share in such activities and to provide employment, as has been done in several of the larger cities which have supplied such help to museums. Such help, however, has not been secured. During the past year the State Museum has cooperated with the following agencies or individuals:

1 United States Bureau of Mines and the United States Bureau of Census, Washington, D. C. The Museum has continued the long-standing plan of collecting jointly the statistics of mineral production from the mines and quarries of the State.

2 New York State Department of Agriculture and Markets. Cooperative entomological studies have been continued of the narcissus bulb pests, insect pests of ornamental trees and shrubs, and the European pine shoot moth.

3 New York State Conservation Department. The Director of the State Museum is a member of the State Council of Parks in the Department of Conservation. The geologists of the Museum staff advise the Conservation Department on the purchase of lands when mineral resources are involved. The State Entomologist has made studies of weevils of Scotch and other pines and has made studies of the European pine shoot moth, the latter with the added cooperation of the Westchester County Park Commission. The Allegany School of Natural History is conducted in the Allegany State Park, in cooperation with the Buffalo Society of Natural Sciences. The State Museum has continued to conduct scientific studies of park problems in this park. The State Botanist has advised the Department on the native vegetation in Oneida and Montgomery counties.

4 The State Health Department has cooperated with the State Entomologist of the Museum staff in the control of the blood-sucking flies on the grounds of the State Tuberculosis Hospital at Ray Brook.

5 New York State Law Department, Office of the Attorney General. The Museum geologists cooperate with the Office of Land Titles on the purchase of mineral lands in the Adirondacks and on other legal problems.

6 Buffalo Society of Natural Sciences, Buffalo, N. Y. The Museum cooperates in conducting the Allegany School of Natural History in the Allegany State Park. The Director of the State Museum is responsible for the educational policy of the school. The school has assisted in the conduct of local scientific surveys in the region of the park. There is also active cooperation with the Allegany State Park Commission. The State Botanist has aided the Buffalo Society in preparing a revised list of the plants of the Niagara Frontier, which it plans to publish in the near future.

7 The University of Buffalo, Buffalo, N. Y. The affiliation with the Allegany School of Natural History is continued, and students of the school receive college credit by the University.

8 Colgate University, Department of Geology and Geography, Hamilton, N. Y. Cooperation on a geological survey of the Morrisville quadrangle.

9 Princeton University, Department of Geology, Princeton, N. J. This cooperation resulted in a geological survey of the Potsdam quadrangle. This study is now completed.

10 The University of Rochester, Department of Geology. Cooperation on a geological survey of the Clyde and Sodus Bay quadrangles.

11 Cooperation within the Education Department: State Library, conducting 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 Dr Rudolf Ruedemann, State Paleontologist of the Museum staff, has cooperated with more than 30 geologists in the preparation of a two-volume general Geology of North America.

13 Dana Natural History Society, Albany, N. Y. Cooperation on a lecture on birds to Albany school children on Bird Day, April 7th, by Edward Avis.

14 Several Long Island narcissus bulb growers have actively cooperated financially with the State Entomologist of the Museum staff on methods of controlling narcissus bulb pests (see also no. 2).

15 The University of Michigan Herbarium, Dr Howard A. Kelly, of Johns Hopkins University, and Charles M. Winchester sr, of Albany. Contributed to the preparation and printing of Handbook 11, by L. C. C. Krieger on a Popular Guide to the Fleshy Fungi (Mushrooms) of New York State.

16 General Electric Research Laboratories, Dr W. R. Whitney, director, and Dr W. D. Coolidge, associate director. Various experiments have been conducted for the control of insect bulb pests, and other scientific problems, in cooperation with the State Entomologist.

17 The American Humane Association, Albany, N. Y. This organization has been conducting a prize competition in order to secure a more humane trap for catching animals. In this worthy endeavor the Zoology office of the State Museum has cooperated. This work has been under way for five years.

18 The Sixteenth International Geological Congress Committee, and the United States Geological Survey were assisted by the geological staff of the Museum in the preparation of an excursion guidebook to New York State geology (See Bibliography).

19 National Research Council, Wild Life Committee. The Director is a member of this committee, which has been studying the facilities devoted to research and the training of research workers on wild life.

STATE COUNCIL OF PARKS

The function of the State Council of Parks, in the State Conservation Department, is to be a "central advisory agency for all parks and parkways, and all places of historic, scientific and scenic interest." The Director of the State Museum is a member of the Council, and has attended the monthly meetings and inspection trips regularly. The State Museum has also cooperated in the administration of the Allegany School of Natural History in the Allegany State Park for the past six years, and in conducting scientific and economic studies in this park. The results of several of these studies have been published and others are in preparation. The most recent publication is one on the oil and gas resources of the park, and a report has been completed on the ground waters of the park. With the increasing number of campers in the park this problem has continued to gain in importance.

Important cooperative entomological experiments on serious insect pests of trees have been carried on in the Westchester county parks by the State Entomologist.

ALLEGANY SCHOOL OF NATURAL HISTORY

(Figures 2-5)

"Future educational systems of the States will undoubtedly offer increasing possibilities for intellectual and spiritual growth of adults. In this connection, the wide field of nature will be recognized as a major asset, furnishing inspiring original materials teaching their own lessons. A well-developed State Park system, closely articulated to the educational program of the State, may be an extremely important instrument for use in ways of which we are as yet scarcely aware."—*John C. Merriam, President, Carnegie Institution of Washington, 1932.*

The sixth session of the Allegany School of Natural History was conducted in the Allegany State Park from July 5 to August 24, 1932. As in former years, the school was conducted by the Buffalo Society of Natural Sciences, with the cooperation and educational supervision of the State Museum, with the cooperation of the Commissioners of the Allegany State Park and in affiliation with the University of Buffalo.

From its inception the school has been conducted as a demonstration of the value of using the state parks for educational and



Figure 2 Students and staff of the Allegheny School of Natural History, season of 1932. Allegheny State Park.



Figure 3 Entrance to the Assembly Hall, Allegheny School of Natural History. Allegheny State Park.



Figure 4 Entrance to Zoology Laboratory, Allegheny School of Natural History. Allegheny State Park.



Figure 5 Staff of the Allegheny School of Natural History and Camp.

scientific purposes, in addition to their recreational uses. Furthermore, the state parks can not be properly administered without technical and scientific information and advice concerning their natural resources. Even today park officials make attempts to follow certain policies without adequate information, and sooner or later pay rather heavily for the lack of technical, professional and scientific advice. In this cooperation the State Museum has continuously concentrated on scientific and educational studies that are intended to aid in the intelligent use and appreciation of the parks.

During the season of 1932 a study was made of the ground water conditions in the park, giving special attention to the potable waters, and the condition of the wells and springs about the camps. This is a problem of great practical importance in the park and is one on which scientific and technical advice was acutely needed.

Other scientific studies included a continuation of the study of the vegetation of the park and local intensive studies of the habits of birds. Reports on these subjects are nearing completion for publication.

The educational and scientific activities already conducted within this park are of exceptional interest, not merely because of their practical bearing, but likewise because the numerous publications of the State Museum have a wide, general circulation throughout the United States. Many other state parks need similar studies and publications.

The work of the school during the past session, in the opinion of Dr R. E. Coker, its director, was most successful. The school has been not only able to hold its own, in spite of the general economic depression, but has had a normal healthy growth during the period when a large number of allied, but not similar summer and camp schools, have not survived the depression.

Maintaining a staff of high professional and personal qualities has been possible largely because this particular kind of school makes a strong appeal to a scholarly and scientific staff on account of its favorable facilities for research and the rather unique methods used in teaching outdoor natural history.

An abstract from Doctor Coker's annual report on the work of the School has been published (72d Ann. Rep't, Buffalo Soc. Nat. Sci. for 1932-33, p. 22-23).

RELATION OF THE MUSEUM TO SCHOOLS AND COLLEGES

Visits to the exhibits of the State Museum are a regular part of the instruction of many public and private schools as well as of certain colleges and universities. Other schools make visits to study certain special exhibits. Automobiles and buses are the favorite method for making these excursions. The Museum guide is always at hand to assist teachers with their classes. If the teacher does not keep in close touch with the class, however, pupils will not be able to make the most of the excursion on returning to the schoolroom, when they should discuss the excursion. With the limited time generally available for the pupils, they need careful supervision and should never be "turned loose" to do as they please. The guide service is intended to meet this need.

Classes of pupils came from the following 31 counties: Albany, Rensselaer, Schenectady, Saratoga, Greene, Washington, Fulton, Dutchess, Otsego, Sullivan, Schoharie, Columbia, Rockland, Cayuga, New York, Clinton, Montgomery, Ulster, Oswego, Suffolk, Essex, Chenango, Oneida, Westchester, Madison, Broome, Herkimer, Warren, Queens, St Lawrence and Putnam. Classes also came from Connecticut, Massachusetts and Vermont.

One school principal brought 100 pupils, 50 miles to Albany and return, and provided the lunch, at a cost of \$1.20 a pupil. It is not always possible to record all the classes that come, because some of them are small and do not report to the guide. Of the classes recorded there were 309, of which the largest number came from counties near to Albany, as Albany, Rensselaer, Schenectady and Saratoga. Albany county led with 91 classes. There were five from Massachusetts. The largest number of classes come from the rural schools. The total number of pupils and college students was 7981. This is an increase of more than a thousand over the previous year.

Without question the Museum does not have as large an attendance from the general vicinity of Albany as it should. Possibly if there were developed a larger number of *school museums*, so that both the teachers and the pupils were accustomed to see objects in connection with their school work, there would be keener appreciation of the value of a visit to the State Museum. This is also an appropriate place to emphasize the need of school museums, particularly at the state normal schools and teachers colleges, so that during the training of the teacher the use of museum materials would be as well understood as is the use of books and the usual laboratory facilities.

Rather frequent requests come to the State Museum from teachers, officials or parents seeking assistance in the identification of materials in the local school museums, and even seeking donations and loans of materials. The Museum is always willing to give such assistance as it can, but it has never been provided with the facilities to deal with this subject in the manner which it merits.

In a recent report of the Carnegie Corporation of New York, its Advisory Group on Museum Education, said (1932, p. 10): "The Group favored an addition to teacher-training courses which would qualify teachers to deal with museum materials understandingly. Perhaps the establishment of departments of museum education in teachers colleges and normal schools would be the best approach. In any case it was believed that the initiative should come from the schools rather than from the museum. The museums are not equipped themselves to undertake teacher training."

The Director concurs in the above opinion, but would supplement it by adding that the normal school and college courses will equally need to be modified to include *field excursions* and *outdoor experience*, such as is now given at the Allegany School of Natural History (see also State Mus. Bul. 284, p. 43-52), before visual education is to be properly balanced with other instruction.

The members of the Museum staff continue to assist the Education Department Editor in the preparation of the Bird and Arbor Day numbers of the Bulletin to the Schools, and the long-standing custom of cooperating with the Dana Natural History Society of Albany, in giving an illustrated popular lecture on birds to the local school children has been continued. The speaker was Edward Avis, who gave his talk April 7, 1933, and was heartily welcomed, as on former occasions.

The popular publications of the Museum, especially the bird and wild flower books and portfolios, and the Museum handbooks, reach a large number of teachers and pupils from the elementary grades to the universities, but there is no way to measure their influence.

MUSEUM ATTENDANCE

During normal economic conditions the total annual number of visitors to the Museum exhibits was about 200,000. Since the depression began this number has declined considerably. Upon the basis of partial counts and estimates the attendance during the past year was 155,000. This is the lowest attendance in many years.

With the closing of the exhibits on Sundays there was a large decline, as Sunday visitors had reached an annual total of more than 40,000. There has been a marked decline in Museum attendance during the summer months with the reduction of automobile tourists. The estimate for August is 35,000, a decline of 5000 over last year. The total number of pupils and college students was 7981, an increase of over 1000 over the preceding year.

In discussing the attendance to the Museum exhibits it is well to recall that this is only one measure of the use and appreciation by the public. It is rather natural that the general public, which visits only the exhibits, is inclined to think that this phase is the main activity of a museum devoted so largely to research and education.

INFORMATION AND PUBLICITY

The State Museum is looked upon by many persons as a general bureau of information, so that a rather extensive correspondence is conducted in response to a great variety of inquiries.

Members of the staff gave ten lectures or talks, reaching a public of about 660. These talks were given in the following five counties: Albany, Columbia, Kings, Rensselaer and Saratoga. The lack of official automobiles and very limited traveling funds tend to discourage this method of reaching the public.

Press releases are given out whenever possible. The Announcement of the Allegany School of Natural History and the advertisements for the school reach a large public and call attention to this unique phase of the work of the State Museum. Members of the staff serve on committees in various organizations and attend conferences which are equivalent to public talks or lectures. In this connection it is, however, of interest to recall that it is impossible to learn how many persons each day consult the thousands of publications which have in the past been produced by the Museum staff, and are in constant use throughout the world in offices, schools, laboratories and libraries.

CONDITION OF EXHIBITION HALLS, EXHIBITS AND STUDY COLLECTIONS

The exhibits in the Halls of Geology and Paleontology continue to require constant attention to protect them from the leaky skylight. The walls and ceilings of these halls have not been painted since the Education Building was built in 1912. For several years they have needed attention. On November 23, 1931, washing was begun on the

walls of the Hall of Paleontology and painting was completed February 25, 1932. On March 23, 1932, the work was begun on the walls of the Hall of Geology, and, after interruption, was resumed January 16, 1933, and painting was completed on May 16, 1933. With these walls repainted, and with similar treatment of the Halls of Botany, Stone Age, Hall of Ethnology, and a few years previously the Hall of Zoology, the general appearance of the exhibition halls has been vastly improved. This has led to favorable comments from visitors who appreciate the general appearance of the exhibit halls as well as the well-arranged contents of the cases. This recent painting has been possible largely by unemployment relief labor.

In the Hall of Geology new exhibits have been prepared to illustrate volcanic activity and that of thermal springs.

The Hall of Zoology has been considerably rearranged to adjust the sequence of the exhibit of birds to conform to recent nomenclatural changes. Fresh labels have improved many of the exhibits. Temporary exhibits illustrating the changes of the local bird population with the season have added interest to the exhibit, as well as exhibits of recent accessions. The Arnold birds' egg collection has been carefully cleaned. The interior of the insect display cases have been thoroughly cleaned, a very difficult undertaking on account of the obsolete style of these cases.

The additions to the collections are shown in the accompanying List of Accessions. Considerable material is acquired by the staff in the course of field work, and a number are secured as donations. Important additions have been made to the Historic Collection.

The problem for the storage of materials becomes more acute every year and has not been solved. Until additional rooms, shelving and cases are provided, the collections will suffer, and at the same time can not be consulted satisfactorily when needed. Finally, in view of the number of persons out of work and the urgent need of help by the State Museum, it is indeed unfortunate that work of this kind could not be secured. Many other museums in the State have had an abundance of such help.

PRINTING AND PUBLICATIONS

"After all it is the written work that lives."—*Dr W. M. Beauchamp.*

(Figures 6, 7)

The Annual Bibliography which accompanies this report shows the activity of the staff in this respect, and includes also papers which are based, at least in part, on the collections of the State Museum, or are the product of some form of cooperation.

During the past year the Museum had an experience unique in its history. In 1929 the State Museum published Handbook 7, by Aretas A. Saunders, on Bird Song. This at once met with hearty commendation by a large and appreciative public, and the edition was soon out of print. In 1933 a letter came from the American Printing House for the Blind, asking for permission to reproduce Bird Song in Braille, for which of course, permission was gladly given. Upon inquiry it was then learned that Congress had made an appropriation of \$100,000 for the printing of books for the adult blind, in the raised letter system of Braille. The Library of Congress made the selection of the books to be printed. The list of those announced for bids on April 11, 1932, included such books as: Beveridge, Life of John Marshall; James, Life and Letters of William James; Steffens, Autobiography of Lincoln Steffens; Taussig, Principles of Economics; Turner, Frontier in American History, and Frost, Collected Poems. This is a distinguished group of authors.

In Braille, Bird Song makes two large volumes, as shown in figures 6 and 7. The Congressional Library distributes these books to 20 public libraries located in the following cities: Albany, Atlanta, Austin, Chicago, Cincinnati, Cleveland, Denver, Detroit, New York, Omaha, Philadelphia, Pittsburgh, Sacramento, Saginaw, St. Louis, Seattle, Washington, D. C. (Library of Congress and National Library for the Blind), Watertown and Honolulu (Library of Hawaii).

Very few books on birds have been available for the blind, and it is particularly appropriate that the blind who can hear should have a book on the songs of birds. The State Museum considers it a great honor to have this publication selected for this purpose. This is, however, but a continuation of the favorable opinion of the value of this book expressed by many competent judges.

The inventory of the older stock of State Museum publications continues to progress slowly. It is not practicable to conduct the sales of these older publications until this inventory is reasonably complete; otherwise publications might be sold which there is no chance to reprint or replace.

PHOTOGRAPHY AND DRAFTING

The photographic and drafting office includes not only the photographs, drawings and lantern slides made by the staff members, but also those acquired by any other method. Photographs are used as a method of making field and laboratory notes as well as for publications.

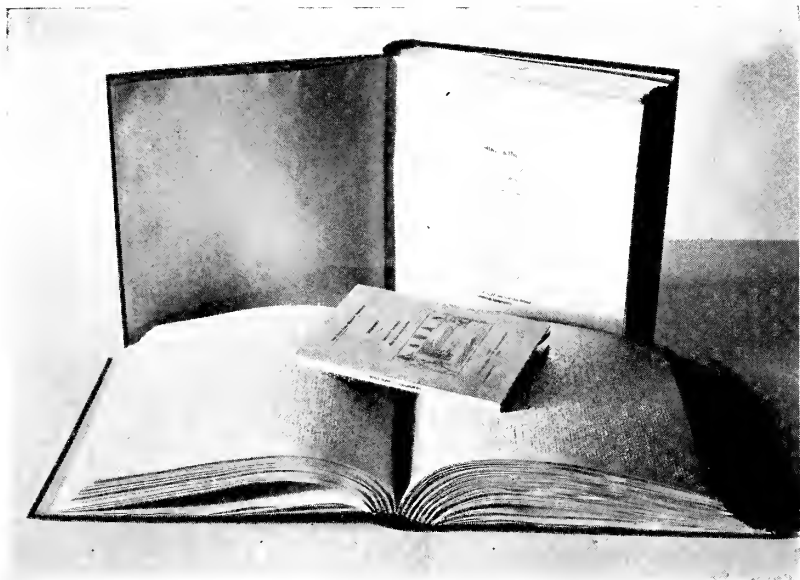


Figure 6 The Braille edition of Saunders' Museum Handbook on Bird Song, showing the raised letter system for the blind. Photograph by E. J. Stein.

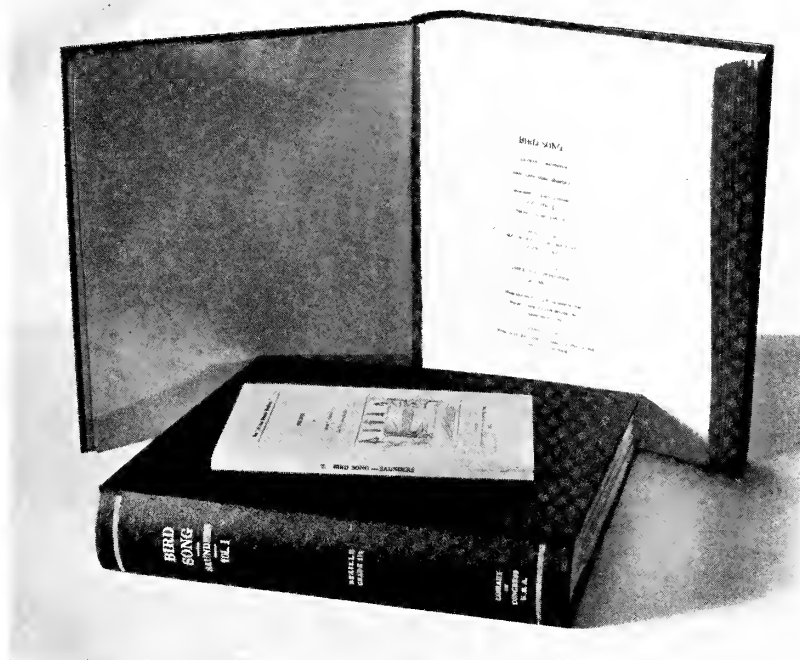


Figure 7 The two-volume edition in Braille of Saunders' Bird Song. Photograph by E. J. Stein.

Progress has been made in transferring negatives from old envelopes to the new substantial standard ones and completing their records. The file set of prints, mounted in large loose-leaf scrap books, is advancing, and is found very useful for consultation. The storage shelving in the darkroom, which has been neglected, has now been put in order, and the older photographic equipment has been transferred to the Historic Collection.

The photographer and draftsman reports that he has made 814 negatives, 2432 prints, 79 enlargements, 69 lantern slides, and 43 drawings.

HISTORICAL COLLECTIONS AND ALLIED MATTERS

(Figures 8, 9)

"I warmly sympathize with the ambition expressed in your annual report to have this Museum more than a mere zoologic or scientific museum. It should be a museum of arts and letters as well as a museum of natural history.

. . . "There should be here a representation of all our colonial and revolutionary life. There should be in this museum for the instruction and inspiration of our people, a full representation of American history since the time when New York cast off its provincial character and became an integral portion of the American republic."—*Theodore Roosevelt's address at the opening of the New York State Museum, December 29, 1916.*

During any period of economic distress many persons and families make adjustments. During such times great numbers of historic objects come to light, many of which are donated to museums while others are sold.

During the past year the main improvement has been not that of acquisitions, but in the progress made in the cataloging and storing of the collections which have been acquired in recent years, far more rapidly than the cataloging. William L. Lassiter continued this work during July and August 1932.

An outstanding historic acquisition has been that of the Weeber Automobile Collection, presented by Mrs Pauline P. Weeber, Albany, N. Y. Of this collection the outstanding object of interest is an automobile (figure 8) designed and built by her husband, Christian F. Weeber. This is probably the only automobile ever built in Albany. This material makes an excellent nucleus about which to build a collection of distinctly New York State historical objects which bear directly on the automobile industry.

An interesting collection of historic material was presented by Mrs I. Flower, Troy, N. Y., which forms the Wellington-Flower Collection. A notable series of household objects, the Stowell-Davis Collection, was presented by Mrs Ellen Davis Montague, Dr Lavinia Davis and Dr Clayton H. Davis. This collection contains a large

number of interesting objects which were new to the Museum collection. The record accompanying the collection is unusually full and complete.

Dr E. D. Andrews' Handbook 15, on the Community Industries of the Shakers was printed, and has met with a good reception.

The collection of scientific instruments, which the State Museum has been assembling for many years, continues to grow. Charles F. VanBenthuisen a few years ago presented an old microscope (figure 9) which is of much interest. Rather recently a valuable book was published on the history of the microscope, including a detailed account of the collection of the Royal Microscopical Society of England (Original Development of the Microscope, etc., edited by A. N. Disney. London. 1928). This volume contains much of interest. In the United States a valuable collection of these old instruments has been acquired by the New York Botanical Garden (cf. Robert Hagelstein, "The Garden's Collection of Historic Microscopes." Jour. N. Y. Bot. Garden, 34:9-13, 1933.) It is hoped that other museums will, with the aid of these publications, make further efforts to secure and make known to the public the results of their efforts to preserve these interesting and valuable records of the development of scientific tools and facilities.

SUMMARY OF THE ACTIVITIES OF THE SCIENTIFIC STAFF

(Figures 10, 11)

"It is essential that this Museum should command the service of many different men for work in many different fields, and that its work should be so closely related to work of the same kind elsewhere that it shall all represent a coordinated whole. This is true of all departments of the work, but especially so of those departments which have a direct utilitarian bearing.

"This Museum, like every other institution of the type, should do everything to develop large classes of workers of this kind. And yet, friends, we must never forget that the greatest need, the need most difficult to meet, is the need to develop great leaders and to give full play to their activities. In the entirely proper effort to develop numbers of individual workers there must be no forgetfulness of this prime need of individual leadership if American achievement in the scientific field is to be really noteworthy. Yet in scientific as well as in historical associations and academies, this fact is often forgotten.

"The really great works must be produced by some individual great man who is able to use to the utmost advantage the indispensable preliminary work of a multitude of other observers and investigators. He will be the first to recognize his debt to these other observers and investigators. If he does not do so he will show himself a poor creature. On the other hand, if they are worth their salt they will be proud to have the great architect use all the results of their praiseworthy and laborious and necessary labor in constructing the building which is to crown it."—*Theodore Roosevelt's address at the opening of the New York State Museum, December 29, 1916.*

The activities of the scientific staff include a variety of work of which this will be a general summary. Further details are given in the special reports following this abstract:

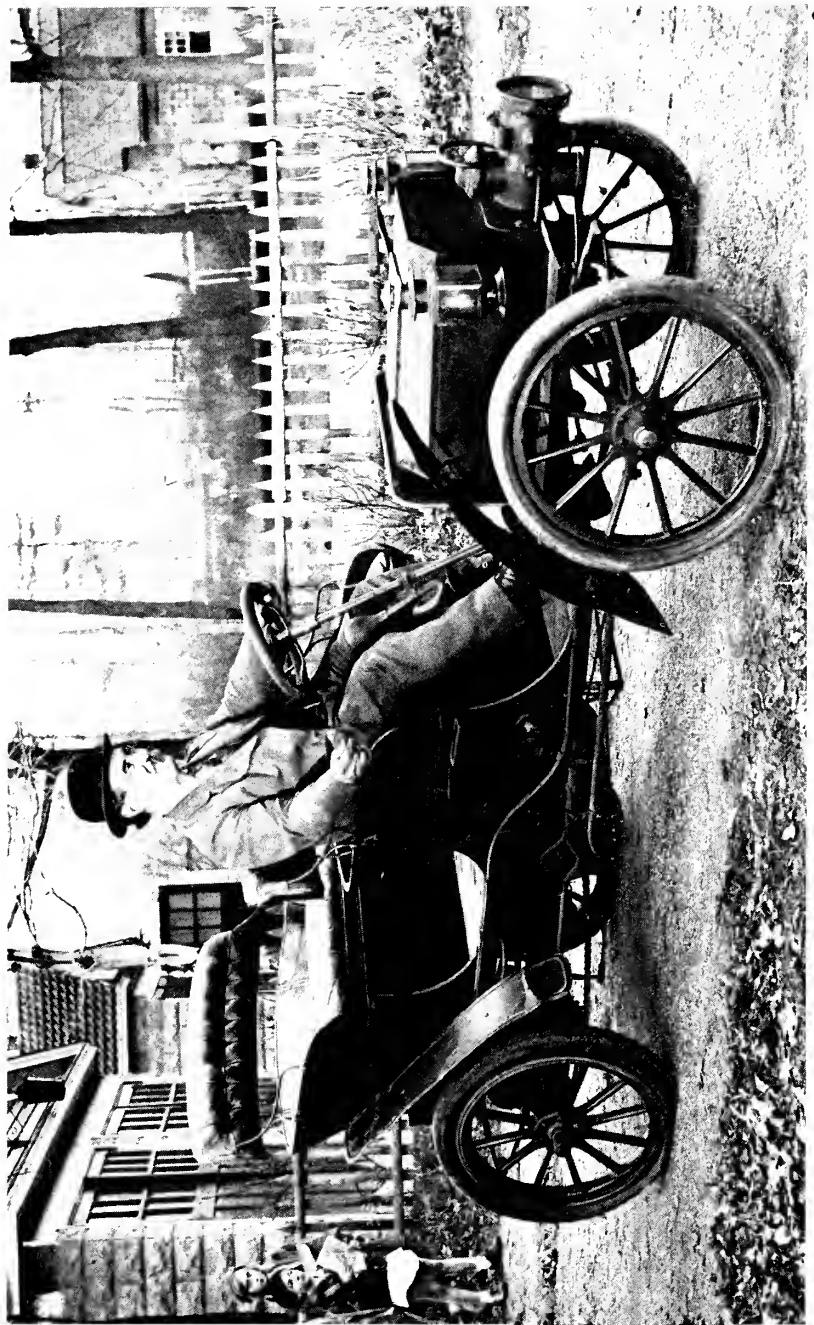


Figure 8. The Weeber automobile. The first automobile invented and built in Albany, N. Y. Built in 1898. The inventor at the wheel, C. F. Weeber. Presented to the State Museum by Mrs Pauline P. Weeber.



Figure 9 Old Culpepper type of microscope. Probably made before 1800. Presented to the Historical Collection of scientific instruments of the State Museum by Charles F. VanBenthuisen. Photograph by E. J. Stein.

Paleontology and stratigraphy. Dr Rudolf Ruedemann, State Paleontologist, has continued his work on an exhaustive monograph on the Graptolites of North America, giving special attention to materials from Oklahoma and Montana. He has also continued the cooperative work on the two-volume general Geology of North America, which has been under way for several years. His study of the geology of the Catskill quadrangle has been delayed because a new topographical map is in preparation. A paper on the Paleozoic plankton has been completed.

Winifred Goldring, Assistant State Paleontologist, has continued her studies of Devonian stratigraphy, giving special attention to the Hamilton formation; she has extended her joint study with Doctor Ruedemann, of the Ozarkian coral reefs; her Handbook 14, Guide to the Geology of John Boyd Thacher Park, has been published, and she has extended her field work on the Cocksackie quadrangle. Three papers on Crinoids have been completed.

An unusual number of paleontologists have worked in the laboratories this year, on account of the extensive collection of types in the Museum collection, and the familiarity of the staff with this material. Thus Dr C. E. Decker, of the University of Oklahoma, working with Doctor Ruedemann, made a study of Oklahoma graptolites; Dr T. Kobayhashi, of the University of Tokio, made studies bearing on the Manchurian collections; Dr E. M. Kindle, Chief Paleontologist of the Canadian Geological Survey, made a study of the types of Devonian gastropods; Dr Lief Stormer, of the University of Oslo, Norway, came for a study of the extensive Eurypterid collection. Cooperation of this character materially advances science and the value of the collections studied.

Miss Goldring's Guide to the Geology of the John Boyd Thacher Park has proved of special educational value and is extensively used, not only by visiting scientists, but also by college classes which visit this park regularly.

Both Doctor Ruedemann and Miss Goldring assisted in the preparation of the Guidebook 4, for the 16th International Geological Congress, as indicated in the Annual Bibliography. This involved field trips as well as the preparation of the report.

Dr Burnett Smith, temporary geologist, completed his report on the geology of the Skaneateles quadrangle.

Dr A. C. Tester, temporary geologist, has continued the preparation of his report on the Randolph quadrangle, which includes a part of the Allegany State Park.

Professor L. W. Ploger, temporary geologist, has continued his field and laboratory studies in the preparation of his report on the geology of the Cattaraugus quadrangle.

Dr R. J. Colony, temporary geologist, continued his studies of the Schunnemunk quadrangle, and his report is nearing completion. He also contributed to the 16th International Geological Congress, Guidebook 9, the result of his prolonged studies of this quadrangle for the State Museum.

Professor N. C. Dale, temporary geologist, completed the revision of the Russell quadrangle and began field work on the geology of the Oriskany quadrangle.

Dr G. Arthur Cooper, temporary paleontologist, has still in preparation his report on the Hamilton formation and a special report on the fossils of the Allegany State Park.

Professor H. D. Whitnall and his colleagues have continued their study of the geology of the Morrisville quadrangle.

Tracy Gillette, of the University of Rochester, extended his cooperative field work on the geology of the Clyde and Sodus Bay quadrangles.

Economic and Precambrian geology. Dr D. H. Newland, State Geologist, and C. A. Hartnagel, Assistant State Geologist, have continued to collect the mining and quarry production statistics in cooperation with the United States Bureau of Census and the United States Bureau of Mines. This work has been under way for many years, and is the main source of information on this subject.

The renewed study of the limestone of the State, by Doctor Newland, has been delayed on account of his ill health, and also extra work involved with the preparation of Guidebook 4, for the 16th International Geological Congress and plans for excursions. The supervision of the guidebook was by Doctor Newland.

Mr Hartnagel has continued to follow closely the oil and gas development (figures 10, 11) in the State which are particularly active at the present time and require constant attention.

The report by Dr W. L. Russell, temporary geologist, on his experimental studies of flooding by water to receive oil, was published as Museum Circular 8.

The study by Charles Brewer jr, temporary geologist, of the geology of the oil and gas of the Allegany State Park, was published as Museum Circular 10. This study was made as a contribution toward an administrative policy for the park officials.

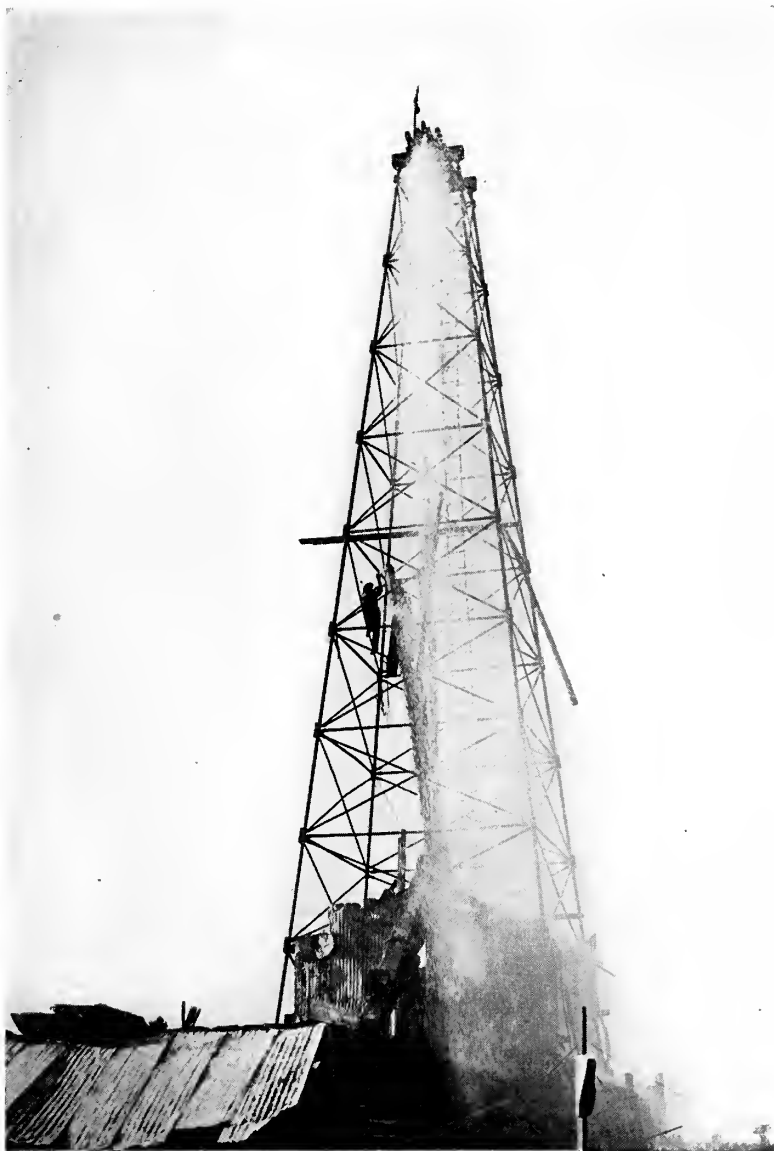


Figure 10 Blowing off a gas well, Geneva Gas Field, 1932. The first well in this field.



Figure 11 Shut-in of the first gas well of the Geneva Gas Field, 1932.

F. T. Thwaites, temporary geologist, made a field study of the ground waters of the Allegany State Park, because this problem had become very serious on account of the large number of camps in the park, and the lack of any comprehensive water and sanitary system that gave proper protection to the ground waters.

Professor N. C. Dale, temporary geologist, completed the field work for his report on the geology of the Russell quadrangle.

Dr A. F. Buddington, temporary geologist, began field work on the Santa Clara quadrangle, as a part of the general systematic study of that region.

Mrs Medora H. Krieger, temporary geologist, began the field study on the Indian Lake quadrangle, having completed her report on the 13th Lake quadrangle.

E. C. Eckel, consulting mineral economist, made further studies of the industrial history of the State, with special reference to the mineral industries.

Botany. Dr H. D. House, State Botanist, has continued to collect specimens and data for a revision of Museum Bulletin 254, Annotated List of the Ferns and Flowering Plants of New York State. Two weeks, in August 1932, were spent on the eastern shore of Lake Ontario, extending a local study which has been under way for several years. This is an area of dunes interspersed with ponds and marshes and contains many plants of interest (figure 13). Some progress has also been made on the flora at the east end of Oneida lake, and in the township of Newcomb.

Mrs Elsie G. Whitney, Assistant State Botanist, has continued the preparation of the handbook on the ferns and their allies, and has added to the collection in the course of her field studies.

Dr R. B. Gordon, temporary botanist, has completed the mapping of the vegetation of the Allegany State Park, and is editing the reports of the other botanists who have in past years been mapping the vegetation of the park. This general report is nearing completion.

Entomology. Dr R. D. Glasgow, State Entomologist, has continued the study of several urgent insect pest problems, most of which have been brought to him by other state administrative departments, and these have been conducted as cooperative projects. The European pine shoot moth, the larch case bearer, juniper webworm, the narcissus bulb pests, and the Pales weevil of the pine are examples of these problems calling for scientific study before satisfactory remedies can be advised for their suppression. These studies have been conducted in cooperation with the Department of Agriculture and Markets and the Department of Conservation, including the Westchester State Park Commission.

These studies have been under way now for several seasons, and excellent progress has been made on them. In addition to reports previously printed, others are in preparation.

The black fly and other biting fly studies have been extended as opportunity and limited funds have permitted. Continued experimentation has been carried on in cooperation with the Department of Health, at the Ray Brook State Hospital.

In all these undertakings the cooperators have shown an excellent and helpful attitude.

Zoology. Dr Dayton Stoner was appointed State Zoologist October 17, 1932, and began at once to organize the work of his office. Since the position had been vacant for some time, he naturally found a considerable accumulation of problems needing attention. Much progress has been made in building up and reorganizing the files equipment, collections and exhibits of this division, and modernizing these as far as circumstances would permit.

Field studies were begun in the spring of 1933 on the life history and habits of the bank swallow in the vicinity of Oneida lake and at Albany. A local study of the birds was also started in Washington Park at Albany. The State Museum has not, in the past, accumulated much local data on birds, so that these studies should be of value.

W. J. Schoonmaker, Assistant State Zoologist, has given a limited amount of study to a survey of the mammals of Rensselaer county.

Aretas A. Saunders, temporary zoologist, working at the Allegany School of Natural History, in the Allegany State Park, has continued his local intensive studies of the habits and habitats of the birds.

Archeology and history. Noah T. Clarke, State Archeologist, has continued his systematic examination of the study collections. The survey of local private collections of Indian materials has been continued in Madison, Oswego, Jefferson and Columbia counties. In addition to the information obtained, a valuable donation was secured for the Museum.

Elsewhere reference has been made to the growth of the historic collections. The most important accomplishment has been the publication of Dr E. D. Andrews' Handbook 15, on Shaker industries. This has been eagerly received by an interested public.

Notable additions to the collection are the Stowell-Davis Collection from Pulaski, N. Y., and the Weeber Collection, consisting of the first automobile made in Albany by Christian F. Weeber, its inventor (figure 8). In addition to this automobile, a large number of other

valuable mechanical models and parts make this a notable and welcome addition to the industrial series.

During July and August 1932, William L. Lassiter continued the arranging and cataloging of the historic materials, largely the Shaker and Stowell-Davis collections.

REPORT OF THE OFFICE OF PALEONTOLOGY

RUDOLF RUEDEMANN, *State Paleontologist*

WINIFRED GOLDRING, *Assistant State Paleontologist*

The State Paleontologist continued the work on the *Geology of North America*, a two-volume publication that is to appear as a part of the *Geologie der Erde*, being published by Gebrüder Bornträger in Berlin. The volumes on North America are to be in English. There are more than 30 collaborators, all experts in their fields, which will make the work fully authoritative. The State Paleontologist is the general editor, and contributor of two chapters. The first volume is nearly assembled.

The work on the Graptolites of North America was undertaken several years ago by the State Paleontologist at the request of geologists of the United States Geological Survey and the immense collections of the Survey were turned over for this purpose. In addition collections of the Canadian Geological Survey and many state surveys, also private collections, are being studied. The work is about half done and is making satisfactory progress. A great difficulty is the fact that new collections are frequently sent in from various parts of America requiring immediate study for stratigraphic purposes, thus postponing the work on the collections on hand.

The work on the graptolites led to a study of the fossil planktonic faunas in the rocks of New York, that is, faunas that were floating in the sea. This element of the fossil life had been hitherto completely neglected, except for studies of the graptolites. A large report on these faunas with 28 plates was completed in the fall of 1932 and a paper on this subject was read at the Cambridge meeting of the Geological Society of America in December. An abstract was previously presented at the meeting of the National Academy of Science.

The work on the Catskill quadrangle was not advanced owing to the fact that the publication of a new topographic sheet was under

way. The work on this topographic sheet will be delayed indefinitely due to financial conditions and it is therefore intended to push this work to completion with the old map in the summer and fall of 1933.

In the past fiscal year as well as in the winter and spring of 1932 much time was spent with visiting geologists and paleontologists who came here to study their material by comparison with our famous type collection comprising more than 15,000 described and figured specimens. Of these may be mentioned Dr Leif Störmer, of the University of Oslo, Norway, who came here to study the new eurypterids discovered in Norway; Professor C. E. Decker, of the University of Oklahoma and acting state geologist, who spent several months working with the State Paleontologist in studying the graptolite fauna of the Viola limestone of Oklahoma, which is of special importance in oil explorations; Dr Teiichi Kobayashi, of the University of Tokio, Japan, and geologist in Manchuria, who compared the Cambrian, Ozarkian and Canadian fossils of Manchuria with new material of like age; Dr E. M. Kindle, chief paleontologist of the Canadian Geologic Survey, who studied the Devonian gastropod types for his Catalogue of Devonian Fossils of North America.

The Assistant State Paleontologist in the summer of 1932 completed the field work for joint papers with the State Paleontologist on the Ozarkian coral reefs of New York and the history of the development of coral reefs. This work was suggested by the discovery of several reefs of different age and composition in the Saratoga region and the observation of their wide ancient distribution around the southeastern portion of the old Adirondack land, suggesting barrier-reef condition.

In the late summer and fall of 1932 the Assistant State Paleontologist accompanied Dr G. Arthur Cooper, of the United States National Museum in his field work on the Hamilton formation, from Cooperstown through the Schoharie valley into the Helderberg area, covered by the Berne and Durham quadrangles. An excellent Hamilton stratigraphic series was collected on this trip.

The Assistant State Paleontologist cooperated with Dr E. M. Kindle, of the Canadian Geological Survey, in checking up Devonian Crinoid synonymies for the Catalogue of Devonian Fossils of North America. This involved months of work.

Three papers on crinoids have been completed, one each on collections of Hamilton and Tully crinoids from New York, lent by Dr G. Arthur Cooper of the National Museum, and one on a Devonian crinoid of Maine, loaned by the Portland Society of Natural History. Handbook 14, Guide to the Geology of John Boyd

Thacher Park (Indian Ladder Region) and Vicinity, was published in 1933.

Accessions. Among the important accessions should be mentioned the stratigraphic Hamilton collection of more than 500 specimens from the Schoharie valley; a study collection of various species of Cryptozoons from the Saratoga area; the collection of the late Edward E. Davis of several thousand fossils from various localities, donated by Mrs Davis; a collection of 63 Silurian graptolites from Bohemia, received from the Bohemian Museum in Prague in exchange for New York graptolites and eurypterids, which are much sought after by European scientists.

REPORT OF THE OFFICE OF GEOLOGY

DAVID H. NEWLAND, *State Geologist*

C. A. HARTNAGEL, *Assistant State Geologist*

Progress in Precambrian geology. About a quarter of the area of New York State is underlain by crystalline rocks of Precambrian age, distributed in two separate regions—the Adirondacks on the north and the Highlands in the southeast. These mountainous and, for the most part, forested tracts, once empty wilderness save for a few mining communities, lumber camps and certain favored resorts for the transient visitor, the sportsman and health seeker, have become, through development of modern transportation facilities, the goal of thousands of tourists, who come during the summer months from every state of the Union as well as from foreign countries. These regions possess many attractions aside from those directly related to the scenery and the native life which the forests and the waters harbor. Not the least source of interest to the visitor is the geological and mineralogical make-up of these very ancient highlands.

Correspondence in our files shows that the Adirondacks and Highlands are included in the itinerary of many travelers from distant places because they afford such a varied array of geological features in easily accessible surroundings.

The Adirondack region constitutes one of two extensions of the Canadian shield that reaches south of the boundary into the United States. The other extension is the Lake Superior Precambrian area of Michigan, Wisconsin and Minnesota, a region less diversified as to topography and because of this lack of diversity affording rather scanty exposures of the Precambrian formations in three-dimensional development.

To visit the Adirondacks is to have opportunity for inspecting some of the characteristic Canadian shield formations, as exhibited, for example, in the Grenville and Laurentian districts which occupy the southern and southeastern borders of the main area. The Laurentian district is largely igneous, made up mainly of plutonic rocks of the anorthosite-gabbro and syenite-granite series with their accompanying dike rocks. The principal intrusions occurred in early Precambrian time, but the dike rocks appear to have continued making their way surfaceward at intervals down to the close of the Precambrian. The outcrop of the igneous bodies is marked by a rugged topography which over large stretches is of mountainous aspect. The Laurentian district reaches its typical expression in Canada along the St Lawrence river below Quebec. Of the Adirondacks, the central and eastern regions, within the limits of Warren, Essex, Hamilton, Clinton and Franklin counties, where the peaks and ridges attain their maximum elevation and ruggedness, present such similar features that they may be regarded as an outlying recurrence of the main Laurentians.

The Grenville includes the part of the shield that lies along the upper St Lawrence and on both sides of the Ottawa river from its outlet for some 200 or 300 miles to the west. It is a region of moderate elevation, subdued topography, of open valleys occupied by lakes, streams and swamps, usually underlain by softer rocks of sedimentary character, separated by ridges of granite, syenite and gneiss. The sediments include original beds of limestones, sandstones and shales now metamorphosed into marbles, impure crystalline limestones, quartzites and schists. The limestones are in notable strength, one of the heaviest accumulations of carbonate rocks found in the whole stratigraphic column. The sediments are generally regarded as of early Precambrian age, designated as the Grenville series. The Grenville beds have extensive development in the western and northwestern Adirondacks, where they partake of the same characteristics as in the type district of Canada. Most of St Lawrence and parts of Jefferson and Lewis counties are included within the area of their occurrence.

Mineral localities are widely distributed over the Adirondack highland. Some are associated with the igneous rocks—anorthosite, gabbro, syenite, granite etc.; in this environment are found deposits of magnetites and magnetite-ilmenite ores, pyrite, garnet, mica and feldspar, to name those of present or potential economic interest. In the sedimentary (Grenville) formations occur zinc and lead ores,

talc, graphite, garnet and pyrite. A host of mineral species, chiefly of the silicate class, having no special value except for collectors and students, might be named as native to the region.

It is perhaps pertinent in this connection to say that neither the Laurentian nor the Grenville districts of the Canadian shield area has importance for precious metal mining. The productive gold and silver, as well as nickel and copper deposits of the shield, lie to the west and north of these districts toward Lake Huron and Hudson bay, where the rock formations (Timiskaming, Keewatin etc.) include types not represented in the bordering region. It is also noteworthy that no gold placers have been found within the vicinity of the lode deposits, although the lodes have been subjected to long-continued erosion that has doubtless reduced by hundreds of feet their former vertical dimensions. Whatever placers may have existed were swept away and the gold dissipated by the Pleistocene ice invasion. There seems to be little chance for finding more than traces of this Canadian gold in the morainal rock débris that found its way into New York State.

The geologic mapping of the Adirondacks has been in progress for about 40 years. The first work, performed before 1900, was of reconnaissance character, based on county and township maps of various scales or on the early editions of the Adirondack Forest Map, on an inch to the mile base. The results of this work are embodied in the 1901 edition of the State Geological Map, on the base of five miles to the inch. With the beginning of the publication of the topographic quadrangle sheets by the United States Geological Survey, scale approximately one inch to the mile, the first satisfactory map for detailed field work became available.

The systematic survey of the Adirondack Precambrian region on that base has been prosecuted, as funds permitted, since 1904. There are 60 quadrangles in whole or in part underlain by the Adirondack formations, of which 27 have now been published, with accompanying descriptions in bulletin form, by the New York State Museum. Some half dozen are completed and in course of publication. At the rate of progress maintained hitherto it will require 30 years more to complete the mapping of the region.

The main Highlands region, together with the southward extension of the metamorphic rocks into Westchester and New York counties, occupies parts of 15 quadrangles, of which three have been surveyed and the results published in bulletin form. Field studies have been brought nearly to completion on three additional quadrangles.

Although the Highlands have contributed substantial quantities of magnetite, emery, feldspar, granite etc., and still possess large resources of these materials, their principal value and interest, so far as the public is concerned, lie in their scenic, recreational and educational features, situated as they are almost at the door of New York City and its environs.

REPORT OF THE OFFICE OF BOTANY

(Figures 12, 13)

HOMER D. HOUSE, *State Botanist*

ELSIE G. WHITNEY, *Assistant State Botanist*

Scientific investigations. A general revision of the Annotated List of Ferns and Flowering Plants of New York State, published as Museum Bulletin 254 (1924) has occupied most of the time available for investigative work. As more extended field work is carried on from season to season the distribution of many species becomes more definitely known. Each season brings the discovery of one or more species of plants not previously known to occur within the boundaries of the State. Frequently such discoveries are noteworthy, as is the case of the sessile-flowered trillium (*Trillium sessile* L.) (figure 12) recently found in abundance near Jamestown, Chautauqua county, by Mrs Claire R. Lepar. The occurrence of this beautiful trillium in this State was doubtful until recently found by Mrs Lepar and was based upon a single specimen collected near Rochester by the Rev. Lawrence Holzer in 1863, but not since rediscovered in that region.

Widespread activity in the publication of researches upon the flora of the eastern United States and particularly monographs of critical genera such as *Carex* and *Potamogeton* requires considerable study of our material in order to bring the revision in line with the most recent advances in systematic botany. This publication has served a most useful purpose for those interested in the native and introduced flora of the State and has resulted in numerous contributions to the collections and frequent cooperation on the part of local students of botany.

Extensive collections were made over a period of about two weeks during August along the eastern end of Lake Ontario in continuation of a study of the flora of that region begun by Neil Hotchkiss. This is a region of extensive sand dune formation fronting the lake, back of which are several partially or fully land-locked ponds and marshes.



Figure 12 Sessile-flowered Trillium, *Trillium sessile* L. Photograph by H. D. House.



Figure 13 Sand-binding dune plants, Woodville, shore of Lake Ontario. Along the lakeside face of low dunes south of Woodville, Jefferson county, showing *Ammophila breviligulata*, *Oenothera cruciata*, *Juncus balticus*, *Cakile edentula*, *Scirpus fluviatilis* (scarce), *Salix syrticola*, *Elymus robustus* etc. Photograph by H. D. House.

In many respects it is a fresh-water duplication of ecological conditions prevailing along the southern shore of Long Island, and the studies thus far made indicate that the region affords a most interesting ecological condition. A group of sand-binding plants (figure 13) is shown in the accompanying illustration. Numerous excellent photographs were also secured of the various types of aquatic, shore and sand dune vegetation characteristic of this region.

Noteworthy contributions. Among the outstanding contributions to the State Herbarium during the year are 210 plants from Washington county, collected by Frank Dobbin; 150 plants from northern New York, collected by Dr W. C. Muenscher, of Ithaca; 373 plants from Columbia county, collected by Rogers McVaugh, of Kinderhook, a graduate student at the University of Pennsylvania, working upon a local flora of Columbia county; 120 plants from northern New York, collected by Mrs Gertrude R. Volz, of Massena; 470 plants of New York State, collected by the Assistant State Botanist, Mrs Elsie G. Whitney, in 1931, and 1179 specimens of flowering plants, ferns and fungi collected by the State Botanist. Of these collections about 600 specimens were mounted for the general herbarium and the remainder, unmounted, were distributed in the unmounted or study collection.

Exhibits. The wood collection has been deteriorating in appearance for several years and at least half of the specimens are now worthless. Present plans call for a smaller exhibit of selected new specimens, arrangements for securing which have already been made, with some additional features added in regard to labels and photographs.

Exchanges. Duplicate plant material to the number of several hundred specimens has been sent in exchange to several institutions, including the Gray Herbarium of Harvard University, the New York Botanical Garden, the United States National Museum and Charles University of Prague, Czechoslovakia.

Identifications. The State Botanist and the Assistant State Botanist are called upon annually to make a large number of identifications of plant material. This service varies from the critical examination of large collections being worked upon by local students with a view of publication, to lots of smaller size of flowering plants, mushrooms and ferns. In this connection mention might also be made of the numerous requests for botanical information covering an amazingly wide field of botanical knowledge. This service is

rendered free of charge and as promptly as possible, since it is regarded as the principal means by which the State Botanist can be of service to the people of the State.

Visitors. The large size and scientific value of the botanical collections, particularly the almost classic value of the mycological herbarium, containing as it does the fungi collected and described by Dr Charles H. Peck, former State Botanist, over a period of more than 40 years, makes the Museum a mecca for American students of mycology. Several students and specialists have spent considerable time here during the past year studying the collections in their particular groups.

Cooperation. During the past year the State Botanist, in addition to minor forms of cooperation with other state departments, has actively cooperated with the Buffalo Museum of Natural History in its efforts, under the authorship of C. A. Zenkert, to prepare and publish a flora of the Niagara Frontier region. A large number of specimens have been critically studied and compared with authentic material in the State Herbarium, and all records of plant distribution contained in the State Herbarium which refer to that region, as well as the results of a critical study of the Frank W. Johnson herbarium, mostly collected in western New York, have been placed at its disposal. This work is nearing completion and it is expected that it will be published shortly.

REPORT OF THE OFFICE OF ENTOMOLOGY

(Figures 14-21)

R. D. GLASGOW, *State Entomologist*

K. F. CHAMBERLAIN, *Assistant State Entomologist*

During the fiscal year 1932-33, as in former years, the resources of the Office of Entomology have been devoted largely to cooperative investigations carried on in collaboration with other public and private agencies. Prominent among these agencies are the State Department of Agriculture and Markets, the State Department of Health, the State Conservation Department, the Westchester County Park Commission, the Federal Insect Pest Survey, the General Electric Research Laboratories and various producers of ornamental plants and manufacturers of insecticide chemicals. In several cases, these cooperative investigations have been a continuation of work begun in previous years.

The European pine shoot moth, *Rhyacionia buoliana* Schiff. This insect was first reported in America in 1914. Like many newly introduced pests, it seems to have attracted relatively little notice for some years. In 1929, however, it had begun in southeastern New York to assume the proportions of a major pest; and with the Hewitt reforestation amendment then under consideration, it appeared to constitute a grave menace to the projected reforestation program (figure 14). For this reason, the insect was then made the subject of one of our major investigations.

In 1929 there appeared to be little general interest in the European pine shoot moth. Four years later, however, at the 1933 session, the New York State Legislature amended the gypsy moth law to read "the gypsy moth and/or the European pine shoot moth," and to make both insects subject to the same drastic regulatory measures.

In the meantime, studies of the life history and habits, and experimental studies of possible control measures were begun in collaboration with staff members of the State Department of Agriculture and Markets, of the State Conservation Department and of the Westchester County Park Commission.

Field experiments continued during the current year have indicated that practical control of this insect may be secured by a single properly timed application either of a rotenone bearing pine-oil emulsion, or of an arsenical dust. Preliminary recommendations for nurserymen have been issued in mimeographed form, and a more extended report on this work is now in course of preparation.

The larch case bearer, *Coleophora laricella* Hubn. This introduced case bearer is not only a pest of European and American larch in ornamental plantings, but for many years it has been a source of major damage to American larch (known also as tamarack or hackmatack) in New York forests (figures 15 and 16). Here the growth increment of this valuable tree is seriously reduced; and in places many trees have died as a result of repeated defoliation by the larch case bearer.

Field experiments have indicated that practical control of this insect may be secured by a single properly timed application of an arsenical dust (figure 17). A report on this work is now in preparation.

Black flies (*Simuliidae*). Studies of these bloodthirsty insects, which are seasonally troublesome in nearly all hilly and mountainous parts of New York, have been continued; and control measures of various kinds have been tested both independently and in collaboration

with staff members of the State Department of Health and some of their associates.

Narcissus bulb pests. Cooperative studies of narcissus bulb pests have been continued in collaboration with Long Island narcissus bulb growers and with staff members of the State Department of Agriculture and Markets and of the General Electric Research Laboratories at Schenectady.

Notable among the studies comprised in this project has been a series of experiments to determine the effect upon narcissus bulbs of relatively high temperatures developed in the high frequency electrostatic field of the apparatus developed in the General Electric Research Laboratories by Dr Willis R. Whitney and his associates, which has come to be popularly known as the General Electric "Fever Machine" (figure 18).

Federal plant quarantine regulations now require that narcissus bulbs suspected of being infected with the narcissus nematode or "eelworm," *Anguillulina (Tylenchus) dipsaci* Kuhn., be submerged for four hours in hot water at a temperature of 111° Fahrenheit. As commonly practised, this treatment does not always result in a complete eradication of the disease-producing nematode, and it is regarded by the growers as harmful to the bulbs.

In the hot water treatment, an undesirably prolonged period of soaking is required while the heat from the water is slowly transmitted to the center by conduction through the tissues of the bulb. In the high frequency electrostatic field of the "fever machine," however, the center of a bulb is heated just as promptly and just as rapidly as the surface.

The number and quality of the blossoms may be greatly reduced by the hot water treatment as practised. Yet healthy narcissus bulbs of the variety Olympia subjected for different periods in the high frequency electrostatic field to temperatures of 114°, 118°, 122°, and 126° Fahrenheit produced a full complement of blossoms that were pronounced by an expert bulb grower to be still unimpaired at 122°, and only slightly impaired even at 126° (figure 19). The study appears to be well worth continuing, and a preliminary report is in preparation.

The pales weevil, *Hylobius pales* Boh. This pine weevil has been a serious pest, not only in reforestation plantings (figure 20), but also of young pines growing in nurseries. Studies of this insect, and control experiments have been carried on in collaboration with staff members of the State Conservation Department and the State



Figure 14 Characteristic deformity of red pine caused by the European pine shoot moth, *Rhyacionia (Evetria) buoliana*. Effective control has been secured by a single properly timed application either of a rotenone bearing pine-oil emulsion, or of an arsenical dust. Photograph by R. D. Glasgow.



Figure 15 American larch trees photographed on June 4, 1933. Should have been in full foliage, but had been almost completely defoliated by the larch case bearer, *Coleophora laricella*. Whiteface mountain in the distance. Photograph by R. D. Glasgow.



Figure 16 American larch in mixed stand, photographed on June 4, 1933. Should have been in full foliage; but had been almost completely defoliated by the larch case bearer, *Coleophora laricella*. Whiteface mountain at left. Photograph by R. D. Glasgow.



Figure 17 Tops of two adjacent young larch trees photographed on the same negative on June 25, 1933. Treated at right, untreated at left. More than 95 per cent of the early foliage was saved by a single properly timed application of an arsenical dust. Photograph by R. D. Glasgow.

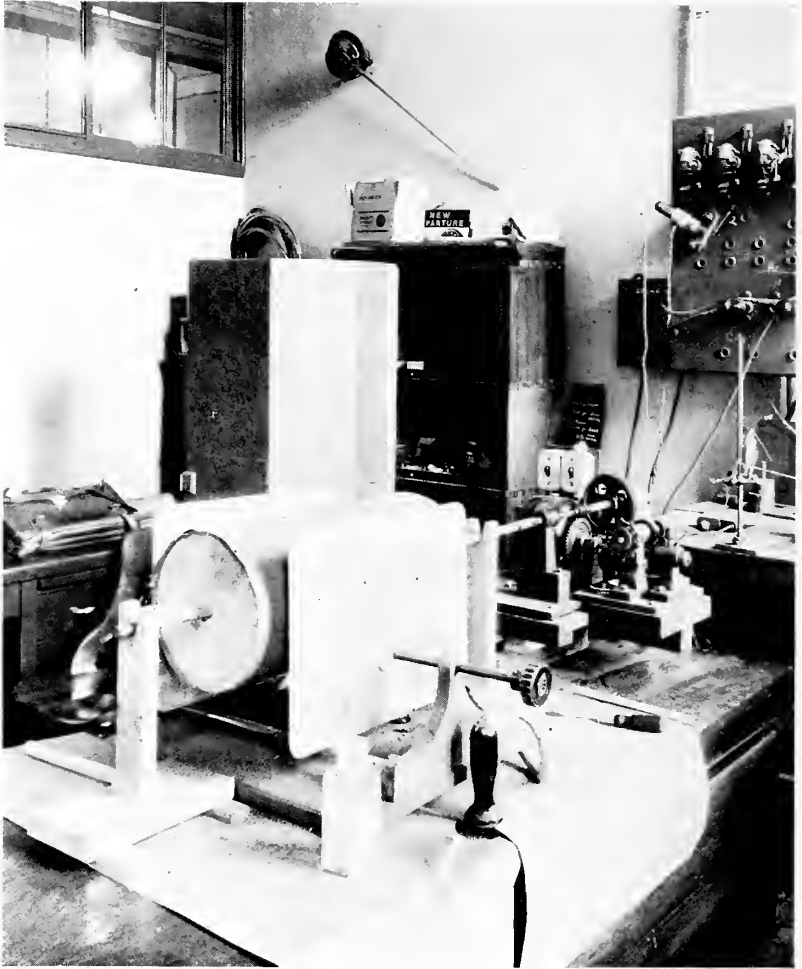


Figure 18 "Fever machine" in the private laboratory of Dr R. Whitney, director, General Electric Research Laboratories, Schenectady. With drum and mechanism developed by Doctor Whitney and A. N. Page, by which quantities of daffodil bulbs might be kept in rotation in the high frequency electrostatic field between the two aluminum plate terminals of a high frequency oscillating circuit comparable to that which generates the carrier wave in a short wave radio broadcast circuit. Here the bulbs could be heated quickly and uniformly from center to circumference to any desired degree, and the temperature maintained as long as desired. Photograph by R. D. Glasgow.

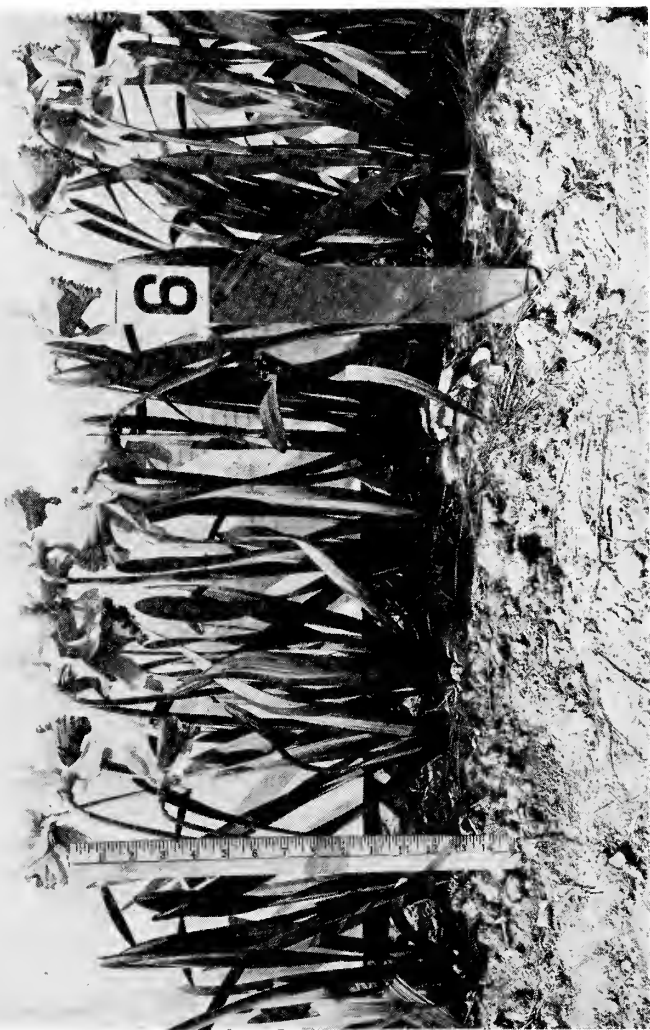


Figure 19 Daffodils from bulbs held at a temperature of 122° F. for 30 minutes in the high frequency electrostatic field of the General Electric "fever machine." Number and quality of biosoms pronounced by expert grower to be in no way inferior to those from untreated bulbs in check plot. Photograph by K. D. Glasgow.

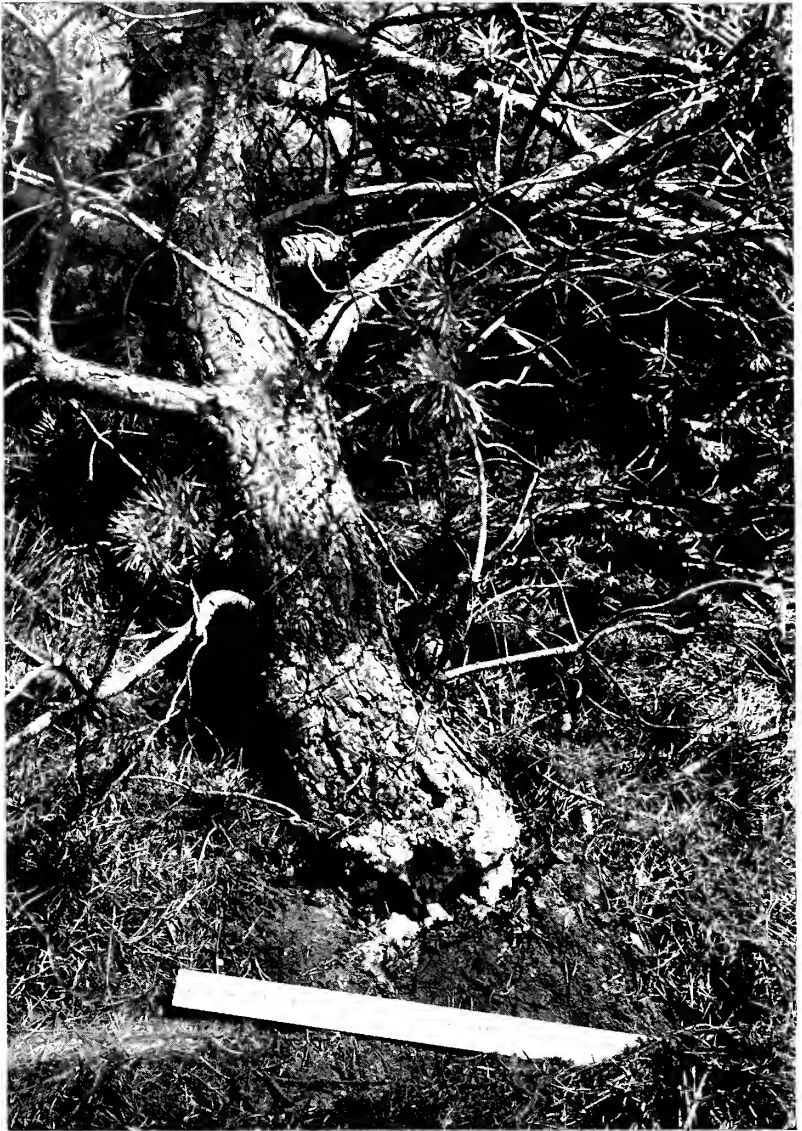


Figure 20 Injury by the Pales weevil (*Hylobius pales*) has caused many Scotch pine trees in reforestation plantings to break off at the surface of the ground. Photograph by R. W. Glasgow and K. F. Chamberlain.



Figure 21 Portion of a group of 40 Chinese juniper trees at the Doubleday-Doran "Country Life Press," Garden City, Long Island, valued at \$25 each. Were very severely damaged by the Juniper web-worm (*Ypsolophus marginellus*) in the spring of 1932, and had been listed for destruction. Were completely restored by a single experimental application of a rotenone bearing pine-oil emulsion. Photographed May 20, 1933, by R. D. Glasgow.

Department of Agriculture and Markets, and with municipalities and nurseries troubled by this pest.

The juniper webworm, *Dichomeris (Ypsolophus) marginellus* Fab. This webworm is sometimes very destructive to junipers in ornamental plantings and in nurseries (figure 21). Control measures usually recommended have not always proved effective as used by nurserymen and others, and have had the disadvantage of leaving objectionable spray residues. Control experiments carried on in collaboration with staff members of the State Department of Agriculture and Markets and with nurserymen and private owners concerned with these problems have developed important improvements in the control of this insect. A rotenone bearing pine-oil emulsion has been found to penetrate the webbed masses of foliage, and when properly applied, to give a 100 per cent kill. A report on this work also is now in preparation.

Other projects. Studies and control experiments have been carried on in collaboration with staff members of the State Department of Agriculture and Markets, of the Westchester County Park Commission and with communities and nurserymen concerned, in a search for improved methods of control for the Spruce gall aphids, *Adelges abietis* L. and *Adelges cooleyi* Gill., for the boxwood leaf miner, *Monarthropalpus buxi* Lab., for the arborvitae leafminer, *Argyresthia thuiella* Pck., and for the cankerworms, *Alsophila pometaria* Harr., and *Paleacrita vernata* Peck.

Observations on the progress of the birch leaf mining sawfly, *Phyllotoma nemorata* Fallen, in its spread across the State have been continued. This European species, which was first observed in Nova Scotia about 1905, and first reported in New York in 1930 (R. D. Glasgow, Jour. Econ. Ent., 25: 693-95, and also N. Y. State Mus. Circular 6), has spread across northern New England and northern New York in recent years with almost explosive velocity.

Interdepartmental cooperation. Our work has turned very largely to the investigation of emergency insect problems undertaken at the request of other Albany departments of the State Government. Many urgent demands for the investigation of still other insect problems have come to us during the year; but with our present staff, and with the meager resources at our disposal, it is impossible to do more than we have been doing. The Office of Entomology should have a larger staff and larger resources in order more adequately to provide the technical scientific service that it is expected to give.

Large state reference collections of insects and an excellent entomological reference library are in the State Museum Office of Entomology at Albany. These facilities are essential for the successful study of special emergency insect problems with which other primarily administrative state departments at Albany are often confronted.

Such special emergency investigations need not conflict in any way with the excellent, but more often long-time, investigations that are carried on at the State College of Agriculture and experiment stations or at the State College of Forestry. These otherwise fully competent institutions are also precluded by distance from providing the close personal cooperation between the administrative officer and the technical entomologist that is regarded as indispensable in special cases, and which is certain to be provided at Albany by the other state departments themselves, even if less economically and less efficiently, unless such personal cooperation can be provided by the State Museum.

The responsible officers of these state departments, while not trained entomologists, usually wish to keep closely in touch with such special emergency investigations as they progress, in order to use immediately any new information that may bear upon their own administrative duties. The employment of entomologists by such other state departments without the facilities of the State Museum could not assure a service equal to that which could be provided by the same men on the staff of the State Museum Office of Entomology with its large accumulation of reference materials and its entomological reference library.

The possession of these reference facilities at Albany, therefore, might seem to place upon the State Museum and the Education Department an undeniable obligation to provide, for other primarily administrative departments at Albany, an urgently needed type of emergency entomological service that can not be provided independently of the State Museum by any other agency in the State.

General routine. In addition to routine care of and work on the insect collections, the Office of Entomology has continued its cooperation with the Federal Insect Pest Survey and has carried on its usual service to correspondents who inquire about insect problems of many kinds; and many additions to the insect collections have been made both as a primary objective, and as a result of our entomological investigations and our correspondence service. Such additions are noted in the general list of accessions to the State Museum collections,

Insects and the Dutch elm disease. Many notable insect pests have appeared prominently during the year. Among these the elm leaf beetle, *Galerucella luteola* Mull. (*xanthomelaena* Schrank), was again particularly abundant and injurious in the eastern and southeastern parts of the State; and in many parts of southeastern New York the fall cankerworm, *Alsophila pometaria* Harr., again defoliated the elms as well as many other species of trees and shrubs.

The conjunction of these two pests through several successive years, with a corresponding series of unusually dry seasons, has been particularly unfortunate just prior to the time when the newly introduced Dutch elm disease appeared in the New York metropolitan area. The cumulative drought injury from several successive dry seasons, intensified each season by cankerworm defoliation in May, and by a second defoliation in late June and July by the elm leaf beetle, has so weakened many elm trees that the elm bark beetle population has had an unusual opportunity to increase.

Some of the elm bark beetles (at least the European elm bark beetle, *Scolytus multistriatus* Marsh), appear in America to be the chief disseminators of the Dutch elm disease, which apparently threatens to destroy the elm trees on our city streets and in our parks and woodlands as it is now destroying the elm trees in Europe, and as the chestnut blight has destroyed the chestnut trees in our forests. Observations have been made on this situation, which has immediately become a problem of first magnitude, and one that will demand the utmost efforts of our state and federal governments to avert such a national calamity.

Since control of the Dutch elm disease appears in part, if not very largely, to be an insect problem, and since all official research work on insect problems in New York has been carried on by scientific agencies within the State Education Department, steps should be taken to provide for departmental cooperation in any program that may be developed to meet this emergency.

REPORT OF THE OFFICE OF ZOOLOGY

(Figures 22-25)

DAYTON STONER, *State Zoologist*

WALTER J. SCHOONMAKER, *Assistant State Zoologist*

General. The present incumbent in the position of State Zoologist of the New York State Museum received official appointment on October 17, 1932. With the assumption of his duties the State

Zoologist immediately began to reorganize the office routine and procedure in an attempt to reestablish and promote the activities necessary to the resumption of more effective participation in the affairs of the Museum.

Correspondence and office routine. During the course of each year considerable correspondence is necessary in answering inquiries concerning zoological matters. These inquiries deal with such items as the occurrence, abundance and identification of various animals, requests for information regarding their habits and economic relations and requests for literature concerning natural history subjects. In addition, considerable time is spent by the members of the staff in identifying and caring for specimens sent or brought in to the laboratory, and many informal conferences are held with individuals who come for information, suggestions and advice.

The maintenance of our card files carrying current notes regarding the occurrence, distribution and other records of New York animals is an ever-present obligation and duty of our staff.

This office is frequently called upon for loans of museum material. Within the past year more than 100 specimens of fishes, reptiles, birds and mammals have been lent to individuals or institutions for study, demonstration or display. This important phase of activity has been encouraged and a system of records is kept of these official loans.

In an attempt to establish and maintain an orderly record of the property an inventory of all its major materials and equipment has been made. As each new item is received it is listed in this inventory, which is filed on 3 x 5 library cards and is easily accessible at all times. Card files of all the exhibit cases in Zoology Hall, together with their contents and data on the care the cases and specimens have received, also have been made as well as a file showing books lent to the Office through the State Library.

Study collections. The two principal methods by which additions are made to the zoological collections of the State Museum are through donations by friends and others interested in the Museum and through collection by members of the staff. In the case of staff members specimens are often taken in the course of the prosecution of field investigations and research problems.

Within the past year additions have been made to our study collections, as are indicated in the List of Accessions.

In some groups of animals large series of specimens are available for study and examination. The fauna of the State is particularly well represented in the Museum's collections of mollusks, spiders

and other arachnids, myriapods, fishes, amphibians, reptiles, birds and mammals. While most other groups are represented in some measure the series is not so complete.

Exhibits. One of the duties of the office is the care of the exhibits of animal life (except insects) housed in Zoology Hall.

Zoology Hall contains about 15,000 square feet of floor space, which, exclusive of approximately 2500 feet given over to the display of insects arranged in 15 cases, carries 71 wall, stationary floor and portable floor cases of various shapes and sizes in which are displayed the other forms of animal life (figure 22). For the most part these exhibits include only those animals of New York State. A few exotic invertebrates, principally in the way of hard corals, are displayed. The amphibians, reptiles, birds and mammals are best represented.

Exhibit materials and cases require frequent attention and rearrangement if they are to remain attractive to visitors. One of our principal efforts during the year has been directed toward rearranging the synoptic series of mounted birds to harmonize with the more modern notions of classification. This necessitated the removal of all the mounted birds—about 400 species, most of which are represented by two or more specimens—the renovation of the interior of the cases, readjustment of shelving and the replacement of specimens and labels. The display now shows in linear series from “highest” to “lowest” practically all the birds known to occur or to have occurred in New York State.

Among the birds collected, mounted and added to our exhibit series during the past year are a female American merganser, an eastern goldfinch in winter plumage, two starlings in winter plumage, an eastern phoebe and a female ring-necked pheasant.

The six large floor cases containing the exhibits of domesticated pigeons and poultry also have been renovated and the specimens rearranged to better advantage.

The position of 11 small portable unit cases containing bird groups has been changed to conform with the arrangement of the synoptic series of birds and the labels are now in course of revision and readjustment.

The floor cases containing the small mammals and the skeletal material also have been renovated and the contents rearranged. A rattlesnake skeleton, the skulls of a copperhead and a water snake, two fish skeletons and a pigeon skull are among the notable additions to the skeletal display within the past few months.

The portable cases containing the muskrat, skunk and opossum groups have been given more advantageous places in the hall and the labels have been framed and otherwise improved.

The case in which are exhibited the examples of New York amphibians and reptiles always attracts a great deal of attention. This display also has been rearranged and casts of several species of salamanders and preserved specimens of two species of heretofore undisplayed lizards have been added to this exhibit.

The small and wholly inadequate invertebrate exhibit, consisting of specimens in fluid, has received some attention in the way of refilling the containers and rearranging the representatives of the several groups. Adequate display materials in two unrepresented groups, the spiders and myriapods, are available, and immediate preparation of a suitable exhibit will be undertaken.

A valuable exhibit and one requiring frequent attention is the Benjamin Walworth Arnold collection of birds' eggs. Both the cases and their contents have had frequent examination and attention during the past year.

It has been possible to obtain for more or less temporary displays (figure 23) two old portable museum cases each with a floor area of about 25 square feet. In one of these have been placed several small bird groups which under present conditions are scarcely sufficient in themselves to command the dignity of individual cases. The scarlet tanager, northern shrike, yellow-billed cuckoo and rose-breasted grosbeak constitute this assemblage.

One of our most popular exhibits has been housed in a portable case similar to the one just mentioned. Its display area has been increased to about 32 square feet by the installation of wood shelving built in the form of a pyramid. Between January 1 and June 1, 1933, a series of three temporary seasonal displays showing respectively the principal species of winter, early spring and May birds occurring in the Albany district has been exhibited. To each of these displays additions were made as the season progressed until at the time the display was removed more than 50 species of late spring birds alone were on exhibit in this case. Following the seasonal bird display a temporary exhibit of some of the recent zoological accessions in the Museum was installed. This will be followed by other temporary exhibits the nature of which will depend upon various factors and the availability of suitable material.

In addition to the dried study skins, skulls and specimens preserved in fluid, the Museum possesses also a series of mounted birds, fishes,



Figure 22 Partial view of the exhibition Hall of Zoology, 1933. Photograph by E. J. Stein.



Figure 23 Temporary exhibit of recent zoological accessions. Photograph by E. J. Stein.

mammals and reptiles together with some skeletal material which, for various reasons, is not suitable for display. These specimens have been in part rearranged so that they are more accessible when and if desired. Some of this material is suitable for loans, study or exhibit purposes; a part of it may be used for exchange. Until a more complete inventory can be taken, however, final disposition of these materials can not be satisfactorily undertaken.

Field work and investigations. Due in part to pressure of routine office duties field investigations of the staff have been somewhat curtailed during the year 1932-33.

The week beginning April 17, 1933, Mr Schoonmaker spent afield in the Capital District in an attempt to secure desirable specimens of birds for our study and exhibit collections. He was successful in obtaining 29 examples representing 14 species; all are useful in augmenting our series. The most important of these is a specimen of a female American morgananser heretofore not represented in the exhibits. This specimen, among others, has been mounted by Mr Paladin.

It has been possible for Mr Schoonmaker to continue limited field observations on and collecting of the mammals of Rensselaer county, the work which constitutes his major field project. Records, data and material are slowly being brought together which will serve as the basis of a proposed publication.

The field activities of the State Zoologist have been confined largely to a continuance of his studies on the breeding habits of the bank swallow in the Oneida Lake region and to investigations of the temperature, distribution and intimate family life of this bird in the Capital District. These studies are being carried on in part by the banding method which is sponsored and promoted by the United States Biological Survey.

Previous to the summer of 1933 Mrs Stoner and the State Zoologist had banded in the Oneida Lake region more than 1300 bank swallows. Only five days, May 22d to 26th, inclusive, during the present season were available for continuing this project. In this time 204 new adult birds were banded, while in addition 12 birds banded in previous seasons were recovered (figure 25).

Our studies of the bank swallow in the Capital District are, for the most part, dependent upon intensive banding operations in a few selected localities (figure 24). In the season of 1933 both the male and female of more than 20 nesting pairs of birds in two small sand pits were banded. In addition the offspring of some of these pairs

were furnished with the numbered metal tags. In order to maintain the record as complete as possible over a period of several seasons the burrows from which these pairs of birds and their families have been banded also have been marked. Some of the points on which it is hoped information will be furnished by this experiment relate to the proportion of birds returning to breed in the exact spot where they bred or were reared the preceding season, the intimate family and colony relationships of these individuals and the status at the time of occupation of any old burrow that may be inhabited for more than one season.

Other activities. Supplementing four press releases dealing specifically with the temporary exhibits as they were installed, several short releases to the press regarding the needs and activities of the Zoology Office have been prepared. These articles have been published not only in local and state newspapers but in out-of-State newspapers as well as in technical and semitechnical journals.

Once each year a Bird Day Number of the Bulletin to the Schools is devoted to the interests of our feathered friends. For some time it has been the custom of the State Museum to cooperate in the preparation of this number. This year the State Zoologist contributed an illustrated article and solicited all but two of the 12 articles comprising the number. The Assistant State Zoologist also contributed a wash drawing which was reproduced on the cover page.

In early spring the State Zoologist cooperated with the Fort Orange Council of Boy Scouts in acting as one of the judges in a bird house building contest sponsored by the council, and late in the spring the Assistant State Zoologist served as one of the judges in the National Humane Society trap contest held in Albany.

Conclusion. Plans for the future and the apportionment of time to be devoted to various activities suggest that it is best to carry forward one or two or a limited number of projects rather than to promote simultaneously several lines of endeavor. In the end, such a program should result in the gradual betterment of the exhibit and study collections, of office and research procedure and of general accomplishment in this Office.

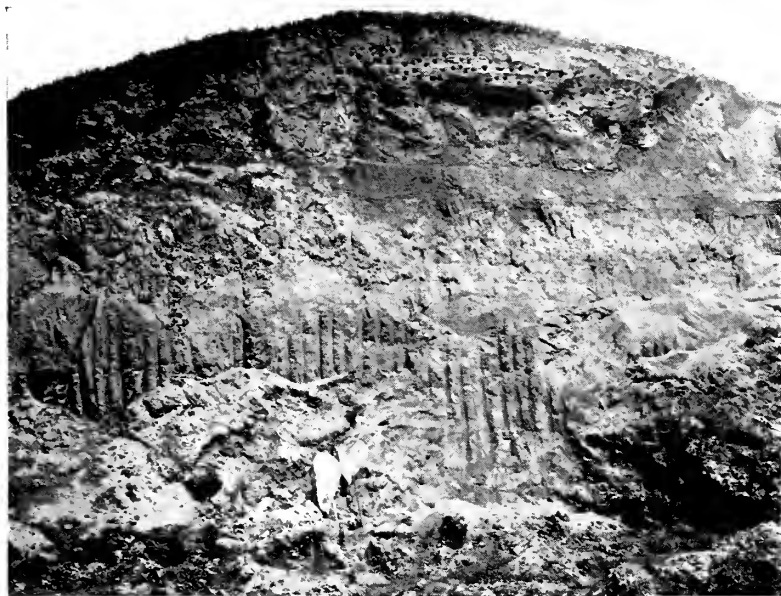


Figure 24 Bank swallow colony at Slingerlands, N. Y. Photograph by Dayton Stoner.



Figure 25 Two banded adult bank swallows, *Riparia r. riparia* (Linn.). Both these birds were banded in the summer of 1931. Recovered May 24, 1933. Photograph by Dayton Stoner.

REPORT OF THE OFFICE OF ARCHEOLOGY

NOAH T. CLARKE, *State Archeologist*

The field of archeology in New York. In the area which we call New York State, Nature played an important part in the division and distribution of human groups during aboriginal times. Because New York was rich in the natural resources of navigable rivers, streams and lakes, and also because it touched the sea, long distances were traveled and intertribal communication was easy, compared with some other areas. Mountains and woodlands were a source of food, clothing and fuel, and fertile lowlands encouraged agriculture.

In the study of archeology and ethnology in relation to the State, it is the purpose of this Office to enlarge our knowledge of the history and prehistory of these Iroquois and other stocks that preceded them here. In recent years it has been clearly demonstrated that there is a genuine and ever-growing popular interest in such subjects as the origin, development, manners, modes of living, customs, arts, industries, religion and mental characteristics of these people. Unfortunately we are confined within the artificial barriers or boundaries of the State to find our answers. The citizens of the State of New York, however, have the right to expect the same fulfilment of their demands for information on matters of archeology and ethnology as is furnished by the State Museum in its other scientific fields. Such information, though it be through the visual instruction of the Museum display or the published results of research, can be disseminated only in proportion to the combined encouragement given by the public and the State Museum to this branch of education.

Public service to archeology. Through the interested citizen we learn of Indian village, camp, fort and burial sites which he may discover in his locality. We learn of his special interests which perhaps we can further; of his collections and that of his neighbor, and much other relevant and useful information for our office files. The Archeologist believes, however, that the State Museum can render a greater service to the average citizen if he will take a more active interest in his State Museum by making a more personal use of it.

To the amateur archeologist and collector this office would suggest that a liberal portion of his collecting effort be spent in salvaging the quantity of Indian materials, scattered throughout the farmhouses and barns of the State, from the inevitable rubbish heap and oblivion.

Should these materials, with all data concerning them, be gathered, recorded and forwarded to the State Museum, a great service would be rendered to science, the State and posterity.

In making a collection of archeological specimens, the importance of meticulously recording and preserving all known facts concerning "finds" which have been won from the soil at the expense of great labor, time and perhaps money, can not be overstated. The relative position and association of cultural materials, together with other distinctive circumstances, all contribute toward the scientific value of one's collection when these data are preserved. The Indian artifact in itself, without data, is not worth scientific recognition. Because of the story it tells it becomes of value.

Forgery of archeological objects. Of recent years, especially during these times of economic distress, many spurious archeological specimens have made their appearance in New York State. In order that the practice of manufacturing forged Indian materials might be stopped, and as a protection to the science of archeology, the State Legislature passed a law which is printed, herewith, in the hope that it will convey its own message (Laws of New York, 1923. Chapter 90).

AN ACT to amend the penal law, in relation to the reproduction or forgery of archeological objects.

Became a law March 23, 1923, with the approval of the Governor. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1 The penal law is hereby amended by adding at the end of article eighty-six a new section, to be section nine hundred and fifty-nine, to read as follows:

§ 959 **Reproduction or forgery of archeological objects.** The reproduction or forgery of any archeological object which derives its value from its antiquity, or the making of any object, whether copied or not, with intent to represent the same to be an original and genuine archeological specimen, with intent to deceive or offer such object for sale or exchange, representing the same to be the original and genuine; or knowingly to have possession of any such reproduced or forged archeological objects, with intent to offer the same as original and genuine, is a misdemeanor punishable by a fine of not less than twenty-five nor more than two hundred dollars or by imprisonment in the county jail for not more than ninety days, or by both such fine and imprisonment.

§ 2 This act shall take effect September first, nineteen hundred and twenty-three.

Routine activities. During the past year the State Archeologist has of necessity confined himself principally to routine of the office. This consists of making identifications and rendering opinions on much material submitted to this office; giving information to the

Attorney General's Office, to professional artists, playwrights, journalists and other writers; supplying loan collections to study groups and institutions; giving talks to school children; furnishing appropriate Indian names for public and private use; answering innumerable questions concerning the field of archeology and ethnology through office calls, as well as by correspondence; accessioning, cataloging, with cross index, all new scientific material received.

A survey of the study collections in storage has been under way in order to examine and classify the duplicate archeological material. In this way it may be sorted according to localities of the State and also make it possible to determine just what artifacts are characteristic, according to the frequency of occurrence, to certain areas. This work has liberated certain specimens for loan and exchange purposes.

It has been a practice of this office to seek all possible information regarding the privately owned collections throughout the State. This involves, for the most part, personal calls by the State Archeologist himself, with the thought that he may keep informed of valuable material, as well as encourage collectors so that eventually the State Museum will be the logical and safe repository for their collections. Many inspections have been made during the past year in the counties of Madison, Oswego and Jefferson and data have been filed in this Office. One extensive collection from Columbia county has been donated to the Museum as a result.

Exhibits. The general impression gained by the average visitor is favorable, but there is need of attention to certain details regarding appearance which can not be ignored if improvement is to be made. The walls and ceiling of the Hall of Ethnology have recently been painted but the hallway connecting the Indian Groups should receive attention.

In view of the fact that it seemed desirable that the Museum should have a historical exhibit, the Alvin H. Dewey Collection, in the former lecture hall, was placed in storage, so that the cases and the hall are now available for historical collections.

MUSEUM COLLABORATORS

On April 18, 1929, the Regents authorized the Director of the Museum to appoint Collaborators, who would assist in the scientific and other phases of the work of the Museum. Dr George H. Hudson was appointed for his second term of three years which expires

June 1934. Dr Ephraim Porter Felt, former State Entomologist of the State Museum staff, was reappointed; his second term expires in October 1936. These Collaborators have continued their active interest in the Museum.

MUSEUM COUNCIL

Figure 26

The State Museum Council is an advisory group appointed by the Board of Regents to promote the general welfare of the Museum. A meeting of the Council was called for December 5, 1932, but was postponed on account of the conflicting dates of the members.

The death of Dr Benjamin Walworth Arnold (figure 26) on November 8, 1932, is a severe loss to the Council and to the State Museum, as Doctor Arnold had for many years been a devoted friend of the State Museum. His outstanding donation to the Museum was the Arnold Collection of birds' eggs, which was described in the 14th Report of the Director of the Museum (State Mus. Bul. 207-8, p. 20-21, 1918). A few years ago Doctor Arnold made a generous offer to the Museum that was intended to provide a natural history preserve or sanctuary, near Albany, but his proposal did not find sufficient additional support to achieve its accomplishment. Doctor Arnold also donated valuable collections of living and fossil Echinoderms to the Museum. He took great pleasure in collecting various kinds of scientific and historic objects, and always maintained an active interest in the plans for the advancement of the State Museum. His memory will long be cherished as a loyal friend and supporter of the Museum. (*cf.* Bulletin to the Schools, 19: 89, 1932.)

GENERAL ADMINISTRATIVE PROBLEMS

Personnel matters. Regarding the salaries of Civil Service employes the Association of State Civil Service Employees has issued two publications: "Facts about Salaries Paid State Employees in New York State," Albany 1932; and "Cost of Living and Price Trends and Their Relationships to Salaries Paid to Employees of the State of New York," by Daniel E. Bellows, Albany 1933. These publications are of special value, as they assist one in acquiring a proper perspective for the salaries of Civil Service positions.

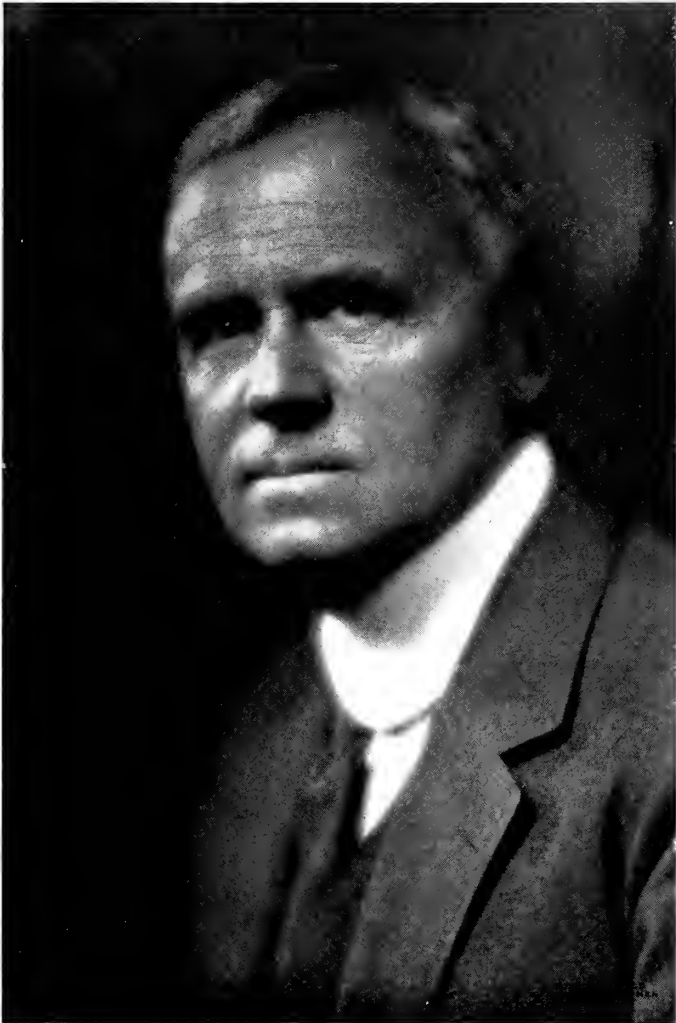


Figure 26 Dr Benjamin Walworth Arnold. Member of State Museum Council; Honorary Curator of Birds. Died November 8, 1932.

The centenary of April 15, 1936. On April 15, 1836, the Legislature authorized the establishment of the State Geological Survey, which was the ancestor of the present New York State Museum, the legal history of which is fully presented in a previous report by William E. Hannan (State Mus. Bul., 293, p. 59-80, 1932). Attention is called to the appropriateness of celebrating the one hundredth anniversary of this important event in the history of state scientific and educational work so that appropriate plans may be matured.

ANNUAL FINANCIAL AND STATISTICAL SUMMARY

THE MUSEUM BUDGET

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

Facilities provided by cooperative projects supplement to an important degree the state appropriation. It is impossible to estimate the amount of these funds precisely, since they include the federal franking privilege, cooperation with many individuals, with organizations and with other state departments. Labor, supplies, expert services, use of automobiles etc. have been provided by this cooperation. Such financial assistance is of the greatest value; but the funds do not pass through the Museum.

The annual and statistical summary for the fiscal year July 1, 1932, to June 30, 1933, follows:

APPROPRIATIONS AND FUNDS FOR FISCAL YEAR

(July 1, 1932 to June 30, 1933)

APPROPRIATIONS

Salaries:

Administrative staff	\$9 000 00
Permanent scientific staff.....	33 450 00
Temporary expert services.....	2 850 00
Scientific assistants	5 200 00
Clerical, labor etc.....	10 220 00
Total salaries	\$60 720 00

NOTE. All salaries of over \$2000 subject to deduction of 6 to 15 per cent.

Equipment and supplies.....	\$3 000 00
Traveling (of which not to exceed \$200 is available for out-of-State travel)	2 450 00
Printing	8 500 00
Total budget	<u>\$74 670 00</u>
Total Museum funds from budget, <i>exclusive</i> of the assistance of cooperators and the reduced salaries..	<u>\$74 670 00</u>

DIRECTORY DATA

Name of Museum: New York State Museum.

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

Name of Director: Charles C. Adams.

Name of Assistant Director: Alvin G. Whitney.

Date of Founding: The Museum is, the outgrowth of state surveys begun in 1836; formal organization of the Museum was effected in 1843.

Open to the public: Open week days from 9 a.m. to 5 p.m. Closed on Sundays and on all legal holidays.

Total number of hours open to the public for the year, about 2430.

Staff:

Administrative officers	2
Permanent scientific staff	11
Technical and clerical assistants, etc.....	11
Part-time employes (expert service).....	9
Work-relief employes (beginning March 9, 1933).....	1
Total staff	<u>34</u>

Salary schedules, 1932-33:

Administrative	\$3000 to \$6000
Scientific professional staff.....	\$1720 to \$4500
Technical assistants (nonprofessional grade).....	\$1600 to \$2000

Hours and vacation:

Hours of work a week, 38½

Vacation allowance, 16½ working days of 7 hours, and all legal holidays.

NEEDS OF THE STATE MUSEUM

THE GENERAL FINANCIAL PROBLEM

During the present period of extreme economic and social stress, it may seem inopportune to emphasize the scientific and educational needs of the State Museum. It is just during such times, however, that the essential facilities for the conduct of its work must be emphasized. The State Museum went through the recent, so-called period of "prosperity" without sharing in the normal increases that should have accompanied the expansion of those activities and industries which are most closely related to the various natural resources, and to whose study the State Museum has given so many years of active work.

The State Museum moved into its present quarters on the top floors of the State Education Building in 1912. It has therefore been over

20 years in its present location, and a general comparison of its status during these years, and as of June 30, 1932, will furnish a general background for a discussion of its present needs.

1 The total amount paid on regular salaries in 1912 was \$35,340, and in 1932, \$60,870, an increase of \$25,530 in 20 years. During this interval there have been extreme fluctuations in the cost of living and in the purchasing power of the dollar, and scientific and educational institutions, including museums, have undergone one of the greatest periods of expansion in their history, just previous to the slump in 1929. The number of persons on the staff in 1917 was 28, and in 1932 it was 24.

2 Equipment and supplies, traveling expenses and temporary scientific expert services were not segregated from 1912 to 1916, and remained at \$10,000. In 1932 the allotment for equipment and supplies was \$5000; that for traveling, \$3300; and for temporary expert services, \$3000. This was an increase of only \$1300 in 16 years. During this period the transition has been made from the horse to the automobile, as a means of conducting field surveys and studies, and in spite of the obligation to conduct statewide scientific, economic and educational surveys, no automobile has yet been provided, which of course makes an excessive drain on the very limited allotment of \$3300 for traveling expenses. Other state departments with similar statewide field work have large numbers of automobiles.

Between 1918 and 1920 the allotment for equipment and supplies was \$5000, and for traveling expenses \$2000, except in 1920, when the allotment was increased to \$2300. The appropriation for temporary scientific services remained at \$3000 since 1917, or for 15 years. From 1918 to 1932, 14 years, there was no increase in funds for equipment and supplies.

3 In order to keep the Museum open on Sunday, from 1912 to 1916, the staff worked without pay, but in 1916 the sum of \$2500 was appropriated for payment for this extra service. This amount remained stationary for ten years, until 1926, when it was increased \$1000. Of the total, \$1020 was allotted to the Museum staff for these services, and the remainder was used for the compensation of other members of the Department concerned with the Sunday opening. There has never been adequate Sunday supervision. With the depression there has been no allotment for Sunday opening for the past two years, and the State Museum has therefore been closed on Sundays.

4 The printing allotment in 1926 was \$8000. This amount has been insufficient to print all manuscripts. The maximum for printing in recent years was \$10,000.

The financial summary for the past fiscal year shows that the State Museum budget was about \$75,000, to which has been added assistance in the form of cooperation. Unfortunately the financial value of cooperating agencies can not be estimated. In this connection the salary reductions should be recalled, and furthermore, as measures of special economy the budget allotment for items other than salaries was not all spent.

In previous Annual Reports attention was called to the fact that, considering the broad policy laid down by the law, providing for the State Museum to conduct scientific surveys of the minerals, plants, animals and natural resources of the State, and including as well the history, industries and arts of the State, the budget which has been provided for the past 20 years is wholly inadequate. When we recall that the neighboring state of Pennsylvania spends on its geological survey alone about \$67,500 annually, Illinois \$125,000, and California about \$63,000, we realize that the leading industrial and financial State of the Union has not provided adequately for the much more comprehensive obligations of the State Museum.

THE CURRENT FINANCIAL PROBLEM

At present the State Museum budget is about \$75,000, a sum less than that which any prosperous city of 100,000 might well provide for the support of a municipal museum. Until the State Museum budget reaches \$250,000, it can not function adequately and meet the public needs in any adequate fashion.

SCIENTIFIC AND HISTORIC RESERVATIONS

No satisfactory policy has been put in practice for the care of state scientific and historic reservations. The present situation is anomalous, and important opportunities have been and are slipping away. Too often the public looks upon such reservations merely as a passive exhibit and not as an active scientific and educational agency contributing positively to our knowledge and to public education. The State Council of Parks has recommended that these state reservations be transferred to the Education Department for administration.

The present passive state policy regarding scientific reservations raises the question as to what is the best method of administering them. Probably several methods should be used. The Director believes that the present method must further be supplemented by privately endowed state reservations. In the 24th Report of the Director (Mus. Bul. 288, p. 51-56, 1931) a system of reservations

for the State Museum was urged. There should be at least a limited number of these in various parts of the State, so carefully selected as to be worthy of a permanent staff devoted exclusively to local scientific studies that can be advantageously made at such locations. Some of these reservations might well be permanent bases for a variety of scientific work, particularly in the biological sciences. State parks will be suitable for certain kinds of studies, but their aims are so different that they can not be expected to be a substitute for the scientific reservations. These parks also have their own scientific problems that call for study.

Some of these reservations could be made to serve as important agencies in the encouragement of local scientific work, by providing camps and laboratories, similar to that of the Allegany School of Natural History in the Allegany State Park, and by encouraging mature naturalists, teachers and scientists to make them bases for year-round or summer research and constructive work. There are many city laboratories, seaside laboratories and similar facilities for indoor studies, but none whatever for year-round inland, outdoor or field study or research. Such a reservation would not be a school in any sense of the word, but a field base, camp or workshop where productive scientific field work could be conducted advantageously.

RESEARCH FELLOWSHIPS

Cooperative research with various industries has been found to be mutually advantageous. Such cooperation may be conducted by several methods. A method that deserves particular commendation is by the establishment of research fellowships. By this method the cooperating agency would finance the work of capable research assistants or fellows, who work under the direction of a member of the State Museum staff on a problem in which the cooperator is particularly interested. The results of such studies should be published by the State Museum and thus made public. In 1929 a fellowship of this kind was initiated with the narcissus bulb growers on Long Island, working under the direction of the State Entomologist. This is a method that could be considerably expanded to advantage.

GROUND WATER RESEARCH

As the population of the State increases, the demand for underground waters for public and private supplies, as well as for industrial use, increases very rapidly. One-half of the public waterworks of the State obtain all or part of their supplies from ground waters.

The mode of occurrence, the quality and the quantity of the water are thus of great importance, as was particularly realized during the severe droughts of recent years. Millions of dollars are invested in public water supply plants, and the delivery or sale of water to the consumer makes it one of the most important mineral resources of the State. The products of the mines and quarries during prosperous times have for a single year amounted to more than \$100,000,000 worth of raw materials, and it is not unlikely that the ground waters are worth considerably more than half that amount. Although the State Museum has collected observations and records on this subject for many years, it has never had the funds, men and equipment to make an adequate statewide study of this vital problem.

NEW STATE MUSEUM MEMORIAL BUILDING

For many years the crowded condition of the State Museum has been regularly emphasized in the Annual Reports. In the 25th Report (Mus. Bul. 293, p. 81-97) a rather full summary was presented of the various proposals that have been made for a new Memorial State Museum Building. With the economic depression those plans have been allowed to rest, but at any time that a state program for extensive public works is undertaken to relieve the unemployment situation, the proposed Memorial State Museum Building should be included. In anticipation of such a possibility the provisional plans already made should be completed and made ready for utilization.

TEMPORARY STORAGE SPACE

Pending the construction of a new State Museum Memorial Building the problem of temporary storage for collections is becoming more acute every year. The hallways or corridors have been utilized for storage because there was no adequate provision made for storage when the Education Building was planned; yet this has been discouraged for various reasons. The crowded condition of the store-rooms is a menace to the collections, and the materials can not be consulted and used.

DONATIONS TO THE MUSEUM

In spite of the preceding statement as to the need of storage space for the Museum collections, it is desirable to inform the public that the State Museum welcomes donations of:

1 Scientific collections of natural history materials, minerals, fossils, rocks, and specimens of plants and animals, particularly when accompanied by scientific data.

2 Historical collections of objects illustrating the history of New York, Indian materials from New York, objects of the Colonial period and the Revolutionary period, household and industrial equipment. Materials illustrating the history of the professions are particularly desired, such as illustrate the history of medicine and surgery, dentistry, engineering in its various aspects, and the tools and equipment used in various trades.

Historic objects related to the various wars in which New York has taken an active part are heartily welcomed.

In all cases it should be borne in mind that it is *primarily New York State material that is sought*, because first of all this is a New York State Museum, and also because space is lacking for other materials. Persons contemplating such donations should call at the Museum or write in advance about such proposed donations.

The State Museum has no desire to monopolize all such materials, but at present in many localities there are no local organizations able to care properly for such collections; and the State should give reasonable assistance in preserving them and making them available.

ENDOWMENT AND TRUST FUNDS

The preceding discussion of the urgent needs of the State Museum reveals the fact that, while the State has done much for the State Museum, it has not fully met its needs. Just as the citizens of the State have in the past generously donated much valuable material to the Museum, the public should be informed in what ways it may continue to assist.

Many persons do not realize that the State Museum, like the universities and other research institutions devoted to advanced learning, has in reserve many important problems and projects that require more money than the Museum budget provides. It is hoped that private citizens will assist in financing such worthy projects. To make this more definite certain methods of assistance will be listed:

1 Donations of funds to be devoted to special scientific, educational or economic studies. A list of these can be furnished to any seriously interested person.

2 A donation of funds, the income alone of which is to be used to conduct special studies. This kind of a fund would give a fluidity which is particularly lacking under the present budget system. Such funds would enable the Museum to take up certain studies in advance of general public interest and legislative appreciation.

3 The donation of carefully selected tracts of land, suitable for

scientific field stations, or for scientific reservations or important historic sites. Each tract should be provided with an endowment for maintenance. Such tracts could be made of the greatest scientific and educational importance under proper supervision.

In this connection attention should be called to the fact that gifts up to 15 per cent of net income, and that 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.

FORM OF BEQUEST

I do hereby give and bequeath to the Board of Regents of The University of the State of New York, in trust for the New York State Museum:

ANNUAL BIBLIOGRAPHY OF THE STATE MUSEUM

The following is a list of papers by the Museum staff published during the fiscal year and including those based, at least in part, on the Museum collections or issued with its cooperation.

Adams, Charles C.

- 1933 The State Museum. 28th Ann. Rep't of the State Education Department, 1:245-47
 1933a Twenty-sixth Report of the Director. N. Y. State Mus. Bul., 298:1-57

Brewer, Charles, jr

- 1933 Oil and Gas Geology of the Allegany State Park, 1931. N. Y. State Mus. Cir. 10, 22p.

Colony, R. J.

- 1933 Structural Geology between New York and Schunemunk Mountain. Guidebook No. 9, 16th Inter. Geol. Cong., p: 19-44

Crosby, C. R. & Bishop, S. C.

- 1929 Three New Species of Spiders (Family *Linyphiidae*). Can. Entomologist, 41:101-5
 1933 American Spiders: *Erigoneae*, Males with Cephalic Pits. Ann. Ent. Soc. Amer., 26, No. 1:105-82

Fernald, M. L.

- 1932 The Linear-leaved North American Species of *Potamogeton*, Section *Axillares*. Memoirs of the Gray Herbarium of Harvard University III (Mem. Amer. Acad. of Arts and Sciences, 17, Pt 1:1-183)

Glasgow, R. D.

- 1932 The Orchard Tent Caterpillar, *Malacosoma americana*, on Long Island and in the Hudson Valley. U. S. Dep't Agric., Bur. Ent., Insect Pest Surv. Bul., 12, no. 5:208
 1932a Eggs of the Elm Leaf Beetle, *Galerucella xanthomelena*, Observed at Garden City, L. I. on June 4. *l. c.* 12, no. 5:235
 1932b The Larch Case Bearer, *Coleophora laricella*, in Eastern and Northern New York. *l. c.* 12, no. 5:237
 1932c The European Pine Mite, *Eriophyes pini*, Reported from Western New York. *l. c.* 12, no. 5:239
 1932d The European Pine Shoot Moth, *Rhyacionia buoliana*, Increasingly Destructive to Pines in Southeastern New York. *l. c.* 12, no. 5:239
 1933 Egg Masses of the Fall Canker Worm, *Alsophila pometaria*, Unusually Abundant in Southeastern New York. *l. c.* 13, no. 3:89
 1933a The Eastern Tent Caterpillar, *Malacosoma americana*, Abundant in Eastern New York. *l. c.* 13, no. 4:115
 1933b The Larch Case Bearer, *Coleophora laricella*, Again Very Injurious in Eastern and Northern New York. *l. c.* 13, no. 4:134
 1933c The Juniper Webworm, *Dichomeris marginella*, Unusually Troublesome in Southeastern New York. *l. c.* 13, no. 4:134
 1933d The Pales Weevil, *Hylobius pales*, Very Injurious to Pines in Eastern and Southeastern New York. *l. c.* 13, no. 4:135
 1933e The European Pine Shoot Moth, *Rhyacionia buoliana*, a Pest of Major Economic Importance. *l. c.* 13, no. 4:135

- 1933f A New Weevil Pest, *Hypomolyx piceus*, Injurious to Pine Plantations in the Higher Altitudes of Northern New York. *l. c.* 13, no. 4:135
- 1933g The Boxwood Leaf Miner, *Monarthropalpus buxi*, Very Troublesome in Southeastern New York. *l. c.* 13, no. 4:136
- 1933h The Black Vine Weevil, *Brachyrhinus sulcatus*, Very Injurious to Taxus in Southeastern New York. *l. c.* 13, no. 4:138

Goldring, Winifred

- 1932 *Albany to Binghamton*. In "The Paleozoic Stratigraphy of New York." Guidebook No. 4, 16th Inter. Geol. Cong., p. 28-39
- 1933 Guide to the Geology of John Boyd Thacher Park (Indian Ladder Region) and Vicinity. N. Y. State Mus. Handbook 14, 112p.
- 1933a A New Species of Crinoid from the Devonian (Oriskany) of Maine. Proc. Portland Soc. of Nat. Hist., 4:153-55

Hartnagel, C. A.

- 1932 *Hornell to East Aurora*. In "The Paleozoic Stratigraphy of New York." Guidebook No. 4, 16th Inter. Geol. Cong., p. 70-73; *Niagara Falls to Rochester*, p. 103-5; *Rochester to Utica*, p. 115-20
- 1933 Before the Coming of Man. History of New York, 1:1-37. Columbia Univ. Press

House, H. D.

- 1933 Additions to the Fern Flora of New York State. Amer. Fern Jour., 23:1-7

Newland, D. H.

- 1932 The Paleozoic Stratigraphy of New York. International Geological Congress Guidebook 4, Excursion A-4, 136p. U. S. Gov't Ptg Office, Washington. Prepared under direction of D. H. Newland. Introduction, p. 1-24
- 1933 The Prospects for Gold Discoveries in New York State. N. Y. State Mus. Cir. 12, 6p.

Ruedemann, Rudolf

- 1932 Guide to the Fossil Exhibits of the New York State Museum. N. Y. State Mus. Cir. 9, 53p.
- 1932a *Utica to Albany*. In "The Paleozoic Stratigraphy of New York." Guidebook No. 4, 16th Inter. Geol. Cong., p. 121-36
- 1932b Interior Markings of *Colpocaris elytroides* in Cooper, Oklahoma. Jour. Paleon., Dec., p. 348
- 1933 Paleozoic Planktonic Faunas of North America. Proc. Nat. Acad. Sci., 19, no. 1:157-59
- 1933a *Camplostroma*, a Lower Cambrian Floating Hydrozoan. Proc. U. S. Nat. Mus. 82, Art. 13:1-8

Schoonmaker, W. J.

- 1932-33 12 popular articles in Nat. Humane Review, vols. 19-20

Stoner, Dayton

- 1932 Ornithology of the Oneida Lake Region: With Reference to the Late Spring and Summer Seasons. Roosevelt Wild Life Annals, 2, nos. 3 and 4:277-759
- 1933 Superstitions and Facts about Kingfishers. Univ. of State of New York Bulletin to the Schools, 19, no. 13:165-67

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.

BY DONATION

- Aldridge, Mrs Walter H., New Rochelle, N. Y.
Specimen of Cicada killer, *Sphecius speciosus* Dru., New Rochelle, N. Y.
- Arnold, Benjamin Walworth, Albany, N. Y.
Starfish, Bahama Islands
- Bailey, Dr L. H., Ithaca, N. Y.
Specimen of *Rubus ithacensis*
- Banker, Dr S. J., Fort Edward, N. Y.
Fee lists
- Barkley, James E., Liberty, N. Y.
Specimens of eggs, larvae and adults of the leaf beetle, *Calligrapha rowena*, Knab., Liberty, N. Y.
- Barron, Leonard, Garden City, N. Y.
Specimens of Japanese beetle, *Popillia japonica* Newn., and *Pachystethus lucicola* Fab., Garden City, N. Y.
- Bartels, Mrs Marie, Lynbrook, N. Y.
Specimens of black carpet beetle, *Attagenus piceus* Oliv., Lynbrook, N. Y.
- Batthey, Dr P. B., Napanoch, N. Y.
Specimen of the work of the white pine weevil, *Pissodes strobi* Peck, Napanoch, N. Y.
- Bigelow, Otis M., Baldwinville, N. Y.
Hammered copper spatula from Seneca river
- Bloch, G. A., Brooklyn, N. Y.
Specimens of bagworm, *Thyridopteryx ephemeraeformis* Haw., Brooklyn, N. Y.
- Bostwick, E. G., Mechanicville, N. Y.
Specimen of milkweed leaf beetle, *Labidomera clivicollis* Kby., Mechanicville, N. Y.
- Bosworth, William L., Coleman Station, N. Y.
Specimen of eyed elater, *Alaus oculatus* L., Coleman Station, N. Y.
- Braasch, G. E., Yonkers, N. Y.
Specimen of fig beetle, *Cotinis nitida* L., Yonkers, N. Y.
- Briggs, Mr
Stone pestle
- Brooks, Jonas H., Albany, N. Y.
2 specimens of *Favosites*, Berne, N. Y.
- Burger, W. H., New York, N. Y.
Specimens and work of pine bark beetle, *Pityogenes hopkinsi* Sw., New York, N. Y.
- Carr, William, Albany, N. Y.
Starling, Albany, N. Y.
- Citron, Mrs H., Ossining, N. Y.
Specimens of silverfish, *Lepisma saccharina* L., Ossining, N. Y.

- Clark, Walter D., Lansingburg, N. Y.
Ceremonial of polished diabase
- Clark, J. W., Albany, N. Y.
Specimens of carpenter ant, *Camponotus herculeanus pennsylvanicus* DeG., Albany, N. Y.
- Clarke, Dr John M., Albany, N. Y.
4 purple sun stars, Maine
- Clements, Rosalie, Hopewell Junction, N. Y.
Specimens of iris weevil, *Mononychus vulpeculus* Fab., Hopewell Junction, N. Y.
- Coker, Dr R. E., Allegany School of Natural History, Allegany State Park, N. Y.
Collection of 10 species of myriopods from Allegany State Park, N. Y.
- Coleman, Mary E., Milwaukee, Wis.
Album quilt
- Collins, Eldress Sarah, Watervliet, N. Y.
Shaker chair catalog
Shaker chair price list
2 copies poem "Sister Corinne"
Face of old clock of iron
- Congdon, Charles E., Salamanca, N. Y.
Wooden ox yoke bow-key
- Conklin, Harold F., Albany, N. Y.
14 Indian stone implements, Greene county, N. Y.
Fragment of Catlinite pipe stem
3 grooved netsinkers, Columbia county, N. Y.
Rolling pin
Wooden mortar
- Cooper, G. A., Washington, D. C.
Inadunate Crinoid, Rensselaerville, N. Y.
- Cox, John, Cambridge, England
Specimen of *Climacograptus inuiti*, Akpatok Island, Canada
- Cox, W. G., New Lebanon, N. Y.
Specimens of European willow leaf beetle, *Plagioderia versicolora* Laich., New Lebanon, N. Y.
- Dascher, Fred J., Albany, N. Y.
Hair worm, Thacher State Park, N. Y.
- Davis, Mrs Edward E., Norwich, N. Y.
Several thousand fossils from various localities
- Davis, Dr J. J., Madison, Wis.
20 fungi from Wisconsin
- Dearth, Glenn, Geneva, N. Y.
6 samples of Oriskany sandstone, from well on Laura Chapman farm near Ovid, N. Y.
239 samples from O'Connor No. 1 well, north of Geneva, N. Y.
138 samples from Mowers No. 1 well, north of Geneva, N. Y.
- Decker, Dr C. E., Norman, Oklahoma
106 specimens of graptolites, Oklahoma
170 fossils, Oklahoma
- Deevey, Robert, Albany, N. Y.
4 killdeer eggs, Albany, N. Y.
- Devine, Dr J. F., Goshen, N. Y.
Specimens of hickory borer, *Cyllene pictus* Dru., Goshen, N. Y.
- Dobbin, Frank, Shushan, N. Y.
210 plants, Washington County, N. Y.
- Doran, E., Albany, N. Y.
Starling, Albany, N. Y.
- Drake, Mrs Frank W., Watervliet, N. Y.
Old carpet weaver's account book
Carpet weaver's loom
- Evers, Louis, Holmes, N. Y.
Specimens of work of white pine weevil, *Pissodes strobi* Peck, Holmes, N. Y.

- Fairbanks, Mrs Henrietta H., Bainbridge, N. Y.
8 plants, Chenango County, N. Y.
- Felt, Dr E. P. Felt, Stamford, Conn.
Specimens and parasite of sassafras weevil, *Prionomerus calceatus* Say,
New York, N. Y.
- Flower, Mrs I., Troy, N. Y.
31 historic articles, the Wellington-Flower collection.
- Follette, Louis E., Saratoga Springs, N. Y.
13 Indian stone and other implements, Fish Creek, N. Y.
- Frederick, A. C., Albany, N. Y.
Specimen of click beetle, *Oxygonus obesus* Say, West Albany, N. Y.
Specimens of scarab beetles *Hoplia trifasciata* Say, Albany, N. Y.
Specimen of carpenter bee, *Xylocopa virginica* Dru., Albany, N. Y.
- Fuller, Maria D., and Vredenburg, Mrs Bertha F., Crugers, N. Y.
Civil War equipment of Henry Vredenburg
- Gabriel, Fred C., Malta, Montana
506 Indian stone and other implements, Seneca Lake, N. Y.
- Geer, Dansforth, Hoosick Falls, N. Y.
2 Walter A. Wood sewing machines
- Gordon, T. A., Albany, N. Y.
Specimens of sexton beetle, *Necrophorus americanus* Oliv., Sheffield, Mass.
- Hall, Mrs Robert A., Menands, Albany, N. Y.
Indian leather coat
Indian leather pouch
- Hallenbeck, Mrs B. Q., North Troy, N. Y.
Specimen of ichneumon fly, *Megarhyssa lunator* Fab., North Troy, N. Y.
- Hampshire, John, Rensselaer, N. Y.
Specimens of spotted grapevine beetle, *Pelidnota punctuata* L., Rensselaer,
N. Y.
- Hardie, Edward, Albany, N. Y.
Hog-nosed snake, Albany, N. Y.
- Haskins, C. P., Schenectady, N. Y.
Specimens of dogbane leaf beetle, *Chrysochus auratus* Fab., Schenectady,
N. Y.
Specimens of powder post beetles, *Lyctus Planicollis* Lec., and *Lyctus
opaculus* Lec., Schenectady, N. Y.
- Holt, J. M., Quaker Bridge, N. Y.
Ox yoke
Pair of chain log grabs
- Houting, Mrs George, Albany, N. Y.
Old scissors
Old key
- Howell, Professor Benjamin F., Princeton, N. J.
Specimen of *Olenellus getzi*, Rohrerstown, Pa.
- Hughes, Marian, Albany, N. Y.
Specimens of beetles, *Nacerda melanura* L., Albany, N. Y.
- Irving, Frank P., Troy, N. Y.
Collection of historic objects
- Jordan, Charles, Rensselaer, N. Y.
Skull of white-tailed deer, Inman, N. Y.
Skull of beaver, Inman, N. Y.
- Kidder, G. S., Port Henry, N. Y.
Specimens of skin beetle, *Trogoderma versicolor* Creutz., Port Henry, N. Y.
- Klahr, Miss M., Albany, N. Y.
Specimen of sphinx moth, *Sphecodina abbotti* Swain, Albany, N. Y.
- Lannagon, Mrs Frank, Albany, N. Y.
Fossil sponge, Helderberg Mountains
- Laraway, Frank J., Albany, N. Y.
Arrowpoint
Spearpoint
Indian knife

- Latham, Roy, Orient, Long Island, N. Y.
384 specimens of miscellaneous beetles from various sections of Long Island
- Lewis, Frank R., Olivebridge, N. Y.
Specimens of May beetle, *Phyllophaga tristis* Fab., Olivebridge, N. Y.
- Lithgow, David C., Albany, N. Y.
Drawing of mural painting for Indian Groups
- Lord, Hon. Burt, Afton, N. Y.
13 historic objects
- Lowe, J. L., Ann Arbor, Mich.
23 lichens and 2 fungi from northern New York
- MacHenry, Charles A., Cape Vincent, N. Y.
2 grooved axes, Poe River, Va.
Pick-shaped stone from Wilson Bay, Jefferson county, N. Y.
- Mager, C. E., New York, N. Y.
Specimen of caterpillar of silver-spotted skipper, *Epargyreus tityrus* Fab., New York, N. Y.
- Mahoney, J. T., Albany, N. Y.
Brunnich's murre, Saratoga Lake, N. Y.
- Martin, Mabel, Albany, N. Y.
Specimens of pipevine swallow tail, *Laertias philenor* L., Albany, N. Y.
- Maxon, Dr William E., Washington, D. C.
4 plants from central New York
- McAlpine, William J.
Piece of oak from frigate "Cumberland" showing borings of teredo
- McEvoy, James J., Hudson, N. Y.
13 historic objects
- McVaugh, Rogers, Kinderhook, N. Y.
373 plants, Columbia county, N. Y.
- Minich, Mrs C. A., Troy, N. Y.
Specimen of maple borer, *Glycobius speciosus* Say., Troy, N. Y.
- Mynter, Kenneth H., Hudson, N. Y.
292 Indian stone and other implements, vicinity of Hudson, N. Y.
- Myers, Charles, Watervliet, N. Y.
2 Hungarian partridges, Watervliet, N. Y.
- New, Mrs Frank J., New Rochelle, N. Y.
Specimens of Japanese garden beetle, *Ascerica castanea* Arrow, New Rochelle, N. Y.
- Niemeier, Fred, Cold Brook, N. Y.
Head of an isotelus, Cold Brook, N. Y.
- Niles, T. F., Chatham, N. Y.
Specimens of flea beetle, *Systema frontalis* Fab., Chatham, N. Y.
Specimens of larvae of *Parharmonia pini* Kell., Amawalk, N. Y.
- Ochsner, Eugene E., Independence, Ohio
2 photographs of mound burials on Cuyahoga river, Ohio
- Ort, Mrs Lloyd W., Niagara Falls, N. Y.
Specimens of silverfish, *Thermobia domestica* Pck., Niagara Falls, N. Y.
- Parsons, Miss, Pleasant Valley Bird and Wild Flower Sanctuary, Lenox, Mass.
Copies of Shaker Gardener's Manual of 1843
- Phelps, Mrs Orra, Gansevoort, N. Y.
Plant from Saratoga county, N. Y.
60 plants, Nova Scotia
- Poor, Dr R. S., Birmingham, Ala.
12 specimens of fossil plants, Alabama
69 specimens of graptolites, Alabama
- Pulvermacher, William D., Flushing, N. Y.
Specimen of cockroach, *Periplaneta americana* L., Flushing, N. Y.
- Retsof Mining Company, Retsof, N. Y.
5 Photographs showing operations in mining salt
- Rice, John, Ilion, N. Y.
Scroll saw
Old metal spectacle case
Miniature yoke
Sumac sap-spile

- Ring, John E., North Chatham, N. Y.
Specimen of European hornet, *Vespa crabro* L., North Chatham, N. Y.
- Robinson, Ezra S., Waterford, N. Y.
6 articles of Civil War equipment
- Rockwood, Mrs George, Lebanon Springs, N. Y.
Small brown weasel, Lebanon Springs, N. Y.
- Sanderson, W. E., Albany, N. Y.
Deer skull, New York State
- Sawyer, Eli J., Hudson Falls, N. Y.
5 photographs of Hidden Farm on Glens Falls-Lake George road, N. Y.
- Sebring, Lewis Beck, Schenectady, N. Y.
Manuscripts of Lewis C. Beck, including 8 small paper-bound notebooks relating to mineral chemistry, and 3 bound volumes on the minerals of New York, representing the material largely incorporated in Mineralogy of New York (1842), one of the final reports of the First Natural History Survey
- Shrieves, J., Albany, N. Y.
6 chilopods, Albany, N. Y.
- Smiley, W. G., Danby, N. Y., through John P. Young, Ithaca, N. Y.
Specimen of *Lepidasterella babcocki*, Danby, N. Y.
- Smith, Sister Alice, West Pittsfield, Mass.
Shaker umbrella
- Smith, W. E., Greenfield, Mass.
Specimens of mottled willow borer, *Cryptorhynchus lapathi*, L.; pine borer *Monochamus carolinensis* Oliv.; Cicada, *Tibicen lyricen* DeG., and Cicada killer, *Sphecius speciosus* Dru., Valhalla, N. Y.
- Spicer, Mrs Caroline M., Troy, N. Y.
Steel engraving of "Weehawken"
- Stein, Edwin J., Albany, N. Y.
Potsherd, triangular quartz arrowpoint and stone cup, Long Island, N. Y.
19 photographs and 19 lantern slides illustrating an Indian marriage, through Chief Clinton Rickard of Tuscarora Indian Reservation
6 photographs of the Glen Sanders Mansion at Scotia, N. Y., through Mrs Charlotte T. Luckhurst, Albany, N. Y.
- Strickland, L. F., Lockport, N. Y.
Specimens of chrysanthemum midge, *Diarthronomyia hypogaea* Loew.
- Sutliff, Mary, New York, N. Y.
Specimen of *Serapias helleborine* from Albany county, N. Y.
- Swan River Nursery, Patchogue, N. Y.
Specimens of hemispherical scale, Patchogue, N. Y.
- Thomas, A. C., Tuckahoe, N. Y.
Specimens of fall cankerworm, *Alsophila pometaria* Harr., Tuckahoe, N. Y.
- Turrell, Luella, Red Wood Falls, Minn.
Iron pancake turner
- Tyger, Mrs Vernon, Saratoga Springs, N. Y.
Specimen of caterpillar of sphinx moth, *Sphecodina abbotti* Swains., Saratoga Springs, N. Y.
- United States Bicentennial Commission, Washington, D. C.
Washington medal
- United States National Museum, Washington, D. C.
11 specimens of *Stephanocerinus angulatus*, Lockport, N. Y.
2 specimens of *Stephanocerinus gemmiformis*, Rochester, N. Y.
- Van Alstine, Dr Chauncey D., Albany, N. Y.
2 turnkeys
- Van Benthuisen, Mrs Charles, Albany, N. Y.
Clock with keys
Old mangel
- Van Den Hoorn, Henry, Westbury, N. Y.
Specimens of Japanese garden beetle, *Ascerica castanea* Arrow, and click beetle, *Hemicrepidius memnonius* Hbst., Westbury, N. Y.

- Van Horn, Cornelius F., through Mrs William H. Brown, Albany, N. Y.
Old stoneware salt jar
- Van Keuren, Grant, Amsterdam, N. Y.
Specimen of crane fly, *Nephrotoma ferruginea* Fab., Amsterdam, N. Y.
- Van Rensselaer, Mrs Nicholas B., New Paltz, N. Y.
15 plants from Ulster county, N. Y.
- Van Slyck, H. J., Schenectady, N. Y.
Specimens of thrips, Schenectady, N. Y.
- Van Wie, H. J., Port Byron, N. Y.
40 Algonkian potsherds from Howland's Island Game Refuge, Port Byron, N. Y.
- Vickers, Robert, Cohoes, N. Y.
Wood duck, male, Cohoes, N. Y.
- Volz, Mrs Gertrude E., Massena, N. Y.
120 plants from northern New York
- Wardell, Mrs Frederick N., Scarsdale, N. Y.
Specimens of termite, *Reticulitermes flavipes* Koll, Scarsdale, N. Y.
- Warren, Thomas E., Ticonderoga, N. Y.
Specimen of maple borer, *Glycobius speciosus* Say., Ticonderoga, N. Y.
- Werner, Franz, Austria
Sand lizard, Austria
- Whetzel, Dr H. H., Ithaca, N. Y.
Fungus from Pennsylvania
- Williams, Dr Huntington, Albany, N. Y.
3 specimens of fossil plants, Gilboa, N. Y.
- Wolcott, Clinton H., Flushing, N. Y.
Specimens of tulip tree scale, *Toumeyella liriodendri* Gmel., Flushing, N. Y.
- Zenkert, C. A., Buffalo, N. Y.
25 plants from western New York

BY EXCHANGE

- Muenschler, Dr W. C., Ithaca, N. Y., through New York State College of Agriculture
150 plants from northern New York
- Perner, Dr J., Prague, Czechoslovakia
63 specimens of graptolites from Czechoslovakia

BY PURCHASE

- American University Union in Europe, Saint-Germain, Paris
2 photographs of wampum belts in the Notre-Dame de Chartres
Catalogue des Reliques et Joyaux de Notre-Dame de Chartres
- Dyda, Charles J., Albany, N. Y.
Flint knife from Buckingham lake, Albany, N. Y.
- Gardner, Rockwell, Hadley, N. Y.
Watch charm
- General Biological Supply House, Chicago, Ill.
Rattlesnake skeleton
- Harmon, Miss E. A., Cleveland, N. Y.
China pitcher
- Pexton, Frank A., Albany, N. Y.
Glass beaded bag from Vermont
- Reinhard, E., Buffalo, N. Y.
17 fossils from various localities
- Stoll, F. A., New York, N. Y.
17 casts of salamanders
4 models of eggs of salamanders
- Whitlock's Bookstore, Inc., New Haven, Conn.
Whitaker Crown Point powder horn

BY MUSEUM STAFF

- Adams, Charles C., Albany, N. Y.
 Handmade toveling
 2 cards and blotter
- Casey, John L., and Carr, William, Albany, N. Y.
 Little brown bat, Albany, N. Y.
- Chamberlain, K. F., Albany, N. Y.
 195 specimens of scarab beetle, *Pachystethus oblivia* Horn., Malta, N. Y.
 15 specimens of miscellaneous insects, Feura Bush, N. Y.
 78 specimens of miscellaneous insects, Wemple Station, N. Y.
 17 specimens of miscellaneous insects, Tupper Lake, N. Y.
 21 specimens of miscellaneous insects, Coeymans, N. Y.
- Chamberlain, K. F., and Sanderson, W. E., Albany, N. Y.
 New York weasel, Hollywood, N. Y.
- Clarke, Noah T., Albany, N. Y., through Sister Sadie Neale, Mount Lebanon, N. Y.
 Charcoal
- Glasgow, R. D., Albany, N. Y.
 Specimens of larvae of Pales weevil, *Hylobius pales* Boh., Yonkers, N. Y.
 Parasites of *Paralechia pinifoliella* Cham.
 Pupae of holly leaf miner, *Phytomyza ilicis* Curt., Garden City, N. Y.
 Larva of beech borer, *Xylotrechus quadrimaculatus* Hald., Amawalk, N. Y.
 Larvae of taxus weevil, *Brachyrhinus sulcatus* Fab., Garden City, Long Island, N. Y.
 Egg masses of fall canker worm, *Alsophila pometaria* Harr., Hawthorne, N. Y.
 10 specimens of water beetle, *Hydrobius fuscipes* L., Lake Placid, N. Y.
 Specimen of diving beetle, *Agabus* sp., Lake Placid, N. Y.
 Larvae and pupae of the Nantucket pine moth, Yonkers, N. Y.
 Pitch pine leaf miner, larvae, and work, Glens Falls, N. Y.
 European pine shoot moth, larvae and pupae, White Plains, N. Y.
 Box leaf miner, larvae, pupae and work, Yonkers, N. Y.
 Abor vitae leaf miner, larvae, pupae and work, Amawalk, N. Y.
 Fall canker worm, larvae and work, New Rochelle, N. Y.
 Juniper webworm, larvae, pupae and work, Yonkers, N. Y.
 Larch case-bearer, larvae and work, Lake Placid, N. Y.
 Black flies, Simuliidae, larvae, pupae and adults, Ray Brook, N. Y.
 Black flies, Simuliidae, larvae, pupae and adults, Alcohol Brook, N. Y.
 Black flies, adults, Lake Placid, N. Y.
- Goldring, Winifred, Albany, N. Y.
 Specimen of *Lindstroemella aspidium*, East Berne, N. Y.
 Specimen of *Ancyrocrinus*, Westerlo, N. Y.
 5 specimens of crinoids, Indian Ladder, N. Y.
 Specimen of *Brachiocrinus nodosarius*, Indian Ladder, N. Y.
 21 specimens of fossil plants, Gilboa, N. Y.
 2 specimens of crinoids, near New Salem, N. Y.
 500 stratigraphic specimens from the Schoharie Valley
 10 specimens of crinoids, Rensselaerville, N. Y.
- House, H. D., Albany, N. Y.
 6 large samples of willemite, Franklin, N. J.
 Specimens of Buffalo carpet beetle, *Anthrenus scrophulariae* L., Albany, N. Y.
 Specimen of eyed elater, *Alaus oculatus* L., Loudonville, N. Y.
 Specimens of carpenter ant, *Camponotus herculeanus ferrugineus* Fab., scarab beetle, *Dichelonyx diluta* Fall., and Pentatomid bug, *Banasa dimidiata* Say., Berlin, N. Y.
 Specimens of Tiger beetle, *Cicindela sexguttata* Fab.; scarab beetle, *Trichiotinus affinis* Gory, and moth, *Ctenucha virginica* Charp., Berlin, N. Y.
 Specimen of Pentatomid bug, *Coenus delius* Say., Berne, N. Y.
 Nest and eggs of Eastern robin, Loudonville, N. Y.
 1179 specimens of flowering plants and ferns, from New York State
 54 specimens of mosses, lichens and fungi, from New York State

- Newland, D. H., Albany, N. Y.
 50 samples serendibite from J. Noble Armstrong farm, Johnsburg, N. Y.
 13 samples of slates and schists from Columbia and Rensselaer counties,
 N. Y.
 Large sample of granite from the Harmon farm, near Russell, N. Y.
 Sample anhydrite, veined by gypsum, Hellsborough, New Brunswick
- Paladin, Arthur, Albany, N. Y.
 12 gray and red fox, raccoon, and black bear skulls from New York State
- Schoonmaker, W. J., Albany, N. Y.
 Ring-necked pheasant, Rensselaer, N. Y.
 32 bird skins, vicinity of Albany, N. Y.
 4 skulls of white-tailed deer, Tennant Lake, N. Y.
- Stein, E. J., Albany, N. Y.
 Starling, Albany, N. Y.
- Stoner, Dayton, Albany, N. Y.
 Little brown bat, Albany, N. Y.
 Skull of domestic pigeon, Albany, N. Y.
- Whitney, A. G., Albany, N. Y.
 Specimens of wood-boring beetle, *Prionus laticollis* Drury, Albany, N. Y.
 Specimens of stone-fly and eggs, Taconic State Park, N. Y.
 Specimen of willow sawfly, *Cimbex americana* Leach, Williamstown, Mass.
 Specimens of milkweed leaf beetles, *Labidomera clivicollis* Kby.,
 Nests of Potter wasp, *Eumenes* sp., Albany, N. Y.
- Whitney, Mrs Elsie G., Albany, N. Y.
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