THE AMERICAN MUSEUM OF NATURAL HISTORY

EIGHTY-SEVENTH ANNUAL REPORT
JULY, 1955, THROUGH JUNE, 1956

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THE CITY OF NEW YORK
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EIGHTY-SEVENTH ANNUAL REPORT OF THE PRESIDENT

To the Trustees of
The American Museum of Natural History
and to the
Municipal Authorities of the City of New York

IN preparing this annual message, I have been keenly aware of how short a period the five years since I became President represent in the span of an organization which is currently rounding out 87 years of scientific and educational work.

It has been customary in recent years for the Director to review various aspects of the Museum's work. This year's report includes a history of the development of educational services: the many areas in which this Museum has pioneered, the large number of people reached through the years, and the pioneering work that continues to be done. The record is impressive and it is fitting, here, to express our appreciation for the opportunities given to us by the City's public schools and their teachers, in bringing this carefully planned educational program to New York's children and adults. But implicit in a review of Museum accomplishments is a challenge. For it is not sufficient that the history of an organization be impressive. It is to the future that we must look.

Today, the need for the work done by this Museum is perhaps the most significant in its history. Basic research, the fundamental investigations in which our scientists engage each day, is clearly essential to the scientific progress of our country. In this age of rapid technological advance, continuing exploration of the unknown must not be neglected. Nor can we fail to provide an atmosphere that will stimulate the scientific inter-

ests of our young people. We must encourage the thirst for knowledge.

Dr. Alan T. Waterman, Director of the National Science Foundation, speaking in New Orleans on August 3, 1956, said: "At a time when progress in technology is critical, funds are more readily available for direct applications of science, and the support of basic research, so important in the long run, is apt to be neglected. This is the present danger."

Our goals, then, can be stated briefly: continuing support for Museum scientists in their fundamental research, and expansion of our teaching program to bring into contact with the Museum all the groups that would benefit by the experiences we offer.

These objectives can be reached. Every department is constantly advancing and experimenting along new lines. And yet our ability to fulfill our aims is limited by the cost of operation. To broaden the base of our efforts, we must continually broaden the base of our financial support.

As a result of City cooperation, generous contributions, and thoughtful bequests, we are able to report that the Museum's financial condition continues to improve. Our Finance Committee has again managed investment funds astutely, the Endowment Fund having a market value on July 1, 1956, of $27,885,740, an increase of $2,259,998 over the previous year. Of this gain, 45 per cent was due to the increase in the value of our securities and 55 per cent to new gifts. In addition, the Pension Fund also continues to grow. This now stands at $5,471,012 as of the end of the fiscal year.

Recently, the sums raised by our loyal Men's and Women's Committees have been increasing. We rely on these annual gifts of friends when computing our budget and must continue to receive this support. In the past twelve months the Committees raised a total of $175,080, the highest amount raised since the inception of the annual Contributors Program in

1937. Mr. C. DeWolf Gibson served as Fund Coordinator, while Mr. George Percy headed the Men's Committee and Mrs. James B. Campbell the Women's Committee. Fortunately they will continue in these posts for the coming year.

We are delighted by the increasing number of young people who help to support our work and were particularly pleased during the past year to receive substantial, unsolicited gifts from two people in their early twenties.

Despite our encouraging financial picture, it must be remembered that efforts to increase the scope of our work are hampered by rising costs. Last year I pointed out the importance of additions to the scientific staff in order to allow time for undisturbed research. It has been with a sense of real satisfaction that Dr. Parr has been able to announce several new appointments in his annual report. However, we have not yet been able to restore all of the scientific positions eliminated because of the depression or the Second World War. Further funds are urgently needed to bring the size of our scientific staff more nearly into line with the work that lies ahead.

Dr. Parr has presented to the Trustees a most interesting report on plans for new and renovated exhibition halls. Slowly but surely these will rise from the planning and preparation stages to public view. This, of necessity, is a slow process, for the conception of exhibits requires painstaking research, and our exhibition staff must frequently create entirely new processes of construction and techniques of display in order to give visual interpretation to the research findings of the scientists. Some exhibits are composed of objects never before seen outside the viewing plate of a microscope.

I would like to describe briefly the relationship existing between the City of New York and the Museum. The City owns Manhattan Square, the property on which our buildings stand, and it also provides for building maintenance to house our great collections. The City pays for our custodial and teaching staffs. Its total monetary aid covers about one-third

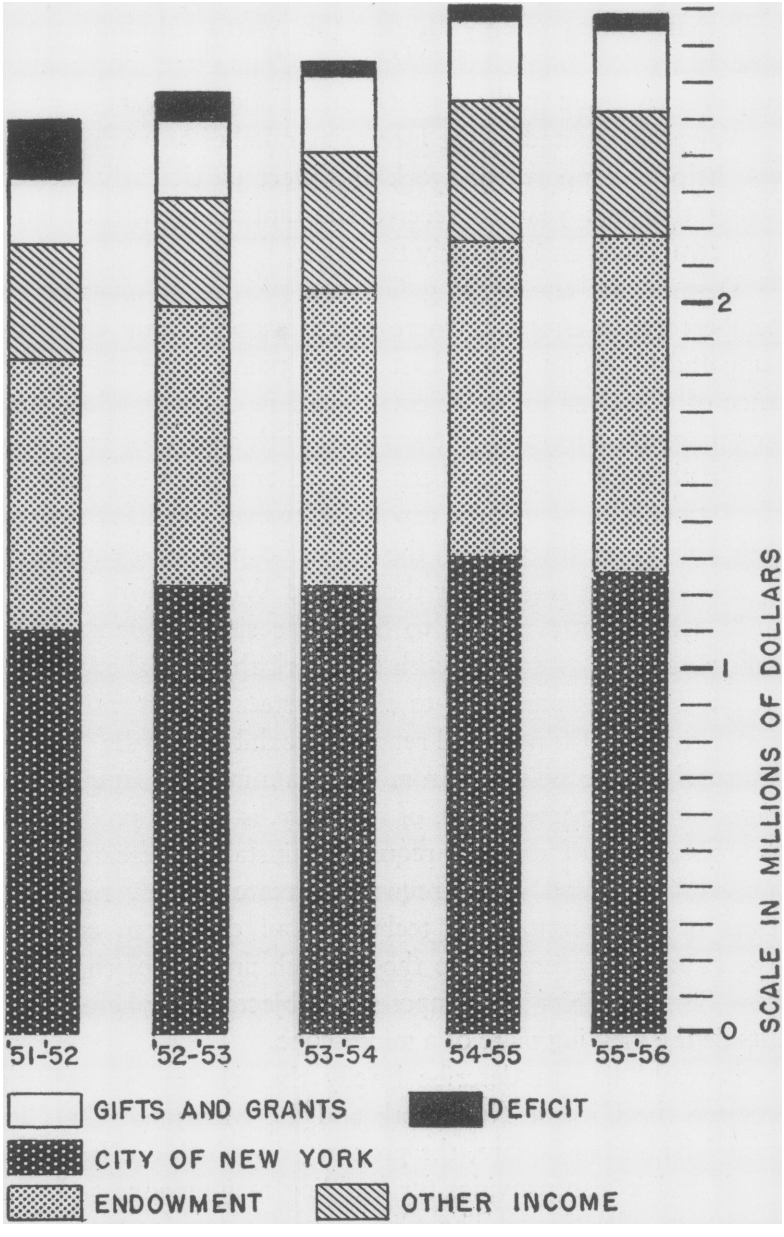

Fig. 1. Sources of income over last five-year period.

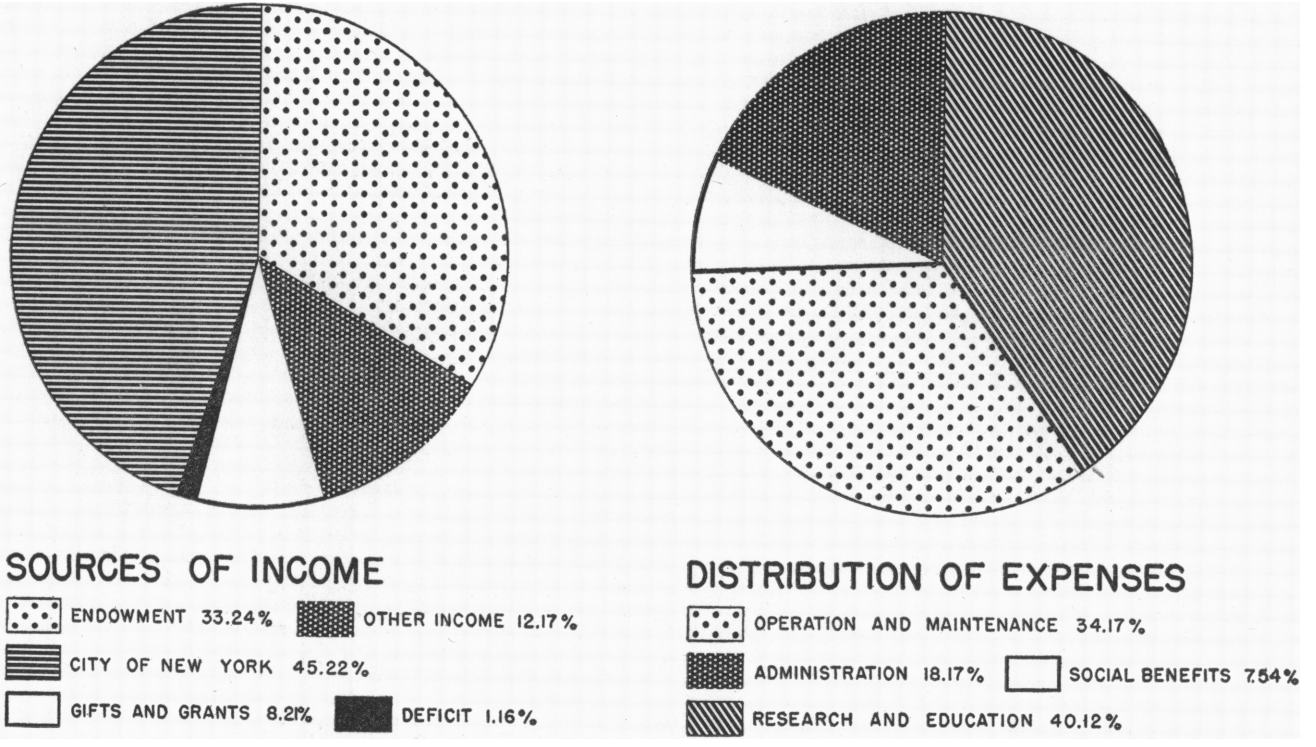

Fig. 2. Sources of income and distribution of expenses for the fiscal year 1955-1956.

of our expenditures. In addition to financial help, we receive advice and assistance from several City officials and their representatives. His Honor the Mayor is represented on our Board by the Hon. Richard C. Patterson, Jr.; the Comptroller, the Hon. Lawrence E. Gerosa, by Mr. Paul P. Brennan; the Hon. Robert Moses, Commissioner of Parks, by Mr. Lewis N. Anderson, Jr.; and the Board of Education, by Dr. William Jansen, Superintendent of Schools.

During the year 1955-1956 the Board elected Mr. William H. Phelps, Jr., of Caracas, as a Trustee. Both he and his father have been Research Associates in our Bird Department for many years and have participated in numerous expeditions which have increased our knowledge of the birds of South America.

We sadly regret the loss of Trustee Archer M. Huntington, who served on the Board from 1909 until his death last December.

Undoubtedly there are many who may not know of the important work being carried on at our three active research stations: the Lerner Marine Laboratory in Bimini, British West Indies; the Archbold Biological Station in Lake Placid, Florida; and the Southwestern Research Station near Portal, Arizona. These laboratories make their facilities available to scientists and students who have problems that can be investigated through utilization of the characteristic features of the area. Each station plays host to scientists representing not only the American Museum but colleges and universities at home and abroad as well as other museums, medical centers, and research units of industry.

At its field stations, in its laboratories and exhibit halls, through its program of public instruction and its far-flung extension services, the American Museum of Natural History is continually looking to the future.

Alexander M. White

THE MUSEUM TEACHES

To provide education for individual visitors according to their interests, and for pupils, teachers, practical investigators, and scientists according to their needs, is the primary purpose and obligation of the Museum. All departments participate in the task in various ways and by various means. When a curator plans the contents of an exhibit, he is planning for public education. When architects, artists, and preparators design and execute a display that will convey the curator's message to the visitors, they engage in an educational function. Through his research the curator continually educates and re-educates himself in order that he may better educate others, and helps to improve the knowledge and understanding that his science and the Museum may offer to the public.

Although the words "educator" and "teacher" are often used interchangeably, "teaching" to most of us implies personal guidance towards an education by the living word, by supervised activities, and by all conceivable means of direct communication between teacher and students meeting face to face.

Teaching, in this sense, is only one among many educational functions of a Museum, but one of extremely high importance for the Museum's services to the community and to the world. This is particularly true of the teaching of the young.

The American Museum of Natural History was probably the first museum to recognize that the special educational task of teaching in, and by, a museum is one that requires special skills, facilities, and organization, and that cannot merely be left to the incidental efforts of other units and personnel primarily concerned with different aspects of the over-all educational task.

In the following chapter John R. Saunders, Chairman of the Department of Public Instruction, will review the long and splendid record of the Museum's educational services through organized teaching. It is a record of which all who have lent their support to the Museum's growth or to any of its functions may well be proud.

A. E. PARR, *Director*

DEVELOPMENT OF EDUCATIONAL SERVICES, 1869-1956

John R. Saunders

THE man who is often called "the father of the Museum" was Albert Smith Bickmore, who received his own training under the great naturalist Louis Agassiz at Harvard. While still a student, Bickmore conceived the idea of establishing a great museum of natural history and chose New York as "probably the best location for the future museum of natural history for our whole land."

Bickmore, as he said in his unpublished biography, determined "that I would work for nothing else by day and dream of nothing else by night until I had, at least in some degree, aided in establishing a museum of natural history on Manhattan Island." With the help of John David Wolfe, who was to become the Museum's first President, Theodore Roosevelt, J. Pierpont Morgan, Joseph H. Choate, Morris K. Jesup, and others, Bickmore's dream soon became a reality.

Education as a primary purpose of the Museum was firmly incorporated in the plans of the original founders of the institution.

On April 6, 1869, the Act of Incorporation established "The American Museum of Natural History, to be located in the City of New York with the purpose of establishing and maintaining in said City a Museum and Library of Natural History; of encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects, and to that end of furnishing popular instruction and recreation."

One year after the incorporation, Bickmore was appointed the Museum's first Director. He was also to become its first teacher.

Much of the school learning in this period was "book learning." The Museum as a dynamic educational force represented a new approach in popular education. The very first and still the basic educational service of the Museum was its collections. When the doors of the old Arsenal Building, which first housed the Museum, opened for the first time on April 27, 1871, the Museum began its public life, and its first students were the throngs of men, women, and children who came to see its exhibits.

By 1872 "large numbers of pupils from the common schools of our city and its suburbs" were reported to be using the Museum under the tutelage of their own teachers. In addition to these young learners, "scientific men, and advanced scholars from several colleges, have come to the City solely to profit by the opportunity the Museum can already offer them, to examine rare and unique specimens."

When the first staff was listed in 1874 it consisted of but two men, Bickmore as Superintendent, which was the title then given to the director, with J. B. Holder as his assistant. It was expressed hopefully that the income from membership would enable the Museum "to secure the additional aid of gentlemen of high scientific attainments . . . who were needed to classify specimens and to enable the Museum to become an efficient institution . . . not only for popularizing the study of Natural History, but for promoting original scientific research." This was the first reference to the scientific staff, upon whose efforts all the future educational work of the Museum was to find a firm foundation.

At the ceremonies opening the first of the Museum buildings on December 22, 1877, the Honorable William R. Martin, President of the Department of Public Parks, predicted the future of the Museum when he said, "With such aids as are here afforded the human mind will be aroused. Men will gather here to study and to teach; to explore and to discover."

Significant, too, were the words spoken on that memorable day by Joseph Henry, the Secretary of the Smithsonian Institution. Henry felt that two essential elements for a successful museum were still to be supplied. He first called for a "professor, who at stated periods of the year would give courses of free lectures on the objects which it contains . . ." or a program of instruction in addition to the exhibits. The other element Henry asked for was the endowment of research, or, as he put it, "a college of discoverers, a series of men capable not only of expounding established truths but of interrogating nature and of discovering new facts, new phenomena, and new principles."

On the same day there was contracted with the City an agreement which determined the policy regarding free access to the Museum for educational purposes. The contract stipulated that all professors and teachers of public schools of the City of New York or other institutions of learning in the city in which instruction is given free of charge should be admitted to all the advantages afforded by the Museum, including its library and collections, for study, research, and investigation, free of charge.

From time to time during the early years the suggestion was made that the exhibits be made more meaningful through teaching. In 1879, the Trustees announced that "as an immediate means of rendering the Museum a source of instruction an assistant will be in attendance on Mondays and Tuesdays to receive Members and their friends, and explain the plan of the institution and the specimens on exhibit." This is the first recorded reference to direct instruction at the Museum.

In 1880, Bickmore, intending to help school children by helping their teachers, had the Trustees' approval to offer a formal educational program for the first time in the Museum's history. This took the form of a lecture course on zoology for teachers, with the use of specimens from the Museum's collections and lantern slides.

The topic chosen by Bickmore for his first lecture was "Corals and Coral Islands." Coral specimens were taken from the exhibit cases and colored plates were selected from Cuvier's "Animal Kingdom," which showed the anatomical structure of the living animals. These illustrations were projected on a transparent screen through a doorway from an adjoining room. The lecture was given in an informal and conversational manner, and the teachers were invited to ask questions.

It is worth noting that the visual method used by Bickmore in his lecture course represented one of the first instances of this type of educational technique to be employed in teacher training in this country.

Bickmore's courses met with immediate success and led to the establishment, in 1884, of the Department of Public Instruction. Bickmore relinquished the Directorship to become the first Curator of the Department. This department has been in continuous operation for 72 years and, although its name has been changed several times, the continuity of its primary function—direct teaching in the museum—has never been broken.

New York State educational authorities learned of Bickmore's program and wanted it expanded and made available for all the state normal schools. A state appropriation made in 1884 launched this expansion, and part of this appropriation was given to the Museum to carry on the Bickmore lectures. This was the first instance of any outside support of the Museum's educational work, and it was to be continued until 1903.

The increasing needs of the specialized student were not being met by the exhibits in the hall cases. The Annual Report of 1885 noted this fact and made the point that the study collections of the Museum should be built up in order to help ". . . students who desire a more intimate acquaintance with the specimens than can be acquired by viewing them as displayed in the cases in the exhibition halls."

As early as 1886 it was noted that the only available lec-

ture room in the building was too small to meet the increasing attendance at the teachers' lectures. There were more than 3000 teachers in New York City, and the Museum's lecture room accommodated only 300. For this reason plans for the second of the Museum's buildings included a lecture hall seating 1000 to be used to extend instruction "to artisans, mechanics and other citizens." In the words of President Jesup, ". . . as the Museum acquires additional collections, it must become an increasingly important aid in the education of artisan and laborer."

Bickmore's project was now so successful that the educational authorities of several other states asked the Museum for help in setting up similar systems.

In the fall of 1889, when the new lecture hall was opened, State Superintendent of Public Instruction Andrew S. Draper commented, ". . . this visual instruction which has been undertaken in this Museum is doing more for the training of prospective teachers than any other single line of work which is being undertaken by modern educators." With only 1000 seats in the new lecture hall, the applications of 2000 teachers for the course in 1890 had to be refused.

This year witnessed another innovation, the first series of lectures for members and their families. Eight lectures were given, five on economic botany and geology by Bickmore and three on the history and origin of dress by Frederick Starr. Lectures for the Members and their children have been given every year since 1890. Another innovation in the same year was the first free lectures for the general public which were given by Bickmore.

Direct instruction for children was started in 1893 when the assistant curators gave a series of talks or informal lectures in the library on Saturday mornings. These talks were illustrated by specimens from the collections.

The first formal cooperation with the New York City Board of Education began in 1895 when the Museum and the

Board of Education jointly sponsored a series of lectures for the general public. This series was under the direction of Henry Leipziger, Assistant Superintendent of Schools, who also gave most of the lectures. The lectures were given on Tuesday nights and from the start drew large audiences. This program had a wide scope of subject matter, often ranging out of the field of natural science into history and the fine arts.

In 1903, in answer to requests from the schools, study collections of invertebrates and birds were set up and were lent for short periods to any school in the City which applied for them. Thus was the School Loan or Circulating Exhibit Division established. The first collections were delivered by foot messenger. In some schools, particularly on the lower East Side, the exhibits were in great demand, as these schools had no material with which to illustrate their work in nature study. At the present time the stock of the exhibits numbers thousands of items, and a fleet of four trucks on regular routes delivers these materials free to the schools. In addition to specimens or collections of specimens, a wide range of many types of exhibits, including habitat groups, dioramas, photographs, charts, and models, is circulated.

The first educational cooperation with a college other than a teacher-training institution was effected in 1892, when Columbia College and the Museum offered a lecture series for the general public on forestry, astronomy, mineralogy, and chemistry. This joint venture continued for more than a decade, and was expanded in 1903 to include a course of lectures on ethnography for students at Columbia, the first college course to be given at the Museum and the forerunner of many such cooperative ventures in future years.

By the year 1904, Bickmore's failing health drew a halt to his museum career. By that time the program, which he had started in 1880 with one class of 30 students, had beeen extended to over one million people, and his influence was widely felt by teachers and students throughout the country. His last-

ing contributions included the establishment of the Department of Public Instruction, one of the first of its kind in the world; the development of his teachers' program; his pioneering use of visual aids in museum instruction; and the establishment of the firm foundation upon which future school museum programs were to be based.

George H. Sherwood succeeded Bickmore and during the 31 years of his tenure was responsible for a vast expansion of the Department's activities and services. Under his direction, and with the help of his two principal associates, Clyde Fisher and Grace F. Ramsey, direct and intensive instruction of school children was provided; courses for teachers, abandoned in 1904 when Bickmore retired, were resumed; the Room for the Blind and the Children's Room were opened; the adult education program was augmented; radio and publication were more fully exploited; two major extension services—slides and films—were established; and the first full-time staff of instructors was employed.

The year 1904 marked the beginning of formal instruction for school children through a series of lectures designed especially to be correlated with school lessons. Initiated in response to a specific request by the teachers of New York City, these lectures, many of which were given by members of the scientific staff, were to continue until 1942. They constituted one of the principal activities of the department and accommodated more than 13,000,000 children.

The first full-time instructor of the Department of Public Instruction was employed in 1907. She was Agnes Roesler, and during her first year she guided a total of 2233 children and adults in the Museum's exhibition halls. Mrs. Roesler was appointed "... as an instructor to meet members and their friends, also classes of school children, and to accompany them through the halls, explaining the meaning of the various exhibits." It was reported that, in addition to these duties, "... Mrs. Roesler also has met regularly classes from the Normal College and

given them illustrated lectures and laboratory instruction. The results obtained have proved so satisfactory that additional instructors will soon be needed."

In 1907 the first special exhibits were placed in some of the branches of the New York Public Library. These first exhibits were on Eskimos and on Indians, the latter to illustrate the poem "Hiawatha" by Longfellow. Loans of this nature to branch libraries continued until 1930. Today, libraries still borrow material from the Circulating Exhibits Division. These exhibits were designed to ". . . stimulate the reading of good books."

Two new projects were started in 1909. The Children's Room and the Room for the Blind were opened that year. The Children's Room, open on Wednesdays and Saturdays, contained low tables and kindergarten chairs. It was equipped with books, clay, and modeling tools. Here the children heard nature talks and drew and modeled from mounted and living specimens. As many as 200 children per day frequented this room. The Room for the Blind contained exhibits that could not easily be damaged by handling. These exhibits were provided with Braille labels, the raised characters of which enabled the blind to "read." It was so difficult for the adult blind to reach the Museum that the attendance at this room was very limited. Lack of attendance forced the Museum to abandon this project a year or two later and to replace it with a special lecture program for the blind.

The number of pupils and teachers served by the educational programs and projects of the Museum passed the million mark for the first time in 1909, when the total contacts made at the Museum and through its extension services reached 1,014,519. Of this number 922,512 were contacts made through the Circulating Exhibits Division.

The first public showing of a motion picture at the Museum took place on January 1, 1909, when Frank M. Chapman used a film in his public lecture on Florida bird life.

The Public Health Department was established at the Museum in September, 1910. One of its first public services was the free distribution of bacterial cultures (non-pathogenic) to laboratories of medical institutions, colleges, and secondary schools. This department later became a part of the Department of Public Education, and similar services were continued until the late 1930's when the Museum abandoned its active interest in the field of public health.

The Lantern Slide Division had its origin in 1911 when the large and excellent Bickmore collection of lantern slides was presented to the Museum by Dr. and Mrs. Bickmore. This collection of over 20,000 slides, many of which were colored, was probably the largest and finest of such collections in the world. The New York State collection of lantern slides and the negatives from which they were made (many provided by Bickmore) was completely destroyed by fire in Albany in 1910. This collection was the only other collection which approximated Bickmore's. In 1915 the official lantern slide lending service began. This service continues to this day. The stock of this division at present consists of aproximately 65,000 standard-size lantern slides in its files, an additional 65,000 in 2500 sets dealing with about 500 subjects, about 8000 kodachromes, 6500 of which are in sets, and an assortment of film strips and recordings.

In the spring of 1912, the first motion pictures were used in the school children's lecture program at the Museum. These were presented by Carl Akeley in two lectures which he gave on his African travels. The majority of the school children's lectures during this period and for a number of years to follow were given by members of the Museum's scientific staff.

In 1914 the Department established 12 lecture centers in schools throughout the City of New York. During the next 25 years, members of the Museum staff gave hundreds of lectures at these centers to hundreds of thousands of school children.

In 1916 the first of the department's special educational publications was issued. It was a handbook for teachers on the Indians of the Eastern Woodlands and was written by Ann E. Thomas. Subsequent years were to see the publication of a score of pamphlets designed to help teachers use the Museum's resources.

By this time the Museum had acquired enough footage of motion picture film to consider seriously the establishment of a library of motion pictures.

The first loans of film from the library were made in 1917 when two two-reel films on Museum expeditions were lent to the Y.M.C.A. for use in Army camps. These films were "Life in the Frozen North" (films of the Crockerland expeditions) and "Hunting Whales off the Coast of Japan" (made by Roy Chapman Andrews). By 1922 the department had secured enough film to start a free lending service of films to the schools of New York City. At first the films were all 35-mm. nitrate stock and could be shown only in a fireproof projection booth. When the service started, very few schools had projection facilities. Later the library added 16-mm. silent films. These eventually were replaced by 16-mm. sound films, which comprise the stock of films in the Film Division today. Free lending of films stopped early in the 1940's, and at the present time a service charge is made for all films. The library contains about 3000 films, which range from one to four reels each, under 1500 titles, and films are lent to schools and other educational institutions all over the United States.

The work with the blind continued to expand. Regular evening lectures were held for the adult blind, and instruction for classes of children totally blind or with impaired vision were given during the day. In this field the Museum was again doing pioneer work, and in 1917, at the annual meeting of the American Association of Museums, a member of the department was asked to give a paper on "Museum Instruction for the Blind."

The department meanwhile had acquired an Akeley motion picture camera, and Clyde Fisher began making educational motion pictures of local small mammals and birds. His first such venture for the department was a film on the life of a gray squirrel. This and other films Fisher made were added to the Museum's growing library of films. It is quite possible that Fisher's film "The Gray Squirrel" was the first educational motion picture produced by any museum.

In 1924 the department used the medium of radio for the first time when some of its staff gave a series of talks on natural history for children over station WEAF.

Grace F. Ramsey experimented in 1924 with special lantern slide lectures for classes from P.S. 47, Manhattan, the School for the Deaf. When she spoke she illuminated her features with a flashlight so that the children who were trained in lip reading could read her lips. The experiment was considered successful. Since that time the department has worked with groups from this school, using teachers on its staff whose mouth movements when they speak are such that their lips can readily be observed by the deaf children.

Formal cooperation with the School Nature League began in 1924. Regular meetings were held at the Museum, and the department cooperated with the organization in providing specimens for school nature rooms. Later, the School Nature League was assigned a space where it maintained a model nature room until 1942 when the organization left the Museum and affiliated itself with the Audubon Society.

Frank E. Lutz, Curator of the Department of Entomology, began experimenting in 1924 with a labeled "Nature Trail" on the property of the field station for insect study at Tuxedo Park, 40 miles north of New York City. This was to lead to the Museum's development of the Trailside Museum and Nature Trails at Bear Mountain, a pioneering project in outdoor education, jointly sponsored by the Museum and the Palisades Interstate Park Commission.

Late in 1926, the department moved its offices and equipment into its present building, which provided the larger quarters and improved facilities that were made necessary by the expanding activities.

The Annual Report for 1927 described the new building as ". . . a building unique in the history of school education throughout the world. The chief purpose of this great building will be to translate the whole world of Nature for the benefit of the school, college, and university mind."

The period from 1927 to 1937 was one of accelerated expansion, characterized by the introduction of more intensive instruction for children, the resumption of courses for teachers, increased adult education, and the establishment of the first corps of full-time instructors.

To correlate exhibits in the Museum with subjects in the school curriculum, a new program for children was established, called "Exhibition Hall Talks." Classes spent one-half hour in a Museum classroom with specimens and visual aids and the following half hour in the exhibition halls with a Museum instructor.

The work with school children was extended in 1927 to include high school students. A loan collection of microscopic slides was prepared and made available to high school biology classes. Exhibits on fossils were added to the Circulating Exhibits Division for high school use, and live drosophila were provided for biology class experimental work. Finally, a series of questionnaires called "Indoor Nature Trails" was prepared for use by visiting high school students.

The following year a lecture series was initiated for the students of biology in high schools. Many of these lectures were given by the scientific staff and similar lecture series were given for the next 20 years. Today special weekly tours of the Museum laboratories are conducted for biology students in the high schools.

The outstanding development of this period, however, was

the resumption in 1929 of special courses for teachers-in-service last given in 1904 under Bickmore. Two courses were offered in 1929. One, called "Cultural Course in Geography for Elementary Teachers" and given by Grace F. Ramsey, had an enrollment of 1313 students. The other, also a lecture course, was for teachers in high schools and colleges, was given by Clyde Fisher, and had an enrollment of 236 students. These were thirty-hour courses for which students received full credit from the Board of Education. Such courses continue to the present time and are accredited by the City College and Hunter College. Instead of mass instruction, the classes of today are limited to 35 students each and to 20 for the laboratory sessions.

It is interesting to note as an indication of things to come, that in 1929 Fisher lectured at Harvard on "The Planetarium." In addition to his Curatorship in Public Instruction, Fisher also held the post of Curator of Astronomy and had traveled to Germany to inspect the newest and most amazing of visual aids, the Zeiss Projection Planetarium.

In cooperation with the Council on Adult Education for the Foreign Born, an evening lecture program was started for foreign born adult students who were attending night school classes in New York City. This program continues to this day and has done much to orient these "new citizens" to life in their adopted country.

Because of the demand on the part of teachers, scout leaders, and nature counselors, a new teachers' course in natural science called "How to Know Objects of Nature" was started in 1931. First given by Fisher and then by Farida A. Wiley, this course and others similar to it have been offered every year since 1931. Later, Miss Wiley instituted a course for Camp Nature Counselors and a special course, consisting entirely of field trips, known as "Natural Science for the Layman," which has proved to be one of the most popular of the department's offerings in the field of adult education.

At the same time, the department began its special program

for nurses-in-training, with the use of Museum exhibits and films that deal with anatomy, physiology, and animal disease vectors.

In March of 1935, in cooperation with the City College of New York, a new program of teacher training began. It consisted of an intensive three-week course on museum teaching methods followed by one week of practice teaching at the Museum. The course met the requirements of the State in that the necessary number of hours of practice teaching were provided. These student teachers put in more than 30 hours weekly at the Museum and additional hours of study at home for this work. In 1935 a total of 30 student teachers underwent this training. In their practice teaching they handled a total of 12,000 children in 261 classes from 125 different schools. The program was operated under the direction of Dr. Ramsey with the assistance of other members of the departmental staff. This arrangement continued until the outbreak of World War II in 1941.

Sherwood died in 1937, and Dr. Ramsey carried on the work of the department until Charles Russell became chairman in 1938. The next fifteen years were marked by considerable change in the organization and activities of the department, and more time was given to experimental educational projects reflecting Russell's background as a professional educator.

Under Russell's direction the department's activities included the Platoon Program of museum education, which was to set the pattern for educational activities for school children all over the museum world and which led the City of New York to give increased support to the department. The staff initiated courses in science activities for settlement house workers, which recognized the need for nature education for underprivileged children; special nature study courses for Museum Members; and lectures in the social studies for high school students.

In 1941, recorded music was broadcast in certain exhibition

halls. The program continued for several years and led to ethnic dances in the halls and finally to an outstanding auditorium series, "Around the World in Song and Dance," with La Meri, Pearl Primus, Leon Destiné, Ruth St. Denis, and many others of note in the dance world.

Also in 1941 a series of new programs, many of them experimental, was started, including a course in science activities for settlement house workers, special courses for Members on bird study, nature photography, and national parks, a training course for Boy Scouts to enable them to act as volunteer docents on Saturdays, a program of motion pictures for school children, and a series of lectures in the social studies for high school students.

A great change took place in the programs for school children in 1942. After the Japanese attack on Pearl Harbor on December 7, 1941, and the entry of our country into the war, the Superintendent of Schools of New York City put a temporary ban on all visits and excursions taken by school classes. This ban was to last until the community was able to work out an effective air-raid warning and safety program. Russell used this cessation of school visits as an opportunity to develop with his staff an entirely different type of program to be put into operation when the schools resumed their visits to the Museum. The new program was called the "Platoon Program." This program presented a Museum all-day experience which included exhibition hall instruction, activity periods, film showings, demonstrations in the lecture rooms, and a special Planetarium demonstration. At first offered for grades three to six, it proved very popular from the start.

This program began in the fall of 1942 and replaced the following teaching programs: the auditorium lectures for school children, the Exhibition Hall Talks, and the special classes for handicapped children. Provision was made in the Platoon Program for the accommodation of physically and visually handicapped children.

The Platoon Program was started as an experiment at the Museum's own expense in 1942. The experiment proved so successful that the City in 1945 made the necessary funds available for the continuance of this activity as a regular feature of the Museum's services to the schools of New York.

In 1949, President F. Trubee Davison made a statement in the Annual Report concerning the Platoon Program. Writing on what he called one of the most thrilling experiments in Museum education, Davison stated, "It is the result of an intensive cooperative study by the educational staff of the Museum and the City's Board of Education. The plan is unique in America or elsewhere, for nowhere else has there been established such a close contact between a museum and the schools of the community to provide a whole day of planned activity centered about a single phase of the students' own school work."

In January of 1945 the department sponsored the first of what was to prove a series of seven annual Visual Aids Institutes. In connection with this, an audio-visual aids exhibit and demonstration center was established in the School Service Building.

On May 1, 1946, the first large special exhibit prepared by the Department, "Masks and Men," was opened to the public in the new exhibition area on the second floor. This exhibit was produced with materials furnished by the Department of Anthropology. "Masks and Men" was later replaced by an exhibit on "Native Carvings in Ivory, Wood, and Stone." In 1948, the special exhibit on head gear and facial ornamentation called "From the Neck Up" was produced. All of these shows proved very popular with Museum visitors.

In 1948 two new events were held in Education Hall. One was the first of the Hobby Shows for Older People; the other, *The New York Times* Children's Book Fair. The Hobby Show has been held every year since 1948. The Book Fair, which attracted over 100,000 people in four days, eventually became too large to be held in the Museum.

In the development of Warburg Hall of Ecology, which was opened in 1951, Miss Wiley of the department served as consultant. On this occasion, Director Parr stated, "In this new hall the Museum takes cognizance of an elementary duty to teach the children and the general public of a large metropolitan area the simple basic facts of life in the natural environment and in nature under human cultivation."

John R. Saunders succeeded Russell in 1952. Since that time the department's efforts have been centered on the improvement of existing teaching programs, on the exploration of new types of teaching projects, and on the planning and production of new circulating exhibits and the renovation of existing ones.

Five new projects were inaugurated in 1953 and 1954. The Platoon Program, now called "The World We Live In" program, has been extended to include grades seven to nine, classes of non-English speaking children, classes for children who are confined to their homes because of chronic illness, and classes from the "600" schools for children who have special behavior and emotional problems, in addition to children who are blind, children with impaired vision, those physically handicapped, and those with retarded mental development. Under this program, since its beginning in 1942, more than 3,000,000 students have received a total of 12,000,000 student hours of instruction.

A teaching program for elementary and junior high school students, called the Half-Day Program, has been initiated. This program offers a wider choice of more specialized topics than is available on The World We Live In program, and in the two years of its existence has accommodated over 24,000 students.

The Natural Science Center for Young People opened its doors to the public on Thanksgiving Day, 1954, and has been open afternoons and weekends ever since. At this writing, close to 60,000 young people have visited the Center, and hundreds of science-minded young people have made repeated visits

to the Center, worked on its projects, assisted in its operation, and gone on its field trips. The benefactors who made the Center possible, Mrs. Lewis S. Thompson and the Peter Brookdale Fund, have, by a new grant in 1956, financed the equipment of a sorely needed activities room and a resultant expansion of the Center's service to young naturalists.

The Science Kit program, originated in 1954 by Elizabeth Guthrie of the City Garden Club, has proved of great assistance to the New York City schools in launching their new curriculum in junior high school and elementary school science. The department assisted in the development of the project, the collecting and identification of the materials, the publication of the descriptive literature accompanying the kits, and, finally, the distribution of the kits to the schools. Each kit contained about twenty different natural history specimens, such as milkweed pods, lichen, samples of soil, and seeds, which could be used as classroom demonstration material. Boys and girls of the junior high schools were encouraged to collect these items when in summer camps as a service project. The materials were delivered to the Museum, where Garden Club volunteers sorted them and packed them in boxes, which later were delivered to science teachers. To help teachers foster the project, the City Garden Club, with the help of the Lantern Slide Division, sponsored the manufacture of a film strip designed to show students how to collect the materials.

An anonymous donor has made it possible to offer a laboratory course in mineralogy for a group of specially selected high school students. This course, given Saturday mornings, has a capacity registration, and the students have shown great enthusiasm and interest.

At the request of the Radio and Television Division of the Board of Education, the department, in 1955 and 1956, made a total of thirty special broadcasts for elementary grades on natural history. These programs were taped and each program was broadcast three times a week over WNYE, the Board of

Education station, and once a week over WNYC. It is reported that 800 classes a week listened to these broadcasts.

Reorganization of the Department's services for adults was begun in 1954, and a new post, Supervisor of Adult Programs, was established. New courses were added, designed to attract not only teachers-in-service but also Members and the public. Attendance for 1956 for these courses was almost double that in 1954. This work holds promise of showing an even more remarkable development in the next few years and will enable the museum to establish a firm leadership role in this type of activity.

Since 1881, the total number of contacts made by all the educational activities for which records have been kept is 692,626,176. The department, with a staff of thirty-five, is now the largest of its kind in the world.

In a summing up of the contributions of those who have been charged with carrying out the Museum's educational services, one fact is evident. From the beginning, the American Museum has realized its educational obligations. Using virtually every known teaching device—the spoken and written word, exhibits, specimens, charts, lantern slides, film strips, motion pictures, the press, radio, and television—this Museum has endeavored constantly to bring the teaching of natural history to adults and children alike and to make it meaningful.

CHRONOLOGY OF HIGH SPOTS

1872 First school groups visit Museum (Arsenal Building)
1879 First docentry
1880 First lecture course for teachers (first formal program for New York City school authorities)
1884 First New York State subsidy
1884 Department of Public Instruction established
1889 First lecture hall opened
1890 First Members Lectures
1890 First free public lectures
1892 First cooperation with colleges, the Columbia Lectures
1893 First direct instruction for school children

1895 Board of Education lectures for general public established
1903 Circulating Exhibits Division established
1904 First program of formal lectures for school children
1907 First full-time instructor employed
1907 First library exhibits circulated
1909 First Children's Room opened
1909 First program for the blind initiated
1909 Educational contacts over one million annually for first time
1909 First public showing of motion pictures at Museum
1911 Lantern Slide Division established
1912 First use of motion pictures in school children's program
1914 Lecture centers established
1916 First educational publication issued
1922 First circulation of motion pictures to schools
1922 First department-produced motion picture
1924 First department radio program
1924 First experimental program for the deaf
1924 Formal cooperation with the School Nature League begins
1924 First experimental nature trail established (Department of Entomology)
1927 Exhibition hall talks begin for school children
1927 First programs for high school students
1929 Resumption of courses for teachers (none since 1904)
1930 Adult education programs begin (program for the foreign-born)
1930 First course for Members (Know Your Museum)
1931 First program for nurses-in-training
1932 First camp leadership course given
1935 First cooperation with the City College of New York
1936 First field course in nature study
1941 First music program in halls
1941 First ethnic dance program
1942 Platoon Program started
1944 Division of Special Exhibits established
1945 First Annual Visual Aids Institute
1947 First Museum "Oscar" for student-made films awarded
1948 First hobby show for older persons
1954 Natural Science Center opened
1954 Science Kit project begun
1954 Half-Day program for schools inaugurated
1956 Special mineralogy course established by endowment

THE YEAR 1955-1956

THE historical review of the Museum's organized teaching program that Mr. Saunders presents in the preceding section of this report is important for two reasons. Obviously, it is valuable as a record, step-by-step, of experiments undertaken, of new programs initiated, of groups accommodated, of techniques, materials, and procedures utilized to make the teaching of natural history meaningful to the public we serve.

But the review has another purpose. As are the historical surveys of scientific research, expedition, and exhibition which we have published during the past three years, it is significant as documentation of the story of the evolution of the Museum itself.

When we prepare the annual report of the Museum, we close the books, so to speak, on departmental activities, when the calendar date reads June 30. But in a museum where the processes of scientific investigation continue daily, regardless of the calendar; where the building of new halls goes forward year in and year out; where field trips come and go regardless of season but with regard only to the manner in which the total work may best be accomplished; where learning and teaching must be as constant as breathing, the end of a fiscal year is more likely to represent the middle of a project than its beginning or its end.

The historical surveys, therefore, give us a perspective and a long view of the growth of a Museum. The "annual" section, which follows, can be described as a capsule view of a fraction of the activity in research, field work, exhibition, and publication carried out in the twelve-month period under consideration.

FIELD WORK AND RESEARCH

The past year has taken Museum scientific expeditions below the surface of the sea, to far-flung regions of the earth, and be-

yond, into the atmosphere. Using such diverse techniques as electronic recording, under-water and aerial photography, skin diving, carbon-14 dating, and digging with spade and shovel, they have pursued investigations into such varied problems as the causes of cultural change in primitive societies, the nature of the sediments in Long Island Sound, the courtship behavior of bower birds, and the determination of geodetic positions of the United States radar installations in northern Canada.

Gordon F. Ekholm of the Department of Anthropology spent three months excavating a late classic Maya site at Comalcalco, in the state of Tabasco, Mexico. Prior to this excavation this portion of the Maya area was almost completely unknown. Dr. Ekholm has not yet completed the study of the 1700 pounds of pottery, fragments of stucco sculpture, and incised bricks brought back to the Museum, but it is expected that the results will be of considerable value to Middle America studies. Comalcalco is the only large Maya site and the only site in the New World that has large structures of fired brick, and the stucco sculpture found there, although related to that of Palenque, has unusual style features that make it an important addition to the known body of Maya art.

On behalf of the department, Donald W. Lathrap, a graduate student at Harvard University, is engaged in the first major archeological work in the Montaña region of Peru. In an interim report Mr. Lathrap indicates that he has already found three ceramic complexes. The Montaña is an area that is proving to be of considerable importance in studies of cultural distribution and interrelationships in South America, and it is anticipated that the results of these excavations will be of great value to students of South American cultures.

Robert W. Weaver and Thomas L. Goodman have returned after spending two years in Thailand studying the ethnic groups in the wilderness areas of the interior. They were able to report meeting a few surviving members of the Phi Thong Luang, a tribe previously thought to be extinct, and to make a

detailed color film and kodachrome record of several other tribes as well. A small collection of Miao specimens, mainly costumes, was also returned by this expedition.

Harold E. Anthony, Chairman of the Department of Mammals, reports that the Fifth Archbold Expedition to New Guinea left New York in March to resume biological investigations in that area, one of the least known regions of the world. Sponsored by Richard Archbold, Research Associate in the Department of Mammals, and headed by Leonard J. Brass, Associate Curator, the expedition had several objectives: to collect mammals and plant life; to study geographical and ecological relationships of the animal and plant life of New Guinea, Malaysia as a whole, and Australia; and to shed further light on the question of previous land connections between these now insular areas.

E. Thomas Gilliard of the Department of Birds left in April on a field trip to India and Nepal under the auspices of Lowell Thomas. After spending six weeks in these countries, Mr. Gilliard continued on to New Guinea where he spent more than a month carrying on his long-range study of bower birds. He was fortunate in obtaining extensive field notes on the unusual behavior of these birds and hopes to incorporate this new material into his comprehensive monograph on bower birds now being prepared for publication.

Charles M. Bogert, Chairman of the Department of Amphibians and Reptiles, spent the past year doing field work in the southwestern United States and Mexico, on a fellowship from the John Simon Guggenheim Memorial Foundation.

Mr. Bogert's work involved studies in two major fields of herpetological research: adjustment of reptiles to temperature and the recording and analysis of the various sounds produced by frogs and toads. The opportunity to work in many different habitats contributed largely to the successful result of this undertaking.

In the Department of Fishes and Aquatic Biology, Libbie

H. Hyman worked on the fifth volume of her definitive treatise on the invertebrates, and did field work in Brazil, Panama, and Trinidad.

Among field projects carried on by the department at the Lerner Marine Laboratory in Bimini was Priscilla Rasquin's work on the effects of various hormones on the osmoregulation of teleosts as well as on the pigmentation of the pineal region in these fishes. William K. Emerson investigated the ecological aspects of the rich molluscan fauna of the Great Bahama Bank.

Mont A. Cazier, Chairman of the Department of Insects and Spiders, spent the major part of the year at the Museum's Southwestern Research Station of which he is Director, supervising the development of the physical plant. For three months of that time, however, he was able to do field work in parts of the Southwest and Mexico, where he collected tiger beetles for laboratory experiments. Willis J. Gertsch also spent several months in the southwestern United States and was able to collect some 5000 spiders during that time. Frederick H. Rindge collected butterflies and moths from Michigan, Wisconsin, Minnesota, Ontario, Manitoba, and the Dakotas, thereby filling a gap in the Museum's collections.

Lester R. Aronson, Chairman of the Department of Animal Behavior, spent two months at the Lerner Marine Laboratory continuing his studies on orientation and jumping behavior in gobies. In Bimini Harbor he collected a large number of little-known postlarval stages of the West Indian pearl fish, providing a complete series from the long, attenuated postlarva to the short, juvenile individuals.

The Department of Geology and Paleontology had several groups in the field during the year. As a result of a trip to the southwestern United States led by Edwin H. Colbert during the summer of 1955 the Museum was able to obtain a fine series of tritylodont specimens from the Kayenta formation in Monument Valley, Arizona. These fossils are among the most important vertebrates ever added to the collections of the

Museum, for they are considered a "missing link" between reptiles and the mammals that evolved from them. The specimens were collected with the cooperation of the United States Geological Survey.

George Gaylord Simpson and his party from the Museum left in May, 1956, to spend several months in Brazil. In a cooperative expedition with the Brazilian National Department of Mineral Production and the Goeldi Museum, the group planned to survey the land around the upper Juruá River, a major tributary of the Amazon, for fossil remains of early animal life. The geology and paleontology of this area are virtually unknown, and this will be the first expedition of its kind ever attempted there.

Norman D. Newell continued the geological and ecological survey of the Great Bahama Bank begun last year and spent six weeks at the Lerner Marine Laboratory. This region is of great interest to historical geologists because it is one of the few examples of a shallow limestone sea like those that long ago covered North America. This study, which it is expected will continue over a three-year period, includes detailed comparisons of living associations of plants and animals with their fossil counterparts. Rocks of the islands in the area contain fossil remains of many of the animals living in the clear, shallow water of the Bank, which averages about 30 feet in depth and thus permits close inspection of the bottom by divers and photography.

Brooks F. Ellis, Chairman of the Department of Micropaleontology, reports the start of the Long Island Sound Project, a joint undertaking of the Museum and New York University, to which the Abercrombie and Fitch Company has lent financial support.

Plans call for the study to continue through the summer of 1958, with the objective of determining the nature and origin of the sediments in Long Island Sound, the relationship between these sediments and the micro-organisms that inhabit

them and the waters above them, and the mechanics of their transportation and deposition.

Two extensive expeditions were undertaken by Planetarium staff members. The first was a trip to the island of Ceylon taken by Joseph M. Chamberlain, Planetarium Chairman, and Thomas D. Nicholson, Associate Curator, with R. E. Logan and Lee Boltin of the Museum's Photographic Division. The purpose of the trip was to develop a documentary film which would tell the story of this exceptionally long eclipse. About two thousand feet of color motion picture film was taken, some of which has already been adapted for use in the Planetarium demonstrations. The department is continuing an editing job which will result in a completed film in the near future.

In January and February, 1956, Messrs. Chamberlain and Nicholson accepted a contract through the Western Electric Company for the Air Force, to determine the geodetic positions of nine radar installation sites along the Distant Early Warning line at the northern extreme of Canada. The positions were determined to an accuracy of 0.05 mile. This degree of precision had not previously been accomplished in this area, and the work can be considered a valuable contribution to the defense network of the United States.

Research within the Museum involved both the beginning and conclusion of several long-range projects, as well as the continuation of others.

Harry L. Shapiro, Chairman of the Department of Anthropology, began a study of the remains of early man in South America, based on excavations made by Junius Bird in a series of caves on the coast of Chile. James A. Ford completed a monograph on the excavations he and Junius Bird carried on at Poverty Point, Louisiana. Margaret Mead's restudy of a South Pacific society after 25 years, which was published in May under the title "New Lines for Old — Cultural Transformation, Manus, 1928–1953," advances a new theory of

cultural change. The study suggests that the evils associated with contact between advanced and underdeveloped countries have been due not to the fact that the change was too fast, but to its being irregular, incomplete, and undesired by the peoples among whom the change occured. It suggests, too, that a complete change of pattern, swiftly accomplished, may be the most appropriate way in which those cultures that lack the complexity of organization necessary to absorb modern technical and political ideas may advance into the twentieth century.

In the Department of Mammals, Joseph Curtis Moore, Research Fellow, has taken up the revision of the Oriental squirrels begun by the late George H. H. Tate. Richard G. Van Gelder, Assistant Curator, is nearing completion of a revision of the spotted skunks (genus *Spilogale*). Hobart M. Van Deusen has been working on the taxonomy, distribution, and ecology of the mammals of Papua, drawing upon the extensive collections made by the Archbold Expeditions and his own experiences as a field member on two of the expeditions. As new species and subspecies are discovered they are described in short papers. The final report is expected to be a substantial volume.

Members of the Department of Birds continued to be occupied with research for the "Check-list of Birds of the World." John T. Zimmer, who is working on three families of South American birds for the list, has virtually completed the section concerning flycatchers. Dean Amadon has finished his manuscript on the starlings and has also written a paper on taxonomy and evolution among the starlings, which is now in press.

"The Gila Monster and its Allies," by Mr. Bogert of the Department of Amphibians and Reptiles, and Rafael Martín del Campo, Curator of Reptiles, Instituto de Biología Universidad Nacional Autónoma, México City, was published in the *Bulletin of the American Museum of Natural History* in April, 1956. This study, covering five years of research, included the

relationships, habits, and behavior of the lizards of the family Helodermatidae.

Considerable progress was made on several comprehensive research projects in the Department of Fishes and Aquatic Biology. The monograph on the reproductive habits of fishes, to which Charles M. Breder, Jr., Chairman, devoted the major part of his time, was advanced almost to completion.

Perihan Sadoglu of the University of Istanbul completed her laboratory work at the Museum on the genetics of Mexican cave fishes and has returned to Turkey. She took with her about 200 living specimens of the fishes with which to continue her research.

Work in fish physiology included the initiation of an investigation by Vladimir Walters on the metabolism of large oceanic fishes, and the continuation by Francesca LaMonte of her studies on the speared fishes. Because of increasing interest in the latter project, Miss LaMonte worked in close cooperation with investigators in several other institutions. An interesting study, begun late in the year in the department's laboratory at the Museum, concerns imitative control in the sargassum fish.

The Department of Insects and Spiders reports progress on several research projects. C. Howard Curran has continued his revision of the North American mydaid flies and is writing a paper describing new Oriental Syrphidae. Willis J. Gertsch spent part of the year on a revision of the spider family Dictynidae, and has accomplished preliminary work on a revision of the North American Tetragnathinae. Frederick H. Rindge has completed a revision of the American species of geometrid moths of the genus *Deilinia.* Mont A. Cazier has been continuing his work with tiger beetles, and Patricia Vaurie has completed a paper describing new species of a genus of scarab beetle, *Diplotaxis,* from Mexico.

The Department of Animal Behavior reports a study by Evelyn Shaw of the sexual behavior of male platyfish raised in social isolation under controlled conditions. The data at present

indicate that complete lack of contact with other fish prior to the time of testing results in considerably reduced sexual activity, and experiments are in progress to determine during which period of growth and development social isolation is most critical. Similar studies on the importance of early experiences are being made by T. C. Schneirla and his collaborators on isolated kittens. Studies of this kind add to the work that is being done in the field, to determine the great importance of early experiences on the individual and the effect that such have for the rest of his life.

During the year George Gaylord Simpson, Chairman of the Department of Geology and Paleontology, completed an important study of the mastodonts of Brazil with Carlos de Paula Couto and also finished studies of the fossil penguins of Australia and of a remarkable new Eocene mammal from Patagonia. Edwin H. Colbert has finished a manuscript on the correlation of continental Triassic beds in North America in cooperation with Joseph T. Gregory of Yale, and has begun work on the genus *Poposaurus,* our first good example of an ornithischian dinosaur.

Bobb Schaeffer has been concerned during the past year with a faunistic and paleoecologic analysis of Mesozoic fish fauna and with preliminary studies for a critical review of the paleoniscoid fishes.

Brian Mason and his associates were able to increase research activities following the completion of X-ray and chemical laboratories early in 1955. At present several major projects are under way, including the mineralogy and petrology of areas of New Zealand and the mineralogy of thermally metamorphosed limestones.

Donald F. Squires, who joined the Department of Geology and Paleontology at the beginning of 1956, initiated two major research projects: a study of Triassic coral faunas and of Gulf and Atlantic coastal plain corals.

Brooks F. Ellis, Chairman of the Department of Micro-

paleontology, reports the establishment, in September, 1955, of a new center for the study of fossil spores and pollen. This center, which is a joint activity of the department and New York University, maintains collections of fossil spores and pollens collected from well samples and surface samples; conducts research projects dealing with these materials; and offers a graduate course in plant microfossils. The purpose of the Center is to train graduate students who plan to enter the petroleum industry as a career, in another new and important phase of micropaleontology, and to give them the opportunity to carry on research in this field.

Dr. Ellis reports that a new publication, "Micropaleontology," was initiated during the year and is serving this entire field of study, with emphasis on Foraminifera, Ostracoda, and microfossils. The publication now has over 950 subscribers.

Jack McCormick continued work on the vegetation of the New Jersey pine barrens and its relation to fire and water. As an outgrowth of this work, the root systems of five frequently burned pitch pines were excavated from the "West Plains." The distribution of the roots was carefully mapped, soil samples were collected, and several other roots were dry-excavated as checks. This work was done in cooperation with John Andresen of the Department of Forestry, Rutgers University.

FIELD STATIONS

The three field stations of the American Museum welcomed scientists from many parts of this country and from abroad whose work covered a wide range of studies.

During its first year of operation the Southwestern Research Station near Portal, Arizona, played host to 82 visiting investigators in twelve fields of scientific inquiry, including parasitology, paleontology, botany, malacology, and arachnology. Lendell Cockrum of the University of Arizona worked on the distribution, biology, and migratory behavior of bats. The results of field tests on lizards carried out by Robert Steb-

bins of the University of California with Richard Eakin, also of the university, suggest that the presence of the "third eye," or parietal eye, has something to do with the determination of how much solar energy is received. Also at the station, O. K. Cartwright of the United States National Museum is attempting to work out the biology of a group of scarab beetles (*Plusiotis gloriosa*).

The Archbold Biological Station at Lake Placid, Florida, continued to serve the needs of research workers in a variety of studies. These included the investigations of Charles L. Remington and his associates from the Osborn Zoological Laboratory at Yale University into the evolution and systematics of butterflies and moths. Interesting experiments were conducted in this connection on the food preferences of the Florida Jay for various mimetic butterflies. The station also played host in December to the annual meeting of the Lepidopterists' Society.

Progress in several phases of its operation was again reported by the Lerner Marine Laboratory, Bimini, British West Indies. A second cruiser, the "Wild Goose," was added to the laboratory's fleet and put into operation in May. The physical plant underwent considerable improvement, including the rebuilding and extension of the dock.

Several important projects were carried on by the visiting scientists. As a result of the work of Dr. Newell and his associates, a most useful chart of the island has been prepared. Dorothy E. Bliss of the Department of Fishes and Aquatic Biology continued work on the glands of crabs. Ross Nigrelli of the New York Zoological Society continues his studies on holothurian and fish cancers. Paul K. Brown of Harvard University conducted research on visual pigments and retinal structure in marine fishes and turtles, and J. G. Moulton of Bowdoin College studied the relations of sound to fish biology.

EXHIBITION

Steady progress has marked the carrying out of the exhibition program. Two habitat groups for the Hall of North American Forests—the Western Pine and the Oak-Hickory—were completed during the year. The Boreal Forest Group was nearly finished, and much preliminary art work was done for the subsidiary displays. The routed lucite migration map for the Hall of North American Mammals is almost complete.

Revision and reinstallation of the exhibit Birds of the New York Area was concluded in the spring.

Among the exhibits completed for the Hall of the Biology of Man were Cell Structure and Function, Reproduction and Embryology, and the Circulatory System and the Respiratory System.

The renovation of Tyrannosaur Hall was completed by the end of the year and included the cleaning of all exhibits, the repainting of all cases, and the re-installation of major exhibits, with new labels throughout the hall. Corridor cases for the Giant Sloth Hall will be completed within a few months.

Most impressive of the new Planetarium exhibits was the installation of the Ahnighito meteorite on a giant Toledo scale.

Outstanding among temporary exhibits in the Corner Gallery was "Gyotaku, the Art of the Fish Print," and the large-scale temporary exhibit, "Cold Hands, Cold Feet," the story of how man has managed to keep his extremities warm in winter.

A new and much needed Conference Room on the second floor was finished, furnished, and put into operation during the year.

PUBLIC INSTRUCTION

Nearly eleven million contacts (10,889,708) were made by the Department of Public Instruction, under the chairmanship of John R. Saunders, during the past year, through courses, visits to the Natural Science Center for Young People, circulating exhibits, motion picture showings, and the use of Science

Kits. Almost seven million additional educational contacts (6,857,614) were made by departments other than Public Instruction and included Membership, Guest Services, Building Services, and the Film and Slide Libraries. Total educational contacts for the past year were almost eighteen million (17,747,322).

AMERICAN MUSEUM-HAYDEN PLANETARIUM

The past twelve months have seen new achievements in nearly every aspect of operation in the American Museum-Hayden Planetarium. Attendance at the popular demonstrations has reached an all-time high for a fiscal year. Staff members have engaged in several important research investigations. The physical plant has been extensively renovated.

A total of 573,500 people attended the seven different sky shows offered, and 8602 were enrolled in eight courses offered in astronomy, meteorology, and celestial navigation. In addition to the regular adult education program, special lectures were given for college students and teachers, and a background conference on the artificial earth satellite was held for press representatives in cooperation with the American Rocket Society.

Highlights of the exhibition program were the opening of the display showing a model of the artificial earth satellite which was built and presented to the Planetarium by *Popular Science Monthly;* the completion of the redesigned exhibit of the Ahnighito meteorite; and the opening of the newly refurbished Willetts Memorial Weather exhibit.

Improvement of the technical facilities of the Planetarium continued, with the addition of new electrical lines and controls to the console in the Sky Theater and the building of a new projection shelf around the entire periphery of the dome to accommodate a system of fourteen new horizon projectors.

MUSEUM STAFF

Dorothy E. Bliss and William K. Emerson were appointed Assistant Curators of Invertebrates, Department of Fishes and Aquatic Biology; Richard G. Van Gelder, Assistant Curator, Department of Mammals; Charles Vaurie, Assistant Curator, Department of Birds; and Vladimir Walters, Assistant Curator of Fishes, Department of Fishes and Aquatic Biology.

The title of the head of the Planetarium, formerly General Manager and Chief Astronomer, was changed to Chairman. Franklyn M. Branley was appointed Associate Astronomer; Kenneth L. Franklin, Assistant Astronomer; and James S. Pickering, Assistant Astronomer and Supervisor of Guest Relations of the Planetarium.

Vera Ujhely was appointed Assistant Executive Secretary.

ATTENDANCE

During the fiscal year here reported on, 1,783,433 people visited the Museum and 573,500 visited the Planetarium, making a combined total of 2,356,933 for the twelve-month period. This represents an increase of 109,988 for the Museum and 74,051 for the Planetarium.

THE AMERICAN MUSEUM OF NATURAL HISTORY

Financial Statement

For the Fiscal Years ended June 30, 1956 and 1955

THE AMERICAN MUSEUM

BALANCE

June 30,

ASSETS:	1956	1955
Current funds:		
General funds:		
Cash	$ 30,004	$ 6,362
Accounts receivable	216,834	146,975
Inventories, principally publications	81,983	86,657
Prepaid expenses and deferred charges	79,054	61,432
	$ 407,875	$ 301,426
Special funds:		
Cash	$ 439,597	$ 428,296
U. S. Government bonds, at cost	186,000	136,500
Accounts receivable	3,940	3,005
	$ 629,537	$ 567,801
Exhibition halls funds:		
Cash	$ 263,962	$ 365,557
U. S. Government bonds, at cost	514,000	462,719
Due from general funds		15,323
	$ 777,962	$ 843,599
	$ 1,815,374	$ 1,712,826
Endowment funds:		
Cash	$ 56,904	$ 136,676
Investments (market June 30, 1956, $27,794,000) (Notes 1 and 2):		
Bonds	9,422,162	8,123,620
Preferred stocks	2,561,863	2,557,274
Common stocks	8,276,519	8,256,427
Other	34,936	35,116
	$20,352,384	$19,109,113
Investment in bonds of The American Museum of Natural History Planetarium Authority, $570,000 principal amount, at cost (Note 3)	$ 425,000	$ 425,000
Pension funds:		
Cash	$ 167,429	$ 126,689
Investments, at cost (market June 30, 1956, $5,303,000):		
Bonds	3,104,013	2,990,439
Preferred stocks	762,536	636,001
Common stocks	967,450	866,495
Real estate mortgages		1,650
Loan receivable	550	
	$ 5,001,978	$ 4,621,274
	$27,594,736	$25,868,213

The accompanying notes are an integral part of these statements.

OF NATURAL HISTORY

SHEETS

1956 and 1955

FUNDS and LIABILITIES:	*1956*	*1955*
Current funds:		
General funds:		
Accounts payable, payroll taxes withheld, etc.	$ 41,220	$ 39,560
Deferred income, principally unearned dues and subscriptions	334,593	242,064
Due to exhibition halls funds		15,323
Appropriations for outstanding commitments	64,475	49,171
	440,288	346,118
Deficit (Note 6)	32,413	44,692
	$ 407,875	$ 301,426
Special funds:		
Balances of funds available for specific purposes, net of overdrafts (Note 6)	$ 629,537	$ 567,801
Exhibition halls funds:		
Funds for exhibition halls rehabilitation	$ 777,962	$ 843,599
	$ 1,815,374	$ 1,712,826
Endowment funds:		
Endowment funds, income available for:		
Restricted purposes	$ 9,280,036	$ 8,865,497
Unrestricted purposes	5,479,580	4,892,152
Funds functioning as endowment, principal and income available for:		
Restricted purposes	526,751	485,497
Unrestricted purposes (Notes 2 and 5)	5,066,017	4,865,967
	$20,352,384	$19,109,113
Funds invested in the bonds of The American Museum of Natural History Planetarium Authority	$ 425,000	$ 425,000
Pension funds:		
Pension fund balance	$ 5,000,851	$ 4,620,147
Welfare fund balance	1,127	1,127
	$ 5,001,978	$ 4,621,274
	$27,594,736	$25,868,213

GENERAL FUNDS

SUMMARY STATEMENT OF CHANGES

for the fiscal years ended June 30, 1956 and 1955

	1956	*1955*
Deficit, beginning of year	$ 44,692	$ 37,715
Less, Transfers from unrestricted funds functioning as endowment	44,692	37,715
	—	—
Income:		
Appropriation from the City of New York	$1,261,301	$1,303,851
Endowment funds	926,949	873,392
Outside trusts and foundations	53,857	53,517
Gifts and grants	175,081	165,424
Other (Notes 2, 3 and 4)	290,335	289,512
	$2,707,523	$2,685,696
Expenses and appropriations:		
General administration	$ 498,021	$ 516,696
Educational activities	1,086,256	1,005,657
Pension and other social benefits	210,327	210,014
Operation and maintenance of physical plant	930,028	972,161
Appropriation for outstanding commitments at end of year	64,475	49,171
	2,789,107	2,753,699
Less, Appropriation for outstanding commitments at beginning of year	49,171	23,311
	$2,739,936	$2,730,388
Deficit, end of year	$ 32,413	$ 44,692

The accompanying notes are an integral part of this statement.

SPECIAL FUNDS

SUMMARY STATEMENT OF CHANGES IN FUND BALANCES

for the fiscal years ended June 30, 1956 and 1955

	1956	*1955*
Balance, beginning of year	$572,776	$523,193
Less, Overdrafts (Note 6)	4,975	30,961
	$567,801	$492,232
Income:		
Endowment funds	$ 92,326	$ 84,234
Gifts and grants	395,791	425,010
Other	83,146	109,125
	$571,263	$618,369
Expenditures for the special purposes and objects for which the funds were established	$509,527	$520,569
Transfers to restricted funds functioning as endowment		22,231
	$509,527	$542,800
Balance, end of year	$659,883	$572,776
Less, Overdrafts (Note 6)	30,346	4,975
	$629,537	$567,801

The accompanying notes are an integral part of this statement.

EXHIBITION HALLS FUNDS

SUMMARY STATEMENT OF CHANGES IN FUND BALANCES

for the fiscal years ended June 30, 1956 and 1955

	1956	*1955*
Balance, beginning of year	$843,599	$874,257
Income:		
Endowment funds	$ 382	$ 365
Gifts and grants	51,916	125,782
Other	381	793
	$ 52,679	$126,940
Expenditures for exhibition hall program	$118,316	$157,598
Balance, end of year	$777,962	$843,599

ENDOWMENT FUNDS

SUMMARY STATEMENT OF CHANGES IN PRINCIPAL

for the fiscal years ended June 30, 1956 and 1955

	1956	*1955*
Balance, beginning of year:		
Endowment funds, income available for:		
Restricted purposes	$ 8,865,497	$ 8,392,020
Unrestricted purposes	4,892,152	4,633,945
	$13,757,649	$13,025,965
Funds functioning as endowment, principal and income available for:		
Restricted purposes	$ 485,497	$ 444,254
Unrestricted purposes	4,865,967	4,401,460
	$ 5,351,464	$ 4,845,714
Totals	$19,109,113	$17,871,679
Additions:		
Gifts and bequests, etc. (Note 2)	$ 661,855	$ 343,373
Net profit on sales of investments	649,692	918,745
Collections from Planetarium Authority on account of principal of promissory notes		25,000
Transfers from special funds		22,231
	$ 1,311,547	$ 1,309,349
Deductions:		
Expenditures, for custodian fee	$ 5,000	$ 5,000
Transfers to general funds:		
For honorariums, consultant fees, etc.	9,475	29,200
To dispose of operating deficit of preceding year	44,692	37,715
Transfers to pension fund for past service costs and temporary pension payments	9,109	
	$ 68,276	$ 71,915
Net additions	$ 1,243,271	$ 1,237,434
Balance, end of year:		
Endowment funds, income available for:		
Restricted purposes	$ 9,280,036	$ 8,865,497
Unrestricted purposes	5,479,580	4,892,152
	$14,759,616	$13,757,649
Funds functioning as endowment, principal and income available for:		
Restricted purposes	$ 526,751	$ 485,497
Unrestricted purposes	5,066,017	4,865,967
	$ 5,592,768	$ 5,351,464
Totals	$20,352,384	$19,109,113

The accompanying notes are an integral part of this statement.

INVESTMENT IN PLANETARIUM AUTHORITY

SUMMARY STATEMENT OF CHANGES

for the fiscal years ended June 30, 1956 and 1955

	1956	*1955*
Balance, beginning of year:		
Invested in revenue bonds	$425,000	$425,000
Invested in promissory notes		25,000
	$425,000	$450,000
Deduction:		
Payment by Planetarium Authority on account of promissory notes		$ 25,000
Balance, end of year, invested in revenue bonds	$425,000	$425,000

PENSION FUNDS

SUMMARY STATEMENT OF CHANGES IN PRINCIPAL

for the fiscal years ended June 30, 1956 and 1955

	1956	*1955*
Balance, beginning of year:		
Pension fund	$4,620,147	$4,298,656
Welfare fund	1,127	1,145
	$4,621,274	$4,299,801
Additions:		
Payments by subscribing members	$ 128,742	$ 125,087
Payments by general and other funds	155,345	148,718
Income from investments	182,875	174,342
Net profit on sales of investments	114,500	42,733
	$ 581,462	$ 490,880
Deductions:		
Payments to members and beneficiaries	$ 196,305	$ 164,937
Expenditures, for custodian fees, etc.	4,453	4,470
	$ 200,758	$ 169,407
Net additions	$ 380,704	$ 321,473
Balance, end of year:		
Pension fund	$5,000,851	$4,620,147
Welfare fund	1,127	1,127
	$5,001,978	$4,621,274

NOTES TO FINANCIAL STATEMENTS

1. The land, buildings and equipment utilized by the Museum are either owned by the City of New York or were charged off at the time of purchase and, therefore, are not reflected in the balance sheet. No valuation of exhibits, collections, library, etc., has been established for balance sheet purposes.

   Investments are recorded at cost in respect of those purchased, and in respect of those acquired by gift, bequest or otherwise at market valuations at the dates of acquisition, probate court valuations or valuations established by the trustees.

2. The Museum owns an interest in certain mining properties acquired through a bequest. No valuation has been recorded on the books for the interest in these properties and, therefore, it is not reflected in the balance sheet. However, the Museum receives royalties from this source and such royalties are recorded, when received, as additions to unrestricted funds functioning as endowment (as bequests) or to current general funds. During the fiscal years ended in 1956 and 1955 royalties received, net of expenses, amounted to $137,651 and $92,363, respectively, of which $50,000 was credited to general funds (other income) in each year.

3. The Planetarium Authority is operated under the supervision of the Museum's management. Its audited financial statements are annexed. Interest income received from the Planetarium amounted to $25,650 and $25,910 during the 1956 and 1955 fiscal years, respectively. These amounts are included in other income of the general funds.

4. Other income of the general funds for the fiscal years ended in 1956 and 1955 include (a) net income from magazine and book shop operations of $21,005 and $25,187, respectively, and (b) transfers from unrestricted funds functioning as endowment of $9,475 and $29,200, respectively. Gross income from magazine and book shop operations amounted to $735,031 and $662,064 for the respective years.

5. Unrestricted funds in the amount of $800,000 have been conditionally appropriated for the construction of a new auditorium subject to appropriation of a like sum by the City of New York.

6. The overdrafts on special funds represent advances in anticipation of gifts, grants and other income. To the extent such income is not received the amounts will be charged against general funds.

7. Income and expenditures for the fiscal year ended in 1955 differ in certain instances from those previously reported because they have been reclassified for comparative purposes.

LYBRAND, ROSS BROS. & MONTGOMERY

Certified Public Accountants

The Board of Trustees,
The American Museum of Natural History,
New York, N. Y.

We have examined the balance sheet of THE AMERICAN MUSEUM of NATURAL HISTORY as of June 30, 1956 and the related statements of funds for the fiscal year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. We made a similar examination for the fiscal year ended June 30, 1955.

In our opinion, the accompanying balance sheets and related statements of funds present fairly the financial position of the Museum at June 30, 1956 and 1955 and the results of its operation for the fiscal years then ended, on a consistent basis.

Lybrand, Ross Bros. & Montgomery

New York, September 13, 1956.

THE AMERICAN MUSEUM OF NATURAL HISTORY
PLANETARIUM AUTHORITY

Financial Statement

For the Fiscal Years ended June 30, 1956 and 1955

THE AMERICAN MUSEUM
PLANETARIUM
BALANCE SHEETS,

ASSETS:	*1956*	*1955*
Cash	$ 9,141	$ 23,238
Accounts receivable	993	441
Inventory of publications	16,214	11,117
	$ 26,348	$ 34,796
Equipment, fixtures, etc.:		
Furniture and fixtures	$ 38,870	$ 38,870
Plant equipment, machinery and tools	70,222	70,222
Zeiss planetarium instrument	126,434	126,434
Copernican planetarium instrument	30,435	30,435
	265,961	265,961
Less, Allowances for depreciation	250,192	246,071
	15,769	19,890
Building, at cost (see note)	569,209	569,209
Land (donated by the City of New York)	—	—
	$584,978	$589,099
Prepaid expenses	$ 1,471	$ 2,039
	$612,797	$625,934

Note: The Authority's corporate charter terminates when all its liabilities, including its bonds, have been paid in full or have otherwise been discharged. At that time title to its personal property passes to The American Museum of Natural History and title to its real property passes to the City of New York to be maintained and operated in the same manner as other city property occupied by the Museum. Because of the nature of the ownership of the property, provision for depreciation of the building is considered unnecessary.

OF NATURAL HISTORY

AUTHORITY

June 30, 1956 and 1955

LIABILITIES:	*1956*	*1955*
Accounts payable	$ 446	$ 3,368
4½% Refunding Serial Revenue bonds, and interest thereon (held by The American Museum of Natural History):		
Interest:		
Unpaid coupons, past due	$252,000	$246,780
Accrued on bonds not yet due	652	870
Accrued on past-due unpaid bonds	174,848	154,200
	427,500	401,850
Less, Payments on account, including $25,650 in each of the respective years	112,050	86,400
	$315,450	$315,450
Principal:		
Past due	$483,000	$454,000
Due in annual instalments of $29,000 each through May 1, 1959	87,000	116,000
	$570,000	$570,000
	$885,896	$888,818
Deferred income, unearned subscriptions	$ 5,653	$ 5,281

CONTRIBUTED CAPITAL AND DEFICIT

Contributed capital:		
Charles Hayden	$156,869	$156,869
Charles Hayden Foundation	130,925	130,925
	287,794	287,794
Deficit, as annexed	566,546	555,959
	$278,752*	$268,165*
	$612,797	$625,934

* Denotes deduction.

STATEMENT OF INCOME, EXPENSES AND DEFICIT

for the fiscal years ended June 30, 1956 and 1955

	1956	*1955*
Income:		
Admission fees less allowances and commissions	$274,632	$243,272
Special lectures and courses	5,805	6,252
Miscellaneous	321	6,208
	$280,758	$255,732
Auxiliary activities:		
Sales booth	$ 65,854	$ 51,887
Sky Reporter pamphlet	5,672	5,264
	$ 71,526	$ 57,151
Total	$352,284	$312,883
Expenses:		
Preparation, presentation and promotional:		
Salaries	$ 93,660	$ 90,840
Supplies and expenses	23,436	24,709
	$117,096	$115,549
Operation and maintenance:		
Salaries	$ 62,673	$ 64,640
Supplies and expenses	26,138	22,052
Special improvements, renovations, etc.	48,534	21,807
	$137,345	$108,499
Administrative and general:		
Salaries	$ 5,000	$ 5,000
Pension fund, social security and other employee benefits	13,496	11,756
Miscellaneous	8,034	8,934
	$ 26,530	$ 25,690
Auxiliary activities:		
Sales booth	$ 47,798	$ 40,594
Sky Reporter pamphlet	4,331	3,940
	$ 52,129	$ 44,534
Total	$333,100	$294,272
Income before interest and depreciation	$ 19,184	$ 18,611
Interest expense:		
On 4½% Refunding Serial Revenue bonds, including $20,647 and $19,342 on past-due bonds for the respective years	$ 25,650	$ 25,650
On advances from The American Museum of Natural History	—	260
	25,650	25,910
Provision for depreciation (see note to accompanying balance sheet)	4,121	5,682
Total interest and depreciation	$ 29,771	$ 31,592
Net loss for year	$ 10,587	$ 12,981
Deficit, beginning of year	555,959	542,978
Deficit, end of year	$566,546	$555,959

LYBRAND, ROSS BROS. & MONTGOMERY
Certified Public Accountants

The Members of The American Museum of
Natural History Planetarium Authority,
New York, N. Y.

We have examined the balance sheet of THE AMERICAN MUSEUM of NATURAL HISTORY PLANETARIUM AUTHORITY as of June 30, 1956 and the related statement of income, expenses and deficit for the fiscal year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. We made a similar examination for the fiscal year ended June 30, 1955.

In our opinion, the accompanying balance sheets and related statements of income, expenses and deficit present fairly the financial position of the Authority at June 30, 1956 and 1955 and the results of its operations for the fiscal years then ended, on a consistent basis.

Lybrand, Ross Bros. & Montgomery

New York, September 13, 1956.

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