

100TH ANNUAL REPORT

THE AMERICAN MUSEUM OF NATURAL HISTORY



JULY, 1968, THROUGH JUNE, 1969



Alexander M. White 1904-1968

President, The American Museum of Natural History 1951-1968
Chairman, Board of Trustees 1968

Our sixth President, Mr. Alexander M. White, died on November 28, 1968, after having guided the Museum through a period of unprecedented growth and change. Mr. White brought to the Museum a thoughtful leadership and a strong sympathy for the natural sciences.

During his tenure the Museum pioneered in communication to the public of the wonders of natural history. An award winning national television series was initiated and a weekly radio program was created for millions of listeners. The Natural History Press was founded and the circulation of *Natural History* Magazine more than doubled. A significant number of exhibition halls were opened during this period.

While Mr. White was President, the value of the Museum's endowment fund was increased from \$19,000,000 to \$56,000,000. The Southwestern Research Station and the Kalbfleisch Field Research Station were acquired.

He will be remembered for his warm friendship and his loyalty to this institution and to all the people who had the privilege of working with him.

100TH
ANNUAL REPORT

THE AMERICAN MUSEUM OF NATURAL HISTORY / JULY, 1968, THROUGH JUNE, 1969 / THE CITY OF NEW YORK



ONE-HUNDREDTH 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

I was elected seventh President of the Museum in October, 1968, and so it will be my responsibility to lead it into its second century as one of the great cultural and scientific institutions of New York City, and indeed of America and of the world. I am supported by a devoted and distinguished body of Trustees and a scientific staff that reflects a very special quality of excellence. We all look forward confidently to a period of expanded usefulness to the world in which we live.

This is our Centennial and we selected for the year a challenging theme: "Can Man Survive?"

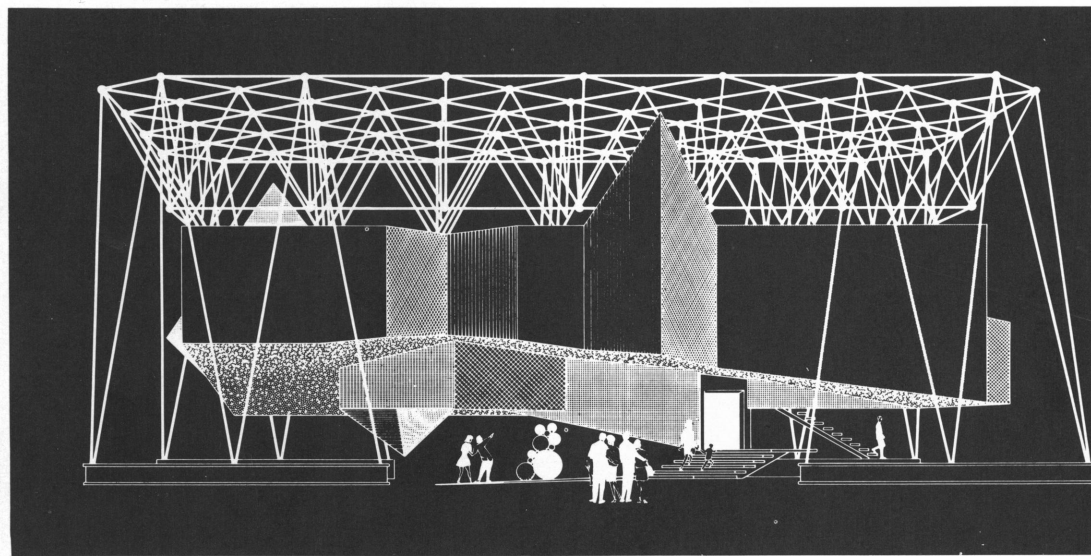
This question is likely to overshadow all others in the political and social discussions during the remaining years of this century. We shall have to examine the condition of human life and the prospects of all living things. The individual's relative freedom to exploit and otherwise modify his environment for his own benefit originated in a simpler, less crowded age when man's technological power was less and when the environment was self-regulating. This state of affairs no longer exists. We must, now and in the future, take a far stricter view of the responsibilities of the individual, and of leaders of business, industry and government, toward the natural world. The time has come to treat crimes against the environment on a par with crimes against society. The issue strikes at the very future of man.

I do not believe the greatest threat to our future is from bombs or guided missiles. I do not think our country will die that way. I think it will die when we no longer care. The Museum and its many constituencies—the Trustees, the staff, the members, the visitors, and the many who are influenced by our publications and traveling exhibits—do care. Through its new program of Environmental Studies, the Museum will help define the problems, the choices, and the consequences of actions relating to the quality of life on earth.

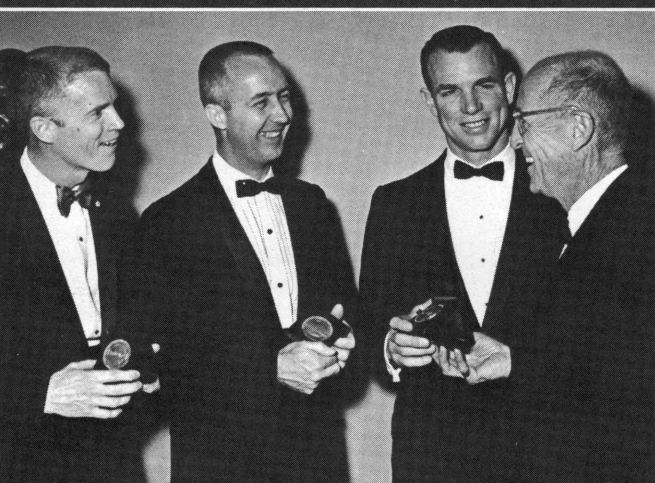
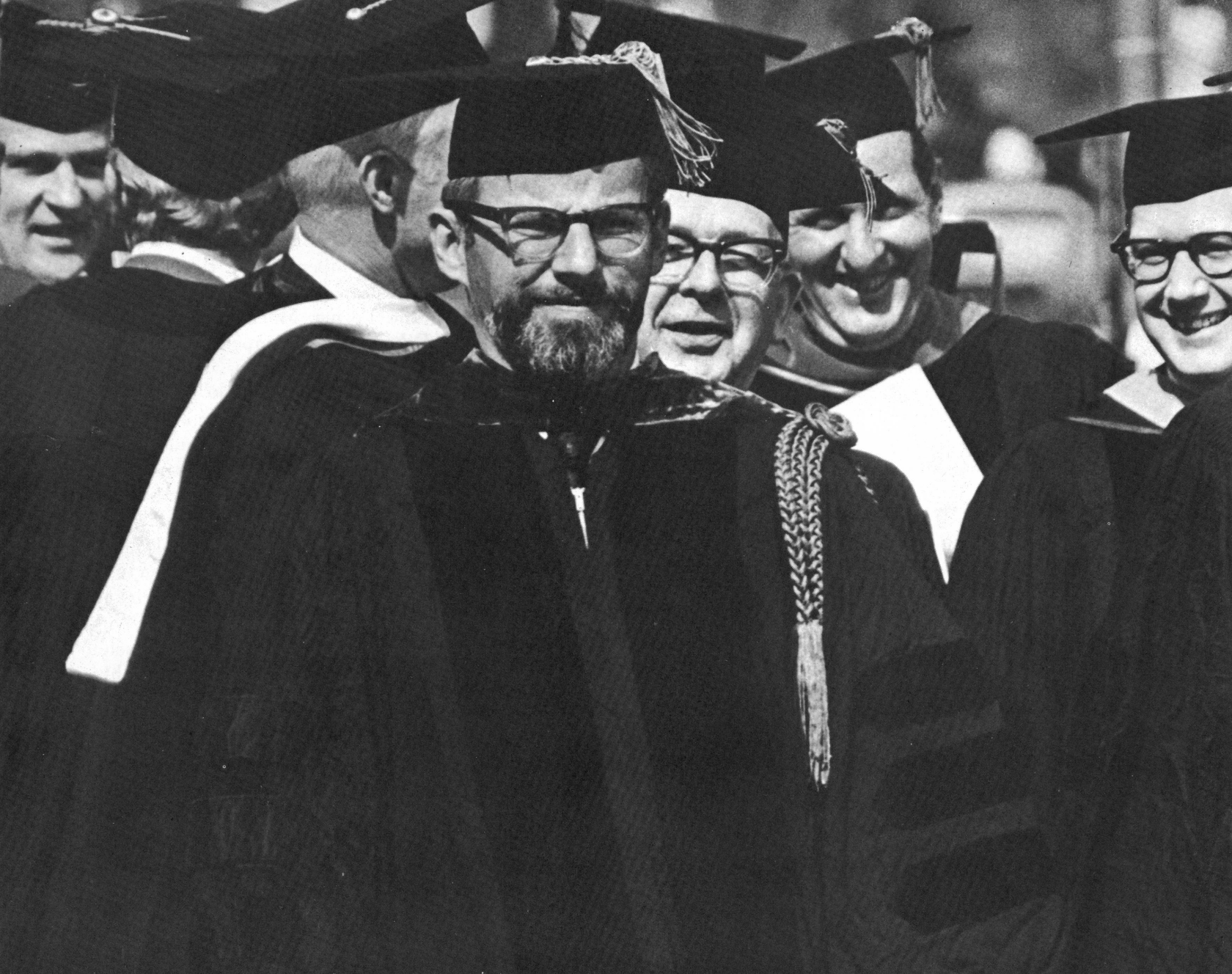
The Centennial Calendar has been a busy one, in which the Museum can take pride. February 13 saw many members of the Board and the staff at the dedication of the new laboratory and residence at the Lerner Marine Laboratory in Bimini. On February 26 we opened the Hall of Ocean Life and Biology of Fishes. The following Sunday, a record crowd of 35,000 came to see *THE WHALE*, all 94 feet of her. An outstanding exhibit, showing how the Museum generates the development of young scientists, opened at the Hallmark Gallery in New York City on May 5.

April 9 was Centennial Day. That evening, 700 people were present when The American Museum of Natural History Gold Medal was awarded to the Apollo 9 astronauts (Mr. Russell L. Schweickart, Col. David R. Scott and Col. James A. McDivitt) and to five of the world's most distinguished scientists (Dr. Theodosius Dobzhansky, Dr. Libbie Henrietta Hyman, Dr. Ernst Mayr, Dr. Margaret Mead and Dr. George Gaylord Simpson). We were gratified to have Mayor Lindsay greet the audience, and to have Commissioner August Heckscher deliver a stimulating address.

On June 10 the New York Philharmonic honored the Museum with a "Salute to Nature" Promenades concert, which delighted our Trustees, Men's and Women's committees, staff and friends of the Museum. The evening was a sparkling event



The widely discussed Centennial Exhibit, "Can Man Survive?" was opened on May 16, 1969. Between then and September 1, it was visited by nearly 80,000 people. Shown here is an architect's drawing of the 55-ton structural shell which was installed to contain the exhibit.



Centennial Day, on April 9, began with an academic procession in which the scientific staff of the Museum held an honored place (top photo). At the Centennial Banquet that evening, The American Museum Gold Medal was presented to the Apollo 9 astronauts and five distinguished scientists; above left are the astronauts, Mr. Russell L. Schweickart, Col. James A. McDivitt and Col. David R.

Scott with Museum President Gardner D. Stout. At center are Mayor John V. Lindsay and Mrs. Lindsay. At right are, from left, Mr. Randolph Guggenheimer; Mrs. Guggenheimer, former City Commissioner of Planning; Mr. John T. Hightower, Executive Director of the New York State Council on the Arts; Mr. Thomas P. Hoving, Director of the Metropolitan Museum of Art, and Mrs. Hoving.

with which to end a busy Centennial Spring.

The name of The American Museum of Natural History was constantly kept before the public during the Centennial Celebration. There was feature coverage in the major New York newspapers and in national magazines, such as *Newsweek* and the *New Yorker*. Mrs. John V. Lindsay conducted a televised tour of the Museum. There were many television and radio broadcasts on our new exhibits, research results and education programs.

On the vital subject of deferred maintenance and operating procedures, Mr. Rodney Cleveland Gott, Trustee, made a report to the Board which included recommendations of prime importance to the Museum. The Trustees are in the process of implementing those recommendations.

The Museum complex includes eighteen structures which were erected at different times over a period of years. Efficient use and future development of the facilities requires that a sound master plan be devised; to that end William Pedersen Associates have been retained to conduct an architectural survey of the Museum's space requirements. A preliminary report has been submitted and final recommendations will be made in September, 1969.

Six new Trustees were elected during the year: Mr. Robert R. Barker, Mr. Richard S. Perkin, Mr. Carroll L. Wainwright, Jr., Dr. Harold C. Haizlip, Dr. Alexander E. Eltz and Mr. Frederick A. Klingenstein. Four former Trustees were re-elected: Mrs. Francis H. Low, Mr. Thomas L. Higginson, Mr. Arthur Gray, Jr., and Mr. Oscar S. Straus, II.

Mr. Charles DeWolf Gibson retired from the position of Vice-President last October, but happily, continues as an active Trustee. He had operated out of the President's office for ten years, the last three as Acting President. Mr. Gibson made an outstanding contribution toward maintaining the Museum's major position as a scientific and educational institution.

Mr. Frederick M. Warburg was elected an Honorary Trustee at the October meeting. He had served as an active Trustee with devotion and

charm for 35 years.

A youthful Mr. Walter F. Meister has retired after 52 years of service to the Museum, above and beyond the call of duty. That record may never be equaled.

This was a year of rewarding achievement and profound sorrow. Our sixth President, Mr. Alexander M. White, died on November 28, 1968, after having guided the Museum through a long period of unprecedented growth and change. Mr. Edgar M. Queeny, a thoughtful and constructive Trustee of the Museum, died on July 7, 1968. He had been an Honorary Trustee since 1965. Mr. Richard S. Perkin, who had joined the Board in October of 1968, showed great interest and devotion in assuming the chairmanship of the Planetarium Committee. Mr. Perkin's sudden death on May 22, 1969, came as a shock.

Mr. Clarence L. Hay, an Honorary Trustee, died on June 4, 1969, after a distinguished association with the Museum, both through his valued work in anthropology and his effective service on the Board, which began in 1924.

The Men's and Women's committees have turned in a performance in keeping with the momentum of our Centennial. Contributions totaled \$383,000, exceeding the record of last year by \$62,000. Without this support, we literally could not continue.

Dr. Libbie H. Hyman received The American Museum of Natural History Gold Medal from her wheel chair. Dr. Hyman, who was renowned among scientists and students of biology throughout the world for her work on the invertebrates, died on August 3, 1969.



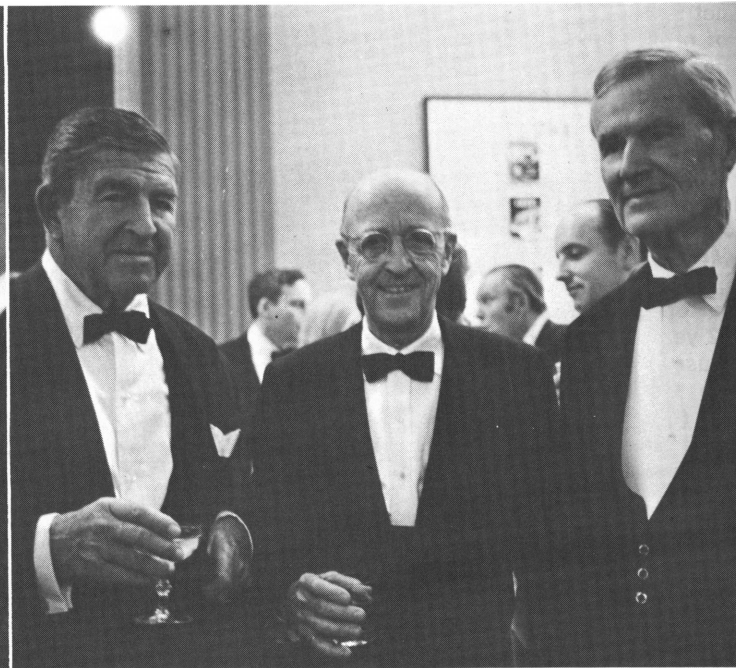
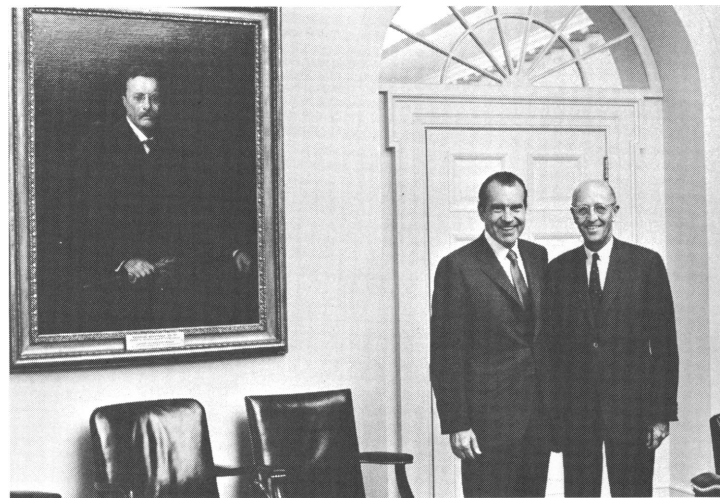
We gratefully salute Chairman David C. Clark of the Men's Committee, and his Vice-Chairmen, Mr. Thomas W. Russell, Jr., and Mr. Larson M. Powell, and Mrs. Hart Fessenden, Chairman, and Mrs. William C. Chanler and Mrs. John C. Bierwirth, Vice-Chairmen of the Women's Committee.

Happily, Messrs. Clark, Russell and Powell have agreed to serve another year. Mrs. Charles F. Morgan and Mrs. John W. Geary II will serve as Vice-Chairmen of the Women's Committee and Mrs. Fessenden will continue as Chairman.

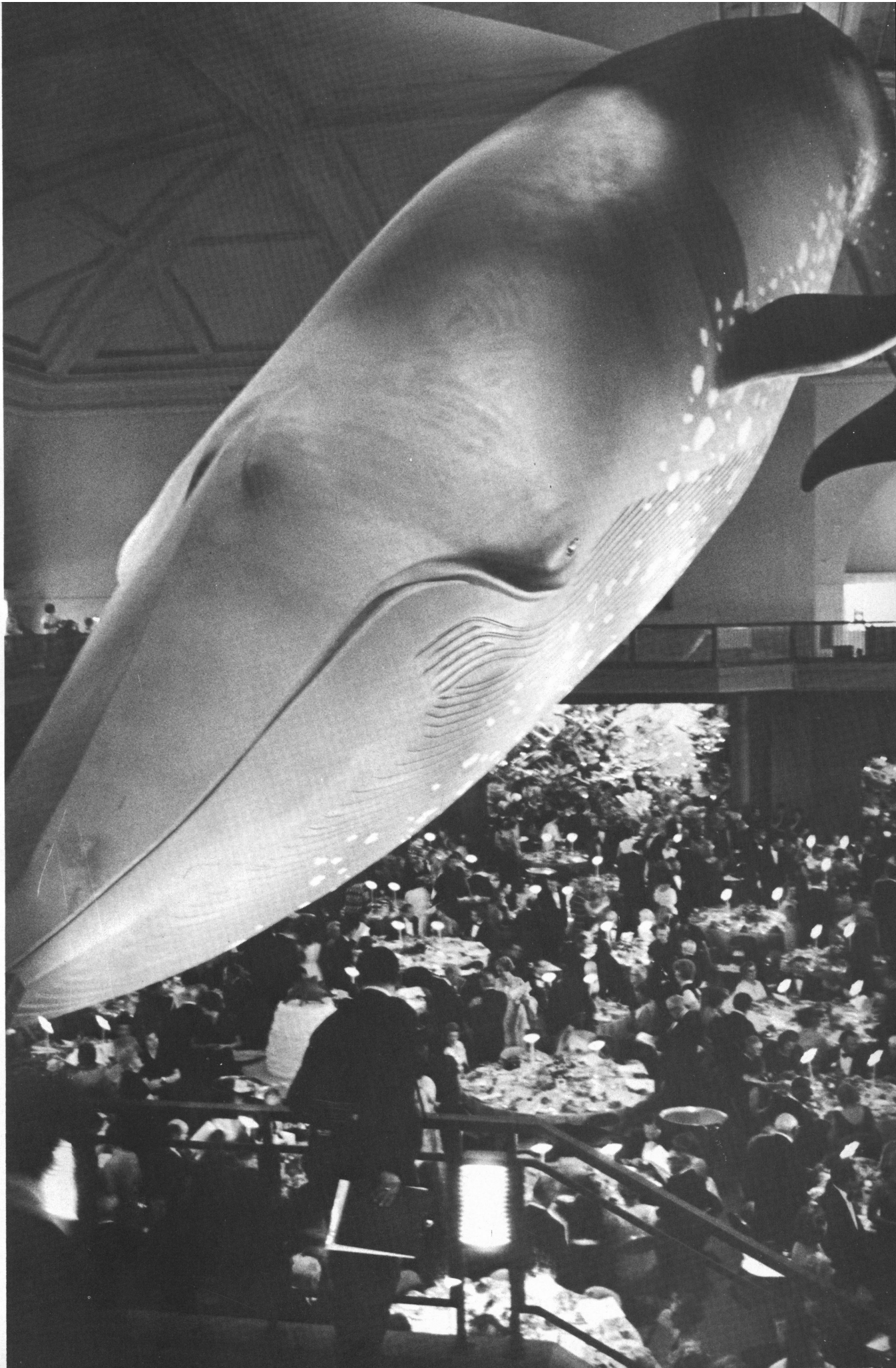
We can all look forward to the years ahead with confidence in the belief that the devotion and interest of everyone concerned will sustain The American Museum of Natural History, and enable it to broaden its usefulness to the world in which it lives.

Richard S. Clark

President



The Centennial year was marked by a variety of activities. On April 29, Museum President Gardner D. Stout visited the White House, where President Richard M. Nixon showed him the de Laszlo painting of Theodore Roosevelt that was lent to the President to hang in the Cabinet Room during his term of office. At far left, at a party after the Centennial Convocation, are (from left) Mrs. James A. Oliver, Mrs. Alexander M. White, Mr. Walter F. Meister and Mr. Gordon R. Reekie. Earlier in the year Mr. Meister retired from the positions of Assistant Director and Secretary after 52 years of service to the Museum. At near left, at the Centennial Banquet, are (from left) Mr. C. DeWolf Gibson, who retired this year as Vice-President of the Museum, Mr. Stout, and Dr. Robert Cushman Murphy. At right: the Centennial Banquet on April 9 in the Hall of Ocean Life and Biology of Fishes.





REPORT OF THE DIRECTOR

Over the past one hundred years The American Museum of Natural History has continually evolved and adapted to its changing environment, as any successful living organism does. The Museum has marked its centennial anniversary with ceremonies befitting one of the major natural history museums in the world. The special events of the year were started on January 2 with the opening of the photographic exhibition of highlights of the Museum's history, "100 Years of Wonder." In rapid succession there followed the dedication of the Lerner Marine Laboratory; the opening of three of the Centennial halls; Margaret Mead's Man and Nature Lectures; the Hallmark Gallery's special exhibit; the Centennial Day observances; the opening of the exhibit, "Can Man Survive?"; the Philharmonic Concert; and the annual meetings and symposia of three scientific groups, the American Society of Ichthyolo-

gists and Herpetologists, the American Society of Mammalogists, and the Institute of Navigation, which had been invited to hold their gatherings at the Museum during the Centennial year. Similar Centennial programs and openings will continue throughout the calendar year 1969.

The Centennial provided a time to reflect on the Museum's past achievements, to view the present with care, and to chart a course for the future that will assure the continuing and increasing productivity of the Museum to science and society. In broad terms the basic functions of The American Museum of Natural History are the production and communication of knowledge about man and the natural world. The *uniqueness* of a museum—the keystone of its programs—is in its collections. The strength of the museum comes from the scholarship and creativity by which the collections are used: in research, in teaching and in the enrichment of life.

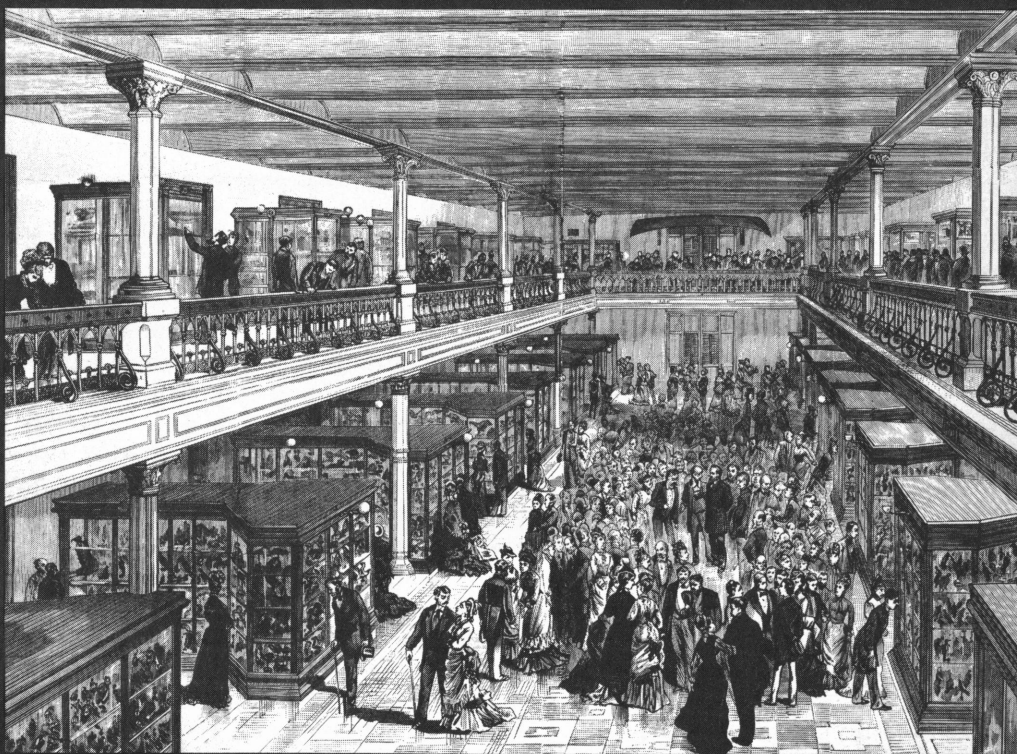
Our scientists have explored nearly every corner of the earth for materials and wildlife that are fast disappearing. In their vast collections they have accumulated more than *16 million* scientific specimens, which form the original reference materials from which scholars obtain new data, build hypotheses and formulate new principles. Each

bit of knowledge derived from the collections increases their value. As new techniques and new approaches are developed the old specimens can reveal new facts; and knowledge that is developed primarily for the sake of learning rather than for any practical implication or application has proved time and again to be the key to a clearer understanding of the life process and the nature of the environment.

The Museum, with its unique collections and renowned curatorial staff, has been actively involved for many years in teaching programs at every level, from primary to postdoctoral. In recent years we have been called upon increasingly to provide both our exceptional human resources and our special material facilities to science education. During the past year, the Museum announced the establishment of a new program, operated in connection with the City University of New York through which the Ph.D. degree is granted for work in evolutionary biology. The departments involved are Ichthyology, Mammalogy and Ornithology, and it is expected that additional departments will join the program in the future.

The knowledge generated by our staff, as well as by scientists working in sister institutions, is

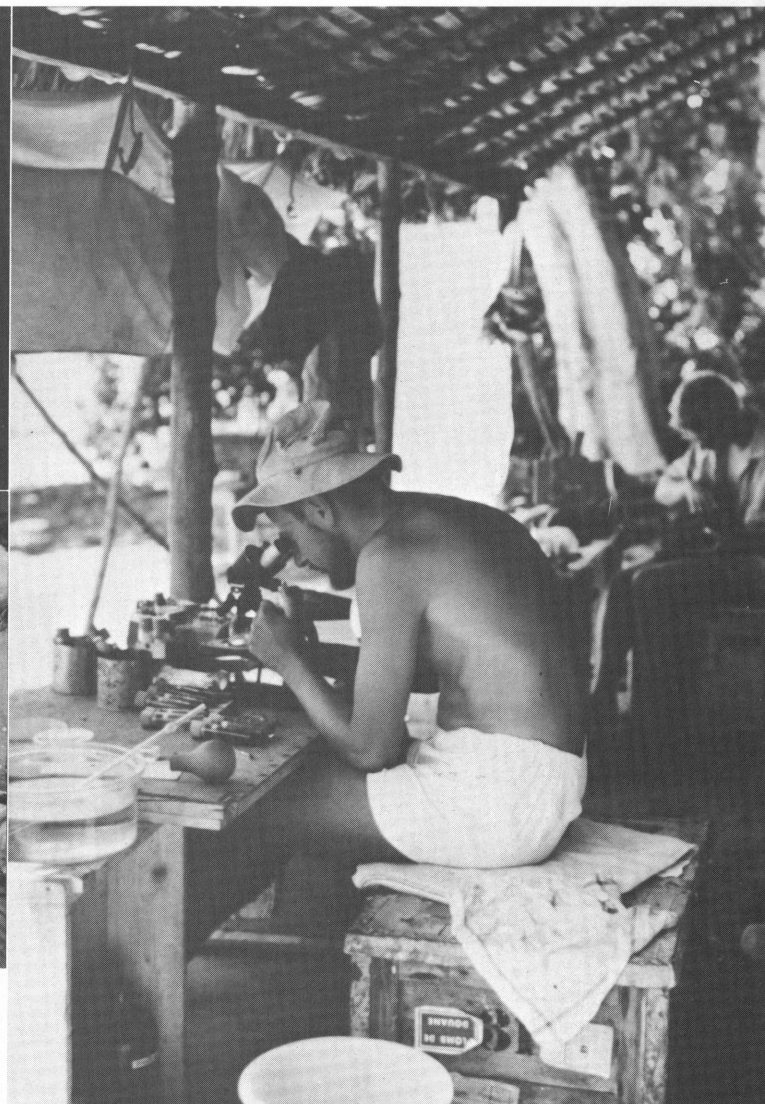
The first building of the Museum to be located at the present site was opened on December 22, 1877. Exhibit techniques have changed radically from the early days, when individual specimens were mounted behind glass. In the past ten years, the Museum has opened fifteen major exhibitions and 20 special or temporary exhibits.



communicated to the public in many ways, but primarily through our exhibits, which form the magnet that draws most persons to the Museum. The exhibits are changed continually to enable us to take advantage of new techniques and new data. In order to bring the older halls up-to-date and to replace outmoded exhibits with new ones the Board of Trustees in 1959 endorsed this Administration's proposal for a major ten-year exhibition program. These major capital improvements were carried out with joint financial support from the City of New York's Capital Budget program and private funds provided by the Board. We have opened fifteen major exhibits and 20 special or temporary exhibits since that time.

Among the outstanding permanent exhibition halls developed in this ten-year program are the Hall of the Biology of Man, the Hall of Small Mammals of North America, the Keller Memorial Shell Exhibit, the Hall of North American Birds, the Hall of the Eskimo, the Hall of Early Mammals, the Hall of Primates, the Hall of Indians of the Eastern Woodlands, the Hall of Indians of the Plains, the Hall of the Biology of Invertebrates, the Hall of Man in Africa, the John Lindley Hall of Earth History and the Hall of Ocean Life and Biology of Fishes.

The learning experience that a museum offers through its exhibits is basic to the needs of our time. Education, in order to be viable, must be a



continuing lifelong process. And nowhere is the process made more readily accessible than in a dynamic museum. As scientific data increases, as technologies advance, as exhibit techniques improve, these teaching machines we call museums will become more and more important sources of refresher education.

Science museums have a glorious opportunity—an opportunity that cannot be permitted to go by—to inspire the young in age and spirit to continue learning in order to understand the meaning of life, to know that the wonder of life is in its unity and in its diversity, and to derive from that knowledge appreciation of the likenesses among men and respect for their differences.

Science museums also have a compelling mission to muster all their resources to analyze the factors involved in the threats to our world-wide environments and wildlife resources; to make prompt and constructive suggestions for remedial actions; and through their educational channels to arouse the public to the urgency of the problems that confront us.

A science museum learns from the records of the ages and contributes knowledge toward the shaping of the future. Today we are keenly aware that in our troubled world a dynamic museum must be an active force in the renovation of society, a determinant of the criteria for the wise use of environmental resources, and a leader in the lessening of tensions and the increase of understanding among men.

James A. Olney

Director



The year saw a wide range of Museum activities in the field and in the classroom, with the focus of attention on Centennial Day itself. At upper left, Mr. Russell E. Train, Under Secretary of the Department of the Interior, addresses the Centennial Convocation. Lower left, Dr. Thomas D. Nicholson (with hand on celestial globe), teaching a class in astronomy. Center, Dr. Ernst Kirsteuer conducting part of his research on ribbon worms (Nermertina) at an improvised field laboratory on Tanikely Island in the Indian Ocean. Above, members of the Museum staff at a buffet lunch before the Centennial Convocation. Right, at the convocation, from left, Dr. Ernst Mayr, Dr. Margaret Mead and Mr. Train.



REVIEW OF THE YEAR 1968-1969

Four members of the curatorial staff were honored by the Museum on the occasion of its Centennial Day. Those awarded the first American Museum of Natural History Gold Medals were Dr. Libbie H. Hyman, Research Associate, Department of Living Invertebrates; Dr. Ernst Mayr, Research Associate in Old World Birds, Department of Ornithology; Dr. Margaret Mead, Curator of Ethnology, Department of Anthropology; and Dr. George Gaylord Simpson, Research Associate, Department of Vertebrate Paleontology.

The distinctions and honors bestowed upon Museum scientists by other organizations during this period include the following:

Administration: Dr. James A. Oliver was elected a member of the Council of the American Association of Museums and was elected to the Survival Service Commission of the International Union for the Conservation of Nature and Natural Resources; he was also re-elected a Vice-President of the New York State Association of Museums.

Department of Animal Behavior: Drs. Lester R. Aronson, Evelyn Shaw and Ethel Tobach were appointed Adjunct Professors in the Biology Department of City College in the City University of New York; the Career Development Award to Dr. Tobach from the National Institute of Mental Health was renewed for a second five-year term; and Dr. Howard R. Topoff was elected to a second term as Secretary of the New York State Entomological Society.

Department of Anthropology: Dr. Gordon F. Ekholm served as advisor for President Nixon's "U.S. Presidential Mission," in which capacity he visited five Latin American countries in May with Governor Nelson A. Rockefeller, head of the mission; Dr. Margaret Mead received an honorary degree of Doctor of Humane Letters from

the University of California at Berkeley, she received the Carmen Memorial Gold Medal together with an honorary life membership from the Middle States Council for the Social Sciences, she received the Centennial Medallion Citation of Hampton Institute, and she was elected a Fellow in the World Academy of Arts and Sciences; Dr. Colin M. Turnbull was appointed Editor of the Viking Fund Publications in Anthropology (Wenner Gren Foundation); Dr. Richard A. Gould was elected a fellow of the American Anthropological Association and a Corresponding Member of the Australian Institute of Aboriginal Studies; and Dr. Walter A. Fairservis, Jr., was appointed a delegate to the International Congress of Iranian Archeology by the Government of Iran.

Department of Entomology: Dr. Lee H. Herman, Jr., was re-elected Vice-President of the New York Entomological Society; and Dr. Alexander B. Klots was elected an Honorary Life Member of the New York Entomological Society.

Department of Herpetology: Mr. Charles W. Myers was appointed Associate in Herpetology at the Museum of Natural History of the University of Kansas; and Mr. Roger Conant received the Distinguished Service Award of the National Recreation and Parks Association for 1968.

Department of Ichthyology: Dr. James W. Atz was promoted from Adjunct Associate Professor to Adjunct Professor in the Graduate School of Arts and Sciences, New York University.

Department of Living Invertebrates: Dr. William K. Emerson was elected President of the Western Society of Malacologists; and Dr. Dorothy E. Bliss was named Chairman Elect of the Division of Invertebrate Zoology in the American Society of Zoologists.

Department of Mammalogy: The American Society of Mammalogists elected Dr. Richard G. Van Gelder President; Dr. Sydney Anderson was re-elected Recording Secretary and Dr. James A. Layne was re-elected Vice-President of the Society.

Department of Ornithology: The Robert

Cushman Murphy Junior High School in Stony Brook, Long Island, was dedicated in honor of Dr. Murphy.

Department of Vertebrate Paleontology: Dr. Norman D. Newell was honored at a dinner given by the Society of Economic Paleontologists and Mineralogists for founders of the Society.

Staff changes are recorded below, including those effective July 1, 1969.

In the administrative offices, the following staff changes took place:

Dr. Thomas D. Nicholson was appointed Director to succeed Dr. James A. Oliver who was appointed to a new position as Coordinator of Scientific and Environmental Programs.

Mr. Sidney S. Whelan, Jr., was appointed Vice-President and Executive Secretary.

Mr. Joseph B. McCartney was appointed Personnel Manager.

Mr. Frank G. Marmorato was appointed Plant Manager.

Miss Ann Breen was appointed Assistant Manager in the Office of Public Relations.

Mr. Louis Ferry was appointed Superintendent of Maintenance and Construction.

In the scientific and educational departments, the following promotions and appointments were made:

Department of Animal Behavior: Dr. Evelyn Shaw and Dr. Ethel Tobach were promoted from Associate Curators to Curators. Mr. Michael G. Moran was appointed Scientific Assistant, and Dr. Helmut E. Adler was appointed Research Associate. Dr. Howard R. Topoff was appointed Research Fellow.

Department of Anthropology: Dr. Harry L. Shapiro was appointed Curator Emeritus of Physical Anthropology, and Dr. Margaret Mead was appointed Curator Emeritus of Ethnology. Dr. Robert L. Carneiro was promoted from Associate Curator of South American Ethnology to Curator of South American Ethnology. Dr. Stanley A. Freed was appointed Acting Chairman of the department.

Department of Entomology: Dr. Willis J.

Gertsch was appointed Curator Emeritus of Entomology. Dr. John A. L. Cooke was appointed Associate Curator, and Mrs. Veronica Picchi was appointed Scientific Assistant. Dr. Thomas C. Barr, Jr., was appointed Research Associate, and Dr. Sixto Coscarón was appointed Research Fellow.

Department of Herpetology: Dr. Charles M. Bogert was appointed Curator Emeritus. Dr. Charles J. Cole was appointed Assistant Curator, and Mrs. Carol R. Leavens was appointed Scientific Assistant. Mr. Itzhak Gilboa was appointed Associate.

Department of Ichthyology: Dr. Donn E. Rosen was promoted from Associate Curator to Curator, and Miss Robin Ingle was appointed Scientific Assistant.

Department of Invertebrate Paleontology: Fossil Invertebrates, Micropaleontology and the Micropaleontology Press have been included as three divisions within the Department of Invertebrate Paleontology. Mr. Niles Eldredge was appointed Assistant Curator, and Mrs. Gail S. Harfé was appointed Scientific Assistant. Dr. Harold B. Rollins was appointed Research Associate.

Department of Living Invertebrates: Dr. Linda Habas Mantel and Dr. Rupert J. M. Riedl were appointed Research Associates.

Department of Mammalogy: Dr. Richard G. Van Gelder and Dr. Sydney Anderson were promoted from Associate Curators to Curators.

Department of Mineralogy: Dr. D. M. Vincent Manson was appointed Chairman of the department.

Department of Ornithology: Dr. Lester L. Short, Jr., was promoted from Associate Curator to Curator, and Mrs. Mary LeCroy was appointed Scientific Assistant.

Department of Vertebrate Paleontology: Dr. Richard H. Tedford was promoted from Associate Curator to Curator. Mr. Morris F. Skinner was promoted from Frick Assistant Curator to Frick Associate Curator. Dr. Frederick S. Szalay was appointed Research Associate.

Archbold Biological Station: Mr. Chet E. Winegarner was appointed Scientific Assistant,

and Dr. Glen E. Woolfenden was appointed Research Associate.

Lerner Marine Laboratory: Dr. Arland L. Carsten was appointed Research Associate.

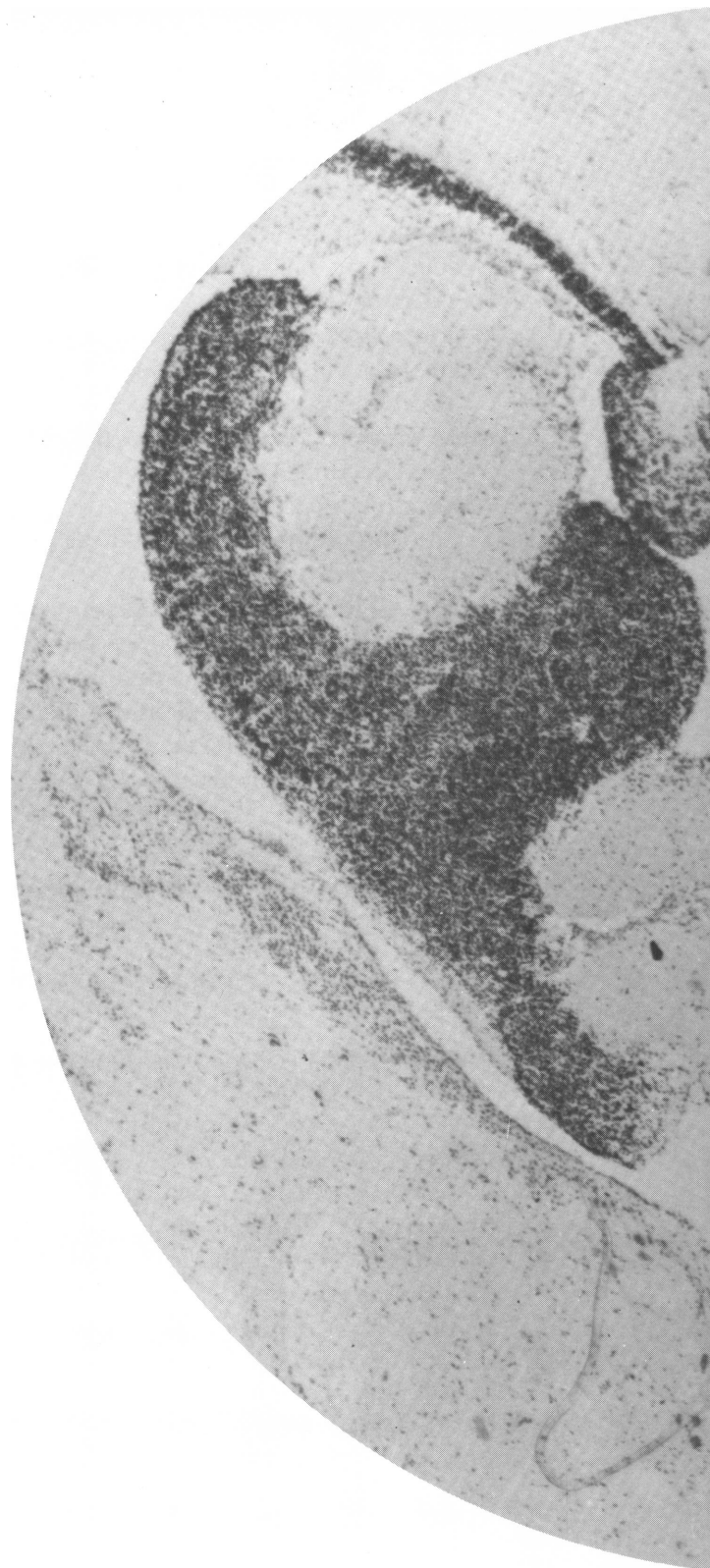
Department of Education: Mr. Robert D. Aylward and Miss Grace Donaldson were promoted from Instructors to Senior Instructors. Miss Caroline Carmody, Miss Janet Chernela, Miss Barbara Donaldson and Miss Frances Dougherty were appointed Instructors.

In the Library, Mr. Russel Rak was appointed Assistant Librarian. Miss Sandra B. Bernstein was appointed Reference Librarian, and Miss Lucienne Sejour was appointed Cataloging Librarian.

On *Natural History* magazine, Mr. Alfred Meyer was promoted from Executive Editor to Editor.

On Scientific Publications, Mrs. Florence Brauner was appointed Editor, and Mrs. Ruth Manoff appointed Assistant Editor.

We were deeply saddened by the deaths of Dr. T. C. Schneirla on August 20, 1968; Dr. Angelina Messina on November 20, 1968; Mr. James S. Pickering on February 14, 1969; and Dr. James Lippitt Clark on March 16, 1969. Dr. Schneirla, Curator in the Department of Animal Behavior, was internationally known and respected for his studies of comparative psychology and animal behavior. Dr. Messina was Chairman and Curator of the Department of Micropaleontology and had, during her career, gained wide recognition for her work with foraminifera and ostracoda. Mr. Pickering, who began a second career as Special Lecturer in the Planetarium in 1951 and was Astronomer Emeritus in the Department of Astronomy at the time of his death, brought a life-long enthusiasm for astronomy to his work here. Dr. Clark, who was Director Emeritus of the Department of Exhibition and Graphic Arts, contributed his enviable experience as an explorer and preparator to the exhibition programs of the Museum.





This cross section of the midbrain of a teleost fish was photographed through a light microscope. The section shows the valvula, a part of the cerebellum occurring only in teleosts and located in the cavity of the midbrain. Dr. Lester R. Aronson, as part of his ongoing studies of brain function in the West African mouthbreeder, has found that the valvula governs balance and locomotion, while the body of the cerebellum governs learning. The cerebellum of mammals had previously been thought by most people to be primarily concerned with locomotion. These studies of fishes suggest that in mammals the cerebellum may have other functions as well.

DEPARTMENT OF ANIMAL BEHAVIOR

Last year, 73 students participated in the activities of the Department of Animal Behavior. By assisting in ongoing studies, they learned the methods of scientific research through direct experience in an "apprentice system" that is becoming all too rare today. The group included postdoctoral trainees and predoctoral and master's candidates. Four students were awarded their doctorates in June. There were, as well, 41 college students working in the Undergraduate Research Participation Program and in the Urban Corps program. The students worked on a variety of projects, including those mentioned here. These studies are particular phases of research that, for the most part, have been under way for some time.

Dr. Lester R. Aronson and Mr. Lawrence Picker have been studying the role of the cerebellum in the behavior of fishes. Their research suggests that, in bony fishes, the cerebellum is involved in more complex processes than knowledge of its evolutionary relationships had suggested.

In another study, Dr. Aronson and Mrs. Madeline L. Cooper have been examining the interrelationships of the endocrine and nervous systems in their regulation of the mating of mammals. They have found strong evidence that, surprisingly, the male hormone does not increase sensitivity of the genitals to the stimuli of mating.

Dr. Evelyn Shaw continued her exploration of the biosocial factors affecting schooling in fishes. Her recent researches show that schooling behavior, which previous investigators had labeled "innate," can be modified by conditions in which the fish were reared. Dr. Shaw has proposed that schooling is a primitive mechanism which appeared very early in the evolution of fishes.

Dr. Ethel Tobach continued her investigation of the evolution of emotional behavior in mammals. In a comparative study using the rat, gerbil

and spiny back mouse, she determined differences and similarities in emotional behavior, specifically in fighting and social organization.

Studies of hearing and visual capacities in fishes occupied Dr. William N. Tavolga. He has discovered that several species of fish have the ability to detect specific sounds in noisy surroundings. Visual capacities in fish were also analyzed, by means of behavioral responses, in contrast to previous studies on vision which had been based on physiological and neurophysiological experiments. It was found that visual thresholds for light of different colors may be as low in fish as it is in humans.

Dr. Helmut E. Adler continued his studies of bird navigation. He has discovered that all current theories of celestial navigation assume an accuracy of sensory discrimination that goes far beyond the demonstrated capacities of the birds. He is seeking an explanation for birds' ability to find their way in environmental clues such as landscape features, sun position or star patterns.

Dr. Howard R. Topoff has looked into the unique relationship between a species of beetle and the army ant: the beetles steal the ants' hunting booty without disturbing the ants. He concludes that, because the ants are in continuous contact with each other, they are not easily aroused by the additional tactual stimulation coming from the invading beetles.

The department contributed to the Museum's Centennial exhibition at the Hallmark Gallery. Exhibits showing live animals in action—a bird pecking at keys for a food reward, a fish responding to a series of moving stripes, cockroaches reacting to light changes—were highly popular.

The department was saddened by the death of Dr. T. C. Schneirla, a Curator who had been in the department since 1945, on August 20, 1968, at the age of 65. Dr. Schneirla was the world's foremost comparative psychologist and a leading student of animal behavior. He provided for the staff and students a model in terms of his advanced behavioral theory, the design and execution of field investigations of behavior, laboratory experimen-

tation, teaching, and the application of theory and knowledge of behavior to current world problems.

Lester R. Aronson, *Chairman*

UNDERGRADUATE RESEARCH PARTICIPATION PROGRAM

The undergraduate research program of the Museum, which is supported in part by the National Science Foundation and is administered by the Department of Animal Behavior, is now in its tenth year. It continues to be highly successful and to evoke growing student and staff enthusiasm and interest.

During the past fiscal year, 234 students applied for admission to the program. Of these, 29 were selected to participate, 20 during the summer and nine during the academic year. Students worked either at one of three Museum field stations—Kalbfleisch, Southwestern and Archbold—or carried out research at the Museum. The students came from many colleges, among them Pembroke, Grinnell, Duke, Antioch and Hunter. Two former student participants joined the curatorial staff of the Museum in July, 1969. In connection with the programs, fifteen papers were published or are in press this year.

Evelyn Shaw, *Program Director*

DEPARTMENT OF ANTHROPOLOGY

In summarizing the activities of the department for the past year, it is gratifying to be able to report that the record has been most satisfactory in research, in exhibition and in the collections. The members of the staff continued their

A street scene in Calcutta, India, where Dr. Harry L. Shapiro has been conducting studies of the biological effects of urbanization, crowding and tension.

WIDE WORLD PHOTOS

original studies in the field and in the laboratory. Since the complexity of their conclusions defies summarization in this space, we can describe only the broad subjects of their investigations.

The dynamics of culture change, a matter of great significance in the modern world, have been studied in New Guinea and India. In the former, the long-spanned investigations of Dr. Margaret Mead have provided unusual insights into the changes that have revolutionized the lives of the natives. In the latter, the effects of urbanization on a traditional village near New Delhi have provided Dr. Stanley A. Freed with data that illuminate this world-wide process.

Closer to home and equally important, a series of Afro-American studies was initiated and directed by Dr. Colin M. Turnbull. Until recently, this vitally important field had scarcely been cultivated by anthropologists or other scientists.

At another level of the understanding of the cultural process are the pioneering studies of Dr. Robert L. Carneiro. His investigations of the evolution of culture and his analysis of the regularities of that fundamental process have aroused great interest.

The archeological investigations of the department have been wide-ranging. The antiquity of man in the New World has continued to engage



the attention of Dr. Junius B. Bird. During the year, he visited several sites in South America and in this country.

Dr. Gordon F. Ekholm, whose name has become associated with the fascinating problem of pre-Columbian culture contacts between America and the Old World, has devoted much of his research time to exploring additional leads.

After an extended field season in Australia, Dr. Richard A. Gould has been analyzing his data, which promise to produce new insights into the interpretations of archeological artifacts and other cultural remains.

In still another area of the department's research program, Dr. Harry L. Shapiro has worked on various human biological problems, among others, the effects of crowding and stress on the population of Calcutta.

The exhibition program of the department has been advanced in a highly satisfactory manner. The Hall of the Peoples of the Pacific is being installed under Dr. Mead's direction. Dr. Ekholm is now supervising the complete reorganization of the Hall of Mexico and Central America, which we expect to open during the coming year. And plans for the Hall of the Peoples of Asia are well in hand. Dr. Walter A. Fairservis, Jr., who is in charge, expects to be able to exhibit an exceptional array of treasures long unavailable to the public.

Dr. Shapiro, assisted by Mrs. Priscilla Ward, has spent some time working on the third section of the Hall of the Biology of Man. He has also developed plans for the revision of the heart exhibit. Dr. Shapiro was in charge of the scientific planning for the Centennial Exhibit of the Museum, "Can Man Survive?", which was opened on May 16.

During the year, a number of notable additions have been made to the collections, particularly in the Asiatic section. It is clear that since traditional cultures are being altered rapidly and the opportunity for gathering representative materials is diminishing at an increasing tempo, such

artifacts are bound to become rare in the future. We have been eager, therefore, to assemble all we can of these materials.

Harry L. Shapiro, *Chairman*

DEPARTMENT OF ASTRONOMY AND THE AMERICAN MUSEUM- HAYDEN PLANETARIUM

During the year, 655,360 people—a record number—visited the Planetarium. On January 1, the evening sky shows were terminated; this allowed for greater flexibility in planning special evening programs. And, as noted, it did not adversely affect attendance.

The education activities of the department continued at a high level, and included day and evening workshops, special programs for representatives of the press and radio, aviation ground school and high school programs. The Planetarium received accreditation as a ground school for pilots from the Federal Aviation Administration.

We continue to explore ways of being of service to the education community. To this end discussions have been held with the Harlem Teachers Group to see whether in-service programs for teachers and programs for young people can be developed.

The dome of the Sky Theater was painted in preparation for installation of a Zeiss Model VI projector, scheduled for September, 1969. A number of other projects in planning and preparation were conducted in advance of the installation.

Sales in the Book Corner continued to do well. It is anticipated that the sales area, which is antiquated, will be enlarged and redesigned during the coming year.

The exhibition areas were changed as follows: The Toledo scale exhibit (Your Weight on Other Worlds) was reconstructed; a new 35-foot lunar-

scape was painted, replacing the one made in 1954; and the Astronomia Hall, which portrays five centuries of astronomy, was completely refurbished. An automatic projection theater was added. North American-Rockwell Corporation installed an Apollo "Man on the Moon" display, and the Hasselblad Camera Company lent us cameras similar to those used on the Apollo spacecraft.

The Starcaster features are carried by 60 domestic radio stations, the Voice of America, and 300 stations of the Armed Forces Radio. Staff members appear frequently on radio and television interviews as news develops concerning space projects, eclipses, meteor showers and new comets.

We report with sorrow the death of Mr. James S. Pickering on February 14, 1969. He served with distinction as a Lecturer and School Relations Officer in the Planetarium for many years and, at the time of his death, was Astronomer Emeritus.

Franklyn M. Branley, *Chairman*

DEPARTMENT OF ENTOMOLOGY

The Department of Entomology suffered a major change during the year with the retirement of Dr. Willis J. Gertsch, who had been at the Museum for 37 years. A specialist in spiders and other arachnids, he was responsible for developing our outstanding research collection of arachnid specimens. His work has justifiably earned him the informal title of "dean of arachnologists." Dr. Gertsch plans to continue his investigations and to work closely with the department for years to come.

The research efforts of Dr. Jerome G. Rozen, Jr., involved the classification and evolutionary relationships of bees, particularly those of the family Fideliidae. The affinities of this uncommon family with the other eight families of bees

have been in question. As a consequence of finding the nesting site of *Fidelia* in South West Africa, Dr. Rozen has demonstrated that a surprising similarity exists between the fideliidas and the leaf-cutting bee family Megachilidae, and he has shown that *Fidelia* exhibits characteristics which are suggestive of the hypothesized wasplike ancestor of bees.

Dr. Frederick H. Rindge continues his long-range studies of the New World moths of the subfamily Ennominae. These belong to the Geometridae, one of the largest—with more than 15,000 species—and most widely distributed families of Lepidoptera. The New World fauna has never been carefully studied, a fact disclosed in Dr. Rindge's latest work. This is the eighth such treatment prepared by him, in a continuing series of studies on the genera of the tribe Cleorini.

One paper on South American assassin bugs, five on silverfish and machilids, and a large paper on those silverfish found in the nests of South African harvester termites are the end products of Dr. Pedro Wygodzinsky's work of last year. He is also finishing a study of a new genus of primitive Enicocephalidae recently discovered in western North America and in the Ussuri River region of the Far East.

Dr. Lee H. Herman, Jr., submitted an extensive manuscript proposing major changes in the existing classification of the rove beetle subfamily Oxytelinae. He is continuing his investigations of the subfamily with a study of the systematics of the genus *Bledius*. While on a field trip, he collected specimens and ecological data for 40 species of this genus.

One of the most valuable accessions made during the year was achieved through the purchase of the Lepidoptera collection of the late Col. F. M. Bailey. The 7443 specimens were collected almost entirely in the higher Himalayas, many localities of which are closed to present-day expeditions.

Jerome G. Rozen, Jr., *Chairman*

DEPARTMENT OF FOSSIL INVERTEBRATES

The most important contribution of the department, the John Lindsley Hall of Earth History, was the first of the new halls to be opened in the Centennial Year. Scientific direction and the entire resources of the Department of Fossil Invertebrates were applied to this undertaking. The hall provides historical background for an understanding of the present environment of man. Exhibits, both static and audio-visual, are used to demonstrate the concept that the apparently unchanging world is in fact the product of continuous and sometimes extreme changes which have taken place through the more than four billion years of the earth's history. Three other departments of the Museum—Mineralogy, Education, and Micropaleontology — made important contributions to this hall.

Research in the department centered on the early origins of certain fossil marine mollusks, the subjects of special competence of Dr. Norman D. Newell and Dr. Roger Lyman Batten. The general objectives of these studies were the formulation and testing of biological principles of wide application, especially in the fields of animal evolution and zoogeography. As in previous years, the work with marine fossils involved comparative studies of analogous living animals and present-day conditions in the sea that provide clues for interpreting the past. An understanding of the fossils also required geological studies which were designed to determine their distribution in time and space and to ascertain the characteristics and history of the rock strata that contain them.

In collaboration with Columbia University, the department completed the training of three candidates for the Ph.D. degree in invertebrate paleontology. This brings to 40 the number of higher degrees in the Columbia University-

Museum program for the training of professional invertebrate paleontologists and places the Museum among the foremost institutions in the world in this educational activity. The program has been in progress for 24 years.

On July 1, 1969, the name of the department was changed from "Fossil Invertebrates" to "Invertebrate Paleontology." At that time the former Department of Micropaleontology was renamed the "Micropaleontology Press," and it became a division of the new Department of Invertebrate Paleontology.

Norman D. Newell, *Chairman*

DEPARTMENT OF HERPETOLOGY

The end of 1968 marked the beginning of Dr. Charles M. Bogert's retirement, a milestone, but hardly a pause in a distinguished career. During Dr. Bogert's many years in the Department of Herpetology (he joined the staff in 1936 and became Chairman in 1945) he developed the Museum's collection of amphibians and reptiles to a point where few could match it in size, diversity, organization, and thoroughness of documentation. He innovated studies of the role of temperature in the lives of reptiles and of the influence of sound on the behavior of amphibians. During this year he continued his research into the ecology, distribution and variation of those salamanders, lizards and snakes that live isolated on mountain tops in Mexico. Dr. Bogert will continue his work as a Curator Emeritus. Upon Dr. Bogert's retirement, Dr. Richard G. Zweifel became Chairman of the Department.

Dr. Zweifel spent ten weeks during the year in New Guinea pursuing his long-standing interest in the frog fauna of that island. He obtained specimens, tape recordings of frog calls, photographs, and field notes which will contribute to several

monographs now in progress. Closer to home, Dr. Zweifel continued long-term studies of the ecology of turtles and frogs at the Kalbfleisch Field Research Station in Huntington, Long Island. The object of the studies is to determine patterns of growth, longevity, and movement in these animals.

The interests of Mr. Charles W. Myers focus on the fauna of Latin America. In cooperation with Dr. John Daly of the National Institutes of Health, he is studying tropic arrow-poison frogs and their toxic skin secretions. Working with the staff of the Gorgas Memorial Laboratory in Panama, Mr. Myers has demonstrated that the common "dooryard" toads and lizards of the rural American tropics carry bacteria that may cause disease in man.

Considerable progress was made on "The Genera of Reptiles," a grant-supported bibliographic project under the direction of Dr. Heldon G. Dowling. Quarterly lists of current literature were published and a service was initiated which makes individual current titles available on library cards. The project is advancing rapidly

toward the use of completely computerized procedures.

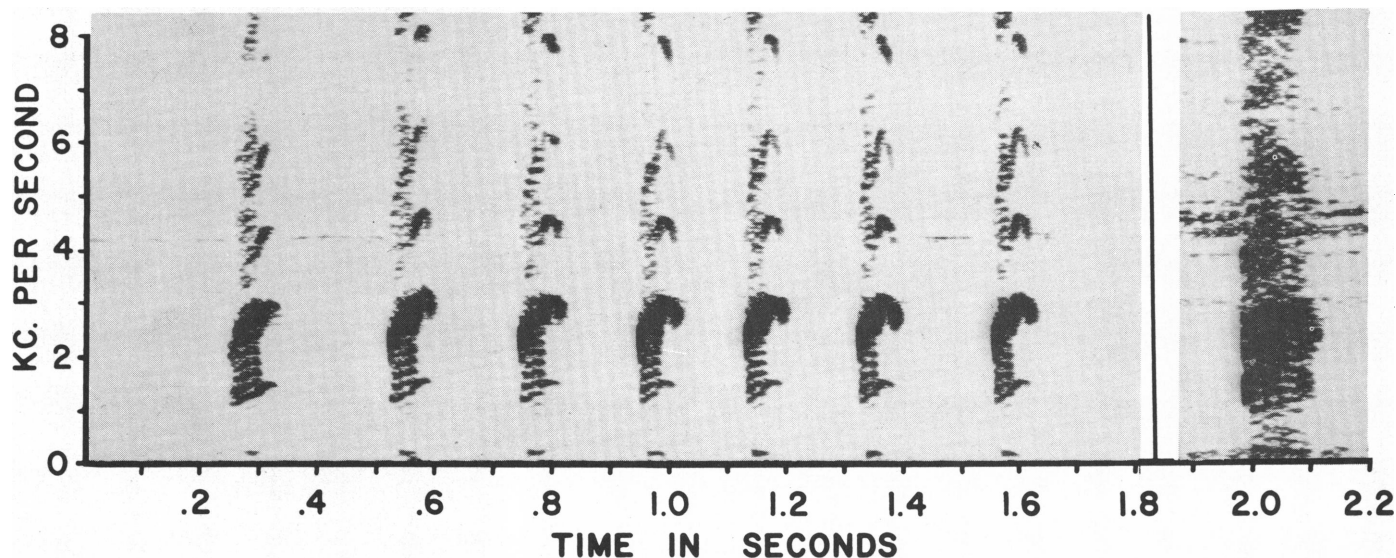
As usual, there was considerable activity in the collecting and cataloguing of specimens and in exchanging specimens with other institutions.

Richard G. Zweifel, *Chairman*

DEPARTMENT OF ICHTHYOLOGY

This past year has seen one of the largest undertakings in the 60-year history of the department—the inauguration of a bibliographic service that covers the ichthyological literature of the world. The project continues and extends the purposes of the original Dean Bibliography of 50 years ago, and it is known officially by the same name. The older bibliography covered the literature up to and including the year 1916 when it was, in effect, discontinued.

This audiospectrogram—a picture of sound—shows the call of *Platymantis papuensis*, a New Guinea frog that has been studied by Dr. Richard G. Zweifel. By observing these graphic representations of the sound of animals, scientists can make precise observations on the differences and similarities among species and on the factors that affect their calls. Some species of frogs resemble each other so closely, for instance, that a study of their mating calls is one of the best ways to determine correct identification.



Today, with a staff of two curators and three assistants available for work on it, and with the use of modern computer technology, it is possible to abstract and index the more than 4000 annual publications in the field. The only other service of its kind in the world is less current, less extensive and less sophisticated in its indexing. The first issue of the new Dean Bibliography will be a 1000-page publication covering the literature of 1968; its distribution is expected in late September, 1969. The bibliography was guided to its impressive rebirth by Dr. James W. Atz, who was assisted by Dr. Gareth J. Nelson.

There were two expeditions to Australia during the year. One, which was conducted by Dr. Donn E. Rosen and Dr. Nelson, went to the fresh waters of Western Australia and the Northern Territory; it lasted three months and covered some 9500 miles of ground travel. The other, conducted by Dr. C. Lavett Smith in collaboration with the Academy of Natural Sciences of Philadelphia, went to the Great Barrier Reef.

Work on Guatemalan fishes continues, and Dr. Rosen and Dr. Reeve M. Bailey expect to complete their field studies during the coming year. As part of Dr. Smith's work on Bahamian fish communities, he has designed computer programs for comparing the hundreds of samples that were taken in past Bahamian expeditions. Dr. Nelson's and Dr. Rosen's anatomical and evolutionary studies of fishes have resulted in several major publications. Dr. Smith's work on the sexuality and phylogeny of perchlike fishes has made substantial progress.

A high point of the year was the completion, under the department's supervision, of the areas dealing with the biology of fishes in the new Hall of Ocean Life and Biology of Fishes, and the opening of the hall.

The educational activities of the department were greatly expanded. Dr. Nelson taught a course in comparative vertebrate anatomy at New York University. Dr. Atz continued teaching his course in fish genetics at the same school. Dr. Smith initiated a summer course in ichthyology for Okla-

homa State University. Dr. Rosen continued his graduate ichthyology course for the City University of New York. During the year the Museum and the City University announced the establishment of a new Graduate Program in Evolutionary Biology, a program which leads to the Ph.D. degree and in which the study of vertebrate systematics is emphasized; two of the students in this new project received their training through the Department of Ichthyology. A third graduate student also studied in the department, and three college students received training in the department through the Undergraduate Research Participation Program.

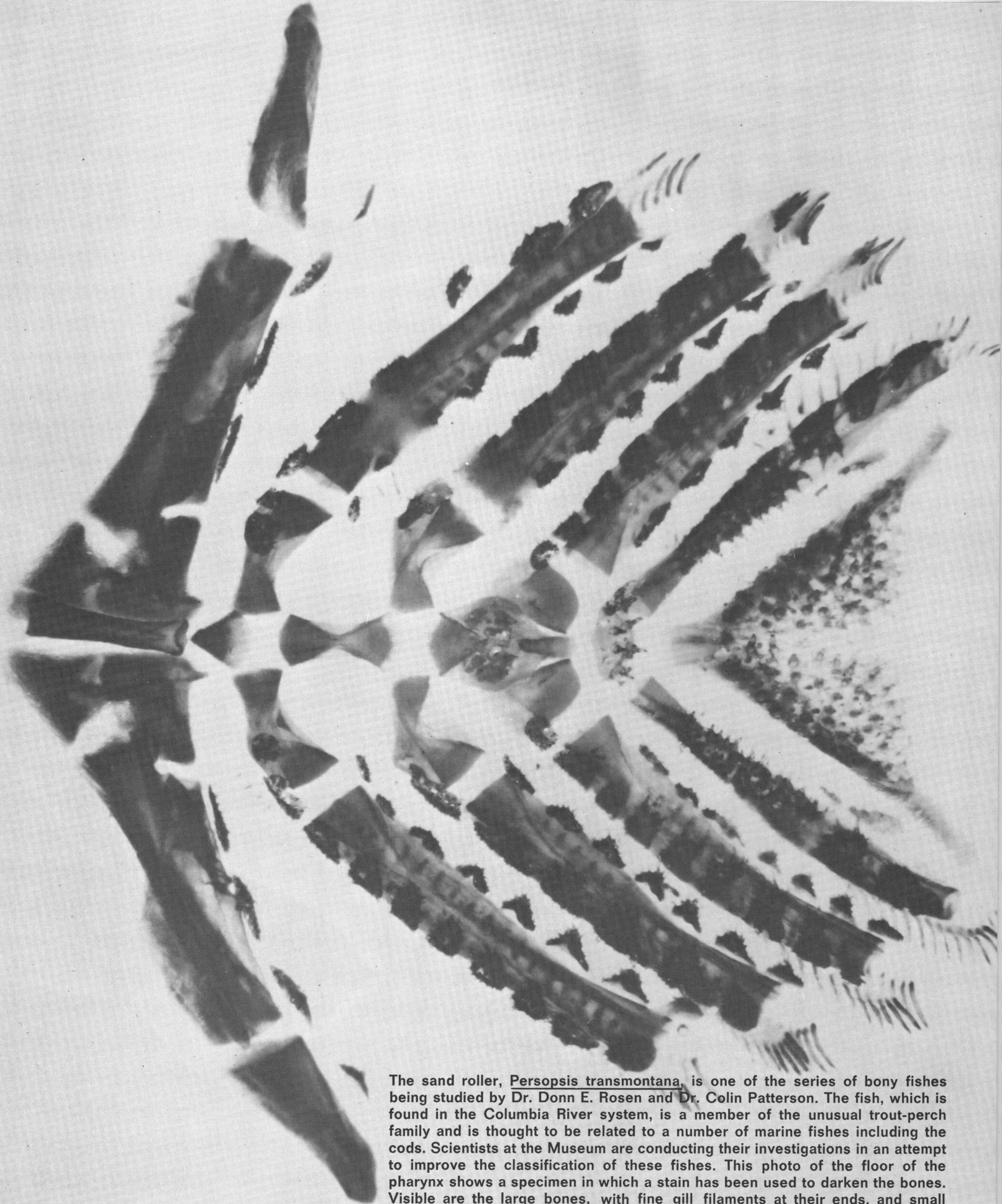
Donn E. Rosen, *Chairman*

DEPARTMENT OF LIVING INVERTEBRATES

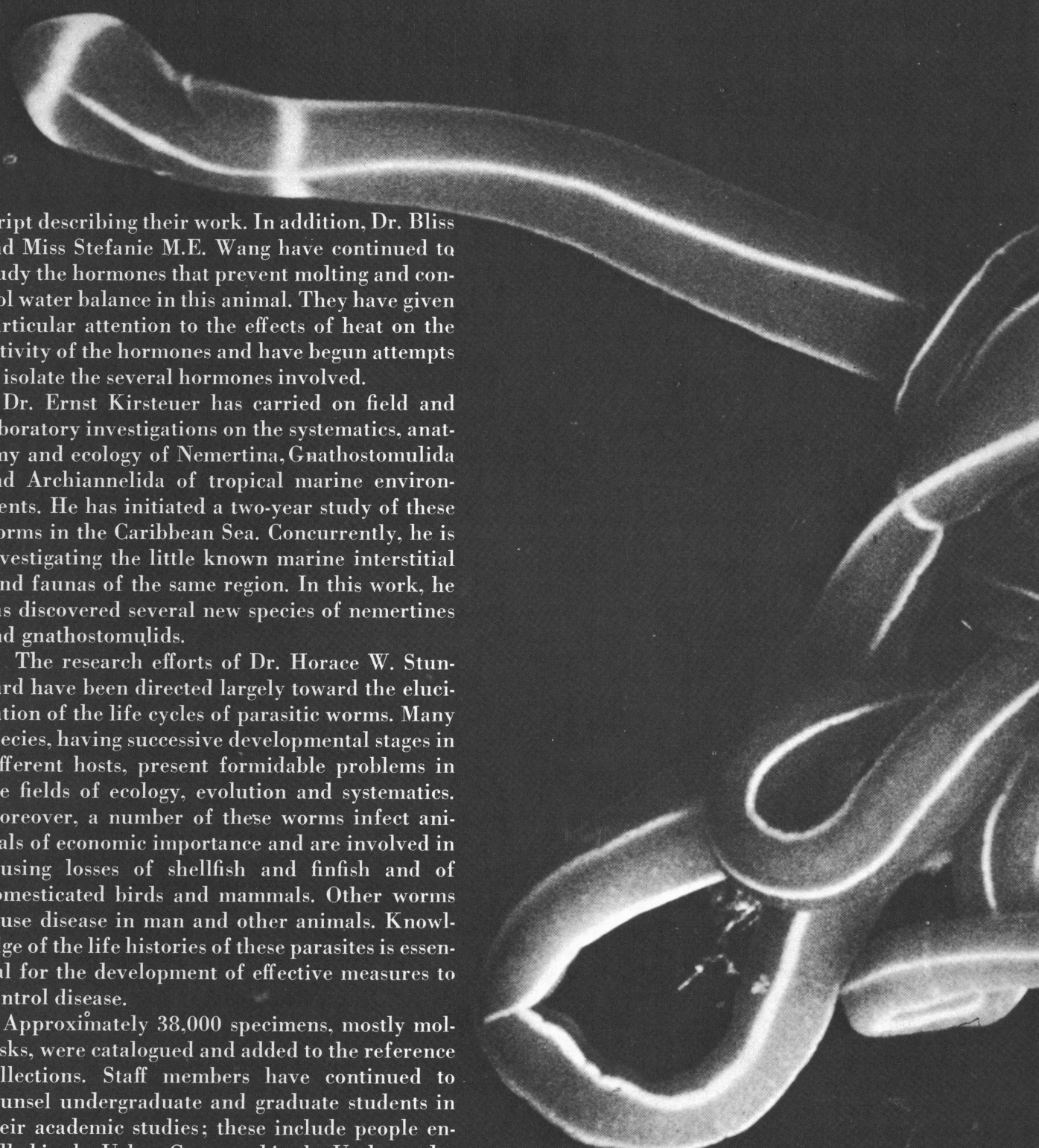
During the past year, the Department of Living Invertebrates was active in programs of research, curation, education and exhibition. Laboratory work and field studies produced new material on the classification, evolution and physiology of a diverse group of invertebrate animals.

Among the research projects undertaken by Dr. William K. Emerson is a survey of the living and fossil marine mollusks of the Galápagos Islands. He has obtained data that provide a framework for the interpretation of the geological history of this archipelago in terms of its past and present marine faunas. The evolution of the Galapagan mollusks, which originated in the late Cenozoic era, suggests that they were derived largely from the New World with minor Indo-Pacific and endemic faunal elements.

Dr. Dorothy E. Bliss and Mr. Edwin A. Martinez have completed their study of hormones that control color change in the land crab, *Gecarcinus lateralis*, and they are preparing a manu-



The sand roller, *Persopsis transmontana*, is one of the series of bony fishes being studied by Dr. Donn E. Rosen and Dr. Colin Patterson. The fish, which is found in the Columbia River system, is a member of the unusual trout-perch family and is thought to be related to a number of marine fishes including the cods. Scientists at the Museum are conducting their investigations in an attempt to improve the classification of these fishes. This photo of the floor of the pharynx shows a specimen in which a stain has been used to darken the bones. Visible are the large bones, with fine gill filaments at their ends, and small tooth-bearing bones jutting off the rear side of the large bones. The actual size from the front (which appears here on the left) to rear is half an inch.



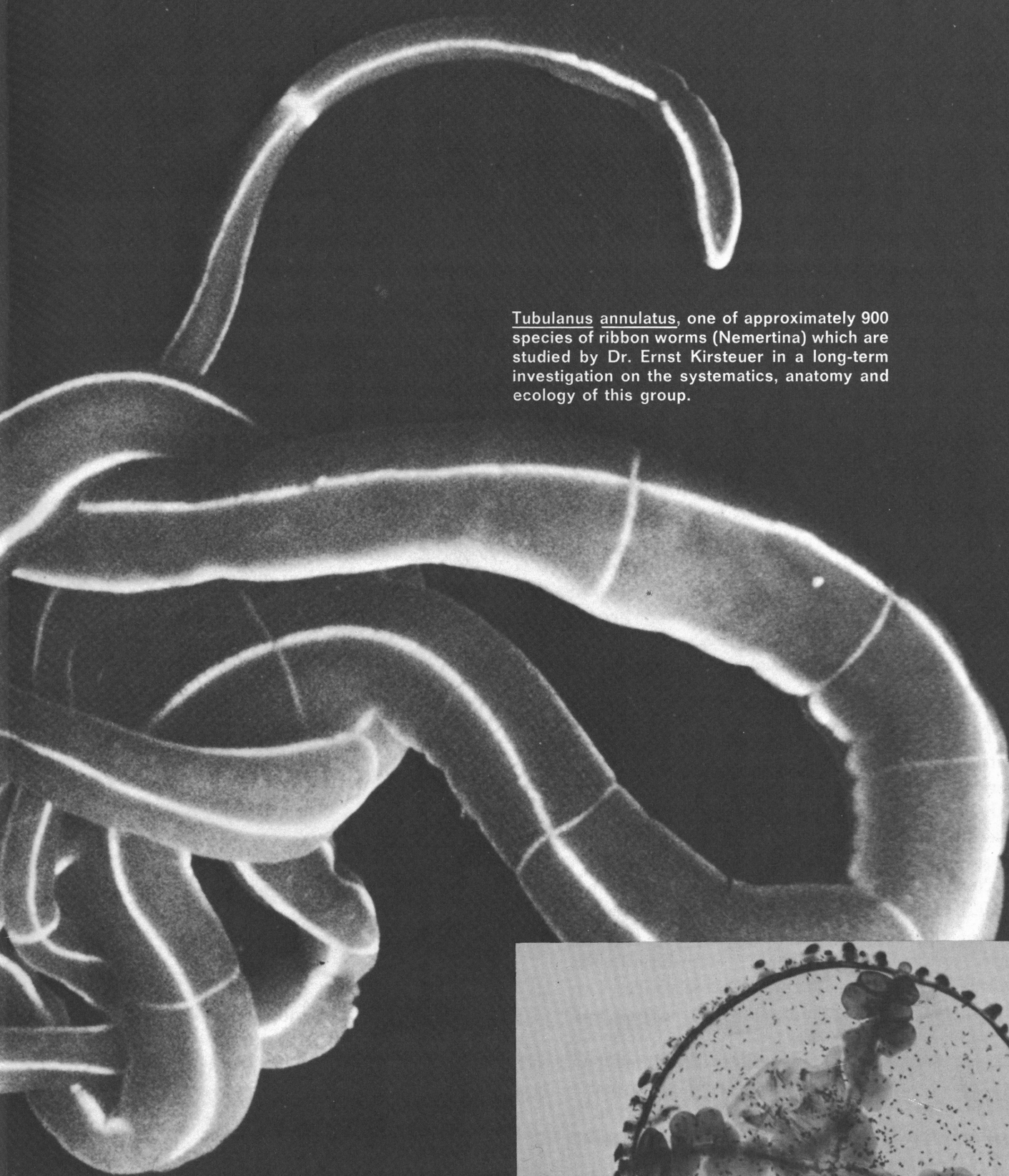
script describing their work. In addition, Dr. Bliss and Miss Stefanie M.E. Wang have continued to study the hormones that prevent molting and control water balance in this animal. They have given particular attention to the effects of heat on the activity of the hormones and have begun attempts to isolate the several hormones involved.

Dr. Ernst Kirsteuer has carried on field and laboratory investigations on the systematics, anatomy and ecology of Nemertina, Gnathostomulida and Archiannelida of tropical marine environments. He has initiated a two-year study of these worms in the Caribbean Sea. Concurrently, he is investigating the little known marine interstitial sand faunas of the same region. In this work, he has discovered several new species of nemertines and gnathostomulids.

The research efforts of Dr. Horace W. Stunkard have been directed largely toward the elucidation of the life cycles of parasitic worms. Many species, having successive developmental stages in different hosts, present formidable problems in the fields of ecology, evolution and systematics. Moreover, a number of these worms infect animals of economic importance and are involved in causing losses of shellfish and finfish and of domesticated birds and mammals. Other worms cause disease in man and other animals. Knowledge of the life histories of these parasites is essential for the development of effective measures to control disease.

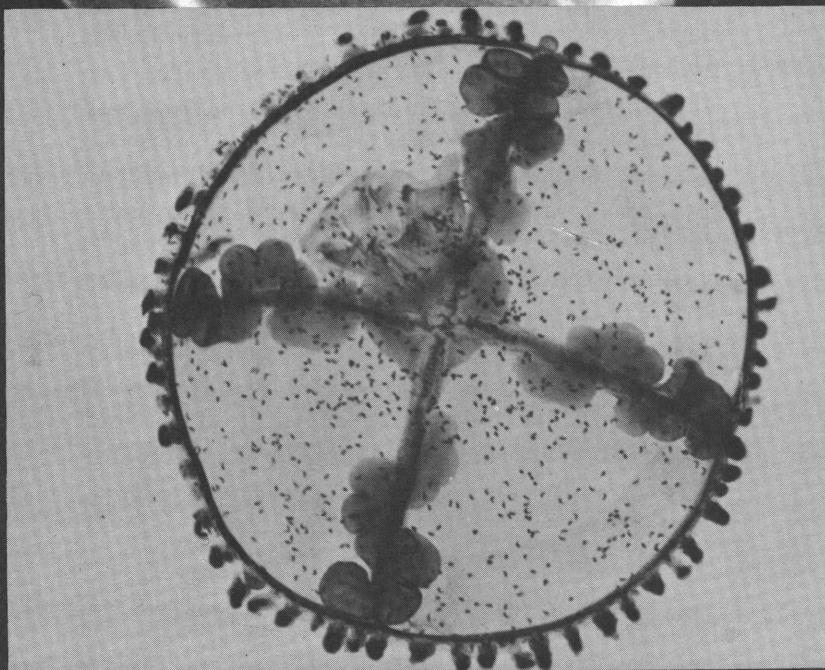
Approximately 38,000 specimens, mostly mollusks, were catalogued and added to the reference collections. Staff members have continued to counsel undergraduate and graduate students in their academic studies; these include people enrolled in the Urban Corps and in the Undergraduate Research Participation Program.

William K. Emerson, *Chairman*



Tubulanus annulatus, one of approximately 900 species of ribbon worms (Nemertina) which are studied by Dr. Ernst Kirsteuer in a long-term investigation on the systematics, anatomy and ecology of this group.

This jelly fish contains hundreds of parasites after having been exposed for one day to the larvae of the trematode (flatworm) Neopechona pyriforme. The worms are being studied by Dr. Horace W. Stunkard.



DEPARTMENT OF MAMMALOGY

As mammalogy enters its second hundred years at the Museum, the department can look back on a century of leadership in research, education and exhibition, and look forward to continuing those facets of past activities that are of value and investigating new lines of productivity for the benefit of science and mankind.

Exhibitions of mammals comprised the nucleus of the collections of The American Museum of Natural History 100 years ago. In 1969 the new Hall of Ocean Life and Biology of Fishes—dominated by the 94-foot model of the blue whale—was opened. The mammal exhibits, completed under the direction of Dr. Richard G. Van Gelder, had been in planning and construction for more than 60 years.

During the past century, the department has sent out more than 300 expeditions. This year there were again a number of expeditions; on one of them, to Mozambique, Dr. Van Gelder collected some 200 specimens and obtained biological and physiological data on many species.

Numerous projects were continued on a long-range basis. Dr. Van Gelder continued his revision of the hog-nosed skunks and published a paper on variations within a population. Dr. Sydney Anderson made considerable progress on his bulletin on the mammals of Chihuahua and prepared a paper on the classification of wood rats. Dr. Karl F. Koopman collected further data on the bats of Sudan and presented a major paper on the zoogeography of bats of the world at a conference in Texas.

Dr. Guy G. Musser broadened his studies of the rodents of the Indo-Australian region to cover the classification of murid rodents. He wrote a monograph on Central American squirrels and papers on other rodents from Mexico, Southeast Asian rats, and the rodents of Celebes and Burma.

Mr. Hobart M. Van Deusen continued work on the mammals of Australia and New Guinea and published a paper describing a new species of flying fox from the Bismarck Archipelago. Mr. George E. Goodwin's monograph on the mammals of Oaxaca, Mexico, was published.

The department continued to prepare the lists of recent literature for the American Society of Mammalogists. Dr. Anderson joined the Graduate Program in Evolutionary Biology to give advanced training in mammalogy through the Museum and the City University of New York.

The department has investigated and made use of new techniques. Several members have been using computers for analysis of their data. Dr. Anderson has worked on mechanisms for increasing the speed and accuracy of measuring specimens and converting these data directly to computer tape. The department has also cooperated with the Department of Mineralogy to develop a computerized question-answering service for the public. Trials, begun in early 1969, indicate that the program will be highly successful.

Richard G. Van Gelder, *Chairman*

DEPARTMENT OF MICROPALEONTOLOGY

The activities of the department were tailored to increase the interrelation between the publication of catalogues, which are its primary product, and the ongoing commitment to education and research.

The department continued to publish the monumental "Catalogue of Foraminifera," now in its seventieth volume, as well as the 29-volume "Catalogue of Ostracoda." Similarly, the second of a three-volume work on smaller foraminifera has been published and the third volume is in the final editing stage.

These catalogues, which are produced by Dr. Richard Charmatz and Miss Lili E. Ronai, continue to be in strong demand. The majority of subscribers are educational institutions.

The proliferation of micropaleontological literature, as well as the massive data bank accumulated during the production of the catalogues and related activities, has resulted in the department's participation in a computer-based storage and retrieval program. Eventually, it will encompass data in all phases of micropaleontology. As a first step, we have published a manual, written by Dr. Harold L. Cousminer, which describes procedures for converting bibliographic, taxonomic and distributional data on foraminifera and ostracodes to a form suitable for machine input.

Feasibility studies are now under way to help refine input methods still further. They will aid our own information program and should be useful to other institutions involved in the growing network of information services in the field of micropaleontology.

The department continues to offer courses in micropaleontology to students from Rutgers University, Hofstra College and C. W. Post College. In addition, more than 1100 papers were catalogued last year.

The department participated in the design of material for display in the John Lindsley Hall of Earth History, in which actual specimens and greatly enlarged models of various microfossils are shown, and their application in economic geology is illustrated.

Finally, the staff has produced the quarterly journal *Micropaleontology*, which is now in its fifteenth year and is well established as the leading professional journal in its field.

The death of Dr. Angelina Messina on November 20, 1968, came as a great shock. Dr. Messina had devoted many years of brilliant service to the department and, at the time of her death, was Chairman and Curator.

Richard Charmatz, *Acting Chairman*

DEPARTMENT OF MINERALOGY

The field of mineralogy has long been focused on a study of rocks and minerals as artifacts of nature, establishing a foundation for the understanding of the development of our universe. Today these studies, as conducted in the Department of Mineralogy, are aimed at an understanding of the interaction of the natural forces that have produced the earth we know. The continuing evolution of our landscape depends on such forces, forces acting within the earth, forces as yet not clearly understood but determining as if by whim the survival of continents, and in turn man's own future.

A study of the chemical evolution of the earth's crust is being continued by Dr. D. M. Vincent Manson. His investigations are focusing on the nature and origin of nodules of ferromagnesian minerals which originate in the earth's upper mantle and are occasionally found at the earth's surface as the result of volcanic eruptions. An essential framework for this study is the work done in documentation of the empirical variations observed in meteorites and other terrestrial rocks. The expanded use of computer facilities has been vital to the progress made.

Dr. Manson made an extended field trip to Europe and Africa during the year. Several reference collections were made and beneficial contacts with colleagues were established.

The number of collaborations with other institutions on research projects continues to increase, with the major contributions from the Department of Mineralogy stemming from its uniquely important collections.

Considerable effort was devoted by the department in the past year to exhibition activities. The John Lindsley Hall of Earth History, an interdepartmental project completed under the direction of Dr. Norman D. Newell, provided a most

rewarding opportunity to present to the public the excitement and relevance of this area of natural history. Numerous special exhibits both within the museum and at other institutions were prepared during the year. Following the opening of the John Lindsley Hall of Earth History, the Morgan Memorial Hall of Minerals and Gems was temporarily reopened to the public.

Dr. Manson delivered numerous lectures at universities during the course of the year which, together with talks before professional societies and amateur groups, and appearances on radio and television, caused the department to play an active role in education.

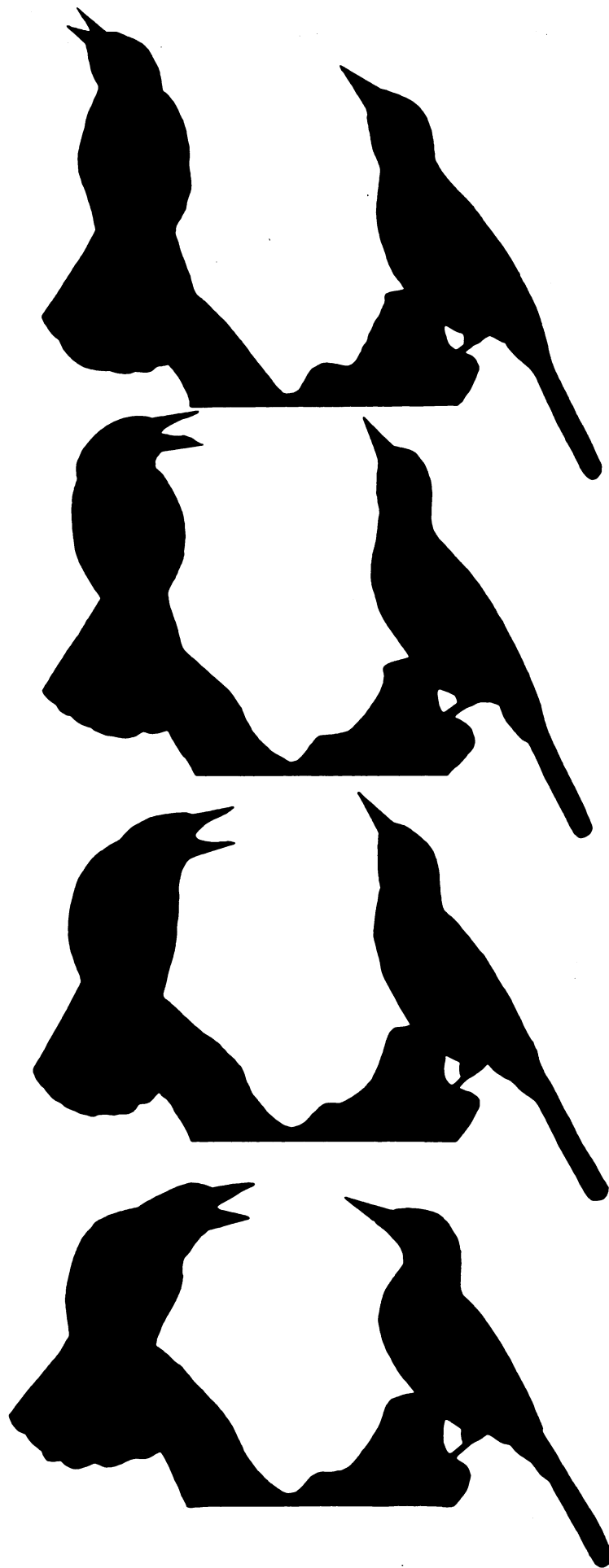
Some 800 mineral specimens, 100 rocks, 60 gem specimens and 20 meteorites were added to the collections. The initiation of modern cataloguing procedures, the curating of the collection, the acquisition of new material and the handling of routine inquiries and identifications for the public continue to be essential activities of the department.

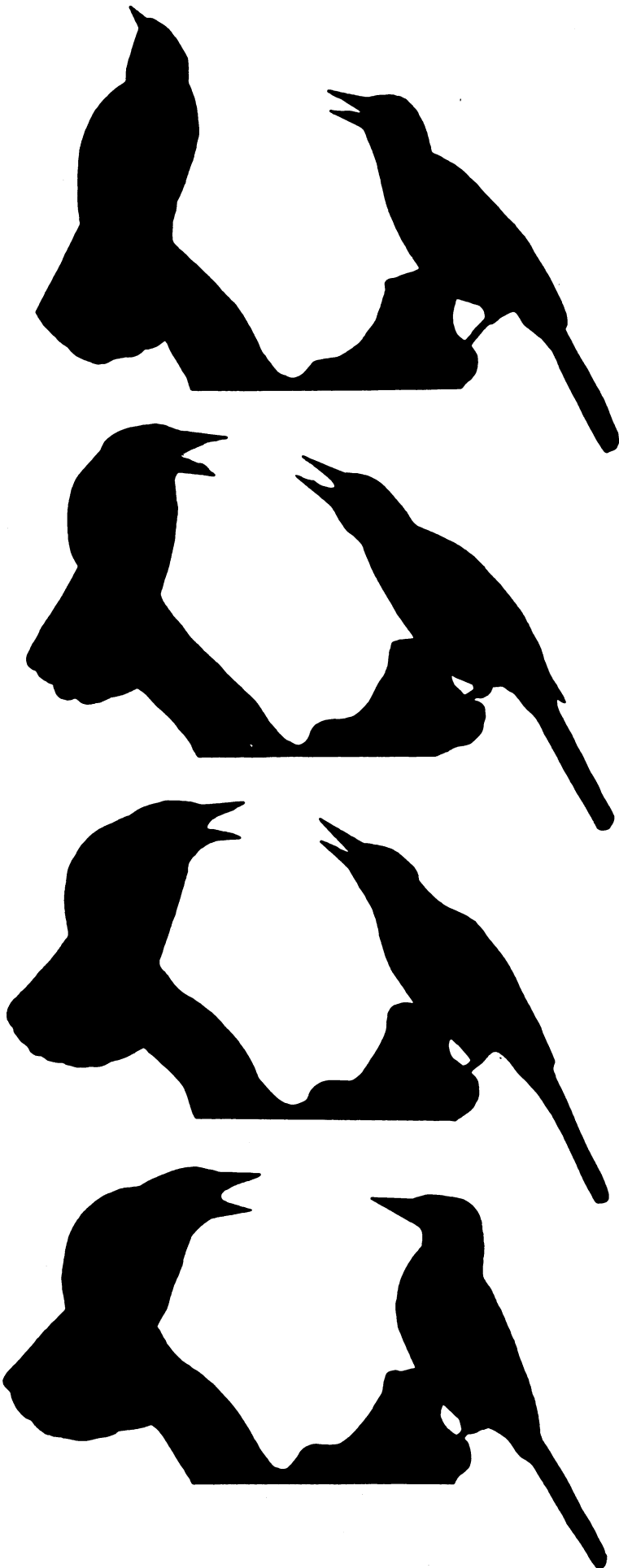
D. M. Vincent Manson, *Acting Chairman*

DEPARTMENT OF ORNITHOLOGY

Education, public service and research are combined in the many-faceted activities of the Department of Ornithology. Through the Frank M. Chapman Memorial Fund, direct financial aid is provided to numerous graduate students and a smaller number of senior scientists. Both research and education are thus served. Many of these grantees do their research at the Museum, to the benefit of themselves and the stimulation of the departmental staff.

The appointment of Dr. Wesley E. Lanyon as an Adjunct Professor at the City University of New York and his participation in the new Graduate Program in Evolutionary Biology reflects this





interest in education. The use of a recently equipped classroom-laboratory in the department enhanced his ability to present advanced ornithology to the students. The involvement of the department in education extends to the general public at all age levels through numerous personal contacts as well as by means of correspondence and telephone calls.

The results of research, too, run the gamut from semipopular, fully illustrated works such as "Eagles, Hawks and Falcons of the World" by Mr. L. H. Brown and Dr. Dean Amadon, to numerous technical papers prepared by the staff. Among the major research projects of the department are Dr. Charles Vaurie's volume on the birds of Tibet, which is now in press, Dr. Lanyon's studies of the flycatchers of the crested group, Dr. Lester L. Short's investigations of woodpeckers in South America, and Dr. Amadon's and Mr. Jean Delacour's work on a volume on the curassows.

Dr. Robert Cushman Murphy continues to raise his influential voice on behalf of the cause of conservation.

The honorary associates of the department are as active and devoted to ornithology and to the Museum as is the regular staff. Mr. James C. Greenway continues his painstaking evaluation of our thousands of type specimens of birds. Mr. Eugene Eisenmann is the chairman of a committee that is preparing a list of the birds of the North American continent under the supervision of the American Ornithologists' Union. Mr. G. Stuart Keith, following years of field work, has completed his work with two collaborators on a monograph dealing with the elusive swamp rails of the genus *Sarothrura*.

We thus hope that the activities of the Depart-

The Pale-eyed Marsh Blackbird (*Agelaius xanthophthalmus*), a distinct new species of blackbird, was discovered by Dr. Lester L. Short, Jr., in August, 1968, in a marsh near Tingo Maria, Peru. These drawings were traced from a film of a pair of birds taken on the spot at the time of discovery. The display that this pair is engaged in is similar to those known in other species of the genus *Agelaius*.

ment of Ornithology reflect the diverse interests of the general public, the conservationist and the scientist in the natural history of birds.

Dean Amadon, *Chairman*

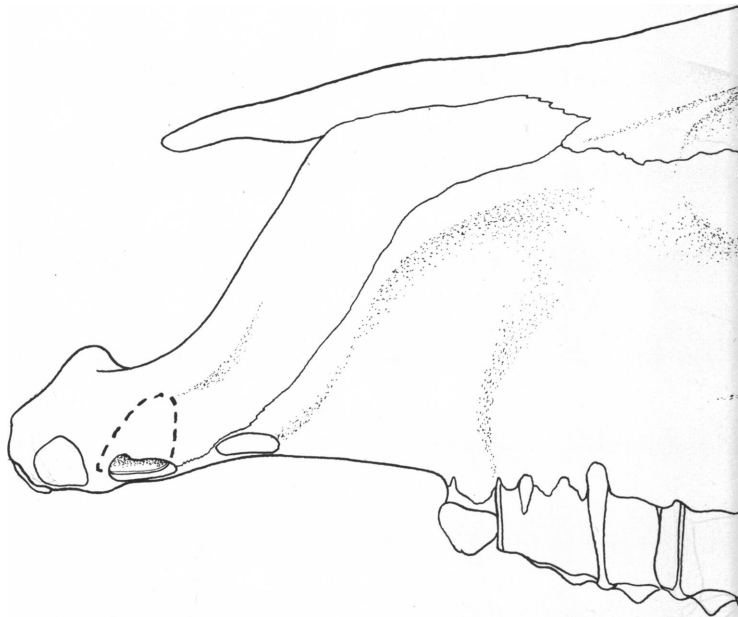
DEPARTMENT OF VERTEBRATE PALEONTOLOGY

Man's current interest in the life of the past is reflected at the scientific level by the expansion of research programs, and at the popular level by continuing enthusiasm for the discoveries and reports of paleontologists. Arguments about our ice-age ancestors, speculations about the extinction of the dinosaurs and deductions concerning the transition from fish to tetrapod are examples of this shared interest.

Serving this interest, the department now has seven vertebrate paleontologists with a supporting staff of six assistants, seven preparators and three illustrators. Together with research associates, scientists from other institutions, and ten graduate students, our staff works on and adds to one of the world's great collections of fossil vertebrates, including the largest single assemblage of fossil mammals.

During the year, Dr. Bobb Schaeffer collected Jurassic fishes in Wyoming and Devonian fishes in the Gaspé. He wrote on the origin and basic radiation of the higher bony fishes and on Triassic fishes from North America, and he is continuing research on various Mesozoic forms. He served as Dean of the Council of the Scientific Staff and helped organize the 1969 Summer Institute in Systematics, which was sponsored by the National Science Foundation. Dr. Schaeffer is also supervising the doctoral theses of two graduate students.

Dr. Edwin H. Colbert is carrying on his research on dinosaurs and on Gondwanaland tetrapods, particularly the Triassic tetrapods of North

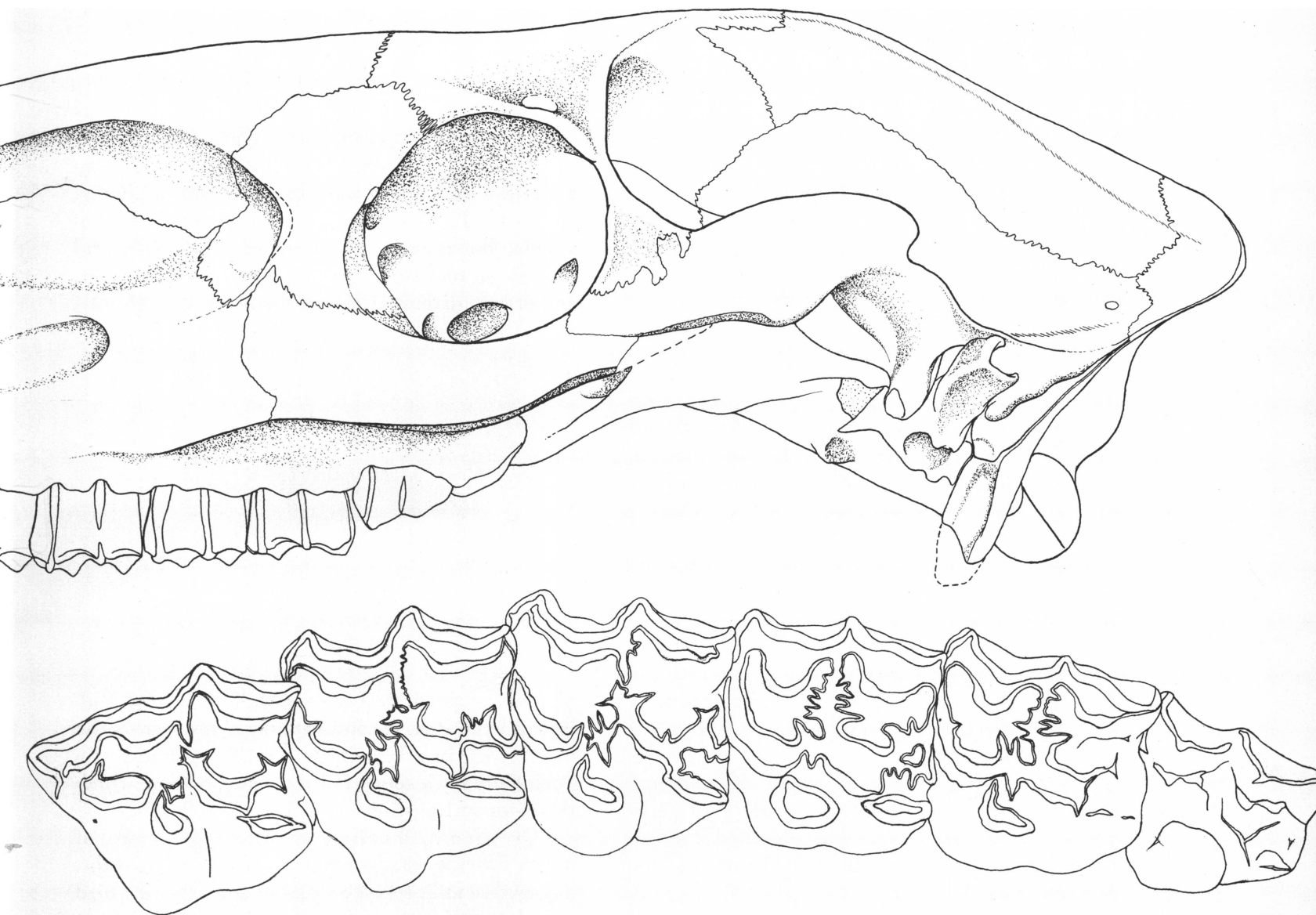


Line drawings of specimens are used to illustrate the papers written by Museum curators. Above is the skull and on the right the cheek teeth of the fossil horse Merychippus, found in Late Miocene or Early Pliocene deposits in South Dakota. The animal lived about eleven million years ago.

America. The second edition of his "Evolution of the Vertebrates" is now in press. In the fourteen years since this book first appeared, it has become a standard college text and is a gratifying success among lay readers.

A new classification of the Mammalia is occupying much of Dr. Malcolm McKenna's time. He is working on Mesozoic and early Tertiary mammals as well, with emphasis on the insectivores, and on stratigraphic problems. During the fall Dr. McKenna presented a course on the history of the mammals, and he is working with three doctoral candidates. He also served as a member of the Systematic Biology Panel of the National Science Foundation.

Dr. Richard H. Tedford is involved in a major revision of the placental carnivores, based mainly on magnificent examples in the Frick and Uni-



versity of Nebraska Collections. This project deals with, among other things, the origin and subsequent history of the "dogs," raccoons, bears and mustelids. He is also continuing his investigation of the history of the Australian marsupials.

Mr. Morris F. Skinner, who is largely responsible for gathering the unparalleled series of post-Eocene horses in the Frick Collection, is now preparing a generic review of the Equidae. In addition, he is writing a series of stratigraphic papers intended to provide documentation for large parts of the collection. The first of these was published in early 1969.

Mr. Ted Galusha, who also collected many of the specimens in the Frick collection, is likewise

preparing thorough stratigraphic accounts of them. Another of his projects is a detailed comparison of the North American Pleistocene "lion" with the similar European cave form.

Mr. Beryl Taylor is primarily interested in the camels, which evolved in North America during the Tertiary and entered the Old World late in their history. He is working on a generic review of each subfamily in the Camelidae, using the extensive representation of these ungulates in the Frick Collection. A first paper was published in 1968 and others are under way. Mr. Taylor is also collaborating with Mr. Skinner on a history of the Tertiary "prong-horned" antelopes.

Bobb Schaeffer, *Chairman*

SPECIAL ACTIVITIES

ARCHBOLD BIOLOGICAL STATION LAKE PLACID, FLORIDA

The year saw further development of the Archbold Station's research program, expansion of its role in the training of young scientists and more active involvement in Florida conservation. The excellent facilities and singular biological setting of the station continued to attract visiting scientists with a wide diversity of interests.

Research at the station, conducted under the direction of Dr. James N. Layne, is primarily concerned with the ecology of the southern highlands region of peninsular Florida, with emphasis on vertebrate fauna. A classification and description of the 1050-acre station property and mapping of the major vegetative associations was completed during the year.

An intensive long-term study of mammal populations was also begun. A variety of techniques is being used to provide detailed data on all aspects of ecology and the life histories of the species involved.

Other ongoing research projects are concerned with the ecology and life histories of birds and cold-blooded vertebrates of the region.

Students from Antioch College, Cornell University, Michigan State University and Wellesley College aided in these projects through the Undergraduate Research Participation Program of the Museum. Dr. A. Farhang-Azad of the School of Public Health, Teheran University, Iran, also assisted in this research as part of a training program in mammalian ecology supported by a fellowship from the World Health Organization.

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A total of 29 visiting investigators and 26 research assistants from 19 institutions in this country and from abroad worked at the station during the year. Their research projects included taxonomic, behavioral, physiological and ecological studies on many groups of organisms. One of the important discoveries was made by Dr. Stewart

Swihart of the State University of New York College at Fredonia. He found what is apparently the first record in invertebrates of the existence of a "color fiber," a special visual neuron from which the color of the stimulating light is reflected.

Dr. Glen E. Woolfenden of the University of South Florida was in residence for three months, engaged in an intensive study of the breeding bird populations in the station. Such investigations not only contribute to basic knowledge of the ecology of southern Florida, but they also provide the basis for intelligent conservation.

Fourteen groups, including 386 persons, and 53 individuals visited the station this year. The majority of the groups were from colleges and universities, and local high schools and elementary schools. In most cases, station personnel worked with the visitors, explaining the facilities and programs and conducting tours. Through such contacts we hope to contribute to a greater

appreciation on the part of the public of the relation between preserving and studying natural areas and the survival and enlightenment of human beings.

Richard Archbold, *Resident Director*

**GREAT GULL ISLAND
LONG ISLAND SOUND, NEW YORK**

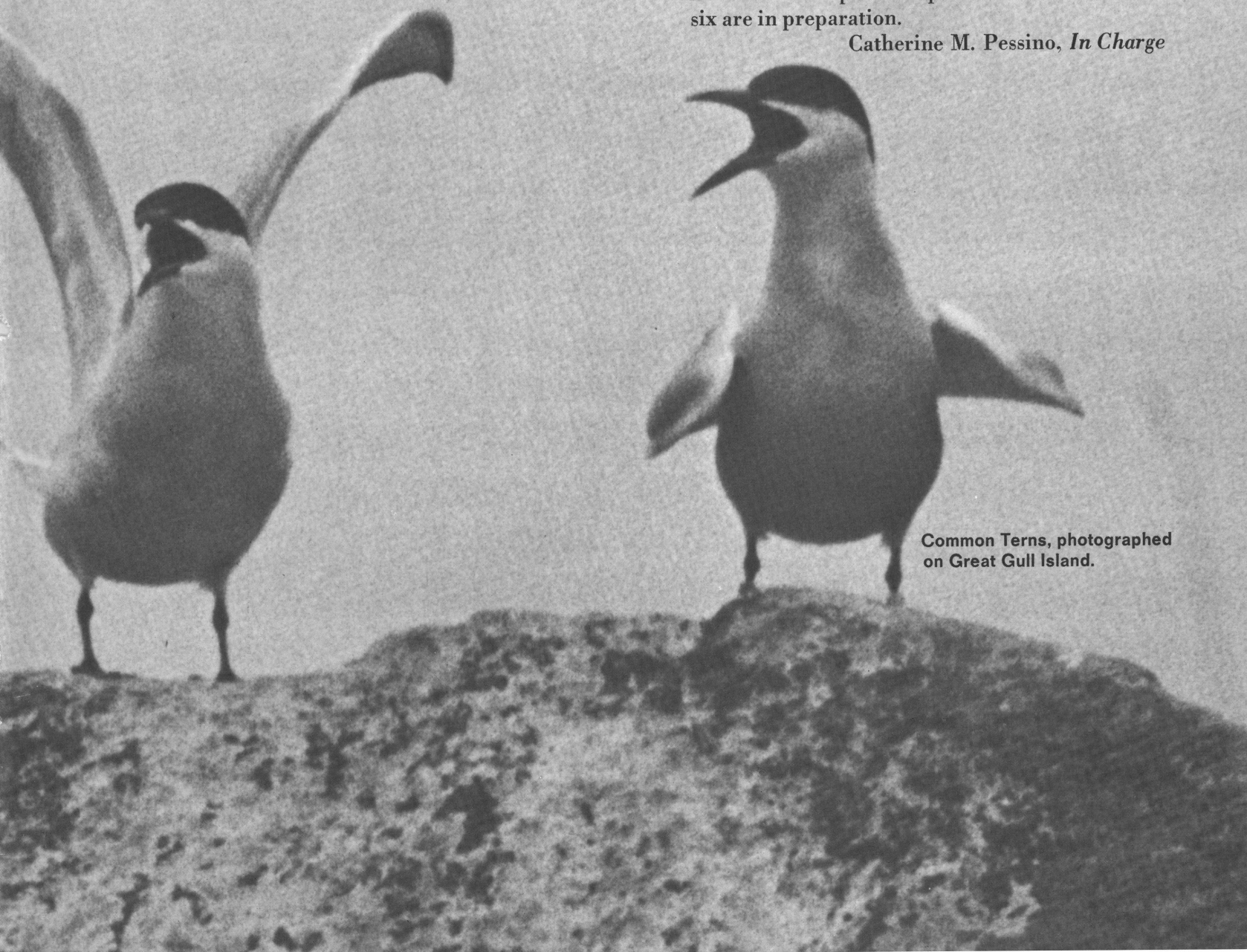
In the 20 years since The American Museum of Natural History took title to Great Gull Island, the tern population of the island has risen from zero to some 5000 nesting birds. More than 2000

of these are Roseate Terns, making this the largest breeding colony in the hemisphere for this little-known species. Great Gull Island dramatically demonstrates what can be done to protect vanishing wildlife, even in an area of such rapid urban expansion.

In addition to being a sanctuary, the island has become a center for bird studies, particularly for studies of the Roseate Tern. All investigators on the island participated in a special banding program that made it possible to recognize individual birds in the field.

Three notes and an article have been published as a result of their work. Four other papers have been accepted for publication and another six are in preparation.

Catherine M. Pessino, *In Charge*



Common Terns, photographed
on Great Gull Island.



The opening of expanded facilities at the Lerner Marine Laboratory made February 13 a festive day at Bimini. At top, guests gathered for the dedication ceremony. At center, the proud moment of the ribbon-cutting with, from left, Lady Cumming-Bruce, Mrs. Michael Lerner, Sir Francis Cumming-Bruce, Governor of the Bahamas, Mr. Michael Lerner, Mr. Robert Mathewson and Dr. Thomas D. Nicholson. Lower photo shows the new pens, with the laboratory in the background.



LERNER MARINE LABORATORY BIMINI, BAHAMAS

The year was a memorable one in that it saw the opening of greatly expanded facilities at the Lerner Marine Laboratory. The new facilities include a 400-foot pier with adjoining shark pens, a research building containing eleven laboratories and a residence for visiting scientists.

The new units were designed and the equipment was planned to offer the most modern technical support to Museum and visiting scientists. The laboratory and residence were dedicated on February 13, 1969, at a ceremony attended by some 300 people. Among the visitors were a number of members of the Board of Trustees, and



among the speakers were Mr. Gardner D. Stout, President of the Museum, and Sir Francis Cumming-Bruce, Governor of the Bahamas. Mr. Michael Lerner, Honorary Trustee of the Museum, dedicated the laboratory to the advancement of studies in marine biology. Dr. James A. Oliver presided.

Despite the restrictions imposed by the building program, we were able to accommodate a large number of visiting scientists. Thirty-seven senior investigators and 50 of their assistants used the facility during the year.

The thirteenth and final cruise for the "Bio-

logical Survey of the Bahamas" was made during the year. Dr. Phyllis Cahn of Long Island University and Dr. Stuart Kahan of the Downstate Medical Center of the State University of New York led this phase of the study, which was focused on the acoustical environment of the Bahamas, in the regions of the reefs of Andros and New Providence Islands. The survey has been in operation for more than five years, and has been staffed by more than 40 scientists from the United States and other countries.

A symposium entitled "The Ecology of Coral Reef Fishes" was held at the laboratory on March

12. Thirty scientists from marine laboratories, universities, museums and other research institutions came from several parts of the world to participate. The symposium dealt with the ecological niche-preference of marine coral fish.

The growing interest in the use of isotopes and other radiological tools prompted the installation of a combination radiological and isotope facility in the new building. Among the pieces of equipment in it are a Cobalt 60 marine irradiator and a 250 kw. X-ray therapy unit.

Continued testing of pharmacological substances effective as anti-shark measures was carried on by Dr. H. David Baldrige from the Mote Marine Laboratory, Sarasota, Florida. A study was made by Dr. Sasha Koulisch of Richmond College in New York on the organization and relationships of the cytoplasmic organelles in the cells of the digestive glands of barnacles. Dr. A. Kenneth O'Gower of the University of New South Wales conducted studies of respiration rates in sharks and blood polymorphisms in *Anadara*.

Robert F. Mathewson, *Resident Director*

KALBFLEISCH FIELD RESEARCH STATION HUNTINGTON, LONG ISLAND, NEW YORK

In addition to long-term projects reported on in previous years, two new studies were initiated by the Museum staff this year. Dr. Gareth J. Nelson is investigating the ecological and behavioral factors affecting reproduction and early development of some of the freshwater fishes maintained at the station. A study begun by Dr. Lester L. Short, Jr., involves the breeding, territorial and feeding behavior of woodpeckers as well as interactions between the sexes and between adults and young.

Eight other senior investigators, seven from the Museum staff and one from Queens College, used the resources of the station during the year.

The station also continues to serve as an important center for the training of college students in the natural sciences. Five graduate students and

22 undergraduates took part in this program. They represented sixteen colleges and universities. Many of them were supported in part by the Undergraduate Research Participation Program. In addition, the station was host to a group of graduate students from the Rockefeller University who were receiving training in ecology.

Among the graduate students taking advantage of the singular opportunities for field research afforded by the station were three enrolled in the newly announced Graduate Program in Evolutionary Biology, sponsored jointly by the City University of New York and The American Museum of Natural History. Noteworthy among the graduate projects is a study, using radio telemetry, of the behavior of free-living turtles.

Four scientific publications, based wholly or in part on studies at the station, have been published during the year. Four more are in press and two other manuscripts are in preparation. A Master's thesis at the City University of New York was based on a study performed at the station. Outstanding among the published reports was an annotated description of the Kalbfleisch flora, written by Dr. Jack McCormick and his students. This 100-page booklet not only constitutes a floristic inventory of the station's 94 acres, but also summarizes the land-use history of the property and includes an analysis of the composition of the flora. It provides essential background information for all future research here and will permit evaluation of any subsequent floristic changes that may occur.

Wesley E. Lanyon, *Resident Director*

SOUTHWESTERN RESEARCH STATION PORTAL, ARIZONA

Although a temporary change of policy limited the number of research investigators during the summer of 1968, the total number of scientists utilizing the Southwestern Research Station was 524, the second highest number of people since the station was established. Thirty-eight in-

stitutions were represented in the fields of entomology, arachnology, herpetology, ornithology and botany. A dozen classes in various areas of natural history used our facilities. Eight papers based on work done here were published. Lectures on the work of the station were given to sixteen groups. And a newsletter was sent to 850 former visitors.

The study collections now contain the vast majority of the birds, plants, reptiles, mammals, arachnids and mollusks, as well as slightly more than 50 per cent of the lichens found in the area. The insect collections have grown to more than 10,000 specimens including more than 2000 species. A fungi collection has been started.

The main improvements included a general upgrading of the station's facilities, the installation of new signs and the use of redwood stain for a rustic appearance in keeping with the locale.

Vincent D. Roth, *Resident Director*

DEPARTMENT OF EDUCATION

While our activities were largely directed toward children, there was a gratifying amount of work done with adults. More than 5000 attended the Evening Lecture Series and an additional 33,000 enjoyed the gallery and slide talks and film programs.

The department resumed the Field Trip Program with two tours devoted to geology and ornithology. This program will be expanded next year to include a three-week archeological tour of Meso-America.

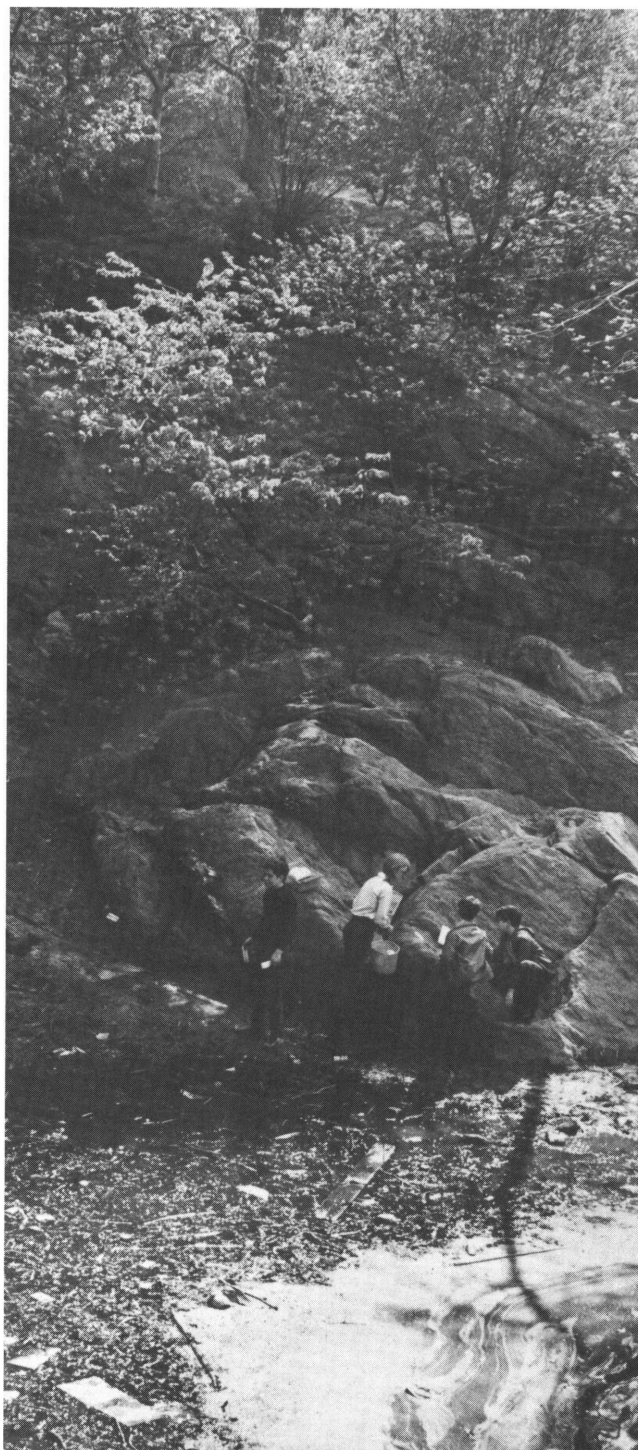
Twenty-one in-service courses for teachers were given and numerous orientation workshops were conducted for science supervisors and science teachers.

We continued to serve an ever increasing number of school children in a variety of ways, ranging from large auditorium presentations to small discussion groups. These programs reached more than 53,000 children from schools in the metropolitan and nearby areas.

A number of special courses and workshops

were offered for the highly motivated child. Among these were the Saturday Morning Classes for Young People and the Saturday workshops of the Louis Calder Natural Science Laboratory, which included an ecological survey of a pond in Central Park.

Young naturalists and their teacher examining a pond in Central Park.



A record number of urban youngsters, 53,034, visited the Natural Science Center for Young People to see the exhibits and living examples of the flora and fauna of the Greater New York area.

Handicapped children, unable to come to the Museum, were visited in more than 130 hospitals and schools by specially trained teachers from the Department of Education. This Hospital Visitation Program, which gives the children direct contact with Museum artifacts and specimens, is supported by the Avalon Foundation.

Portable Museum exhibits were circulated to 299 schools, libraries, neighborhood centers and other organizations in the city. Fifty-six exhibits were used as motivating research materials in a special therapeutic summer course for children at Nanuet, New York.

A number of volunteers from the Women's Committee of the Museum assisted ably at the busy Information Desk. And taped tours of much of the Museum were made available in Spanish, French and German as well as English.

A special Museum Training Course was given for employees of the smaller museums of New York State. This course was offered in cooperation with The Metropolitan Museum of Art and was supported by the New York State Council on the Arts.

The Museum sponsored a school essay contest throughout the metropolitan area. There were hundreds of entries, and on June 23, through the generosity of a Trustee, 44 prizes were awarded to the winners.

Richard S. Casebeer, *Chairman*

DEPARTMENT OF EXHIBITION AND GRAPHIC ARTS

A simple way to summarize the activities of this department during the past year is to say that never before in the history of the Museum has there been a twelve-month period in which so much work was accomplished. This is a fitting achievement for the Centennial year.

Of the new permanent exhibits completed, the first was the John Lindsley Hall of Earth History, opened on January 16, 1969. The hall, which was begun in September, 1964, represents a departure from Museum tradition, for most of the design and all of the exhibit construction and installation were the work of outside contractors. Notable features of the hall are a rotating relief globe of the world more than six feet in diameter; one of the few working seismic recorders on public display; and a ten-minute introductory, multi-media exposition of the hall's subject matter, which uses eight screens for simultaneous projection of slides and films, accompanied by commentary and musical background.

On February 26, 1969, the Hall of Ocean Life and Biology of Fishes was opened to the public. The most impressive exhibit in the hall—the 94-foot, single point suspended blue whale—had been completed in November, 1968. Sculpted in Fiberglas and polyurethane, the model was more than two years in construction and cost nearly \$300,000. Other notable exhibits in the hall are the fifteen dioramas of life in and adjacent to the seas, and an exhibit of the phylogeny of fishes—the most comprehensive of its kind in the world—in which some 400 models are displayed. Films and animated displays are also used to help interpret fish biology.

The Centennial was started with a one-year temporary exhibit, "100 Years of Wonder," which opened in the Corner Gallery on January 2. It is a pictorial history of the first century of the Museum, portraying outstanding events and personalities of the period by means of more than 100 photographs and engravings, and a selection of memorabilia taken from a box in the recently revealed cornerstone.

The major Centennial exhibit, "Can Man Survive?" was opened on May 16, 1969. This \$650,000 exposition of man's mastery of technology and his present resulting dilemma is an attempt to create a "closed environment" exhibit within the Museum. The visitor progresses through a series of ramps and chambers that trace

man's development and exploitation of his resources. The multi-media technique is used here to its full; films, slides and sound are combined to create an atmosphere of personal involvement, culminating in the posing of the title question and the answer, "It's Up to You."

Two other temporary exhibits were mounted during the year: "Speaking of Animals," a collection of photographs from the World Health Organization, and "Nature and the Camera," the second exhibit of entries for *Natural History's* annual photographic contest. The exhibit-of-the-month displays continued in the Seventy-seventh Street foyer.

Other work progressed on permanent exhibits, notably the halls of the Biology of Invertebrates, and Mexico and Central America, and installation has started in the Hall of Peoples of the Pacific. Renovation of the habitat groups continued in the Hall of African Mammals.

The work of the Graphic Arts Division reflected the activities connected with the Centennial. In addition to its normal quota of illustration for popular and scientific publications, an exceptional amount of graphic art was produced for the Centennial, including the various Centennial posters and all attendant promotional material.

We learned with regret of the death of Dr. James Lippitt Clark on March 16, 1969. As Director of Arts, Preparation and Instruction from 1935 to 1949, he led the department in the development of techniques and the installation of exhibitions that greatly enhanced the fame of the Museum.

Gordon R. Reekie, *Chairman*

LIBRARY

Last year was a time for re-evaluation and re-organization in the Library. New procedures were begun, internal library records were simplified or mechanized and a regular binding program was established.

The Library entered into various cooperative

ventures in order to supplement the collection and use it more effectively. One of these arrangements is with the New York Metropolitan Reference and Research Library Agency, Inc., conveniently known as METRO. This agency is considering the feasibility of cooperative acquisitions, and cataloguing, storage and reference programs in metropolitan New York.

Inter-library loans (including photocopies) increased. This was made possible, in the main, by a grant sponsored by the New York State Inter-Library Loan Program of the New York State Department of Education.

Although the number of public readers declined because of shortened hours, lack of a reference librarian and a variety of purely mechanical problems, circulation again was more than 60,000.

Nearly 1300 new volumes were received and catalogued and more than 14,000 issues of periodicals were added. Among these were 159 new serial titles.

The re-cataloguing and reclassification pilot project, sponsored by the New York State Council on the Arts, is progressing well, as is the second Council grant for the purchase of Library of Congress cards.

Our chief display outside the Museum was an exhibit of rare biological sciences books, "Beasts-Birds-Bugs-Books," at the New York Public Library.

All in all, in 1968-1969, our collection, which is second to none, has been made more valuable and more accessible to those who need it.

Thomas G. Basler, *Librarian*

PUBLICATIONS

CURATOR

The past year has been a prosperous one in the annals of *Curator*. The magazine continues to

increase its circulation; it is now in the vicinity of 1000. This, together with an extremely high renewal rate, has proved very encouraging.

At the end of this period, the present editor, Dr. Harry L. Shapiro, retired from his responsibilities for the journal.

Harry L. Shapiro, *Editor-in-Chief*

NATURAL HISTORY MAGAZINE

Natural History has had a year of evolution and experiment. The "Naturalist at Large" column, formerly written by Marston Bates, now features a wide and distinguished list of authors, including Archie Carr, William Watkins, Garret Hardin and Edward Abbey. The magazine's second special supplement, "The Unforeseen International Ecologic Boomerang," appeared in the February issue. A measure of its success can be read in the fact that the magazine sold 4000 off-prints of the supplement, with the bulk of the requests coming from colleges and universities. In May, an article called "The Myth of Peaceful Atom," which raised questions on safety measures in the nuclear power industry, stimulated a wide range of response from laymen, nuclear engineers and public officials. A sampling of this response appeared in a new but still occasional "Letters to the Editor" column. Museum scientists participated substantially in the editorial year, both in terms of written articles (20 per cent of all articles in the magazine were written by Museum authors) and editorial checking.

At year's end, paid circulation exceeded 209,000, the highest in the magazine's 69 years. Correspondingly, the renewal rate climbed from 59.8 per cent last year to slightly more than 65 per cent this year. Two years ago, in fiscal 1966-67, the renewal rate stood at 53.5 per cent. This circulation pressure has caused the magazine to begin using a digital computer operation, which will be programmed to handle the growing burden of mailing, renewing, adjusting and billing.

Advertising revenue also continued to grow,

having at year's end increased more than 20 per cent over last year's level.

Alfred Meyer, *Editor*

NATURAL HISTORY PRESS

In the summer of 1968, the Natural History Press published one of three reprint volumes on "The Mountain Arapesh," the New Guinea peoples first studied by Dr. Margaret Mead in 1931-32 for The American Museum of Natural History. At that time the Press also brought out "The Curious Naturalists" by Niko Tinbergen, "The Marvelous Animals" by Helena Curtis, "The Irish Countryman" by Conrad Arensberg, "South of Yosemite: The Writings of John Muir," edited by Frederick R. Gunsky, and "Discovering Plants" by Richard and Deana Klein. The American Museum Sourcebooks were expanded to include two new titles: "Myth and Cosmos," edited by John Middleton, and "Marriage, Family, and Residence," edited by Paul Bohannan and John Middleton. With the publication in August of Andrew P. Vayda's "Peoples and Cultures of the Pacific," the Press initiated a new series of readers in a greater understanding of peoples and cultures of the world.

In the fall the Press added to its list "The Geology of New York City and Environs" by Christopher J. Schuberth. It also published "Biology: the Science of Life" by Helena Curtis, and "Kinship and Social Organization," edited by Paul Bohannan and John Middleton. Several new juvenile books were produced, including "It Works Like This," edited by Thomas G. Aylesworth, and "Snow Stumpers" by David Webster.

The year saw the publication of the popular "Bankers, Bones and Beetles," an anecdotal history of The American Museum of Natural History and the men associated with it. Geoffrey Hellman's book will soon be followed by "Heritage of Life," a pictorial history of the scientific achievements and great expeditions of the Museum, written by Natural History Press's senior editor, Jean

Le Corbeiller.

This year we printed a revised edition of William A. Ritchie's well-received "Archaeology of New York State" and added an ecology reader to our Sourcebooks, "Environment and Cultural Behavior," edited by Andrew P. Vayda.

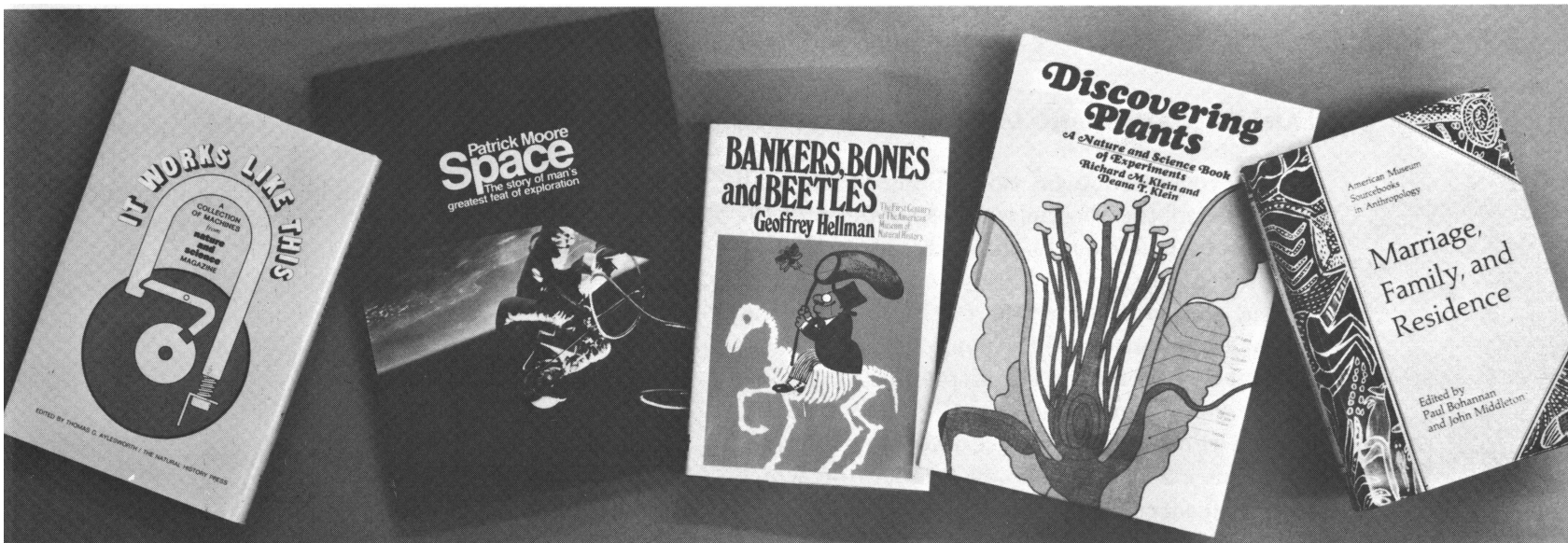
Elizabeth Knappman, *Associate Editor*

NATURE AND SCIENCE

The growing awareness of environmental problems and the increasing interest in science today make few publications as relevant as *Nature*

and *Science*, the Museum's magazine for children. ner such things as how frogs hibernate, how plants reach for light, how ice forms and how spiders, pigeons and other animals behave. In issues devoted to special topics they learned what scientists are finding out about the problems of survival in cities and in the Arctic, and what changes in the earth's crust are caused by earthquakes, volcanoes and continental drift.

Most important, they learned how they and everything around them are constantly changing, and how changes in one thing affect so many others. And they learned that man must discover how to live *with* nature instead of trying to overcome it, if we are to survive.



These books are among the publications for adults and young people published by the Natural History Press.

and *Science*, the Museum's magazine for children.

Last year, our sixth, we took young readers on nearly a hundred "expeditions" to explore specific aspects of nature in places ranging from the kitchen sink to the distant stars.

They discovered how and why a scientist raises wolf pups, or goes to live with the aborigines in an Australian desert, or tries to lift big telescopes high above the earth or "tags" whales. They learned the way to investigate in a scientific man-

A survey of teachers using the magazine in their classrooms showed almost unanimous agreement that it is the best of its kind. However, for various reasons—mainly the cost of subscriptions, available time in the classroom and sales promotion problems—*Nature and Science* still reaches only a fraction of its potential audience. Efforts are now in progress to promote the magazine more effectively during the coming year.

Franklyn K. Laudén, *Editor-in-Chief*

SCIENTIFIC PUBLICATIONS

The office of Scientific Publications published eleven articles in the *Bulletin*, totaling 1478 pages, and 54 numbers in *American Museum Novitates*, totaling 1399 pages. The publication of the 1968 *James Arthur Lecture on the Evolution of the Human Brain* brought the total number of pages published during the year to 2905.

In addition a total of 486 printed pages was in press as of June, 1969.

Miss Ruth Tyler, Editor of Scientific Publications for 25 years, retired in January, 1969. Mrs. Florence Brauner was appointed Editor, and Mrs. Ruth Manoff began work as Assistant Editor in the department in May, 1969.

Florence Brauner, *Editor*

PLANT OPERATION AND MAINTENANCE

This year, structural remodeling of the Hall of Peoples of the Pacific was completed and the hall was turned over to the Exhibition Department for development.

The original cornerstone of the Museum was located and opened and the copper box and items within it were removed for display.

The ventilation system of the Main Auditorium was renovated to reduce noise and increase ventilating efficiency. The new incinerator, which satisfies all current requirements for the reduction of air pollution, was placed in service.

To serve the public better, several of the rest rooms were completely renovated and the dining room and kitchen of the new restaurant were finished and put into operation.

Various modern offices, classrooms and laboratory spaces were constructed.

The final contract to complete the modernization of the electrical system of the Museum was awarded. Upon completion of this work, three-phase alternating current at 110/208 volts will be available throughout the Museum with new wiring and modern protection to limit current over-

load for the various branch circuits. As a result, the safety of the installation will be enhanced, its flexibility measurably improved and its service capacity increased by approximately 50 per cent.

Authority to prepare plans and specifications for a modern fire detection system to cover the Museum, with the exception of the exhibition halls, has been obtained. The City has already provided funds for this system and efforts are being made to perform quickly the work preliminary to the letting of contracts. By means of a panel in the Custodian's office, the system will indicate the location of any fire, so that effective action can be taken early.

Paul H. Grouleff, *Plant Manager*

ATTENDANCE

During the fiscal year 3,018,545 persons visited the Museum, and 655,360 (including 616,118 paid admissions) visited the Planetarium, making a total of 3,673,905.



FINANCIAL
STATEMENTS
AS OF
JUNE 30, 1969

THE AMERICAN MUSEUM OF NATURAL HISTORY AND
THE AMERICAN MUSEUM OF NATURAL HISTORY PLANETARIUM AUTHORITY

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THE AMERICAN MUSEUM
BALANCE SHEET,

ASSETS:	General Fund	Special Funds
Cash:		
Demand deposits	\$ 210,349	\$ 738,641
Time deposits		504,810
Accounts receivable	544,057	41,812
Investments (Notes 1 and 2) :		
Bonds		1,823,329
Preferred stocks		
Common stocks		
Planetarium Authority bonds (Note 3)		
Total investments		<u>1,823,329</u>
Prepaid expenses and other assets	205,259	
	<u>\$ 959,665</u>	<u>\$3,108,592</u>
LIABILITIES AND FUNDS:		
Accounts payable and accrued liabilities	\$ 240,001	
Deferred income	813,664	
Advance from the City of New York	150,000	
Funds:		
General fund (deficit)	(244,000)	
Special funds (Note 4)		\$3,108,592
Endowment funds (Note 5)		
Investment in Planetarium Authority bonds		
Pension Fund		
Frick Employees Retirement Fund		
	<u>\$ 959,665</u>	<u>\$3,108,592</u>

OF NATURAL HISTORY

June 30, 1969

Endowment Funds	Investment in Planetarium Authority Bonds	Pension Fund	Frick Employees Retirement Fund	Total
\$ 168,707		\$ 244,635 20,000	\$ 353	\$ 1,362,685 524,810 585,869
20,451,279		6,051,427	281,683	28,607,718
2,036,882		645,364	57,696	2,739,942
23,427,809		3,965,455	220,679	27,613,943
	\$425,000			425,000
45,915,970	425,000	10,662,246	560,058	59,386,603
				205,259
\$46,084,677	\$425,000	\$10,926,881	\$560,411	\$62,065,226
				\$ 240,001 813,664 150,000
				(244,000)
\$46,084,677				3,108,592
	\$425,000			46,084,677
		\$10,926,881		425,000
			\$560,411	10,926,881
			560,411	560,411
\$46,084,677	\$425,000	\$10,926,881	\$560,411	\$62,065,226

The accompanying notes are an integral part of these statements.

SUMMARY STATEMENTS**for the year ended**

	<u>General Fund</u>
Balance (deficit), July 1, 1968	(\$ 68,758)
Additions:	
Appropriation from the City of New York	2,116,381
Gifts, bequests and grants (Note 6)	381,616
Interest and dividend income:	
Endowment funds	1,497,296
Other	51,305
Net profit on sales of investments	
Contributions of pension fund members and Museum (Note 8)	
Other income (Notes 3, 6 and 7)	768,433
	<u>4,815,031</u>
Deductions:	
Expenditures for:	
Educational activities	2,040,840
Special purposes and objects for which the funds were established	
Payments to pensioners and beneficiaries	
General administrative expenses	889,233
Plant operating and maintenance expenses	1,617,847
Pension and other social benefit expenses (Note 8)	513,999
	<u>5,061,919</u>
Transfers between funds	<u>71,646</u>
Balance (deficit), June 30, 1969	<u>(\$ 244,000)</u>

OF CHANGES IN FUNDS

June 30, 1969

<u>Special Funds</u>	<u>Endowment Funds</u>	<u>Pension Fund</u>	<u>Frick Employees Retirement Fund</u>
<u>\$3,274,786</u>	<u>\$45,041,749</u>	<u>\$10,379,151</u>	<u>\$557,915</u>
1,020,695	1,440,222		
493,959			
96,818		490,466	28,992
	1,173,876	54,355	
		527,301	
<u>467,052</u>			
<u>2,078,524</u>	<u>2,614,098</u>	<u>1,072,122</u>	<u>28,992</u>
3,593,640			
89,381	5,000	519,040	25,800
		5,352	696
<u>56,221</u>			
<u>3,739,242</u>	<u>5,000</u>	<u>524,392</u>	<u>26,496</u>
<u>1,494,524</u>	<u>(1,566,170)</u>		
<u>\$3,108,592</u>	<u>\$46,084,677</u>	<u>\$10,926,881</u>	<u>\$560,411</u>

The accompanying notes are an integral part of these statements.

NOTES TO FINANCIAL STATEMENTS

1. The Museum maintains its accounts generally on an accrual basis; however, fixed assets (charged off at time of purchase), exhibits, collections, library, etc., are not reflected in the balance sheet. The land and buildings utilized by the Museum are principally owned by the City of New York.

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. Market valuations of investments are as follows:

Special funds	\$ 1,805,873
Endowment funds	53,786,494
Pension Fund	11,509,775
Frick Employees Retirement Fund	541,802
	<u>\$67,643,944</u>

3. The investment in bonds (\$570,000 principal amount) of The American Museum of Natural History Planetarium Authority is carried at cost. The financial statements of the Authority, which is operated under the supervision of the Museum's management, are annexed. Interest income of \$25,650 received during the year from the Planetarium is included in other income of the general fund.
4. The balance at June 30, 1969 of special funds (funds which are received or appropriated for specific purposes) is net of overdrafts of approximately \$240,000. These overdrafts represent expenditures in anticipation of gifts, grants, other income and transfers from other funds.
5. Endowment funds (including certain funds functioning as endowment) are summarized as follows:

	<u>Restricted Purposes</u>	<u>Unrestricted Purposes</u>	<u>Total</u>
Endowment funds, income available for	\$21,553,197	\$ 8,952,230	\$30,505,427
Funds functioning as endowment, principal and income available for	<u>2,791,696</u>	<u>12,787,554</u>	<u>15,579,250</u>
	<u>\$24,344,893</u>	<u>\$21,739,784</u>	<u>\$46,084,677</u>

6. The Museum owns an interest in certain mining properties (acquired by bequest) which is not reflected in the balance sheet. During the year, royalties received from this source were credited to the general fund (\$50,000, included in other income) and endowment funds (\$12,198, included in bequests).
7. Other income of the general fund includes net income of \$191,902 from magazine and book shop operations. Gross income from these operations amounted to \$1,953,770.
8. The pension plan of the Museum covers substantially all its employees. The Museum and each member contribute to the Pension Fund 6% and 5%, respectively, of the member's compensation as defined. Contributions by the Museum (including the Planetarium Authority) amounted to \$287,397 for the year.

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, 1969 and the related summary statements of changes in funds for the 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.

In our opinion, the accompanying balance sheet and related summary statements of changes in funds present fairly the financial position of The American Museum of Natural History at June 30, 1969, and the results of its operations for the year then ended, in conformity with the accounting principles referred to in Note 1 applied on a basis consistent with that of the preceding year.

Lybrand, Ross Bros. & Montgomery

New York, August 20, 1969.

**THE AMERICAN MUSEUM
PLANETARIUM
BALANCE SHEET,**

ASSETS:

Cash		\$148,416
Accounts receivable		2,744
Inventory, publications and souvenirs, at cost		24,684
 Equipment, fixtures, etc. (Note 1) :		
Zeiss planetarium instrument, at cost (Note 2)	\$135,059	
Less, Allowance for depreciation	64,153	
	<hr/>	70,906
 Furniture, fixtures and equipment, at cost, less allowance for depreciation, \$139,526	 1	 70,907
	<hr/>	
 Building, at cost (Note 1)		569,209
 Land (donated by the City of New York)		 —
		<hr/>
		\$815,960
		<hr/> <hr/>

OF NATURAL HISTORY
AUTHORITY

June 30, 1969

LIABILITIES:

Accounts payable	\$ 6,962	
4½ % Refunding Serial Revenue bonds, past due (Note 3)	570,000	
Accrued interest, past due	<u>315,450</u>	
	892,412	

FUND:

Trust Agreement	2,000
-----------------	-------

CONTRIBUTED CAPITAL AND DEFICIT:

Contributed capital:		
Charles Hayden	\$156,869	
Charles Hayden Foundation	<u>250,925</u>	
	407,794	
Deficit, as annexed	<u>486,246</u>	<u>78,452*</u>
		<u>\$815,960</u>

*Denotes deduction.
The accompanying notes are an integral part of these statements.

STATEMENT of INCOME, EXPENSES and DEFICIT
for the year ended June 30, 1969

Income:		
Admission fees, less allowances and commissions	\$464,760	
Auxiliary activity, sales booth	90,522	
Special lectures and courses	28,768	
Miscellaneous	<u>5,730</u>	\$589,780
Expenses:		
Preparation, presentation and promotional	234,263	
Operation and maintenance	165,416	
Special repairs and improvements	19,425	
Auxiliary activity, sales booth	73,657	
Administrative and general	21,329	
Pension fund, social security and other employee benefits (Note 4)	<u>36,409</u>	<u>550,499</u>
Income before interest and depreciation		39,281
Interest on past due 4½% Refunding Serial Revenue bonds	25,650	
Provision for depreciation (Note 1)	<u>6,753</u>	<u>32,403</u>
Net income for year		6,878
Deficit, July 1, 1968		493,124
Deficit, June 30, 1969		<u><u>\$486,246</u></u>

The accompanying notes are an integral part of these statements.

NOTES TO FINANCIAL STATEMENTS

1. The Authority's corporate charter terminates when all its liabilities, including its bonds, have been paid in full or otherwise discharged. At that time, its personal property passes to The American Museum of Natural History and 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. It is the policy of the Authority to capitalize only major additions and replacements of equipment, machinery and other plant items and to depreciate such items over their useful lives. Because of the nature of the ownership of the property, provision for depreciation of the building is considered unnecessary.
2. The Planetarium Authority has signed a contract for the purchase of a new Zeiss planetarium instrument to be installed in fiscal year 1970. The Charles Hayden Foundation has agreed to contribute a substantial portion of the purchase price, which amounts to \$144,980 after allowance for the presently installed instrument.
3. The Planetarium Authority bonds were purchased by The American Museum of Natural History in 1948. The Charles Hayden Foundation contributed \$200,000 to the Museum toward the purchase of such bonds.
4. Substantially all the Authority's employees are members of The American Museum of Natural History Pension Plan. Contributions to the plan by the Authority amounted to \$14,446 for the year.

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, 1969 and the related statement of income, expenses and deficit for the 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.

In our opinion, the accompanying balance sheet and related statement of income, expenses and deficit present fairly the financial position of The American Museum of Natural History Planetarium Authority at June 30, 1969 and the results of its operations for the year then ended, in conformity with the accounting principles referred to in Note 1 applied on a basis consistent with that of the preceding year.

Lybrand, Ross Bros. & Montgomery

New York, August 20, 1969.

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