

112th ANNUAL REPORT 1980 / 81 AMERICAN MUSEUM OF NATURAL HISTORY



COVER:

A photomicrograph from the Department of Mineral Sciences, shows the inside of a meteorite which landed in Serra de Magé, Brazil, in 1923. A thin slice of the meteorite was magnified 70 times to reveal its minerals and their textures. The meteorite came from a small planet which formed 4.5 billion years ago. Scientists studying meteorites and moon rocks have learned a great deal about the origin and history of the Earth. This kind of research is an on-going activity at the American Museum of Natural History, which this year opened the Arthur Ross Hall of Meteorites.

112th ANNUAL REPORT 1980/81
AMERICAN MUSEUM OF NATURAL HISTORY

| Page | Contents |
|------|--|
| 2 | Report of the President |
| 5 | Report of the Director |
| 8 | Anthropology |
| 11 | Astronomy & Planetarium |
| 14 | Entomology |
| 17 | Herpetology |
| 19 | Ichthyology |
| 21 | Invertebrates |
| 26 | Mammalogy |
| 29 | Mineral Sciences |
| 34 | Ornithology |
| 37 | Vertebrate Paleontology |
| | Field Stations |
| 42 | Archbold Biological Station |
| 44 | Great Gull Island |
| 44 | Southwestern Research Station |
| 47 | Education |
| 49 | Exhibition and Graphics |
| 50 | Library |
| 51 | Publications |
| 52 | Administration |
| 53 | Development and Communications |
| 56 | Treasurer's Report |
| | Financial Statements |
| 58 | of the Museum |
| 64 | of the Planetarium Authority |
| 68 | Officers, Trustees and Staff |
| 72 | Members Elected by the Board to Higher Categories |
| 73 | Contributors |

mu•se•um . . . an institution devoted to the procurement, care and display of objects of lasting interest or value [British *Museum*] [American *Museum of Natural History*] . . . *Webster's Third New International Dictionary*.

The American Museum of Natural History, given as an example of the use of the word, very aptly fits the Webster definition. There is even more in the connotation of the word *museum*, especially as it pertains to the American Museum. This Museum is a great center of basic research in the biological, mineralogical and anthropological sciences. The fruits of this research are shared with institutions and with scholars and scientists throughout the world, forming the basis of their investigations and inquiries. There is sharing, too, with the public at large through Museum exhibitions, educational programs and publications.

One measure of the Museum's educational scope and influence is attendance. Visitors come here to learn and to be intellectually stimulated and entertained. In fiscal 1980–1981, a total of 2,345,558 persons came to the American Museum and the Hayden Planetarium — 1,783,876 to the Museum itself and 561,682 (including 409,668 paid admissions) to the Planetarium.

Another mark of the Museum's outreach is the circulation of *Natural History* magazine. In 1980–1981, the total print run for each issue was 500,000, with 460,000 copies going to Associate Members of the Museum. An estimated 1,200,000 readers saw each issue.

One hundred and twelfth 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.

Despite the stresses of our times, the American Museum remains steadfast to its goals and its purposes. It is an institution that is vital to the society in which it functions.

For the past 112 years, enormous strides have been made at the Museum in exhibition, research and teaching. I feel fortunate to have witnessed some of these changes as the Museum continues to grow. During the past year scientists associated with the Museum have been in the forefront in discussions relating to evolution and how it has come about. Fascinating research projects have begun and a broad spectrum of special exhibitions have arrived, highlighting the many aspects of the world in which we live.

The October 17 opening of our largest permanent anthropological hall, the Gardner D. Stout Hall of Asian Peoples, was one such exhibition. The hall represents 14 years of planning and construction and occupies some 16,000 square feet of floor space. On display are more than 3000 objects and artifacts from the many diverse Asian cultures. Support of this magnificent hall was aided by a \$1 million grant from the Kingdom of Saudi Arabia. The new hall is also a lasting tribute to the dedication and leadership of President Emeritus Gardner D. Stout.

A special related exhibition, the "Traditions of Saudi Arabia," which included a Bedouin tent and its contents, helped to trace the history of this fascinating area from Hellenic times to the present.

With the opening of the Arthur Ross Hall of Meteorites on April 30, the Section of Meteorites, Minerals and Gems, which includes the Morgan Memorial Hall of Gems and the Harry Frank Guggenheim Hall of Minerals, is now complete, representing achievement of another major goal. Our 31-ton Ahnighito, or Cape York meteorite as it is also known, is the centerpiece of this new and inspiring hall. It is surrounded by examples of the five basic types of meteorites as well as by moon rocks on loan from NASA. The hall, which explores the history and evolution of our solar system, was made possible through the generous support and vision of Museum Trustee Arthur Ross.

A major symposium on meteorites was held in conjunction with the hall's opening. It attracted leading scientists from around the country. Topics of the day-long event included the origins of the solar system, the age of its planets and what can be learned from meteorites. The symposium attracted more than 1000 persons—scientists, journalists, the public at large.

It was during this fiscal year that our Department of

Mineral Sciences, with the help of Vice President and Trustee Plato Malozemoff, completed a five-year, \$500,000 program of reorganization, rejuvenation and expansion, and then embarked on a second phase. The first five-year project saw the Department totally revamped, both physically and in terms of its program and table of organization. In phase two, also aided by Trustee Malozemoff, a fund for economic mineralogy was established with strong support from mining industry sources. This will strengthen our Department's work in helping to identify this country's vital mineral resources, with special emphasis on national economic goals.

Diamonds have always exerted a certain fascination, and our "Story of Diamonds" exhibition was no exception. Displays ranged from the mining and cutting of diamonds to their history and romantic appeal. The beautiful Rainbow Collection, lent by Rainbow-Gems International, was a highlight that lived up to its name.

It has often been said that Man's greatest ambition has been to fly by his own power. Bryan Allen, pedaling the DuPont-sponsored Gossamer Albatross across the English Channel, came as close to fulfilling this dream as anyone ever has. This incredibly light craft was suspended from the ceiling of the Roosevelt Memorial Rotunda as part of a dramatic exhibition documenting the historic event.

Elizabethan England was recreated during the uncommon special exhibition, "Shakespeare: The Globe and the World," which was supported by grants from the National Endowment for the Humanities, Metropolitan Life Insurance Company, Exxon Corporation and the Corporation for Public Broadcasting. Organized by the Folger Shakespeare Library, the exhibition highlighted this remarkable period of history. The displayed material, most of which had never before been seen by the general public, included four of Shakespeare's First Folios, the personal Bible of Queen Elizabeth and school children's Horn Books. Live performances of excerpts from Shakespeare's plays, guided tours, lectures, music and dance demonstrations were offered in conjunction with the exhibition. They brought to life this fertile and exciting era.

The majesty and wonder of the geology of America's Southwest were vividly displayed in 160-degree panoramic murals during our exhibition, "Profiles of the Past: Geology of Three Southwest Canyons." The indigenous plant and animal life of the magnificent Bryce, Zion and Grand Canyons were also represented.

The Museum acquired one of the world's finest private cone shell collections from Thomas and Virginia Munyan. The 2200 specimens, representing 400 species, added materially to our strength in this field. A number of selected shells were displayed in a special exhibition—part of the series of Arthur Ross Exhibits of the Month.

The Museum is carrying forward the long-term task of reorganizing, refurbishing and restoring its vast



The United States Postal Service featured three masks from the American Museum of Natural History's Northwest Coast Indian collection in its American Folk Art Series of commemorative stamps. The photograph shows an official first day of issue envelope and a sheet of the stamps. The masks and the stamps became the subjects of a special Museum exhibition, "Masks by Mail," which was on view in the Roosevelt Rotunda. The masks from the Museum's collection were acquired in the 1880s from three tribes. The three American Museum masks are (counter clockwise from upper left) Heiltsuk Bella Bella tribe, Tingit tribe, and Bella Coola tribe. The fourth mask (upper right) is Chilkat Tingit tribe from the Smithsonian Institution.

anthropological holdings. While great strides have been made, the work is expected to continue for at least five more years, supported by the Margaret Mead Fund for the Advancement of Anthropology. Generous contributions to that fund continue to come in and now total more than \$3.5 million.

National recognition of the scope and beauty of our Anthropology Department's American Indian items came from the U.S. Postal Service, which chose to depict three of our Northwest Coast Indian masks in a series of colorfully striking postage stamps. The original masks and sheets of the stamps formed the basis of an exhibition in the Roosevelt Memorial Hall entitled, "Masks by Mail."

The Department of Anthropology brought to a close the field research phase of a long-term project in Peru. Huanuco Pampa, an Inca provincial capital, was excavated over a 10-year period. More than two million artifacts were unearthed and now the immense job of computer cataloging them has begun.

This Department also received a \$500,000 grant

from the Richard Lounsbery Foundation. Spread over a period of five years, the grant will help to support research projects in biological anthropology.

A major expansion of the motion picture showing capabilities of our main auditorium has gotten underway. The IMAX film projection system, when completed early in 1982, will greatly expand our film program. It will be the only such facility in the Tri-State area. With a projected image size more than eight times larger than our current system's, IMAX will virtually engulf viewers in a cinematic world.

In support of the Museum's wide-ranging and very active research efforts, the National Science Foundation made a \$100,000 grant to help purchase a new scanning electron microscope. This powerful, state-of-the-art instrument is greatly enhancing our interdisciplinary investigations at the very frontiers of science.

We have restructured our research mechanism in ethology to give new direction to zoological investigations and to create a greater synthesis between this work and the Museum's other studies in evolutionary

biology. The Animal Behavior Department was dissolved and its personnel, research projects, teaching program and exhibition responsibilities were allocated among other zoological departments. This step was implemented as recommended by a distinguished panel of behaviorists.

A generous fund has been established at the New York Community Trust by the Lila Acheson Wallace Fund. The income will be applied toward improving the appearance of our buildings and beautification of the parklands surrounding them.

One of the most pleasant aspects of this report is to note the remarkable progress made by our annual Corporate Campaign under the very able leadership of Trustee Donald C. Platten. Under his enthusiastic direction, the campaign produced contributions totaling more than \$800,000 in unrestricted funds from an expanding list of corporations, an increase of more than \$200,000 over 1979-1980. It is clear that there is an increasing recognition by the business community that support of this Museum is a sound investment in the future.

We were saddened by the deaths of our Honorary Trustees Charles DeWolf Gibson and Sylvan Coleman.

Mr. Gibson was first elected a Trustee in 1952. After his retirement from the Air Reduction Company, he devoted full time to the Museum as Vice President. Mr.

Coleman was elected a Trustee in 1970, after retiring as Chairman of the Board and Chief Executive Officer of E. F. Hutton and Company, Inc. His experience, knowledge and guidance helped to generate important support for the Museum.

It was with regret, too, that we accepted the resignation of Trustee Osborn Elliott from the Board.

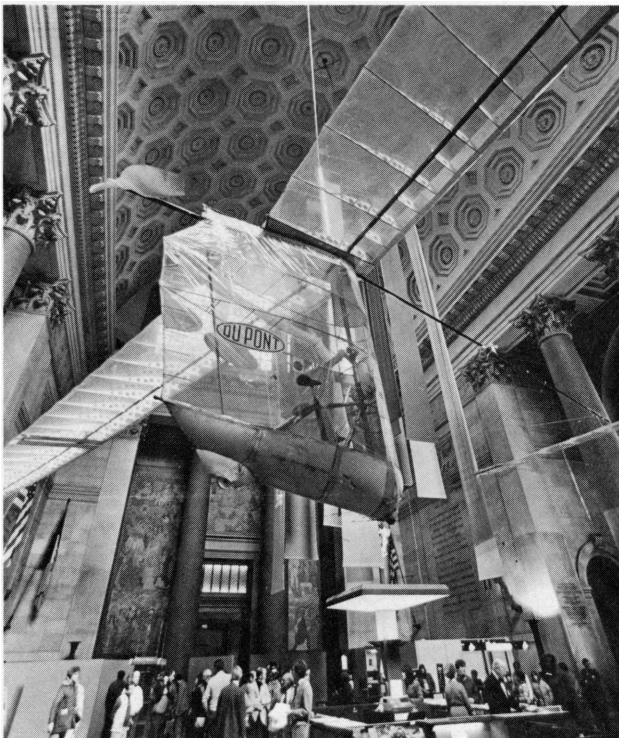
Mr. Elliott, who joined the Board in 1958, felt compelled to resign from this as well as other outside activities because of the demands of his new position as Dean of the Graduate School of Journalism at Columbia University.

The study of the diversity of life continues to be our mainspring. Adding to basic knowledge and the understanding of the world we live in promises to keep us more than busy for the foreseeable future. To my mind, the Museum is an institution close to the center of the scientific breakthroughs that will mark the decade of the '80s. For our friends and supporters there may be no endeavor more worthwhile.

Robert G. Goelet ✓

Robert G. Goelet,
President

A man-powered airplane, the Gossamer Albatross, was suspended from the ceiling of the Museum's spacious Roosevelt Rotunda. The plane made world news in 1979 when it was flown across the English Channel by bicycle racer Bryan Allen in the world's longest controlled, human-powered flight. The plane has a 96-foot wingspan and weighs 55 pounds. It fit easily into the Rotunda, which is 117 feet long and 96 feet high. The Gossamer Albatross, powered by foot pedals, in its historic flight across the English Channel.



Director's Message

One of the most compelling objectives in our exploration of space is the search for clues to the origin, nature and history of the universe we live in. Hand-in-hand with it is our search for evidence of life beyond the earth. We have spent billions of dollars and untold man-hours in the effort. There seems to be no more honorable and universally supported quest than the exploration of nature to uncover our roots and our place within the scheme of all matter and time. This drive on the part of humanity is not unique in our time, however. It pervades all of history, philosophic thought, scientific inquiry.

In this great and challenging human goal we share today the experiences of a remarkable age. Our generation has visited the moon, photographed the surfaces of planets, probed the universe in space and time almost to its forming. Could there ever be a period of human history more exciting, more challenging?

Yes, there could. Suppose that, in addition to the physical wonders we have seen, we found life in space as well. Not just simple, barely recognizable life, but myriads of forms, some identical to those we know on earth, some similar but tantalizingly different, and others bizarrely unique. Suppose we even found humans, like us in most ways, yet subtly different. Does anyone doubt that such discoveries would revolutionize our science and our philosophy?

Farfetched? Not at all. It *has* happened before, and not long ago. Only 150 years ago, on December 27, 1831, Charles Darwin, then only 22 years old, sailed forth as an unsalaried naturalist aboard H.M.S. Beagle on a round-the-world voyage of exploration and discovery that lasted five years. On the uncharted coasts and unmapped lands he visited Darwin encountered plants, animals and human societies that were unknown to the naturalists and scientists of his day. And this life exhibited just such puzzling similarities and differences, compared to the familiar life in the Old World.

Darwin's intense interest in finding a rational explanation for the distinct differences and variants he found among plants and animals that were otherwise quite similar led him many years later to propose a startling concept. He became convinced that living things in nature went through a process of natural selection whereby conditions in their environment led to new species and to the extinction of others.

The name of Darwin and the expression Darwinism have been inextricably linked with the theory of evolution ever since. Yet Darwin did not invent the concept of evolution among living things. The idea can be traced to antiquity, and it gained credence in the 17th and 18th centuries as observations of biological order in nature, the identification and interpretation of fossils, and the discoveries of new plants and animals on the continents and islands of the Americas and Pacifica shook the notion that the diverse life forms of the world

were permanent and unchanging. The concept arose early in the 19th century that life proceeded from simple to more complex forms but satisfactory evidence from nature to explain the mechanism for change was lacking.

Darwin found and recognized in nature the evidence for natural selection as an explanation for evolution. Generations of biologists after him produced so much additional evidence in support of evolution that it is regarded as the one great unifying concept in the life sciences. But time also challenged the "Darwinism" of the middle 19th century as new evidence arose concerning the process whereby nature selects, changes and eliminates. Darwin, for example, correctly saw the influence of inheritance in the evolutionary process, but, limited by the science of his time, he had no adequate theory of how heredity worked. It remained for biologists of the 20th century to find the mechanism in genetics, the science of hereditary change.

In recent years, we have seen revolutionary changes in our concepts of the earth, its origin, its evolution, its obvious features—concepts as startling as those that, some centuries ago, sent it spinning on an endless journey around the sun. Such ideas have helped us interpret the earth's past in new ways, and its present and future as well, based on the evidence recorded within its structure. Similarly, we have found new answers to the puzzling distributions of the earth's living forms; new ways to look for, understand, and organize the diverse characteristics we see in living things and their fossil ancestors; new questions concerning the pathways that nature has found in providing the diversity we see in life around us. It is in this quest that the research at the American Museum of Natural History plays a leading role.

Research here takes its stimulus from our collections. Gathered during the past 112 years from sources world-wide, their 34 million specimens in zoology, paleontology, mineral sciences and anthropology are the basis for what we study, exhibit and teach. While our Museum is literally crammed with fossils, animal specimens, minerals and rocks, and relics of human material culture, it is not a warehouse. It is more aptly analogous to a library of material things gathered, organized, arranged, recorded, preserved and used for the knowledge we can derive from them. The visible products of this knowledge are the Museum's famous exhibitions and popular education programs. The purpose of our research is to identify, describe and explain the diversity in the earth's structural materials, its life forms and the culture of human society. The raw materials from which we seek to derive this knowledge and understanding are our collections, supplemented by collections from other institutions, and by the laboratory of nature from which they come.

The overwhelming weight of evidence we find in these sources today (far more so than it was when Darwin presented his evidence from the Beagle voy-

age over a century ago) identifies a world of change in which new forms evolve to join and sometimes replace others. The process proceeds at a pace incredibly slow by the standards of our lifetimes, but the span of time in which this change takes place is so vast that it builds and wears away mountains and continents, produces and destroys suns, fills the earth with living creatures in millions of diverse forms. There is no other rational explanation for the universe we see around us than evolution.

This does not mean that we still perceive our world and the nature of the processes that shaped it in the same way that Darwin did. Evolutionary science today is in a state of ferment perhaps more profound than at any time in its history, and many of our curators are at the heart of the challenges and controversies that have arisen within it. Five major books presenting new and challenging evidence and ideas on evolutionary theory were published by our curators within the past two years, more than in the preceding twenty.

I am proud of the quality and independence of our science and our scientists, and of the standards of their scholarship. While they respect the relevance and traditions of the past in the sciences in which they work, they have not hesitated to break with them sharply, explore new and sometimes unpopular paths and speak out boldly and courageously on the issues and opportunities that must be part of every science if it is

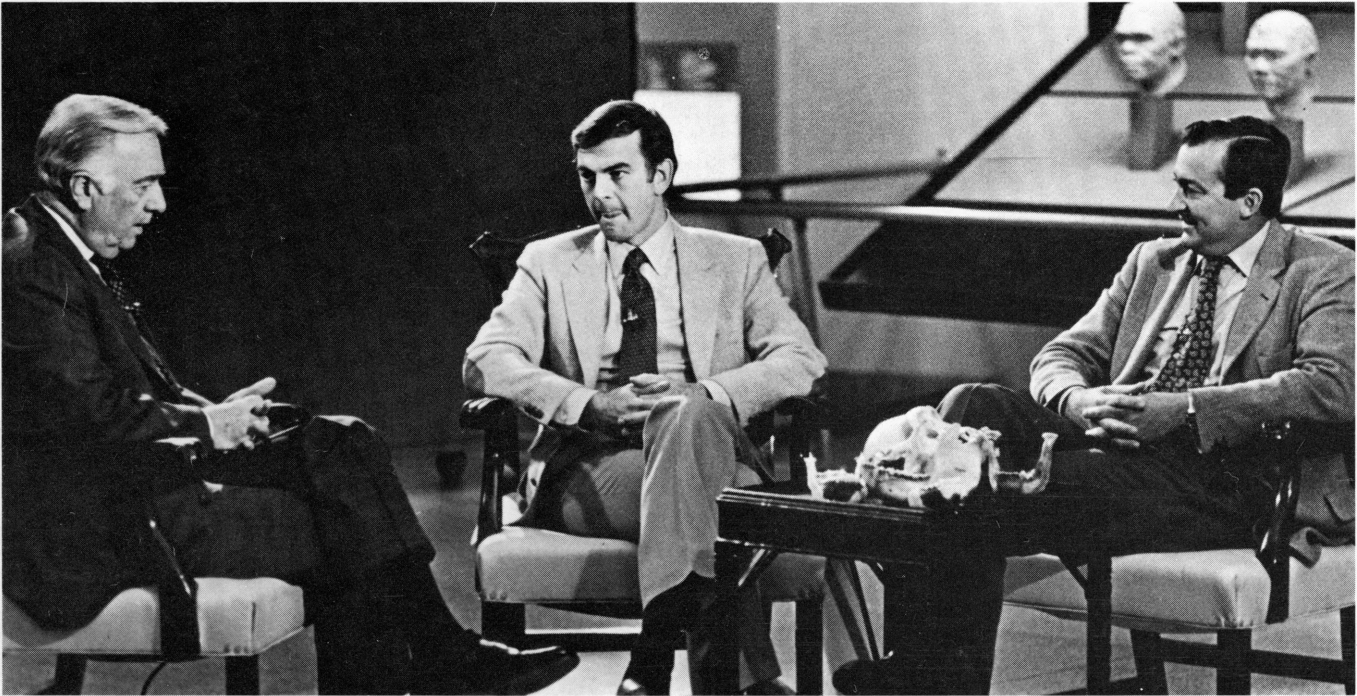
to progress.

We encourage our scientific staff to think and act imaginatively and independently in their work, to defend their scientific and scholarly views and their right to hold them with vigor, to identify and present the implications of their work for the broader scientific and social issues of our day. We want them to be leaders, when leadership opportunities and characteristics are called for. We want them to consider and interpret the consequences of their research and the research of their colleagues for society broadly. We evaluate them only by the quality and significance of their work.

The sciences we follow sometimes take us in directions that are not universally popular. Indeed, in some instances, we find ourselves deeply embroiled in controversy. Today, for example, we see arising again in the name of creationism a challenge to the scientific basis for explaining the diversity we find in living organisms. All of our training, our experience and our traditions tell us that careful observations of the natural world, intelligent organization of the information derived from such observations, and the development, criticism and continual testing of hypotheses to account for our observations lead us to a better albeit always imperfect knowledge and understanding of nature. This process, which we call science, has allowed us to find and describe relationships among the earth's living creatures, present and past, that

Celebrating the opening of the Arthur Ross Hall of Meteorites this April were, left to right, Martin Prinz, Chairman of the Department of Mineral Sciences; Museum President Robert G. Goelet; Arthur Ross, a Museum Trustee and benefactor of the new hall; Mrs. Goelet, and Thomas D. Nicholson, Museum Director. The group is in front of the 31-metric-ton Ahnighito meteorite—the largest meteorite ever to be retrieved from the earth. The opening of the hall came after two years of planning and construction.





With the Museum's Hall of the Biology of Man as the setting for a program in his CBS television series, "Universe," Walter Cronkite led two eminent anthropologists, Donald C. Johanson (center) and Richard E. Leakey, in a heated discussion of the origins of earliest man. The American Museum is a center of research and study of evolution. The Hall of the Biology of Man graphically traces human development.

account for the origin of their forms and characteristics in a process called evolution that has been taking place for billions of years. Science and the scientific method leave no alternative to this, even though they also recognize that we know and understand the process of evolution imperfectly. But that is true of everything in nature.

It is surprising and somewhat disappointing to see the issue of creationism rising again during the time of the sesquicentennial of Darwin's voyage. That event and the wealth of observation and evidence that Darwin brought back from it was the beginning of a great flowering in the biological sciences that has brought enormous benefit to mankind, both intellectually and physically. Perhaps its greatest lesson, however, was that our perception of nature ought to be based on our observations of nature, for any other alternative leaves us in ignorance. Galileo showed us that five centuries ago when he looked at the heavens through a telescope and saw that the earth moved. He was shocked when he found among his contemporaries many who preferred to remain in ignorance. They refused to look through his telescope, he tells us, because by looking they might see something that they couldn't believe!

We may think today that such an attitude is absurd, but yet we see around us in this remarkable age of enlightenment so many who still prefer ignorance to knowledge. How sad it is that with so much from which to see and learn many millions of our young people refuse to look, turning away from their educational

opportunities. How disappointing that so many adults, brought up in the excitement of the space age with its renewed emphasis on science education, know and understand so little about the goals and methods of science, scholarship and the unquenchable human drive for knowledge. How shocking and audacious it is, after all the evidence of the past century, to see the dogma of creationism surviving, demanding and in some instances, even winning equal billing with science.

At the American Museum of Natural History we cannot accept this silently. The Museum was called on before to speak out with conviction in support of evolutionary science, and we will take up the challenge to do so again. Creationism, we insist, has no place in scientific thought and theory; it isn't even a matter of equal time or equal billing with science. It belongs somewhere else, perhaps, depending on what you believe, but not in science. In a process that is compelled to seek and find both questions and answers from what is observed in the natural world, the only authority that science can accept is nature. History has shown us unfailingly that when science is challenged by any authority but the evidence from nature, science inevitably is the winner. And until science is perceived as winning, humanity is the loser.

Thomas D. Nicholson

Thomas D. Nicholson,
Director

Department of Anthropology

Fourteen years of work culminated in the opening of the Gardner D. Stout Hall of Asian Peoples, the largest permanent exhibition in the Museum. Yet, even as this hall opened, planning continued for such future installations as the Margaret Mead Hall of Pacific Peoples, the Hall of South American Peoples and the special exhibition "Star Gods of the Americas," a collaborative effort with the Museum of the American Indian. Research projects this year took staff to four continents for excavations and studies of village peoples.

The Department continued renovating its storage facilities. Collections are being inventoried, cleaned and prepared for removal to the new fourth floor storage area, which will include compact storage equipment.

The Departmental Loan Committee, under the leadership of Stanley A. Freed, Curator, continued to formulate guidelines governing the lending of specimens to other scientific and educational institutions. A new Accessions Committee, under the leadership of Enid Schildkrout, Associate Curator, was formed to fulfill a similar function for new acquisitions.

Lounsbery Program The Department also announced the formation of the Lounsbery Program in Biological Anthropology, whose overall objective will be to provide support for a wide variety of anthropological topics. The Lounsbery Laboratory of Biological Anthropology is currently being refurbished, and the Lounsbery program is funding fieldwork in the United States and the Sahara. A small grant program has also been established to assist scientists from other institutions in carrying out their field projects.

David Hurst Thomas, Chairman and Associate Curator, conducted three large-scale archeological field projects. During the summer of 1980, Dr. Thomas led a crew of 50 people on a two-month archeological dig to complete excavations at Hidden Cave, Nevada, where natural and cultural deposits span the last 25,000 years and contain a number of important perishable finds. Ancillary geological, paleontological and palynological studies were also completed at the Hidden Cave site in 1980. A regional random sample will be completed by an American Museum of Natural History crew in 1981.

Dr. Thomas also led two months of fieldwork on St. Catherines Island, Georgia. In addition to excavation of an Irene period burial mound, the field crew concentrated on locating the ruins of a sixteenth- and

seventeenth-century Spanish mission site, the oldest non-aboriginal settlement in Georgia. The site has now been located with certainty, and excavations will continue on both the Spanish and the aboriginal structures in the future. Two additional volumes in "The Anthropology of St. Catherines Island" series were also finished this year.

Desert Ecology The National Geographic Society has awarded Dr. Thomas a grant to initiate excavations on Mount Jefferson, Nevada, during the summer of 1981. The work is also supported by the Museum and the Desert Research Institute. This project, a spin-off of the long-term excavations at Gatecliff Shelter, will center around the excavation of a large village site at 12,000 feet. A Museum crew has begun excavations at Barker Creek Village, the highest archeological site ever excavated in North America. This research promises to fill a major gap in our knowledge of desert cultural ecology.

Robert L. Carneiro, Curator, continued to gather data for a manuscript, already in draft form, on the problems of game depletion and village movement in the Amazon Basin. Further research also was done into the role of Herbert Spencer in the early history of anthropology.

With his literary co-executor, Beth Dillingham, Dr. Carneiro continued to edit the essays of Leslie A. White for publication in a separate volume. Work was also done on the applicability of the mechanism of natural selection to the evolution of culture.

Urban Impact Stanley A. Freed, Curator, continued to collaborate with Ruth S. Freed, Research Associate and professor of Anthropology at Seton Hall University, in analyzing data collected in India in 1977-78 concerning changes in the life of Shanti Nagar, a village in northern India that they first studied in 1958-59. Both the earlier and later research were oriented toward the general problem of urban influences on traditional village life. Some areas of village life have undergone substantial change, while other aspects of the culture and society were much as they had been in 1958. Analysis of the changes, their causes and the sequence of adjustment throughout the culture and society that might be brought about by a specific innovation will be the focus of the Freed's continued research activity.

Dr. Schildkrout received a continuation grant for two years from the National Science Foundation to continue analysis of data on the economic roles of children in Nigeria. Dr. Schildkrout also began research on the history of some of the Museum's early collections of African ethnology. She has been invited to present this material at a conference in Venice in June, 1981. In addition, Dr. Schildkrout chaired a symposium on the economic roles of children in West Africa at the African Studies Meetings in Philadelphia in October,



The ruins of a lost Incan city, Huanuco Pampa, stand lifeless against a gray Peruvian sky. During Museum expeditions to the site, more than two million artifacts were uncovered. Craig Morris, Associate Curator in the Department of Anthropology, led the Museum's research there. The Department of Anthropology is currently processing and analyzing findings from the lost city.

1980, and is preparing an edited volume of these papers.

Crab-eating Primates Ian Tattersall, Associate Curator, completed fieldwork on the crab-eating macaques on the island of Mauritius. Blood profiles of these animals suggest that diabetes mellitus may occur at a relatively high frequency in this monkey population. He also resurveyed the brown lemur population of Mayotte, an island of the Comoro archipelago. Additionally, work was completed on a monographic treatment of the lemur fauna of Madagascar, which is now in press. Current research includes the analysis, in collaboration with Research Associate Jeffrey Schwartz, of the phylogenetic relationships of these primates.

Craig Morris, Associate Curator, spent most of the year in Peru directing a long-term archeological study of the Inca city Huanuco Pampa, which began in 1971. During the year, analysis was completed of the collection of more than one million sherds of pottery from previous excavations. In collaboration with Patrick Carmichael, Trent University, Dr. Morris located and surveyed 14 sites in the Huallaga Valley of Central Peru, which had been settled by Inca Colonists sent from Cuzco. He also surveyed parts of the pre-Inca Lupaca Kingdom near the Peru-Chile border in

collaboration with Heather Lichtman of the Massachusetts Institute of Technology.

Philip C. Gifford, Scientific Assistant, is completing the cataloging of the Drummond Collection, in addition to supervising the collections to be exhibited in the new Hall of Pacific Peoples.

Harry L. Shapiro, Curator Emeritus, is finishing his book on Ernest Hooton for Columbia University Press, which should be in press by next spring. He is also working on a project on the Biology of the American People. Discussions are also in progress for a special exhibition on "The World That Jesus Knew," using the archeology of that period.

Fossil Casts Priscilla Ward, Scientific Assistant, has been tending the physical anthropology collections, cataloging and preparing a card file on new cast materials of fossil hominids, and assisting visiting scholars studying the materials. She is also preparing a card file on the South American ethnology collections and handling occasional research for Dr. Tattersall.

Gordon F. Ekholm, Curator Emeritus, continued general curatorial supervision of the Mesoamerican collections on a part-time basis.

Junius B. Bird, Curator Emeritus, prepared a report during the year on the archeology of Elizabeth Island in the Strait of Magellan in southern Chile and is

preparing a report on the archeological material of the Madden reservoir.

In January, Dr. Bird and his assistant, Paloma Carcedo, went to Panama where they worked with Berta Brown of the Isthmian Anthropological Society on the extensive lithic collections there. At the invitation of the Banco de la Republica Dr. Bird also went to Guayaquil for the opening of a new archeological museum. During the year Dr. Bird visited Ecuador, Peru and Panama where he organized, photographed and cataloged the collection from the Madden reservoir.

New Storage Space Barbara Conklin, Coordinator of the Curatorial Service Program, reports that the construction of the new storage space is proceeding and new storage equipment is being selected. Since the completion of the Hall of Asian Peoples, the Curatorial Service Staff has restored specimens not used in the exhibit, and cleared the exhibition preparation space for curators' use in preparing two new permanent exhibitions: the Hall of Pacific Peoples and the Hall of Peoples of South America.

In conjunction with the Photo Collection Library, an inventory of photographs in the Department has been initiated. Curatorial Assistant Paul Beelitz accompanied and maintained condition reports on two special exhibitions—Gold of El Dorado and Peru's Golden Treasures. Curatorial Assistant Anibal Rodriguez supervised the expanding program to assist visiting scholars and students.

Scientific Publications:

Bird, Junius B. and Robert McK Bird

1980. Gallinago maize from the Chicama Valley, Peru. *Amer. Antiquity*, vol. 45, no. 2, pp. 325-332.

Carneiro, Robert L.

1980. Chimera of the upper Amazon. In Richard de Mille, ed., *The Don Juan papers; further Castaneda controversies*. Ross-Erikson Pubs., Santa Barbara, Calif. pp. 94-98.
1980. [Foreword to] An introduction to culturology, by Wen-Shan Huang, South Sky Book Co., Hong Kong, pp. viii-x.
1981. Leslie A. White. In Sydel Silverman, ed., *Totems and teachers: perspectives on the history of anthropology*. Columbia Univ. Press, New York, pp. 209-251, 293-297.

Conklin, Barbara

1980. New storage at the American Museum of Natural History: balancing continuity and change. *Curator*, vol. 21, no. 1, pp. 63-70.

Ekholm, Gordon F.

1980. Pre-Columbian Art. Annotated catalog of the pre-Columbian collections of the museum. Didrichsen Art Mus., Helsinki, Finland, pp. 96.

Notes:

1. In the bibliographies, the names and members of the staff and Fellows of the American Museum of Natural History appear in regular type.
2. In the bibliographies, an asterisk appears beside the names of graduate students whose work is being sponsored by members of the staff of the American Museum of Natural History.

Freed, Stanley A.

1980. The American Museum of Natural History, Department of Anthropology. *Amer. Indian Art Mag.*, Scottsdale, Arizona, vol. 5, no. 4, pp. 68-75.

Morris, Craig

1980. The Academic American Encyclopedia. *Arete Publ. Co.*, Princeton, vol. 10, pp. 69-73.
1980. Huanuco Pampa. Nuevas evidencias sobre el urbanismo Inca. *Rev. De Museo Nac.*, Lima, Peru, pp. 139-152.

Schildkrout, Enid

1980. Children's work reconsidered. *Internatl. Soc. Sci. Jour.*, vol. 32, no. 3, pp. 479-489 (English), 525-536 (Spanish), 512-524 (French).
1980. Young traders of northern Nigeria. *Nat. Hist. Mag.*, vol. 90, no. 6, pp. 44-53.
1980. Regression and progress in the study of race and ethnicity. *African Studies Assoc.*, vol. 6, pp. 213-223.

Tattersall, Ian

1980. Monkey. *Acad. Amer. Encyclo.*, vol. 13, pp. 532-535.
1980. Primate. *Acad. Amer. Encyclo.*, vol. 15, pp. 539-542.
1980. [Review of] Nursery care of nonhuman primates. *Amer. Scientist*, vol. 86, no. 3, p. 329.
1980. [Review of] A world like our own. *Nat. Hist. Mag.*, vol. 90, no. 3, pp. 92-95.
1981. Aspects of Neotropical bird speciation during the Cenozoic: Discussion. In Gareth Nelson and Donn E. Rosen, eds., *Vicariance biogeography: a critique*. Col. Univ. Press, New York, pp. 406-410.

Sussman, Robert W. and Ian Tattersall

1980. A preliminary study of crab-eating macaques (*Macaca fascicularis*) in Mauritius. *Bull. Mauritius Inst.*, vol. 9, no. 1, pp. 31-58.

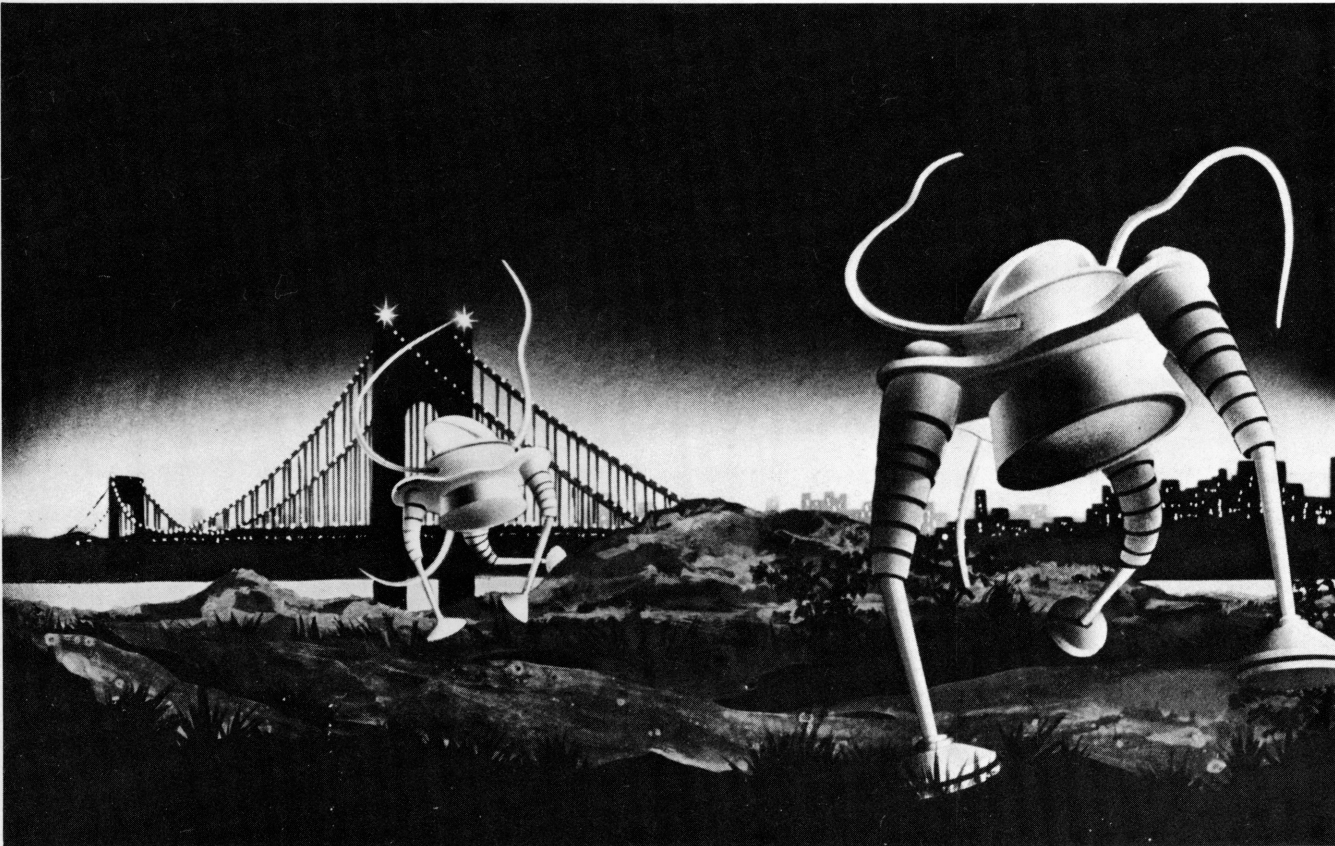
Thomas, David Hurst

1980. Margaret Mead as a museum anthropologist. *Amer. Anthropol.*, vol. 82, no. 2, pp. 354-361.
1980. The interdisciplinary approach in archaeology: a view from St. Catherines Island, Georgia. In *Excursions in southeastern geology: the archaeology-geology of the Georgia coast*, Guidebook 20. 1980 annual meeting of the Geological Society of America, Atlanta, pp. 135-142.
1980. The secrets of Hidden Cave. *Nevada Mag.*, vol. 40, no. 4, pp. 42-45, 50.
1980. [Review of] The past is human: ancient mysteries examined. *Amer. Anthropol.*, vol. 82, no. 4, pp. 877-878.
1980. [Review of] Saga America. *Jour. of Calif. and Great Basin Anthropol.*, vol. 2, no. 1, pp. 146-148.
1980. [Review of] Transformations: mathematical approaches to culture change. *Amer. Sci.*, vol. 68, no. 3, pp. 338-339.

Abstracts and Popular Publications:

Bird, Junius B.

1980. [Introduction to] Museums of the Andes: great museums of the world series. *Newsweek Book Service*, New York, pp. 1-5.



A Martian invasion, as envisioned by popular science fiction writer H. G. Wells in his novel, "The War of the Worlds," was amusingly reinterpreted for the American Museum-Hayden Planetarium Sky Show, "The End of the World." The show explored various scientific theories and man-made legends about how the world will end. This delightful graphic was created by Planetarium artist Helmut K. Wimmer. During the fiscal year, 561,682 people visited the Planetarium.

Astronomy and the American Museum—Hayden Planetarium

The Department of Astronomy of the Museum, the American Museum-Hayden Planetarium, continues to serve as an educational, entertainment and reference center for the general public and for researchers in astronomy and the space sciences. A continuing program of changing Sky Shows, courses, exhibitions, a reference library, special lectures and activities enable the Planetarium to fulfill this multiplicity of objectives.

Sky Shows The focal point of the Planetarium is its 663-seat Sky Theater where the Zeiss Mark VI Projector and almost 200 auxiliary special effects projectors are used to present Sky Shows that focus on a variety of astronomical topics.

During the past year, three different Sky Shows and the traditional Christmas program were presented to

a total of 413,863 people of which 59,164 were members of school groups attending the presentations with their classes. Featured from March to September, was "The Beginning," a program that considered several cosmological theories concerning the birth, evolution, and destiny of the universe. Shown September through November was "The End of the World," a popular Sky Show focusing on the possible natural and man-made catastrophes that could bring an end to the earth's existence.

The Christmas season brought back "Star of Wonder," which took audiences back 2000 years for a look at the sky over Bethlehem at the time of Jesus' birth. After a revival of "The End of the World," the spring season saw "The Drama of the Universe," a presentation of recent astronomical facts, theories and phenomena, such as the seasonal changes of the sky, auroras, comets and meteors. In addition to these pre-recorded Sky Shows, "Stars of the Season," a live program considering the seasonal stars and constellations and upcoming astronomical events was offered Wednesday evenings and Saturday mornings.

The Planetarium continued to present Laser Light concerts in its Sky Theater on Wednesday and week-



Working on the design of a teacher's guide to the American Museum-Hayden Planetarium are, left to right, Phil Harris, Student Intern in the Planetarium, Allen Seltzer, Acting Manager of the Planetarium, and Joseph Sedacca, Manager of the Graphics Office. The guide offers information to teachers about Planetarium sky shows, programs and exhibitions.

end evenings. Two different shows were offered, "Light Years" and "Laserock II." A total of 117,507 people attended Laserium performances— a 21 percent increase in attendance over the same period during fiscal 1979-1980.

School Groups Special shows for school groups were also presented. The regular pre-recorded Sky Show, as well as four different curriculum-oriented programs, were presented live and focused on a specific topic. In addition, several special lectures were given to advanced high school and college students in the Sky Theater. A schedule of school program offerings as well as other pertinent information regarding class visits to the Planetarium was provided in the "Teacher's Guide" prepared by Acting Manager Allen Seltzer, which was sent to all the New York City area schools at the beginning of the academic year.

Courses During the past year, 23 different evening and Saturday courses in the areas of astronomy, aviation, navigation, and astronomy for young people were offered. Also scheduled was a special 12-week

course called Cosmos, which was based on the television series written and hosted by Carl Sagan. Sixty-one students enrolled in the course, taught by Lloyd Motz of Columbia University, making it the most popular Planetarium course in 10 years. During the past academic year, a total of 815 students enrolled in Planetarium courses, a substantial increase over last year's enrollment of 737.

During the year, a concerted effort was made by David Roth, manager of the two sales shops, to stock a greater variety of merchandise, including items associated with popular media events. Net shop sales for the fiscal year rose 16.5 percent over the same period last year. Surpluses from the Planetarium Shops contribute to the operational funds.

Exhibition In addition to the routine maintenance of the two floors of astronomical exhibits and the Sky Theater, several major projects were undertaken. An important continuing project has been the renovation of the Planetarium's Sky Theater. During the past year, a completely new sound system was installed, greatly improving the sound quality of the Sky Shows. In addition, considerable time was spent on the alignment

and positioning of the horizon projectors, resulting in more precise panoramic projections. Several new projectors were designed and constructed for the Theater, including one equipped with an anamorphic lens and rotating aperture, which will provide the dramatic effect of rotating galaxies that appear almost three-dimensional.

A \$240,000 grant was awarded by the Charles Hayden Foundation to secure new, state-of-the-art automation controls for Sky Theater auxiliary projection equipment. This hardware, which will be installed over the next two years, will bring a new level of sophistication to programming. New projectors also were installed in the Guggenheim Space Theater, and the almost 2000 slides used in the Theater's program were cleaned and remounted.

The Perkin Library The Richard S. Perkin Library continues to grow as a valuable research facility that serves the Planetarium and Museum staff as well as the general public. The library currently subscribes to 82 periodicals and has nearly 12,000 volumes. In addition, it maintains a photographic collection, which contains some 1500 prints and a 16mm film collection.

Special Events A Voyager retrospective with Robert Jastrow, of the Goddard Institute for Space Studies, and Kenneth L. Franklin, Planetarium Astronomer; special tours for the New York Chapter of the National Academy of Television Arts and Sciences, *Omni* Magazine account executives, and 30 United Nations diplomats; and the annual meeting of the International Council of the Museum of Modern Art were among the special events held during the year. The Planetarium's Public Affairs officer played a leading role in their organization.

Staff Activities Mark Chartrand III was Chairman and Associate Astronomer until October, 1980, when he resigned to become executive director of the National Space Institute, a space advocacy organization. Dr. Chartrand served as Chairman since March, 1973.

Mr. Seltzer, formerly Education Coordinator, was named Acting Manager in October. He also coordinated flying safety seminars held in the Sky Theater with the Federal Aviation Administration.

Dr. Franklin, Astronomer, continued his responsibilities in the presentation of Sky Shows, coordinating the exhibition program, and overseeing the Guggenheim Space Theater. His Sky Show script, "Night of the Hunter," was in production and was scheduled to be presented in the fall and winter of 1981.

Thomas A. Lesser, Senior Lecturer, wrote the Sky Show script, "The Drama of the Universe," producing that program and "Star of Wonder." He developed a treatment for a special Albert Einstein presentation to be given during the spring and summer of 1982.

Clarence A. Brown, Assistant Producer, co-authored the script, "The End of the World," and produced both the audio track and the visuals for the Sky Shows.

Helmut K. Wimmer, the Planetarium's Art Supervisor, updated and repaired exhibitions, coordinated the layouts of the Planetarium's art wall, and contributed a painting of the solar system to the new Arthur Ross Hall of Meteorites. Mr. Wimmer also designed the stamp that will commemorate the Planetarium's 50th anniversary in 1985.

Philip S. Harrington completed his second year as Planetarium Intern, co-authoring the Sky Show script, "The End of the World," with Mr. Brown. The internship program, which began in 1968, is supported in part by a grant from the New York State Council on the Arts.

Abstracts and Popular Publications:

Branley, Franklyn M.

1981. The Planets in Our Solar System. Thomas Y. Crowell Co., New York, 34 pp.

1981. [Review of] America Journeys into Space: the Astronauts of the U.S., by Anthony J. Cipriano. *In* The Science Teacher, vol. 48, no. 3, p. 52.

Chartrand, Mark R., III.

1980. Solar Max, *Omni*, vol. 2, July, p. 123.

1980. Star's End, *Omni*, vol. 2, August, p. 123.

1980. Names, *Omni*, vol. 3, November, p. 141.

1980. Testing Their Metal, *Omni*, vol. 3, December, p. 148.

1981. Happy New Year. *In* The Westchester Engineer, vol. 45, January, pp. 3, 6-7.

1981. Is Space Exploration Out of Sight? *In* The Washington Post, February 12, p. 18.

1981. East-West Satellite Upmanship, *In* The New York Times, May 21.

1981. Testimony Before the Subcommittee on Space Science and Applications, Committee on Science and Technology, U.S. House of Representatives, March 4.

Franklin, Kenneth L.

1981. Astronomy and Calendar. *In* World Almanac. Newspaper Enterprise Association, pp. 755-791.

1981. Supernova to Star. *In* Fire of Life: The Smithsonian Book of the Sun, Smithsonian Exposition Books, Washington, D.C., pp. 64-71.

1980/81. Rising and Setting Times of the Sun, Moon and Planets. The New York Times, daily.

Lesser, Thomas A.

1980. Star Gazing. *Diversion*, November, pp. 222-229.

1980. Starry, Starry Night. *Sojourn*, Fall, pp. 26-27.

Seltzer, Allen

1980/81. Sunrise and Sunset Times. *Newsday*, daily.

Department of Entomology

From Indomalaya to the western United States, the members of the Department search for, describe, study and observe the world's insects and spiders. While some researchers are classifying newly found specimens, others are studying behavior, such as the massing of army ants. With a collection of nearly 16 million insects and spiders, the overriding tasks of curating are crucial for maintaining accessibility and organization.

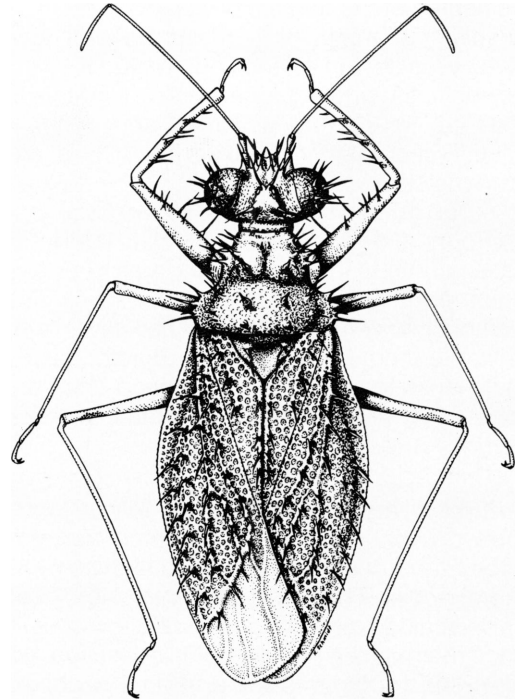
The Department began the year with a three-year National Science Foundation operations support grant and the appointment as Chairman of Randall T. Schuh, succeeding Lee H. Herman, who had served in that capacity for the past seven years. The NSF grant provided \$103,945 in the first year to improve the organization and accessibility of the 16 million-specimen insect and spider collections. To that end, 49 insect storage cases and 10 alcohol-preserved-specimen storage cases were purchased, along with drawers and unit trays to fill them. NSF funds also paid for visits totaling 14 weeks by six specialists who sorted to the generic level collections of ground beetles, moths, stink bugs, parasitic flies and harvestmen.

Randall T. Schuh, Associate Curator and Chairman, collected extensively in the western United States, searching for members of the plant bug family Miridae. He devoted particular attention to documenting the host associations of members of the subfamily Phylinae, which feed principally on woody plants. In June, 1980, he was aided by Scientific Assistant Kathleen Schmidt during a 10-day stay at the Museum's Southwestern Research Station in Portal, Arizona, and in July, he collected in California, Nevada, Utah, and southwestern Arizona.

Dr. Schuh continued his research on the phylinae plant bugs of Indomalaya and the western Pacific, a long-term project that is nearly finished. He also completed, in cooperation with Brenda Massie, a "Bibliography of Miridae (Hemiptera) 1956-1980," an annotated computerized listing of some 1200 entries.

Taxonomical Treatment Lee H. Herman, Curator, has been completing the third part of a monograph of *Bledius*. In this part, Dr. Herman treats taxonomically the 40 species of the *annularis* and *emarginatus* groups occurring in the United States and Canada. Sixteen species are newly placed as synonyms, and a key, illustrations, descriptions and discussions are finished. Ten of the named species of the *annularis* group are placed in an unresolved complex of species.

Although Dr. Herman was able to recognize as many



The higher classification of true bugs is a research interest of Randall T. Schuh, Associate Curator and Chairman of the Department of Entomology. This three-millimeter Leptopodid bug, Patapius spinosus, is the Mediterranean species of a world-wide group. Of the 16 million specimens in the Department of Entomology, about 500,000 are true bugs. This particular drawing took Scientific Assistant Kathy Schmidt six hours with microscope, specimen and pen. In working with small and imperfect species, scientists often find drawings more effective than photographs in clarifying the differences among species.

as 15 or 20 species in the complex, he has not yet found objective, communicable characters that would enable other researchers to identify them correctly and thus set this group aside for future study. Completion of Part III of the monograph is expected upon Dr. Herman's return from a field trip to the western United States, during which he hopes to find additional specimens of several rarely collected species, to test his interpretations of several variable species and several similar-appearing species, and to add new distributional and habitat data.

Dr. Herman also began dissections for taxa to be included in Part IV of his monograph of *Bledius*. In this work, he plans to propose a phylogeny of the species groups and, where possible, of the species within certain groups, to discuss the distribution of the groups, and to present information on the biology of the genus.

Moth Families Frederick H. Rindge, Curator, continued his long-range systematic studies of the moths of the family Geometridae, with particular emphasis on the very large subfamily Ennominae. He is now working on a generic revision of the New World Nacophorini. Until now, this tribe has been

defined almost exclusively on the North American representatives; no one has heretofore attempted to place all the appropriate Neotropical and Chilean groups in it.

At present, it appears that the tribe can be divided into two sections. One of these is basically northern in distribution, although three of the 11 included genera occur in Central and South America. The second section, purely Neotropical and Chilean in distribution, is proving a difficult group with which to work because of a complete lack of any published revisionary studies except those by Dr. Rindge.

Reclassification Curator Pedro Wygodzinsky's work centered in part on the Enicocephalidae, a group of Hemiptera considered by some as the sister group of all remaining Heteroptera. Until a few years ago, the higher classification of the enicocephalids was thought to be reasonably well understood, with two accepted subfamilies: the Aenictopecheinae and the Enicocephalinae, the former with well-developed genitalia and the latter with genitalia highly reduced. Species recently collected in Singapore have genitalia which are, however, completely unlike those of any known Aenictopecheinae and make it necessary to reconsider the higher classification of the group.

Another project concerned with the Enicocephalidae is a revision of the group for the Western Hemisphere. With the participation of Scientific Assistant Kathleen Schmidt, the genera *Enicocephalus* and *Neocylocotis* (a new genus) were redescribed or described, formerly prepared keys were tested and improved, and drawings were added as necessary. Dr. Wygodzinsky and Ms. Schmidt also published a paper on the Microcoryphia (machilids, rock jumpers) of the northeastern United States.

With Dr. Herman Lent of Rio de Janeiro, Dr. Wygodzinsky has co-authored a work in which three new genera of reduviids were described. One of the new genera, *Namapa*, is from Panama; the other two, *Nanokerala* and *Hadrokerala*, are from southern India. Combined, the latter two sister groups seem most closely related to the Panamanian genus.

New Subgenus Dr. Wygodzinsky also continued his work on the family Simuliidae (black flies) with Research Associate Sixto Coscarón of La Plata, Argentina, revising the subgenera *Simulium* (*Psa-roniocompsa*) and *Simulium* (*Inaequalium*) a new subgenus whose range includes much of the tropical areas of Central and Western South America.

A shorter paper on a group of high-altitude black flies of the subgenus *Simulium* (*Ectemnaspis*) is also nearly finished. The species from Colombia are of special interest because of the unique structure of the pupal gills, a condition not found in any other species of the subgenus.

Revisionary work was also continued on *Gigan-*

today, the dominant black fly genus of the high mountains from Tierra del Fuego to Mexico. The revision of approximately 70 species now contains more than 2000 individual drawings, gathered in about 160 plates.

Dr. Wygodzinsky and Scientific Assistant Sarfraz Lodhi continued their long-term project on the trichobothria of the second antennal segment in the Reduviidae. All species examined possess trichobothria, but the number and arrangement varies considerably in different taxa.

Spider Biogeography Norman I. Platnick, Associate Curator, continued his research in systematics and biogeography. His taxonomic work, conducted with the artistic assistance of Mohammad Umar Shadab, Scientific Assistant, concentrated on the spider family Gnaphosidae and includes revisions of the North American representatives of two genera, *Sergiolus* (with 18 species, completed) and *Drassyllus* (with about 60 species, almost completed); description of a new genus that contains four species found from southern Texas south to Panama and in Jamaica; supplements to previous revisions of *Eilica*, *Lygromma* and *Zimmiromus*; a survey of the species found in the Seychelle Islands; and identification of a peculiar species found in Jamaica. The last species turned out to be an introduced one (being native to the Pacific Islands from Java and the Philippines east to New Caledonia) previously described in two different genera to which it does not belong and actually a member of *Odontodrassus*, a genus previously known only from tropical West Africa but now shown to occur in such far-flung locales as South Africa, Israel, and Nepal as well.

Dr. Platnick's biogeographic work included a review of the history, methods and prospects of spider biogeography and a study of the effect of widespread taxa in analyses of distribution. He and Gareth Nelson, Department of Ichthyology, saw their book on systematic and biogeographic theory through press. Dr. Platnick also edited a collection of papers on arachnid systematics in honor of the 75th birthday of Willis J. Gertsch, Curator Emeritus, which will appear in the Museum's Bulletin series. Dr. Gertsch continued working actively, concentrating on his studies of the venomous brown recluse spiders.

Ant and Roach Behavior Drs. Betty Faber and Howard Topoff joined the Department of Entomology as Research Associates upon the dissolution of the Department of Animal Behavior. Dr. Faber will continue her research on the behavior of the American roach in particular, and other roaches in general. Dr. Topoff, in cooperation with his students from Hunter College of the City University of New York, will pursue his studies of ant behavior in the Museum and at the Museum's Southwestern Research Station in Portal, Arizona.

Alice Gray retired after 38 years as a Scientific Assistant in the Department. She now holds the title of Scientific Assistant Emerita and continues at an undiminished pace her work with educational programs in entomology, answering inquiries from the public, and with origami. Mr. Louis Sorkin, who had worked on the spider collection for over two years as a Curatorial Assistant paid with NSF funds, was appointed to the position of Scientific Assistant; he will continue under NSF support, identifying the North American spider collection to the generic level.

Scientific Publications:

Gertsch, Willis J. and Norman I. Platnick

1980. A revision of the American spiders of the family Atypidae (Araneae, Mygalomorphae). Amer. Mus. Novitates, no. 2704, pp. 1-39, figs. 1-60.

Harrington, B. Jane

1980. A generic level revision and cladistic analysis of the Myodochini of the World (Hemiptera, Lygaeidae, Rhyparochrominae). Bull. Amer. Mus. Nat. Hist., vol. 167, pp. 45-116, figs. 1-103.

Herman, Lee H.

1981. Revision of the subtribe Dolicaonina of the New World with discussion of phylogeny and the Old World genera (Staphylinidae, Paederinae). Bull. Amer. Mus. Nat. Hist., vol. 167, pp. 327-520, figs. 1-689, tables 1, 2.

Mirenda, J., D. Eakins, K. Gravelle, and H. Topoff

1980. Predatory behavior and prey selection by army ants in a desert-grassland habitat. Behav. Ecol. Sociobiol., vol. 7, pp. 119-127.

Mirenda, J. and H. Topoff

1980. Nomadic behavior by army ants in a desert-grassland habitat. Behav. Ecol. Sociobiol., vol. 7, pp. 129-135.

Nelson, Gareth and Norman I. Platnick

1981. Systematics and biogeography: Cladistics and vicariance. Columbia University Press, New York, 567 pp.

Platnick, Norman I.

1980. On the phylogeny of Ricinulei. Verhandl. 8. Internationaler Arachnologen-Kongress, Wien, 1980, pp. 349-353.

1980. [Review of] Biogeography, by E. C. Pielou. Syst. Zool., vol. 29, pp. 228-230.

1981. The progression rule or progress beyond rules in biogeography. In Nelson, Gareth and Donn E. Rosen, eds., Vicariance biogeography: a critique. Columbia University Press, New York, pp. 144-150.

1981. A review of the spider subfamily Palpimaninae (Araneae, Palpimanidae), I. Bull. British Arachnol. Soc., vol. 5, pp. 169-173, figs. 1-18.

Platnick, Norman I. and G. Nelson

1981. [Review of] Phylogenetic systematics, by Willi Hennig. Philos. Sci., vol. 47, pp. 499-502.

Platnick, Norman I. and M. U. Shadab

1980. A revision of the spider genus *Cesonia* (Araneae, Gnaphosidae). Bull. Amer. Mus. Nat. Hist., vol. 165, pp. 335-385, figs. 1-145, maps 1-6.

1981. On Central American *Cryptocellus* (Arachnida, Ricinulei). Amer. Mus. Novitates, no. 2711, pp. 1-13, figs. 1-21.

Raven, Robert J. and Norman I. Platnick

1981. A revision of the American spiders of the family Microstigmatidae (Araneae, Mygalomorphae). Amer. Mus. Novitates, no. 2707, pp. 1-20, figs. 1-54.

Rindge, Frederick

1981. A revision of the moth genera *Meris* and *Nemeris* (Lepidoptera, Geometridae). Amer. Mus. Novitates, no. 2710, pp. 1-28, figs. 1-43, maps 1-4.

In press. Recent additions to the collection of the American Museum of Natural History. Jour. Lepidopterists' Soc., vol. 35.

Rozen, Jerome G., Jr., and Ned Robert Jacobson

1980. Biology and immature stages of *Macropis nuda*, including comparisons to related bees (Apoidea, Melittidae). Amer. Mus. Novitates, no. 2702, pp. 1-11, figs. 1-12.

Schuh, Randall T.

1981. Willi Hennig Society: Report of First Annual Meeting. Syst. Zool., vol. 30, no. 1, pp. 76-81

1981. Discussion of Land-snail biogeography: A true snail's pace of change. In Nelson, Gareth and Don E. Rosen, eds., Vicariance biogeography: a critique. Columbia University Press, New York, pp. 231-234.

Schuh, Randall T., and J. D. Lattin

1980. *Myrmecophyes oregonensis*, a new species of Halticini (Hemiptera, Miridae) from the western United States. Amer. Mus. Novitates no. 2697, pp. 1-11, figs. 1-19.

Schuh, Randall T., and J. T. Polhemus

1980. Analysis of taxonomic congruence among morphological, ecological, and biogeographic data sets for the Leptopodomorpha (Hemiptera). Syst. Zool., vol. 29, no. 1, pp. 1-26, figs. 1-26, tables 1-4.

1980. *Saldolepta kistnerorum*, a new genus and new species from Ecuador (Hemiptera, Leptopodomorpha), the sister group of *Leptosalda chiapensis*. Amer. Mus. Novitates, no. 2698 pp. 1-5, figs. 1-7.

Shear, William A.

1980. A review of the Cyphophthalmi of the United States and Mexico, with a proposed reclassification of the suborder (Arachnida, Opiliones). Amer. Mus. Novitates, no. 2705, pp. 1-34, figs. 1-33, tables 1-4, 1 map.

Topoff, H., J. Mirenda, R. Droual, and S. Herrick.

1980. Behavioral ecology of mass recruitment in the army ant *Neivamyrmex nigrescens*. Anim. Behav., vol. 28, pp. 779-789.

1980. Onset of the nomadic phase in the army ant *Neivamyrmex nigrescens*: distinguishing between callow and larval excitation by brood substitution. Insects Sociaux, vol. 27, pp. 175-179.

Topoff, H. and J. Mirenda

1980. Army ants do not eat and run: influence of food supply on emigration behavior in *Neivamyrmex nigrescens*. Anim. Behav., vol. 28, pp. 1040-1045.

1980. Army ants on the move: influence of food supply on frequency of emigrations. Science, vol. 207, pp. 1099-1100.

Vaurie, Patricia

1980. Revision of *Rhodobaenus*. Part 1: Species in South America (Coleoptera, Curculionidae, Rhyncophorinae). Bull. Amer. Mus. Nat. Hist., vol. 167, pp. 1-44, figs. 1-44, tables 1-4.

Wygodzinsky, Pedro and H. Lent

1980. Description of one new monotypic genus of Reduviinae from Panamá and two from southern India (Hemiptera, Reduviidae). Rev. Brasileira Biol., vol. 40, pp. 733-742, figs. 1-5.

Wygodzinsky, Pedro and K. Schmidt

1980. Survey of the Microcoryphia (Insecta) of the northeastern United States and adjacent provinces of Canada. Amer. Mus. Novitates, no. 2701, pp. 1-17, figs. 1-18.

Department of Herpetology

The Department's collection of preserved amphibians and reptiles has worldwide representation and consequently serves an international community of scholars. Rather like a lending research library, specimens are acquired, carded and, often, sent out on loan. During the past year, specimens were accessioned from 21 countries on five continents. Specimens were lent on request to investigators in the United States and at 13 foreign institutions, from Brazil to the U.S.S.R. Meanwhile, Museum scientists continue to advance knowledge in their own areas of expertise.

The resources of the Department continued to be heavily utilized, with 78 professional visitors and with 3040 specimens being lent to or returned by some 100 researchers at other institutions. The valuable specimen catalogs, used for preparing loan invoices and for data confirmation, have become too old and badly worn to withstand further daily use. Therefore, the catalogs were put on microfilm, from which hardbound reprints were generated by a special printing process.

The Department was awarded a three-year curatorial support grant of \$224,622 from the National Science Foundation, in recognition that the herpetological collections constitute a national scientific resource. This renewed support continues the salaries of two curatorial assistants, who help maintain the collection and increase the speed and amount of service to the scientific community. The grant includes renovation funds to permit expansion into adjacent quarters, which will provide the department with its first new permanent space in 25 years.

A grant also was received from the Merck Sharp & Dohme Research Laboratories, to fund field work being planned for additional studies of poison-dart frogs in Panama.

Amazonian Studies Charles W. Myers, Chairman and Curator, investigated species limits in a complex assemblage of poisonous frogs from the upper Amazon and completed a manuscript on the subject. Field work previously conducted by Dr. Myers in Amazonian Peru and Colombia contributed to these studies, which nonetheless depended largely on an unsurpassed collection made in the 1920's by former

Throughout the 1920s, former Herpetology Research Associate Harvey Bassler (back row, wearing tie) searched the western Amazon Basin for petroleum and also for biological specimens which he later donated to the Museum. He is pictured here with his field crew in 1921. Exxon Corporation recently retrieved from storage his 50-year-old expeditionary notes and maps which are useful for certain work with the specimens. The Bassler Collection and other South American specimens form a significant part of the Department's more than 232,000 amphibian and reptile specimens.



Research Associate Harvey Bassler (1883-1950). Dr. Bassler explored the western Amazon Basin from 1921 to 1931 as a petroleum geologist, and he collected herpetological and anthropological materials that he later donated to the Museum. Scholars have been hampered in using these materials by the lack of Dr. Bassler's original notes. However, his expeditionary reports and original route maps of a half-century ago were retrieved from storage and made available for study by the Exxon Corporation, through the courtesy of Kenneth P. Pipes, Manager of the Exploration Division, Producing Department. Dr. Myers worked in the Exxon Offices from January to March, compiling Bassler's itineraries and extracting geographical data pertinent to the natural history collections.

Australian Frogs Curator Richard G. Zweifel was honored with a six-month appointment as Visiting Curator at the Australian Museum in Sydney, which allowed him to spend October through March studying frogs in Australian museums and in the field. Dr. Zweifel's particular interest was in microhylid frogs, tiny animals that inhabit the tropical rain forests of Queensland and are best sought when the males give their mating calls during the heavy rains of the monsoon season.

Field work made it possible to record the calls of the frogs for later electronic analysis, which aided in the detection of several undescribed species. Some of these species are so similar in morphology that, without knowing how the males sounded, one could not be sure that they indeed were different species. Integrated studies of vocalizations, morphology, habitat and distribution will now be possible, owing to the mass of data accumulated on what was previously a poorly known group.

Lizard Genetics and Behavior Curator Charles J. Cole continued his investigations of reproduction and inheritance of all-female species of lizards (*Cnemidophorus* and *Gymnophthalmus*). With funding from the National Geographic Society, specimens of *Gymnophthalmus underwoodi* were collected in Surinam for comparisons of morphology, reproduction, and chromosomes with specimens collected previously in Trinidad. In the laboratory, a specimen of the Trinidad stock produced healthy offspring, although this single parent had been kept in complete isolation since the time of its own hatching.

Preliminary data from collaborative studies with Research Associate Herbert C. Dessauer in biochemical genetics based on protein electrophoresis indicate that reproduction in all-female populations of *Gymnophthalmus* is clonal, as in the unisexual species of *Cnemidophorus* from the American Southwest.

Research Associate Carol A. Simon is continuing her comparative studies on lizard chemoreception and on the effect of habitat structure on the territory size

of an iguanid lizard.

St. Catherines Island Drs. Cole and Zweifel worked on St. Catherines and Sapelo islands, Georgia, in May, 1981, to close out field projects started in 1974. They have been engaged in a general ecological and biogeographical survey of the amphibians and reptiles of St. Catherines and in a more specific study of ecological relationships between two morphologically similar species of lizards, both skinks of the genus *Eumeces*, that coexist on the island.

In seven years, nearly 500 lizards were marked for individual recognition, and recaptures in later years provided abundant data on growth, movements and survival. In the larger picture, differences among the faunas of St. Catherines and the other barrier islands, and differences between the fauna of any one island and that of the adjacent mainland, have posed challenging problems in ecology and biogeography. This work has been supported by the Edward John Noble Foundation.

Snake Studies All three curators conducted original studies on some aspect of snake systematics. Dr. Myers coauthored the description of a new genus and species of snake from Mexico and also completed a paper on the bluntheaded vine snakes of Panama, including revisionary notes on the genus *Imantodes* and a description of an unusual new species that he had collected in isolated cloud forest near the Colombian border.

Dr. Cole completed and sent to press a 178-page collaborative revision of a section of the genus *Tantilla* from the southwestern United States and Mexico. Some of the snakes included in this revision are "sibling species," look-alikes that have not been properly differentiated by previous workers.

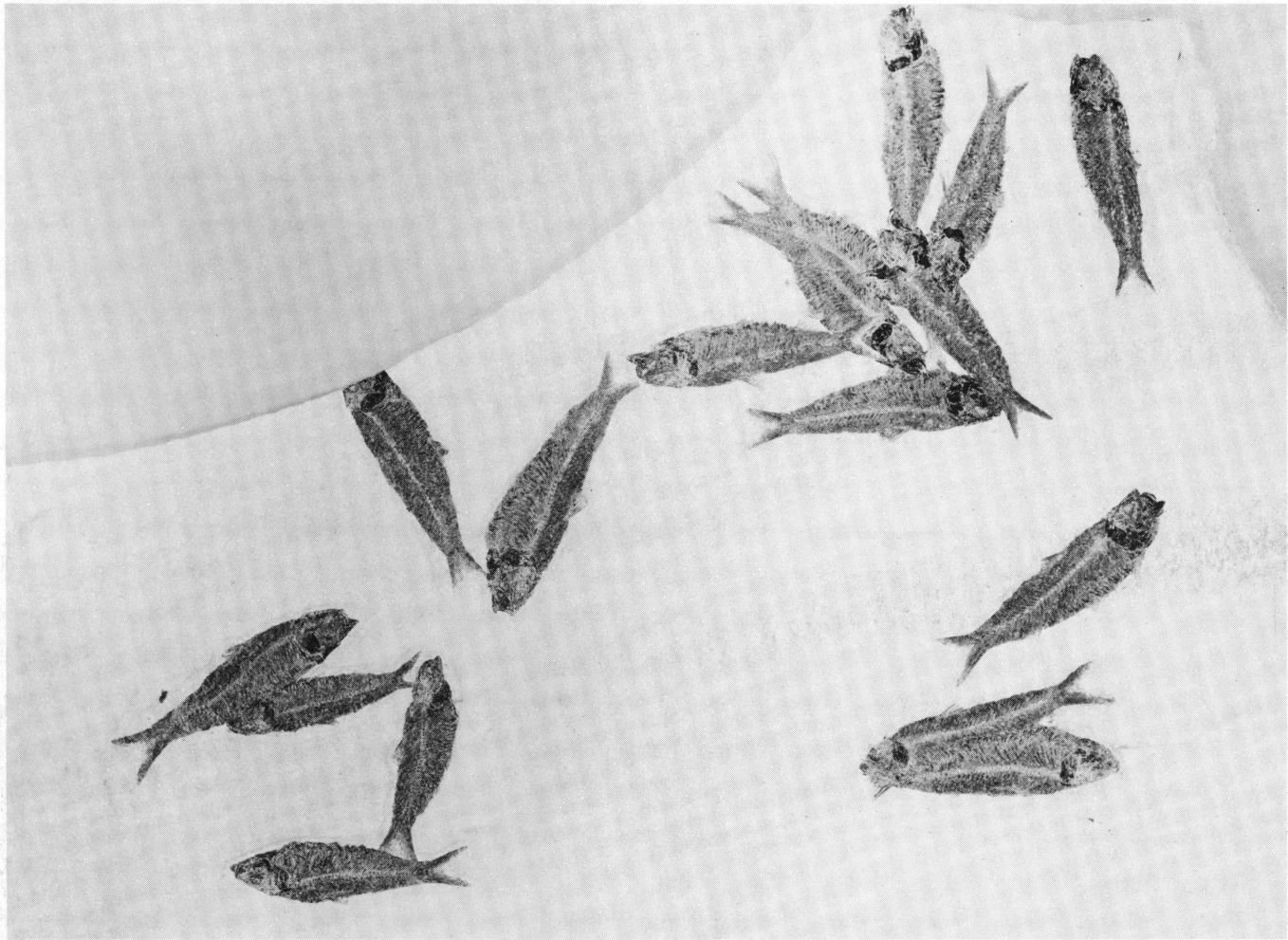
Dr. Zweifel had two manuscripts accepted by the *Journal of Heredity*. One paper elucidates the genetics of color pattern polymorphism in the California kingsnake; the second manuscript, coauthored with Research Associate Herbert Dessauer, deals with the inheritance of blood proteins in the same snakes.

Scientific Publications:

Bissinger, Barbara E. and Carol A. Simon
1981. The chemical detection of conspecifics by juvenile Yarrow's spiny lizard, *Sceloporus jarrovi*. Jour. Herpetol., vol. 15, no. 1, 77-81.

Craig, Robert J., Michael W. Klemens, and Susan S. Craig
1980. The northeastern range limit of the eastern mud turtle *Kinosternon s. subrubrum* (Lacepede). Jour. Herpetol., vol. 14, no. 3, pp. 295-297.

Myers, Charles W. and Jonathan A. Campbell
1981. A new genus and species of colubrid snake from the Sierra Madre del Sur of Guerrero, Mexico. Amer. Mus. Novitates, no. 2708, pp. 1-20, figs. 1-12, table 1.



Thousands of these four-inch herrings, *Knightsia*, cover an area larger than a football field near Kemmerer, Wyoming. To Lance Grande, a Graduate Student in the Department of Ichthyology, they provide evidence of a massive fish kill that occurred 50 million years ago. This herring's closest living relative, *Hyperlophus*, is found today in Australia. Mr. Grande is an advisee of Curator Donn E. Rosen and one of 11 graduate students who participate in the doctoral program sponsored jointly by the Department of Ichthyology and the City University of New York.

Simon, Carol A., Karen Gravelle, Barbara E. Bissinger, Israel Eiss, and Rodolfo Ruibal

1981. The role of chemoreception in the iguanid lizard *Sceloporus jarrovi*. *Animal Behav.*, vol. 29, pp. 46-54.

Zweifel, Richard G.

1980. Results of the Archbold Expeditions No. 103. Frogs and lizards from the Huon Peninsula, Papua New Guinea. *Bull. Amer. Mus. Nat. Hist.*, vol. 165, pp. 387-434, figs. 1-14, table 1.

1981. Description and relationships of a new species of microhylid frog (genus *Barygenys*) from Papua New Guinea. *Pacific Sci.*, vol. 34, no. 3, pp. 269-275, figs. 1-4.

Abstracts and Popular Publications:

Dessauer, Herbert C. and Charles J. Cole

1980. Gene dosage and electrophoretic phenotypes of diploid, triploid and tetraploid *Cnemidophorus* lizards. *Fed. Proc.*, vol. 39, no. 6, p. 1747.

Department of Ichthyology

As rapidly changing environments threaten species, the Museum's role in documenting animal life through its collections becomes increasingly important. Museum specimens are sometimes the only remaining evidence of extinct species. For these reasons, the department is striving to increase the breadth and depth of its collection. This year nearly 58,000 specimens were added to the existing fish collection of more than one million.

One of the most important goals of a Museum department is to document, through its collection of

specimens, the occurrence of diverse forms of animal life. Rapidly changing environments have added a sense of urgency to this task, and the members of the Department of Ichthyology press ahead in making their collections as fully representative as possible while they can, before the more vulnerable environments and unique species disappear forever.

Modern political and social changes are bringing about corresponding changes in the role of museum collections, imposing greater restrictions and offering greater challenges and obligations to all facets of museum operations. Improved transportation and modern sampling methods have made collecting more efficient, and the Department collections have become much more representative. But political conditions have closed some areas, and laws and ethical constraints are making it difficult to gather new specimens of rare, threatened or endangered species.

These obstacles have increased the significance of existing collections. Sometimes specimens collected long ago can provide information that will help shape policies to protect and encourage endangered forms; in other instances, museum specimens are the only remaining evidence of species that are now extinct.

The single most important resource of a major museum is thus its collection of specimens. These specimens are the basis of research, exhibition and teaching, and it is the availability of the collections that sets museum laboratories apart from other organizations devoted to biological research.

Collection Expansion This past year, the Department of Ichthyology has made considerable progress in the expansion and improvement of its collections. In reporting this progress, it seems appropriate to review the objectives and priorities of the Department with respect to the collection.

The Department always tried to avoid rigidity with regard to acquisitions, because it recognizes that acquisition policy must be flexible enough to take advantage of unique opportunities for acquiring significant materials and that there really is no way to anticipate the future research interests of the staff and visiting colleagues. Additionally, it is imperative to ensure that the collections are well curated. This includes providing adequate protection, maintaining accessibility so that any given specimen and its accompanying data can be located quickly.

Center for Study As an overall acquisition policy, the Department will continue to strive for representation of as many species of fishes as possible. Curator Donn E. Rosen and his colleagues have actively pursued a research program dealing with higher fish classification. Such research, carried out over the past two decades, depends on a comprehensive reference collection.

At the same time, it is important to acquire

comprehensive collections from selected geographic regions, to have life history stages represented, and to prepare specimens for special uses (skeletal, scale and histological materials).

Optimum Conditions This year, the fish collection was increased by 80 accessions, totaling 58,000 specimens. In addition, 71,000 specimens were newly cataloged and made accessible in the permanent storage area. Curator Gareth E. Nelson, with help from several graduate students, revised the way in which storage space is used, thus enhancing shelf capacity by 25 percent.

Norma Feinberg, Scientific Assistant, made considerable progress toward consolidating and organizing the Department's histological preparations and did extensive curatorial work with the skeleton collections. Graduate student Guido Dingerkus, a Field Associate, has reworked the collection of sharks and rays and made it more accessible.

Systematics Textbook Meanwhile, the Department's collection continues to be used by the staff, by colleagues all over the world, and by an increasing number of students who have been attracted to work with members of our staff. This year a comprehensive textbook on systematics was completed by Dr. Nelson and Dr. Platnick of Entomology, and Drs. Nelson and Rosen coedited a symposium volume on modern methods and concepts of historical biogeography. Dr. Nelson also made progress on his studies of anchovies of the world.

Dr. Rosen completed three projects: one on the interrelationships of lungfishes and tetrapods, another on the interrelationships of silversides, killifishes, flying fishes and their allies, and a third in which the bases for empirical evolutionary research were reviewed. Dr. Smith continues to work on a major book on the fishes of New York; this year, collections made in connection with this project totaled more than 6000 specimens.

As a result of the reorganization of the Department of Animal Behavior, Lester Aronson, Curator Emeritus, and Research Associates Eugenie Clark, Madeline Cooper and Peter Moller were transferred to the Department of Ichthyology.

Scientific Publications:

Atz, James W.

1980. [Review of] *Biology of Fishes*, by C.E. Bond. *BioScience*, vol. 30, no. 11, p. 773.

1980. [Review of] *Fish Physiology: Vol. VIII, Bio-energetics and Growth*, W.S. Hoar, D.J. Randall and J.R. Brett, eds. *BioScience*, vol. 30, no. 12, p. 840.

Dingerkus, G. and *E.D. Santoro (Sponsor: Donn E. Rosen)
1981. *Cornea regeneration in the Pacific Giant Octopus, Octopus dofleini, and the common octopus, O. vulgaris*. *Experientia*, vol. 37, pp. 368-369.

- Hinegardner, R.T., J.W. Atz, R.C. Fay, M. Fingerman, R.K. Josephson, N.A. Meinkoth, J. W. Miller and M.E. Rice
 1981. Laboratory Animal Management. Marine Invertebrates. National Academy Press. Washington, D.C., ix + 376 pp.
- Moller, Peter
 1980. Electroreception and the behaviour of mormyrid electric fish. Trends in Neurosciences, vol. 3. pp. 105-109.
 1980. Electroperception. Oceanus, vol. 23. pp. 44-54.
- Nelson, Gareth
 1981. Letter to the editor. Nature, vol. 289 (19 Feb.), p. 627.
 1981. Letter to the editor. Science, vol. 212, no. 4490 (3 April), p. 6.
- Nelson, Gareth and Norman Platnick
 1981. Systematics and Biogeography: cladistics and vicariance. Columbia Univ. Press. New York, xi + 567 pp.
- Nelson, Gareth, and Donn E. Rosen
 1981. Vicariance Biogeography: a critique. Columbia Univ. Press. New York, xvi + 593 pp.
- Rachlin, J.W.
 1981. [Introduction to] Fifth Symposium on Hudson River Ecology. J.W. Rachlin, ed. Hudson River Environmental Soc., New York, p. 4
- Rosen, D.E. and D. G. Buth
 1980. Empirical evolutionary research versus neo-Darwinian speculation. Syst. Zool., vol. 29, no. 3, pp. 300-308.
- Rosen, D.E.
 1981. Letter to the editor. Nature, vol. 289, no. 1, pp. 104-105.
 1981. [Introduction to] Vicariance Biogeography: a critique. Nelson, G. and D.E. Rosen, eds., Columbia Univ. Press. New York, pp. 1-5.
- Rosen, D.E., P.L. Forey, B.G. Gardiner, and C. Patterson
 1981. Lungfishes, tetrapods, paleontology, and plesiomorphy. Bull. Amer. Mus. Nat. Hist., vol. 167, pp. 159-276.
- Smith, C. Lavett
 1981. [Discussion of] There Have Been no Statistical Tests of Cladistic Biogeographical Hypothesis, by D. Simberloff, K.L. Hech, E.D. McCoy and E.F. Connor. In Nelson, G. and Donn E. Rosen, eds., Vicariance Biogeography: a critique. Columbia Univ. Press. New York, pp. 69-72.
 1981. Fishing in a sensitive Hudson. In Proc. Fifth Symposium on Hudson River Ecology. J.W. Rachlin, ed. Hudson River Environmental Soc., New York, pp. 105-107.

Department of Invertebrates

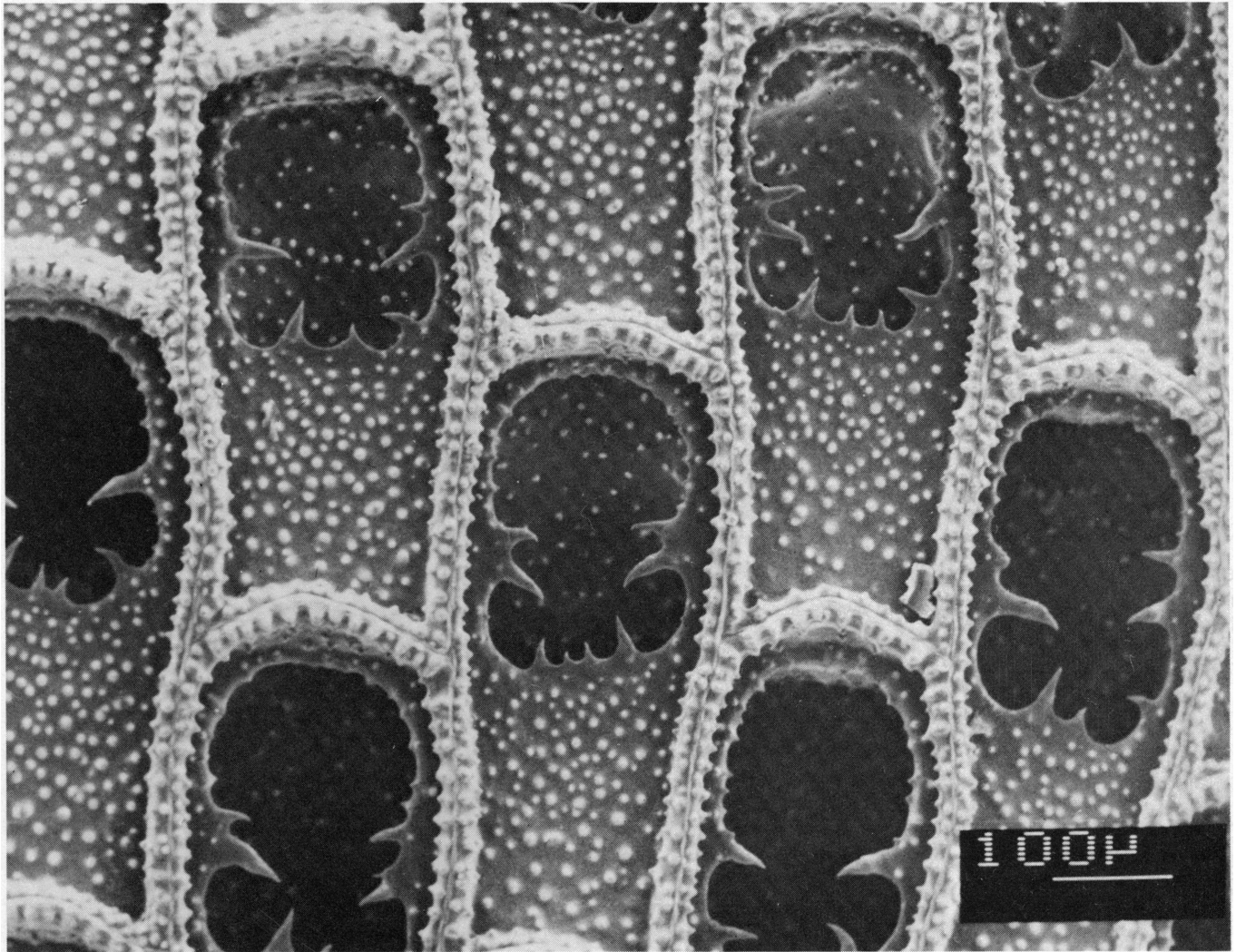
The broad spectrum of professional challenges presented by fossil and recent invertebrates was again reflected in the wide variety of research topics pursued by staff members. These projects concerned not only functional morphology and systematics, but also physiology, reproductive biology, behavior, ecology and biogeography, whereby biochemical and histological techniques, as well as statistical methods, computer programs, scanning electron microscopy and field investigations, were employed to obtain results. Diverse as the projects may appear, they are conducted with the central objective to advance phylogenetic and evolutionary concepts.

During the year, 70 loans of typological and non-typological materials were made to researchers at other institutions in this country and abroad, and 63 collection-related inquiries were processed. Also, the Department accommodated 123 visiting scientists who studied specimens from the collections. In addition, approximately 250 appointments by amateur collectors, artists, writers and other interested parties were made to use the reference collections.

In the realm of education, the Department was again much involved in communicating to the public the significance and excitement of research on invertebrates through lectures, seminars, special courses, guided tours, radio and television programs, and the publication of semi-popular books. The Department also collaborated with the Department of Exhibition and Graphics on the temporary exhibits "Profiles of the Past: Geology of Three Southwest Canyons," and "Glories of the Sea: The Munyan Collection of Cone Shells."

Ultrastructure of Worms and Limpets Ernst Kirsteuer, Chairman and Curator, continued his researches on the morphology and systematics of marine nemertean worms. He advanced a study of the ultrastructure of the proboscis armature in monostiliferous hoplonemerteans, completed a paper on shallow water nemerteans from Bermuda, and initiated a long-term project concerned with the reclassification of the phylum Nemertina.

Roger L. Batten, Curator, nearly completed a study of the muscle attachment areas on the shells of limpets, representing a number of families in all of the major orders of gastropods. Some limpets have patterned muscle pits the width of a muscle cell, while others show no histological evidence of attachment at all. A few limpets, including a new species from the



This design is actually a colony of bryozoans, Membranipora savartii, magnified 100 times. Assistant Curator Judith Winston in the Department of Invertebrates is studying these small, aquatic animals which live in mosslike colonies attached to seaweed or rocks. With the new scanning electron microscope, partially funded by the National Science Foundation, Museum researchers are able to magnify subjects as much as 300,000 times.

Galapagos Rift, have thin layers of myostracum, a type of shell structure that is universally found as a thick deposit in the muscle scars of Bivalvia. He also has resumed a study of the mesogastropods of the southwestern U.S. Permian with Ellis Yochelson of the U.S. Geological Survey.

Evolutionary Theory Niles Eldredge, Curator, pursued his investigation of the relationship between paleontology and evolutionary theory. Work this year concentrated on the nature and validity of "species selection," and the identification of the interrelationships among various levels of evolution. This study was conducted in collaboration with Elisabeth S. Vrba, Transvaal Museum, South Africa. He also continued his investigation of the interrelationships among calmoniid trilobites and

examined the growing impact of the creationist movement in the United States, evaluating the threat of this movement to science and science education.

Invertebrate Time Clocks William K. Emerson, Curator, continued his studies of molluscan systematics and zoogeography and his investigations of relative dating of late Pleistocene invertebrates by radiometric and biochemical methodologies. In collaboration with John F. Wehmiller and Everly Keenan of the University of Delaware and George Kennedy of the U.S. Geological Survey, two Pleistocene marine terraces at Turtle Bay, Baja California, were dated at approximately 95,000 and 120,000 years on the basis of amino acid racemization in fossil mollusks.

The faunal differences between the two terraces

conform to age relations and hydroclimatic influences documented previously in other terraces on the Pacific coast of North America. The terraces also were found to contain both locally extinct northern and southern species, an enigmatic situation not uncommon in western North American Pleistocene marine deposits.

Echinoderm Classification Prior to his resignation in April, Bruce N. Haugh, Assistant Curator, completed a comprehensive project dealing with the internal anatomy of fossil echinoderms. The study was conducted jointly with Bruce M. Bell, Stovall Museum, Oklahoma. The new anatomical information obtained will form the basis for reclassification of the 20 classes of echinoderms into three new subphyla.

For the first time, a unified appraisal of both living and extinct classes of echinoderms will be available to neo- and paleobiologists. The results of a study on modes of preservation of echinoderm viscera in extinct members of the phylum, and their significance for classification and phylogeny appeared as a feature article in *Science*.

Life Histories of Moss Animals The ecology and population biology of bryozoans from cryptic reef environments are being studied by Judith E. Winston, Assistant Curator, who joined the Department in August. Because bryozoans are small and easily studied in comparison with such other colonial organisms as corals, they make good models for understanding the processes important in the lives of colonial organisms in general. During her fifth year of research sponsored by the National Science Foundation on this topic, Dr. Winston, in cooperation with Jeremy Jackson of Johns Hopkins University, continued field experiments on bryozoans in Jamaica and Belize.

Dorothy E. Bliss, Curator Emerita, collaborated with Lawrence W. Powers, Research Associate, in the preparation of a review entitled "Terrestrial Adaptations," which will appear as a chapter in the multivolume treatise, "The Biology of Crustacea," being published by Academic Press. Dr. Bliss is serving as editor-in-chief of the treatise and also, with Linda Habas Mantel, Research Associate, as co-editor of volume 2, "Physiological Regulation."

Permian-Triassic Crisis Norman D. Newell, Curator Emeritus, and Donald W. Boyd, Research Associate, continued their work on the revolutionary changes in marine faunas at the close of the Paleozoic, some 230 million years ago. At that time, one half of the Late Paleozoic families of invertebrates and an estimated 98 percent of the species died out in a brief period of a few million years, leaving oceanic life depleted until new groups appeared 10 or 15 million years later.

The present studies concentrate on the systematics and evolutionary changes in a major group of bivalve

mollusks, the Pectinacea (scallops), which survived the crisis with marked changes. Field work on this problem again took the investigators to Nevada and Utah in May and June. They were joined in the field by Dr. Roger Batten and Yin Hongfu, a visiting scientist from the Peoples Republic of China.

Research Associates Howard R. Feldman, Research Associate, studied the systematics and paleoecology of Onondagan age brachiopods in central and southeastern New York State. He also collaborated with Ellis F. Owen, British Museum (Natural History), on a series of monographs on the systematics and biostratigraphy of the brachiopod faunas of northern Sinai.

John J. Lee, Research Associate, and his collaborators have extended their studies of the comparative biology of larger foraminifera and their algal endosymbionts from shallow, tropical waters to new collections from the Gulf of Elat, Eniwetok Atoll and the Great Barrier Reef. They also investigated food quality and how it affects the relationships in food webs involving benthic marine protozoa and meiofauna.

Dr. Mantel investigated the effects of low doses of common pollutants, benzene and naphthalene, on the blue crab, *Callinectes sapidus*. These substances will decrease the growth rate, slow regeneration, and affect the salt and water balance in this commercially important crab.

Shape of the Earth Leslie F. Marcus, Research Associate, continued computer studies of the shape of the earth, and in collaboration with colleagues at Queens College, the northeastern United States sea levels over the last 12,000 years were modeled. He also initiated, together with François Vuilleumier, Department of Ornithology, and Jaques Blondel, University of Montpellier, France, a project to study the similarities of guild structure in birds of Mediterranean habitats in Chile, France and California by using multivariate statistical analysis.

Dr. Powers completed a cinematographic study of fiddler crab social behavior. Territorial defense of burrows and the success of male courtship displays were documented.

George A. Schultz, Research Associate, made progress in several studies on systematics of isopod crustaceans from Antarctica and from caves in Mexico.

Horace W. Stunkard, Research Associate, continued his NSF-supported research on parasitic worms. He investigated the life-cycles of four species of digenetic trematodes belonging to three families. The sexual and asexual generations and the larval stages that occur in successive molluscan and piscine hosts, and their taxonomic status have been elucidated. The experimental work was performed at the Marine Biological Laboratory at Woods Hole.

Micropaleontology Press John A. Van Couvering, Editor, and Associate Editors Norman Hillman and Ruth Manoff report accelerated production during the year with publication of the 81st and 82nd volumes of the "Catalogue of Foraminifera" and the 44th volume of the "Catalogue of Ostracoda," each containing about 450 pages, the ninth volume (in 12 issues) of the "Bibliography and Index of Micropaleontology," and five issues of the quarterly scientific journal *Micropaleontology*. Volumes 1 and 2 of the "Catalogue of Planktonic Foraminifera" were reprinted to accommodate growing demand.

Dr. Van Couvering led a small party to investigate new finds of hominoid fossils in western Kenya and contributed to papers on the mammal fossils of this area, and also in Iran, based on his stratigraphic and radiometric research. With William A. Berggren, Research Associate, he also published a study of the global event that terminated the Eocene, based on research in the Polish Carpathians.

We sadly report the death in July, 1980, of Associate Morris Karl Jacobson, who was for many years a strong supporter of our malacological program.

Dianne Fauchér uses a computer typesetter to efficiently prepare scientific catalogs issued by Micropaleontology Press, one of four publishing offices within the Museum. Over the coming year, the Museum will be computerizing additional word-processing functions with the arrival of a new computer slated for administrative and scientific uses.



Scientific Publications:

Andrews, Peter, Grant E. Meyer, David R. Pilbeam, John A. Van Couvering, and Judith A.H. Van Couvering

1981. The Miocene fossil beds of Maboko Island, Kenya: geology, age, taphonomy, and palaeontology. *Jour. Hum. Evol.*, vol. 10, no. 1, pp. 35-48.

Batten, Roger L. and Richard Schweikert

1981. Discussion of Lost Pacific Continent: A Mobilistic Speculation. *In Nelson, G. and D.E. Rosen, eds., Vicariance Biogeography: a critique.* Columbia Univ. Press, New York, pp. 359-366.

Bernor, Raymond L., Michael O. Woodburne, and John A. Van Couvering

1980. A contribution to the chronology of some old world Miocene faunas based on Hipparionine horses. *Geobios*, vol. 13, no. 5, pp. 705-739.

Campbell, Bernard G., M. Hassan Amiri, Raymond L. Bernor, Warren Dickinson, Robert E. Drake, Rebecca M. Morris, John A. Van Couvering, and Judith A.H. Van Couvering.

1980. Maragheh: a classical late Miocene vertebrate locality in northwestern Iran. *Nature*, vol. 287, pp. 837-841.

D'Attilio, Anthony and William K. Emerson

1980. Two new Indo-Pacific coralliophilid species (*Gastropoda, Muricacea*). *Inst. Malacol. Tokyo*, vol. 1, no. 5, pp. 69-73, pls. 19, 20.

Eldredge, Niles

1981. Discussion of the riddle of dispersal: dispersal theories and how they affect vicariance biogeography. *In Nelson-G. and D.E. Rosen, eds., Vicariance Biogeography: a critique.* Columbia Univ. Press, New York, pp. 34-38.

Eldredge, Niles and Leonardo Braniša

1980. Calmonioid trilobites of the Lower Devonian *Scaphiocoelia* Zone of Bolivia, with remarks on related species. *Bull. Amer. Mus. Nat. Hist.*, vol. 165, pp. 181-290.

Emerson, William K. and Anthony D'Attilio

1981. Remarks on *Muricodrupa* Iredale, 1918 (*Muricidae: Thaidinae*), with the description of a new species. *The Nautilus*, vol. 95, no. 2, pp. 77-82, 9 figs.

Haug, Bruce N.

1981. Discussion of vicarious plant distributions and paleogeography of the pacific region. *In Nelson, G. and D.E. Rosen, eds., Vicariance Biogeography: a critique.* Columbia Univ. Press, New York, pp. 275-286.

Haug, Bruce N. and Bruce M. Bell

1980. Fossilized viscera in primitive echinoderms. *Science*, vol. 209, pp. 653-657.

1980. Classification schemes. *In Broadhead, T. and J. Waters, eds., Echinoderms. Univ. Tenn. Studies in Geology*, vol. 3, pp. 94-105.

Lee, John J., Marie E. McEnery, Monica J. Lee, Jason J. Reidy, Judith R. Garrison, and Rudolf Rottger

1980. Algal symbionts in larger Foraminifera. *In Schwemmler, W. and H.E.A. Schenk, eds., Endocytobiology: Endosymbiosis and Cell Biology. a Synthesis of Recent Research.* Walter de Gruyter, New York, pp. 113-124.

Lee, John J., Marie E. McEnery, Rudolf Rottger and Charles W. Reimer

1980. The isolation, culture and identification of endosymbiotic diatoms from *Heterostegina depressa* D'Orbigny and *Amphistegina lessonii* D'Orbigny (Larger Foraminifera) from Hawaii. Bot. Marina, vol. 23, pp. 297-302.

Mantel, Linda H.

1980. Perspectives on osmotic and ionic regulation in decapod crustaceans. In Zhirmunsky, A. and F.J. Vernberg, eds., Proceedings of a workshop on joint USSR-USA research program on physiology and biochemistry of marine animals. U.S. Dept. of Commerce, NOAA, pp. 103-112.

McEnery, Marie E. and John J. Lee

1981. Cytological and fine structural studies of three species of symbiont-bearing larger foraminifera from the Red Sea. Micropaleontology, vol. 27, pp. 71-83, pls. 1-6.

Newell, Norman D. and Donald W. Boyd

1981. Note on *Limatulina* de Koninck, 1885, an aberrant aviculopectinid. Jour. Paleont., vol. 55, no. 1, pp. 62-64.

Newman, Walter S., Richard R. Pardi and Leslie F. Marcus

1980. The determination of the magnitude and date of dip-slip faulting by discordance in sets of sea level curves. U.S. Geological Survey, Open-file Report no. 80-6, pp. 108-111.

Newman, Walter S., Richard R. Pardi, Leslie F. Marcus and J. A. Sperling

1980. The determination of the magnitude and date of dip-slip faulting by discordance in sets of sea level curves. U.S. Geological Survey, Open-file Report no. 80-842, pp. 156-158.

Newman, Walter S., Leslie F. Marcus and Richard R. Pardi

1981. Paleogeodesy: Late Quaternary geoidal configurations as determined by ancient sea levels. In Allison I., ed., Sea Level, Ice, and Climatic Change. International Association of Hydrological Sciences, Publ. no. 131, pp. 263-275.

Saperson, Esfir and Martin J. Janal

1981. Biostratigraphy of the Anomaliniidae and Cibicididae in the Soviet Tethyan Palaeogene. Micropaleontology, vol. 26, no. 4, pp. 393-413.

Schultz, George A.

1980. *Arcturocheres gaussicola* n. sp. (Cabirosidae) parasite on *Antarcturus gaussianus* Vanhoffer (Arcturidae) from Antarctica (Isopoda). Crustaceana, vol. 39, no. 2, pp. 153-155.

Shipman, Pat, Alan Walker, John A. Van Couvering, Paul J. Hooker, and J. A. Miller

1981. The Fort Ternan hominoid site, Kenya: geology, age, taphonomy, and paleoecology. Jour. Hum. Evol., vol. 10, no. 1, pp. 49-72.

Stunkard, Horace W.

1980. Successive hosts and developmental stages in the life history of *Opechona cablei* sp. n., (Trematoda: Lepocreadiidae). Jour. Parasitol., vol. 66, no. 4, pp. 636-641.

1980. The morphology, life-history, and systematic relations of *Tubulovesicula pinguis* (Linton, 1940) Manter, 1948 (Trematoda: Hemiuridae). Biol. Bull., vol. 159, no. 3, pp. 737-751.

1981. The life history, developmental stages, and taxonomic relations of the digenetic trematode, *Lasiotocus minutus* (Manter, 1931) Thomas, 1959. Bio. Bull., vol. 160, no. 1, pp. 146-154.

1981. The morphology, life history, and systematic relations of *Lasiotocus elongatus* (Manter, 1931) Thomas, 1959 (Trematoda: Digenea). Bio. Bull., vol. 160, no. 1, pp. 155-160

Van Couvering, John A., Marie-Pierre Aubry, William A. Berggren, Jonathan P. Bujak, Charles W. Naeser, and Tadeusz Wieser

1981. The terminal Eocene event and the Polish connection. Palaeogeogr. Palaeoclimat. Palaeoecol., vol. 44, no. 3, pp. 222-260.

Winston, Judith E. and Nathaniel J. Eiseman

1980. Bryozoan-algal associations in coastal and continental shelf waters of eastern Florida. Florida Sci., vol. 43, no. 2, pp. 65-74.

Abstracts and Popular Publications:

Dott, Robert H., Jr. and Roger L. Batten

1981. Evolution of the Earth. 3rd edition. McGraw-Hill, New York, 573 pp.

Eldredge, Niles

1980. An extravagance of species. Natural History, vol. 89, no. 7, pp. 46-51.

1981. Gentlemen's agreement. [Review of] The Evolutionary Synthesis: Perspectives on the Unification of Biology, Mayr, E. and W. B. Provine, eds. The Sciences, vol. 23, no. 4, pp. 20-23; 31.

1981. Creationism isn't science. New Republic, April 4, pp. 15-17; 20.

1981. Letter on creationism and prediction in science. Science, vol. 212, no. 4496, p. 737.

Emerson, William K.

1981. [Obituary of] Morris Karl Jacobson. Amer. Malacol. Union Bull., for 1980, pp. iii-iv, 1 fig.

Emerson, William K. and William E. Old, Jr.

1981. Bibliography of Morris K. Jacobson. Amer. Malacol. Union Bull., for 1980, pp. iv-v.

Feldman, Howard R., Ellis F. Owen and Francis Hirsch

1980. Brachiopod paleontology and paleoecology of the Jurassic rocks at Gebel Maghara, northern Sinai. Abstract presented at the Fifth Mediterranean Conference, Bar-Ilan University, Ramat-Gan, Israel.

Gould, Stephen J. and Niles Eldredge

1981. Letter on creationism and evolution. Discover, vol. 1, no. 3, p. 7.

Haugh, Bruce N.

1980. Echinodermata. McGraw-Hill Yearbook of Science and Technology: pp. 155-158.

Horenstein, Sidney S.

1980. New York City Notes on Natural History, nos. 16, 17, 13 pp. ea.

1981. New York City geology. In The City as History, Crawford, J., ed. LEAP, New York, pp. 53-56.

1981. New York City Notes on Natural History, nos. 18, 19, 20, 13 pp. ea.

Old, William E., Jr.

1980. [Review of] Wonders of Snails and Slugs, by Morris K. Jacobson and David R. Franz. N.Y. Shell Club Notes, no. 265, p. 4.

1980. [Review of] Conchs, Tibias, and Harps, by Jerry G. Walls. N.Y. Shell Club Notes, no. 267, p. 2.
1981. Munyan Collection at the American Museum of Natural History. Hawaiian Shell News, no. 255, p. 3.

Department of Mammalogy

A major renovation facilitated the movement of some 10,000 specimens from crowded storage areas, increasing their accessibility to visitors and for loans. On the average day two visitors used the extensive mammalogy collection of 250,000 specimens within the Museum. Research has focused on such topics as the mammals of Bolivia, the functions of color patterns in communication, the distribution of bats, animal behavior, and the diversity and distribution of rodents in the Indo-Australian world.

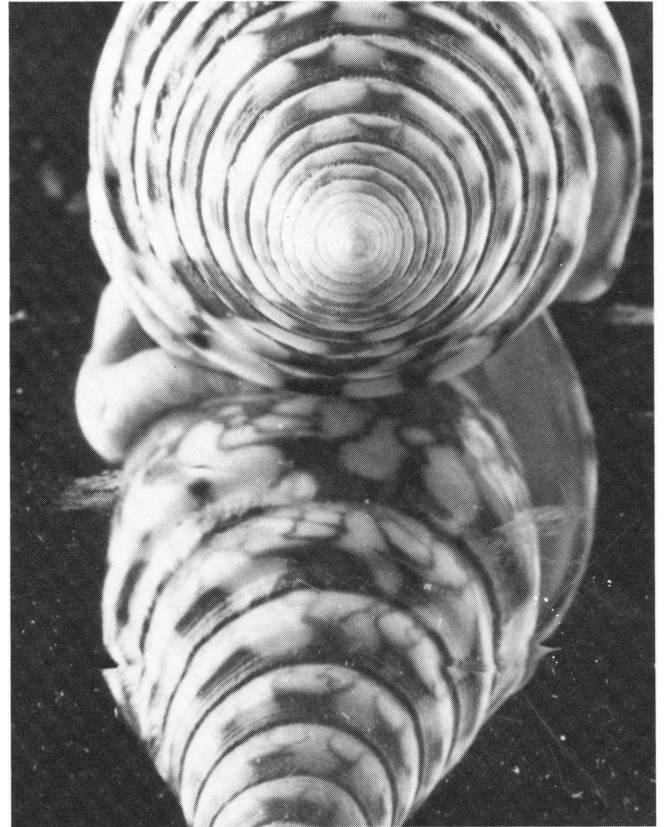
The usual activities of research, curation, and varied museum and public service projects were complicated by important changes within the Department. The renovation of more than 371 square meters of storage space under a grant from the National Science Foundation enabled the Department to move specimens from crowded storage areas and working space in other parts of the collection. This will permit the reorganization of some 50,000 other specimens in the next few years.

At the end of January, five employees from the former Department of Animal Behavior were transferred to the Department, broadening the scope of its activities and necessitating additional shifting of specimens, cases, laboratories and offices.

Archives Reorganized Research and curation have continued relatively unabated. In addition, most of the records and archives have been moved, reorganized and documented with the help of Archival Intern Albert Palazzo, supported by a grant from the New York State Council on the Arts.

Services to visitors and borrowers have continued at a high level. As of April 22, 1981, 339 loans, including 4804 specimens, were outstanding. A total of 170 visitors spent 488 days studying here. An average of two outside visitors per day used the collections at the Museum, and on the average, four loans were sent out and four others returned each week.

Bolivian Bat Studies Sydney Anderson, Chairman and Curator, continued research on the mammals of Bolivia, both in the laboratory and in the field. He and



This beautiful Milne-Edwards shell is one of 2200 rare and scientifically valuable cone shells donated by Thomas and Virginia Munyan. Named in honor of a professor at the Paris Museum in 1891, the four-inch shell has an unusually elongated cone which is reflected here. These deep-water shells are found in the Indian Ocean. A portion of the Munyan Collection was displayed as the Arthur Ross Exhibit of the Month entitled "Glories of the Sea: The Munyan Collection of Cone Shells." These shells are now part of the Department of Invertebrate's collection of 8,500,000 specimens of recent and fossil invertebrates.

his wife, Justine, spent two months in Bolivia in the autumn of 1980, along with Field Associate Ronald Pine and Patricia Remsik, whose work was supported by the Museum's undergraduate research program. In spite of some delays resulting from a change in the Bolivian government during this time, 600 specimens of mammals were obtained.

Dr. Anderson has been joined by Curator Karl F. Koopman and former Curatorial Research Intern G. Ken Creighton, of the University of Michigan, in preparing an account of the 77 species of bats now known from Bolivia. The analysis of data obtained earlier by Dr. Anderson on the ecology of raccoons has proceeded in collaboration with Nancy Olds, a graduate student at Queens College.

Dr. Koopman has continued his studies of the world's bat faunas, dealing specifically with eastern Papua, tropical Australia, Bolivia, South America in general, and Africa (the genus *Scotophilus*). Two papers dealing with general problems in systematics and zoogeography have been accepted for publication.

Rodent Relationships Archbold Curator Guy Musser's publications this year on new genera of murid rodents from the Komodo Islands, West Java, Ceylon, Sulawesi and the Philippines, and on the taxonomy of other Indo-Malayan genera, reflect results from the core of his research over the past few years— understanding the monophyly of the genus *Rattus*. That genus was said to contain more than 500 named forms by researchers who thought they had reasonably defined the group; but the genus was never adequately diagnosed or defined and was comprised of several polyphyletic groups distantly related to each other, rather than a cluster of species derived from a common ancestor. Instead of a tapestry reflecting the actual diversity and distribution of the species over the Indo-Australian World, the threads of *Rattus* phylogeny formed a massive knot, concealing any patterns.

Unraveling the genus has opened new perspectives for considering the diversity and evolution of Asian murids and different premises for posing questions

about phylogenetic relationships and zoogeography. Dr. Musser's reports combine the results of basic alpha-taxonomic research that comes from sorting specimens and defining species—the primary methodology for phylogenetic studies—with partial syntheses to reveal patterns of diversity, relationships and geographic distributions that were hidden before.

Scanning Electron Microscope Illustration is crucial to portraying basic data, as well as the results of research. Besides employing standard kinds of illustrative materials, Dr. Musser has turned to the Museum's scanning electron microscope for photographs of dentitions and parts of crania.

The SEM has proved to be a powerful tool for transforming visual data from specimens into illustrative representations that can be appreciated by readers. Dr. Musser has spent much time working closely with the operator of the SEM. Some results of this collaboration were published this year, and more will appear

Mammalogy Curatorial Assistant Pamela Griffith helped move the 1900 skins, skulls and skeletons of the 50-year-old African bovid collection into new, movable storage cases. Scientific departments are continually striving to improve the accessibility of their specimens which are studied by researchers throughout the world. This year, the Department of Mammalogy lent nearly 7000 specimens and assisted 170 visitors using the collections at the Museum.



in years to come. In the past, paleontologists have used the SEM to illustrate isolated teeth of small rodents, but Dr. Musser's reports represent the first time SEM micrographs have been used so extensively to document the teeth and skulls of small mammals.

Dr. Musser assumed the chairmanship at the end of this year, when Dr. Anderson's seven-year term ended.

Communicating with Color Curator Richard G. Van Gelder has concentrated on the analysis of color patterns in mammals and how color patterns may function in communication. Considerable time was devoted to preparing parts of a comprehensive list of mammalian species of the world to be published by the Association of Systematic Collections. Additional material was gathered on the relationship of time to evolutionary divergence as exemplified by the potential for hybridization. Some additional work was done on a long-term study of skunks of the genus *Conepatus*. Work on a popular book on mammals of our national parks was completed. Publication is expected in 1981.

Ethel Tobach, Curator, has pursued four major areas of research in animal behavior, with special emphasis on the development of social behavior. Since 1964, the development of marine mollusks of the genus *Aplysia* has been studied in the field and in the laboratory. Work was begun this year on comparative studies of social and reproductive behavior in two species of fish of the genus *Sarotherodon*; in one species, the eggs are incubated in the mouths of the males and in the other, in the mouths of females. Studies of social behavior in two species of spiny mice of the genus *Acomys* continue, and the relationship of genetics, behavior and other characteristics are being studied in several strains of laboratory rats, *Rattus norvegicus*.

Scientific Publications:

Anderson, Sydney

1981. The raccoon (*Procyon lotor*) on St. Catherines Island, Georgia. 7. Nesting sea turtles and foraging raccoons. Amer. Mus. Novitates, no. 2713, pp. 1-9, figs. 1-3, tables 1-2.

Anderson, Sydney and Edwin M. Hudson

1980. The raccoon (*Procyon lotor*) on St. Catherines Island, Georgia. 6. Time and place of activity of radio-tagged individuals. Amer. Mus. Novitates, no. 2700, pp. 1-28, figs. 1-12, tables 1-6.

See also Langguth and Anderson below.

Archer, Michael

1981. Results of the Archbold Expedition. No. 104. Systematic revision of the marsupial dasyurid genus *Sminthopsis* Thomas. Bull. Amer. Mus. Nat. Hist., vol. 168, pg. 63-223, figs. 1-74.

Koopman, Karl F.

1981. [Discussion of] Taxon pulses, vicariance, and dispersal: An evolutionary synthesis illustrated by carabid beetles. In *Vicariance Biogeography: a critique*, Nelson, G. and D.E. Rosen, eds. Columbia University Press, New York, pp. 184-187.

Koopman, Karl F., Robert W. Dickerman, and Charles Seymour

1981. Notes on bats from the Pacific Lowlands of Guatemala. Jour. Mammal., vol. 62, no. 2, pp. 406-411.

Langguth, Alfredo and Sydney Anderson

1980. Manual de identificación de los mamíferos del Uruguay. Univ. de la Republica, Fac. Humanid. y Cienc., Dept. Zool. Vertebrados, Montevideo, Uruguay. pp. 1-65, figs. 1-140.

Musser, Guy G.

1981. Results of the Archbold Expeditions. No. 105. Notes on systematics of Indo-Malayan murid rodents, and descriptions of new genera and species from Ceylon, Sulawesi, and the Philippines. Bull. Amer. Mus. Nat. Hist., vol 168, pp. 225-334, figs. 1-51.

1981. A new genus of arboreal rat from West Java, Indonesia. Zoologische Verhandlungen, no. 12, pp. 1-35, pls. 1-4.

Musser, Guy G., and Boeadi

1980. A new genus of murid rodent from the Komodo Islands in Nusatenggara, Indonesia. Jour. Mammal., vol. 61, no. 3, pp. 395-413, figs. 1-7.

Musser, Guy G., and Patricia W. Freeman

1981. A new species of *Rhynchomys* (Muridae) from the Philippines. Jour. Mammal., vol. 62, no. 1, pp. 154-159, figs. 1-2.

Otsuka, Cary, Yves Rouger, and Ethel Tobach

1981. A possible relationship between size and reproductive behavior in a population of *Aplysia punctata* Cuvier, 1803. The Veliger, vol. 23, no. 2, pp. 159-162.

Tobach, Ethel

1981. Evolutionary aspects of the activity of the organism and its development. In *Individuals as producers of their development: a life-span perspective*, Richard M. Lerner and Nancy A. Busch-Rossnagle, eds. Academic Press, New York, pp. 37-68.

See also Otsuka, Rouger, and Tobach and Wyers, Adler, Carpen, Chiszar, Flanagan, Glaserfield, Glickman, Mason, Menzel, and Tobach.

Van Gelder, Richard G.

1980. Talking to animals: A new look at coloration. Special Publ. in honor of Prof. J. Frank Cassel. North Dakota State University, Fargo, N.D., 40 pp.

Wyers, E. J., H. E. Adler, K. Carpen, D. Chiszar,

O. J. Flanagan, Jr., E. Von Glaserfield, S. E. Glickman, W. A. Mason, E. W. Menzel, and Ethel Tobach

1980. The sociobiological challenge to psychology: On the proposal to "cannibalize" comparative psychology. Amer. Psychol., vol. 35, no. 11, pp. 955-979.

Abstracts, and Popular Publications:

Koopman, Karl F.

1981. [Review of] *Macroevolution: Pattern and process*, by S.M. Stanley. BioScience, vol. 31, p. 170.

Van Gelder, Richard G.

1980. At camp in the Kalahari (Letter from the Field). Rotunda, vol. 4, no. 9, p. 5.

Tobach, Ethel, and Betty Rosoff (eds.)

1981. *Genes and gender III: Genetic determinism and the child*. Gordian Press, New York, 175 pp.



Visitors admire the 31-metric-ton Ahnighito meteorite in the Arthur Ross Hall of Meteorites. The hall is adjacent to the Harry Frank Guggenheim Hall of Minerals and the Morgan Memorial Hall of Gems. The meteorite hall attracted some 60,000 visitors from the time it opened in April to the close of the fiscal year in June. The Department of Mineral Sciences was responsible for the scientific content of the hall.

Department of Mineral Sciences

Locked in meteorites are clues to the development of the earth and other planets. To reveal their secrets to the public and to scientists, the Department has focused this year on meteorites, both in exhibition and research. The Arthur Ross Hall of Meteorites opened this spring to give visitors an up-close view and to describe recent scientific advances. Departmental researchers are also studying the Antarctic meteorites, which contain materials never before seen on earth.

One of the main events this year was the opening of the Arthur Ross Hall of Meteorites. Martin Prinz, Chairman, was responsible for the scientific content

and Albert Woods, of the design firm of Ramirez and Woods, was the chief designer. Arthur Ross, Trustee, played a major role in lending encouragement and financial support.

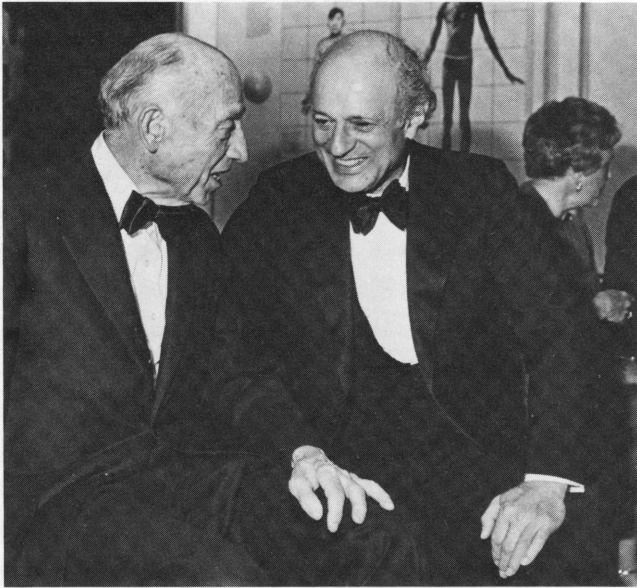
The opening of the hall was preceded by the highly publicized one-day Arthur Ross Meteorite Symposium in which eight outstanding scientists from across the country informed a capacity audience of exciting new findings in this field, which includes Planetology. A special supplement to the April issue of *Natural History* magazine carried four articles on meteorites.

A special exhibition, "The Story of Diamonds," was on display for several months. It contained six modules that covered several aspects of diamonds, but the most spectacular exhibit unit displayed 300 naturally colored diamonds, the finest such collection ever assembled.

Antarctic Meteorites Since 1969, it has been recognized that Antarctica is a major untapped source

of new meteorites. Americans started systematically bringing them back in the mid-1970s, and thousands of new samples have now been found. These specimens are processed by the National Aeronautics and Space Administration, which then decides who will have access to them.

The Museum's meteorite research team, headed by Dr. Prinz, has been involved in Antarctic meteorite studies. The team is particularly interested in a group of meteorites called polymict eucrites, at present found only in Antarctica. They are made up of small



Museum Trustee Arthur Ross, right, chats with the Honorable Jacob K. Javits, former United States Senator from New York. Mr. Javits came to the Museum in April to mark the opening of the Arthur Ross Hall of Meteorites. The April reception was attended by Museum Trustees, scientists and celebrities.

fragments of different types of basalts broken by impact. The main questions center on how many types of basalts there are, how they relate to one another, and how they relate to other meteoritic basalt groups.

High-Temperature Metamorphism In studying other meteoritic basalt groups, it has become clear that they are more complex and varied than previously known. The group called howardites has multiple basalt groups, as does the group of stony-irons called mesosiderites. The mesosiderites are additionally complex because the broken fragments of basalt have been radically changed from their original condition by high-temperature metamorphism (at about 1000°C). Their interaction with hot iron-nickel metal has produced chemical reactions between metal and silicates unknown on Earth and unique in the solar system. The original state of the basaltic fragments needs to be determined so that comparison with other meteoritic basalt groups can be made. These studies

will provide evidence as to whether they came from a single planet, more complex and perhaps larger than earlier visualized, or from their own small and unique parent planets.

Consortium Studies The Meteorite Working Group of NASA has asked the Museum's research team to lead studies on several polymict eucrites. This entails detailed examination in Houston of the specimens, chipping and cutting unique fragments for thin-section study, and then enlisting other research groups to carry out a program of coordinated studies based on the initial findings.

The work on meteoritic basalt groups is being ably led by Jeremy S. Delaney, Postdoctoral Fellow. As a result of these studies, a new basaltic group has been found, and complex igneous and metamorphic processes are being clarified for the first time. Fragments of a group of rocks called orthopyroxenites, as well as fragments of olivine in the various meteoritic groups, have also been found to be more complex and varied than originally assayed.

Metamorphic Records In a similar vein, George E. Harlow, Assistant Curator, is concentrating on the effects of the complex metamorphic processes on individual mineral groups and the chemical reactions affecting the formation of minerals. Minerals are sometimes "clouded" with fine grains of other minerals, which are often "sweated out" by metamorphic processes. Identifying fine minerals permits a better understanding of the events they have experienced and, therefore, their history.

Studies of clouding in pyroxene and plagioclase have been extended by Dr. Harlow to several meteorite groups and have revealed important differences in their history not previously recognized. He has also carried out elaborate calculations on the metal-silicate high-temperature reactions and has shown that excessive abundances of silica and phosphate in mesosiderites result from unique metamorphism. Dr. Harlow is now working on determining the composition of the groups before metamorphism.

Ureilites and Nakhilites Work is progressing on numerous meteoritic fronts, but studies published this year on two unique groups are particularly worthy of mention. One group called ureilites consists of rocks with olivine and pyroxene crystals set in a carbonaceous matrix that contains tiny diamonds. The diamonds are formed by high shock pressures on the carbon as a result of intense impact in space. Study of the entire group of eight known ureilites, in cooperation with the Institute of Meteoritics at the University of New Mexico, has resulted in clarification of the nature and origin of this unusual group, and new ureilites have now been found in Antarctica.

The group called nakhilites consists of only three



At a special symposium on meteorites, scientists discussed such far-ranging topics as "The Sky is Falling" and "A Grand Tour of the Planets." Held in conjunction with the opening of the Arthur Ross Hall of Meteorites, the symposium attracted more than 1050 people. The speakers were (front from left) Noel W. Hinners of the Smithsonian's National Air and Space Museum, Eugene M. Shoemaker of the U.S. Geological Survey, Clark Chapman of the Planetary Science Institute, Gerald J. Wasserburg of the California Institute of Technology, (back from left) John A. Wood of Harvard-Smithsonian Astrophysical Observatory, Ronald Greeley of Arizona State University, Donald E. Brownlee of the University of Washington, Martin Prinz, Chairman of the Museum's Department of Mineral Sciences, and Lawrence Grossman of the University of Chicago.

meteorites, which are unique in that they formed under oxidation conditions similar to those on Earth and are young for meteorites—only 1.3 billion years old. Study of the newest nakhlite, and comparison with the other two, has given insight into their history. There has recently been speculation that they may come from Mars.

Transmission Electron Microscopy A transmission electron microscope (TEM) enables the study of extremely fine detail in minerals, at very high voltages. Techniques have evolved rapidly in the past few years, especially the ability to chemically analyze minerals that can be seen only at very high magnification. The instrument, which is at the Department of Environmental Sciences of the Mount Sinai School of Medicine, has already been employed by Arthur N. Langer, Research Associate, in a cooperative study of asbestos particles found in complex nickel minerals. Nickel workers in New Caledonia have an unusually high rate of mesothelioma, a rare type of lung cancer sometimes associated with asbestos. Study of several specimens of the nickel ore mineral garnierite with the TEM has shown the presence of intergrown fibrous minerals.

In order to pursue these valuable TEM studies on minerals in the Department's collections, an ion thinner has been obtained with the help of a grant from the Camille and Henry Dreyfus Foundation. This instrument, which shoots a beam of ions at small particles for many hours and basically wears them

down, is essential in order to produce ultrathin mineral particles suitable for study in the TEM. Studies in progress or anticipated deal with clouded minerals, peridot (gem-quality olivine) from numerous localities, amphiboles, inclusions in gemstones, and the fine matrix of the unique meteorite Bencubbin (Australia).

Dr. Harlow has also published his earlier results on low albite, a member of the feldspar mineral group, the most common on the Earth's surface. His studies elucidated the relationships of the atomic arrangements and bonding, which are essential to their further use in recording events they have experienced.

Economic Mineralogy Fund With an increasing awareness of the need for mineral resources, especially as they affect national economic goals and security, the need for an economic mineralogist at the Museum has intensified. The new curatorial position in economic mineralogy will involve research on selected ore deposits or problems, which will be carried out through field and laboratory studies. This program will bring new insights into ore development and exploration.

Use will be made of existing mineral collections and new collections of ore minerals and mining localities will be made, adding a valuable resource, especially for mineral exploration. Exhibitions and educational programs that make the public more aware of the nature and importance of mineral resources problems, will be generated by the economic mineralogy program.

With the help of Trustee Plato Malozemoff an economic mineralogy fund drive was begun this year. Support from mining and mineral companies has been enlisted, and the response has been very positive thus far. The program is part of a continuing effort to coordinate the unique needs of the Museum with those of contemporary society.

Mineral Collections This year, about 2000 new mineral specimens with a value of \$1,082,563 were donated to the collections. Some of the more notable donations include: a superb cluster of emerald crystals, with quartz, from the Chivor Mine, Colombia, valued at \$50,000; a gold and rose diamond necklace designed by Richard Lounsbury and executed by Cartier of Paris, as well as a blue sapphire set in a platinum ring, both gifts of the estate of Vera Lounsbury; a five-carat diamond crystal in matrix; a smaller diamond crystal in matrix; a Ch'ien Lung period Chinese Jade (nephrite) vase; a lady's ring consisting of a blue star sapphire cabochon weighing 35 carats surrounded by 18 round diamonds (total weight 3.10 carats) set in platinum; a peerless collection of 68 minerals from the St. Joseph's Lead District, Missouri; a very large tourmaline (elbaite) crystal from Haddam Neck, Conn., that was pictured in the 20th Annual Report of the U.S. Geological Survey of 1899; an unusually fine tourmaline crystal group from the Jonas Mine, Minas Gerais, Brazil; and a collection of six carvings of fish made from tourmaline (elbaite, variety rubellite) from California.

In addition, a total of 206 new mineral specimens were received in exchange for our specimens for a value of \$50,145. The most notable specimens received were the finest tourmaline (elbaite) known from Nuristan, Afghanistan; three superb gem-quality aquamarine crystals from Gilgit, Pakistan; a cahnite from Franklin, N.J.; and a suite of Alpine-type minerals from Acushnet Quarry, Bristol Co., Mass.

Mineral Classification Last year, the Department acquired the Columbia University mineral collection of 40,000 specimens; this year the awesome task of describing and cataloging was undertaken by James Ferraiolo, Mineralogy Coordinator, and a devoted group of students and volunteers. He has also been carrying out a detailed inventory of the entire mineral collection.

This work has resulted in a massive compilation and reorganization of all of the nonsilicate minerals of the world and the relevant literature citations of their description—a type of comprehensive classification that was last carried out more than 30 years ago by Harvard mineralogists. The classification will be published in the Museum's publication series and should be the standard reference for years to come. Associate Joseph Rothstein has been working to improve the complex gem nomenclature.

A highly active program of exchanges, accessions, loans and a wide variety of other activities related to the main collection was ably administered by Joseph Peters, Scientific Assistant. A revised catalog of the meteorite collection was prepared for publication by Carol O'Neill, Curatorial Assistant.

Scientific Publications:

- Berkley, J.L.*, K. Keil and M. Prinz
1980. Comparative petrology and origin of Gobernador Valadares and other nakhlites. *Lunar and Planetary Science XI*, Houston, Texas, vol. 2, pp. 1089-1102.
- Berkley, J.L.*, G.J. Taylor, K. Keil, G.E. Harlow and M. Prinz
1980. The nature and origin of ureilites. *Geochimica et Cosmochimica Acta*, vol. 44, pp. 1579-1598.
- Delaney, J.S., G.E. Harlow, M. Prinz and C.E. Nehru
1980. Metamorphism in mesosiderites: Radical changes in a post-igneous silicate regolith. *Lunar and Planetary Science XII*, Houston, Texas, pp. 208-210.
- Delaney, J.S., C.E. Nehru and M. Prinz
1980. Olivine clasts from mesosiderites and howardites: Clues to the nature of achondritic parent bodies. *Lunar and Planetary Science XI*, Houston, Texas, vol. 2, pp. 1073-1087.
- Delaney, J.S., M. Prinz, C.E. Nehru and G.E. Harlow
1980. A new basalt group from howardites: Mineral chemistry and relationships with basaltic achondrites. *Lunar and Planetary Science XII*, Houston, Texas, pp. 211-213.
- Harlow, G.E. and G.E. Brown
1980. Low albite: An X-ray and neutron diffraction study. *American Mineralogist*, vol. 65, pp. 986-995.
- Harlow, G.E. and J.S. Delaney
1980. Inclusions in minerals in howardite clasts: Indicators of processed and unprocessed clasts in unmodified regolith breccias. *Lunar and Planetary Science XII*, Houston, Texas, pp. 392-394.
- Harlow, G.E. and R. Klimentidis
1980. Clouding of pyroxene and plagioclase in eucrites: Implications for post-crystallization processing. *Lunar and Planetary Science XI*, Houston, Texas, vol. 2, pp. 1131-1143.
- Langer, A.M., A.N. Rohl, I.J. Selikoff, G.E. Harlow and M. Prinz
1980. Asbestos as a co-factor in carcinogenesis among nickel processing workers. *Science*, vol. 209, pp. 420-422.
- Nehru, C.E., J.S. Delaney, G.E. Harlow, S. Frishman and M. Prinz
1980. Orthopyroxenite clasts in mesosiderites and howardites: Relationships with diogenites and orthopyroxene cumulate eucrites. *Lunar and Planetary Science XII*, Houston, Texas, pp. 765-767.
- Nehru, C.E., S.M. Zucker, G.E. Harlow and M. Prinz
1980. Olivines and olivine coronas in mesosiderites: Implications and petrogenesis. *Geochimica et Cosmochimica Acta*, vol. 44, pp. 1103-1118.
- Prinz, M., C.E. Nehru, J.S. Delaney, G.E. Harlow and R.L. Bedell
1980. Modal studies of mesosiderites and related achondrites, including the new mesosiderite ALHA 77219. *Lunar and Planetary Science XI*, Houston, Texas, vol. 2, pp. 1055-1071.

Abstracts and Popular Publications:

Delaney, J.S., R. Bedell, S. Frishman, R. Klimentidis, G.E. Harlow and M. Prinz

1980. Highly differentiated eucritic clasts in polymict breccias Allan Hills A78040 and A77302. *Meteoritics*, vol. 15, pp. 280-281.

Harlow, G.E., J.S. Delaney, C.E. Nehru and M. Prinz

1980. The origin of abundant tridymite and phosphate in mesosiderites: Feasibility of possible reactions. *Meteoritics*, vol. 15, pp. 297-298.

Nehru, C.E., J.S. Delaney, G.E. Harlow and M. Prinz
1980. Mesosiderite basalts and the eucrites. *Meteoritics*, vol. 15, pp. 337-338.

Rothstein, J.

1980. Stilbite, stevensite, arandisite, touchonite (four unusual gems) and some ideas on gem nomenclature. *Lapidary Journal*, pp. 2042-2054.

Watters, T.R., M. Prinz, E.R. Rambaldi and J.T. Wasson
1980. ALHA 78113, Mt. Egerton and the aubrite parent body. *Meteoritics*, vol. 15, p. 386.

Director Thomas D. Nicholson shows Prince Bernhard of the Netherlands an extraordinary cluster of azurite crystals in the Harry Frank Guggenheim Hall of Minerals. The individual crystals, up to five inches long, are among the largest ever recorded for this mineral. Many experts consider this mineral specimen to be the finest in existence. The Hall of Minerals contains many spectacular crystallized minerals, including a two-pound specimen of crystallized gold (also in this display case) and a 496-pound piece of topaz, which is the world's largest single topaz crystal. Like so many other visitors to the United States, Prince Bernhard included the Museum on his itinerary. The Museum attracts two and a half million visitors a year from all parts of the world.



Department of Ornithology

As a world renowned center for education and research, the Department seeks understanding of the systematic relationships of birds and associated aspects of their biology. Its unparalleled collections of nearly one million specimens attract scholars to the Museum and generate loans around the world. Field trips to Africa, South America and the western United States have added specimens and knowledge of little known birds and their habitats.

Lester L. Short succeeded Wesley E. Lanyon as Chairman at the beginning of the year. George F. Barrowclough joined the staff as Assistant Curator in January, coming to the Museum after receiving his doctorate from the University of Minnesota and pursuing postdoctoral studies at the University of California at Berkeley.

The Department's collections are vital to systematic ornithological researches. Loans from it were made to colleagues on all continents save Antarctica. Chinese ornithologists are now using Department specimens in their systematic studies. Important additions came as a result of staff work in South America and Australia.

Supervised by Dr. Lanyon, assisted by all staff, and in cooperation with the Exhibition Department, all major halls featuring birds are undergoing modifications ranging from the simple changing of names on labels to the revision of entire exhibits, as in the Sanford Memorial Hall of the Biology of Birds. The extensive updating is in preparation for the 1983 Centennial Meeting of the American Ornithologists' Union, which will attract North American and foreign ornithologists to the Museum where the Union was founded.

Frank M. Chapman Memorial Fund Administered by the Department, the Chapman Fund remains the most important non-governmental granting body for ornithology. This year, 95 awards totalling \$44,710 were granted, mainly to younger researchers. Robert C. Eckhardt completed his studies of West Indian flycatchers as a Chapman Fellow, and such fellowships were awarded to Philip Gaddis of the Museum of Northern Arizona for study of titmouse communication and to Timothy Crowe of the Percy Fitzpatrick Institute, South Africa, for systematic study of African partridges (*Francolinus*) and birds of prey.

Lester L. Short, Chairman and Curator, continued long-term studies on hybridization and speciation in certain Australian birds with colleagues Jennifer Horne and Richard Schodde of Australia's national bird collection. Their first report, currently in

press, documents the first case of five-way avian hybridization in sittellas (*Daphoenositta*). His other long-range project, the systematics and behavior of woodpeckerlike birds, such as barbets (*Capitonidae*), honeyguides (*Indicatoridae*), and woodpeckers (*Picidae*) continued with field studies in Malawi, Zambia and Kenya with Jennifer Horne from August to October.

With support of the Edward John Noble Foundation, Dr. Short and Jennifer Horne also advised on the successful translocation of 12 endangered Redcockaded Woodpeckers from a firing range at Fort Stewart, Ga. to St. Catherines Island, coastal Georgia, where they commenced studies that will provide information helpful in managing the island for the species in a new environment.

Tyrant Flycatchers Lamont Curator Wesley E. Lanyon directed his efforts at laboratory and field studies of a subfamily of the large, taxonomically difficult family (*Tyrannidae*) of the tyrant flycatchers. Using skeletal characters, he hopes to add a new dimension to unraveling their relationships. Field work in Suriname during October and November, with support from the L.C. Sanford Trust Funds, netted flycatcher specimens new to the department's collections, vocal records, and other data.

Over 30 years of recordings of bird voices are represented in the many tapes obtained by Dr. Lanyon, including especially detailed vocal material on ontogeny and variation in both wild and captive meadowlarks (*Sturnella*). Dr. Lanyon is reviewing and curating this collection of tape-recordings to ensure their scientific value for researchers in generations to come.

Andean Birds François Vuilleumier, Curator, traveled to the Venezuelan Andes in November and December, gaining new insight into the factors responsible for the habitat selection, population densities, breeding and altitudinal distribution of Andean birds. As part of his continuing researches of the distribution, zoogeography, speciation and origins of Andean birds, he is co-editing a book on high montane tropical biota with Dr. Maximina Monasterio, University of the Andes, Venezuela.

Dr. Vuilleumier's investigations with French scientist Jacques Blondel and Museum Research Associate Leslie Marcus have centered around computer studies of the ecomorphological convergences of birds in the Mediterranean climates of countries on the continents of Europe, North America and South America. He also began study of faunal turnover in birds of the Pacific island of New Caledonia, based partly on his prior visits there.

George F. Barrowclough, Assistant Curator, has been setting up a new Biochemical Systematics Laboratory, which will aid him in researches on the

genetic and biochemical differentiation of birds. This will add a new approach to the Department's work on elucidating the systematics of birds. Dr. Barrowclough, partly with National Science Foundation support, studied and collected juncos (*Junco hyemalis* complex) in California and Nevada during May and June. The juncos, which are morphologically divergent and hybridize extensively, offer an excellent challenge for his methods, and he will continue his broad analysis of the genetic differentiation, variation and speciation of this group.

Birds of Prey Dean Amadon, Lamont Curator Emeritus, continued various studies on birds of prey, partly at the Archbold Biological Station. Scientific Assistant John Bull did field work in Ecuador, Peru

and the Galapagos Islands. Scientific Assistant Mary LeCroy conducted studies of several bowerbirds and birds-of-paradise in Papua New Guinea in conjunction with her continuing researches on these groups.

Research Associate Jared M. Diamond continued his New Guinea researches, using helicopters to conduct the first ornithological studies in the Gauttier Mountains, and also the Fakfak Mountains of Western New Guinea. Among his results was the rediscovery of the Greater Melampitta (*Melampitta gigantea*). Biologically unknown and previously represented by but five specimens, it roosts and nests in underground caves, emerging ratlike to feed in the forest understory. Research Associate Robert W. Dickerman continued systematic studies on Central American birds, and with

Wesley E. Lanyon, right, Lamont Curator of Birds in the Department of Ornithology, examines models for upgrading the Sanford Memorial Hall of the Biology of Birds. With him is Michael Blakeslee, designer in the Department of Exhibition and Graphics, who prepared the models. The Museum's various bird halls are among the many permanent exhibitions which are constantly being reviewed and refurbished to provide visitors with the latest scientific information.



Research Associate William H. Phelps, Jr., on the birds of Cerro Urutani on the Venezuelan-Brazilian border.

Research Associate Eugene Eisenmann's efforts largely have gone into manuscript preparation for the American Ornithologists' Union's forthcoming list of the bird species of North America (south to Panama), Eisenmann being chairman of the committee preparing the long-awaited volume. Research Associate James C. Greenway, Jr., continued his efforts at completing the annotated list of the Department's type specimens.

Zebra Finch Behavior Cheryl F. Harding, Research Associate, was away for most of the year as Program Associate in the Psychology Program of the National Science Foundation in Washington, D.C., but she continued her research on hormonal control of male social behavior in Zebra Finches with the help of students. G. Stuart Keith, Research Associate, continued work on African and Malagasy birds and participated in the 5th Pan-African Ornithological Congress in Malawi during August. Research Associate H. Philip Zeigler received a Research Scientist Award from the National Institutes of Health, allowing him to devote his time fully to his researches, which mainly treat neural control of drinking in the domestic pigeon. Research Associates Harding and Zeigler were both assigned to the Department and appointed to three-year terms.

Scientific Publications:

Amadon, Dean

1980. Important groups of birds in the study of island biogeography. In *Wildlife of the Islands*, by William H. Amos. Harry N. Abrams, New York, pp. 205-221.

Barrowclough, George F.

1980. Gene flow, effective population size, and genetic variance components in birds. *Evolution*, vol. 34, pp. 789-798.

1980. Genetic and phenotypic differentiation in a wood warbler (genus *Dendroica*) hybrid zone. *Auk*, vol. 97, pp. 655-668.

Barrowclough, George F. and Fred C. Sibley

1980. Feather pigmentation and abrasion: test of a hypothesis. *Auk*, vol. 97, pp. 881-883.

Bock, W. J. and J. Farrand, Jr.

1980. The number of species and genera of Recent birds: A contribution to comparative systematics. *Amer. Mus. Novitates*, no. 2703, 29 pp., 1 fig., tables 1-5.

Brunn, B., H. Mendelssohn, and John Bull

1981. A new subspecies of Lappet-faced Vulture (*Torgos tracheliotus*) from the Negev Desert, Israel. *Bull. British Ornith. Cl.*, vol. 101, pp. 244-247.

Bull, John

1981. Double-crested Cormorant breeding on Long Island. *Kingbird*, vol. 31, pp. 83.

Diamond, Anthony W. and G. Stuart Keith

1980. Avifaunas of Kenya forest islands. I: Mount Kulal. *Scopus*, vol. 4, pp. 49-55.

Dickerman, Robert W. and Alexander R. Brash

1980. Barn Owl Thanotocenosis on Pacific lowlands of Guatemala. *Biotropica*, vol. 12, pp. 228-229.

Génermont, J., M. Lamotte, F. Vuilleumier, P. Blandin, H. Descimon, A. Dubois, G. Pasteur and H. Tintant

1980. Le concept biologique de l'espèce dans la zoologie contemporaine. In *Les problèmes de l'espèce dans le Règne Animal*, vol. 3, C. Bocquet, J. Génermont, and M. Lamotte, eds. Société Zoologique de France, Paris, pp. 427-452.

Gochfeld, Michael, Stuart Keith and Paul Donahue

1980. Records of rare or previously unrecorded birds from Colombia. *Bull. Brit. Ornith. Cl.*, vol. 100, pp. 196-201.

Harding, Cheryl F.

1981. Social modulation of circulating hormone levels in the male. *Amer. Zool.*, vol. 21, pp. 223-231.

*Hope, Sylvia [Sponsor: Wesley E. Lanyon]

1980. Call form in relation to function in the Steller's Jay. *American Naturalist*, vol. 116, no. 6, pp. 788-820. 11 figs., 5 tables.

Keith, G. Stuart.

1980. Origins of the avifauna of the Malagasy Region. *Proc. IV Pan-African Ornithological Congr.*, pp. 99-108.

1980. The avifauna of the Impenetrable Forest, Kigezi, Uganda, with special reference to altitudinal distribution. *Proc. IV Pan-African Ornithological Congr.*, pp. 159-167.

Lanyon, Wesley E.

1981. Breeding birds and old field succession on fallow Long Island farmland. *Bull. Amer. Mus. Nat. Hist.*, vol. 168, pp. 1-60, figs. 1-31, tables 1-24.

LeCroy, Mary

1981. The genus *Paradisaea*—display and evolution. *Amer. Mus. Novitates* no. 2714, pp. 1-52.

LeCroy, Mary, Alfred Kulupi and William S. Peckover

1980. Goldie's Bird of Paradise: display, natural history and traditional relationships of people to the bird. *Wilson Bull.*, vol. 92, pp. 289-301.

Luine, V., F. Nottebohm, C. Harding and B. S. McEwen

1980. Androgen affects cholinergic enzymes in syringeal motor neurons and muscle. *Brain Research*, vol. 192, pp. 89-107.

Phelps, William H., Jr. and Robert W. Dickerman

1980. Cuatro subespecies nuevas de aves (Furnariidae, Formacariidae) de la region de Pantepui, Estado Bolivar y Territorio Amazonas, Venezuela. *Bol. Soc. Venez. Cien. Nat.*, vol. 33, pp. 138-147.

Short, Lester L.

1980. Speciation in African woodpeckers. *Proc. IV Pan-African Ornithological Congr.*, pp. 1-8, fig. 1, table 1.

1980. Chaco woodland birds of South America—some African comparisons. *Proc. IV Pan-African Ornithological Congr.*, pp. 147-158, figs. 1-3, tables 1-4.

1981. [Discussion of] The riddle of dispersal. In *Vicariance biogeography: a critique*, Nelson, G. and D. E. Rosen, eds., Columbia Univ. Press, New York, pp. 30-33.

Short, Lester L. and Jennifer F. M. Horne

1980. Ground barbets of East Africa. *Living Bird*, vol. 18, pp. 179-186, 2 figs.

1980. Vocal and other behaviour of the Green Barbet in Kenya. *Ostrich*, vol. 51, pp. 219-229, figs. 1-4.
1981. Vocal and other behaviour of Stierling's Woodpecker. *Scopus*, vol. 5, pp. 5-13, figs. 1-2.
- Wild, J. M. and H. P. Ziegler
1980. Central representation and somatotopic organization of the jaw muscles in the brainstem of the pigeon (*Columba livia*). *Jour. Compar. Neurol.*, vol. 192, pp. 175-201.
- ¹Vaurie, Charles
1980. Taxonomy and geographical distribution of the Furnariidae (Aves, Passeriformes). *Bull. Amer. Mus. Nat. Hist.*, vol. 166, pp. 1-357.
- Vuilleumier, François
1980. Preface, pp. 5-6, Notes, pp. 333-342. *In* Taxonomy and geographical distribution of the Furnariidae (Aves, Passeriformes), by C. Vaurie. *Bull. Amer. Mus. Nat. Hist.*, vol. 166, pp. 1-357.
- Ziegler, H. P., P. W. Levitt and R. R. Levine
1980. Eating in the pigeon (*Columba livia*): movement patterns, stereotypy and stimulus control. *Jour. Compar. and Physiol. Psych.*, vol. 94, pp. 783-794.

¹ Dr. Vaurie, Research Associate, died in 1975, before publication of this Bulletin

Abstracts and Popular Publications:

- Amadon, Dean
1980. [Foreword to] *Encyclopedia of North American Birds*, by John K. Terres. Alfred A. Knopf, New York, pp. xiv-xv.
1980. [Review of] *Der Sakerfalke, Falco cherrug*, by Wolfgang Baumgart. *Raptor Res.* vol. 14, no. 4, p. 128.
1981. The attraction was fatal. *The Warbler*, vol. 25, no. 4, p. 3.
- Bull, John and Edith Bull
1981. From Cape to Cape—some nature notes. *Linnaean Newsletter*, vol. 35, no. 4 (Fall 1980).
- Harding, Cheryl F., *Kevin Sheridan and *Michael Walters [Sponsor: Cheryl Harding]
1980. [Abstract] Hormonal activation of social behavior in male Zebra Finches. *Amer. Zool.*, vol. 20, p. 856.
- Keith, G. Stuart
1980. If you can't pronounce it, you can't count it. *Linnaean Newsletter*, vol. 35, no. 2, pp. 1-4.
1981. Now you see it, now you don't. *Birding*, vol. 13, no. 2, pp. 42-51, 8 figs.
- Lanyon, Wesley E.
1981. Birds observed on a winter cruise of the Nile, February 1981. Mimeographed report. American Museum of Natural History, 10 pp.
- LeCroy, Mary
1980. [Review of] *The birds of paradise*, by Michael Everett; *The great bird illustrators and their art 1730-1930*, by Peyton Skipwith; and *Birds of prey*, by Gareth Parry and Rory Putnam. *Curator*, vol. 22, pp. 116-119.
1980. *Bridgebuilders. Paradise (Air Niugini)*, no. 23, pp. 5-6.
- Peckover, William S. and Mary LeCroy
1980. Down in the forest. *Paradise (Air Niugini)*, no. 25, pp. 10-13.

- Short, Lester L.
1980. [Review of] *A bibliography of the birds of Rhodesia*. *Auk*, vol. 97, p. 921.
- Short, Lester L. and Jennifer F. M. Horne
1980. [Review of] *The birds of Zanzibar and Pemba. An annotated list*. *Auk*, vol. 97, pp. 909-910.
- Vuilleumier, François
1980. [Review of] *Les rangeurs et l'évolution*. *La Terre et La Vie*, vol. 34, pp. 306-308.
1981. [Review of] *Biogéographie et écologie*. *Auk*, vol. 98, pp. 207-208; *La Terre et La Vie*, vol. 35, pp. 153-154.
1981. [Review of] *Handbook of the birds of Europe, the Middle East and North Africa: The birds of the western Palearctic, Vol. 2: Hawks to bustards*. *Quart. Rev. Biol.*, vol. 56, pp. 83-84.

Department of Vertebrate Paleontology

Studies, through fossils, of such topics as the paleogeography of the Age of Mammals, extinct horned turtles and Mesozoic sharks is producing new knowledge of the ancient world. In addition to conducting research, departmental members curate the world's largest collection of fossil vertebrates. Consequently, a major focus is upon collection management to increase accessibility of specimens to the scientific community.

Nearly a decade has passed since the Department moved to the Frick Wing, and efforts to make the fossil vertebrate collection as a whole more accessible for research have been continuously underway since. Aided by grants from the National Science Foundation, these internationally significant collections are now more comprehensive and easily available for research than ever before. A proposal to reorganize the dinosaur collection has just been approved for support by the NSF for the next three years.

A gratifying consequence of this availability is the greatly increased use of the fossil vertebrate collection and its supporting documentation by more than 100 visiting paleontologists from North America and abroad. Loans from the collections have likewise been sent worldwide in the number of over 1400 specimens during the past year. An important aspect of this service to the scientific community is the preparation by the departmental laboratory staff of hundreds of precise casts of type and other unique specimens from the collections for use in research by colleagues. The highly refined techniques used by our preparators to produce replicas enormously extend the influence of the collections by providing scientifically useful copies

of Department materials that can be incorporated into the collections of other institutions.

Australian studies Richard H. Tedford, Chairman and Curator, has been engaged in the study of the history of Australian mammal fauna for nearly 30 years. Aspects of this problem were addressed in the field this year when he joined colleagues from Flinders University, South Australia, for work in the eastern Lake Eyre Basin. His previous work in that part of the state of South Australia had yielded large collections of fossil marsupial remains from Miocene through Pleistocene rocks. Problems of regional stratigraphy were the focus of this year's work, supported by the National Geographic Society as well as the investigators' institutions.

The ultimate purpose of such studies was to provide a chronological succession for the younger (Pliocene and Pleistocene) fossil remains and to test previous ideas about the ancient environments in this enormous inland basin (it focuses the drainage of nearly a seventh of the continent in the salt pan of ephemeral Lake Eyre). Both objectives were successfully achieved: the scattered fossil occurrences were chronologically ordered, and the widely held notion of a giant fresh water lake in Central Australia during Ice Age time was reduced to saline plains and sand ridges much like the environment at present.

The North Atlantic Connection Frick Curator Malcolm C. McKenna continued to sift the evidence from diverse fields on the history of the biota in the Arctic early in the Age of Mammals. The strong faunal similarity of early Eocene mammals in Europe and North America suggests that geographic continuity across the Arctic was sundered by the development of the North Atlantic in later times.

On invitation from the NATO Advanced Study Institute, Dr. McKenna reviewed the geophysical and paleontological evidence for the histories of two early Cenozoic transatlantic bridges, both of which were still available for terrestrial biota in early Eocene time. His review pinpoints field areas in the Arctic where these ideas may be tested.

Dr. McKenna continued and completed a number of other projects in aspects of mammalian phylogeny: recognition of a supposed phenacodont from the Paleocene of China as a tethythere (with M. Chow, Peking); study of palaeoryctine cranial morphology and the earliest lipotyplan skull (the latter with M. Novacek, San Diego State); a cladistic analysis of amino acid sequences in vertebrates, and lagomorph molecular systematics.

Turtle studies Curator Eugene S. Gaffney returned from Australia in July 1980, after four months of working on the remains of the strange horned turtle *Meiolania* in the Australian Museum (Sydney) and

in the field on Lord Howe Island. This work was supported by a visiting curatorship at the Australian Museum and funds from the American Museum of Natural History, Columbia University and the Explorer's Club.

Description of the skeleton was completed and sufficient material brought to New York for a complete reconstruction of the skeleton, eventually to be exhibited. The combined American-Australian field crew was also successful in finding new material on Lord Howe Island and in doing geological work that will increase the usefulness of the older collections.

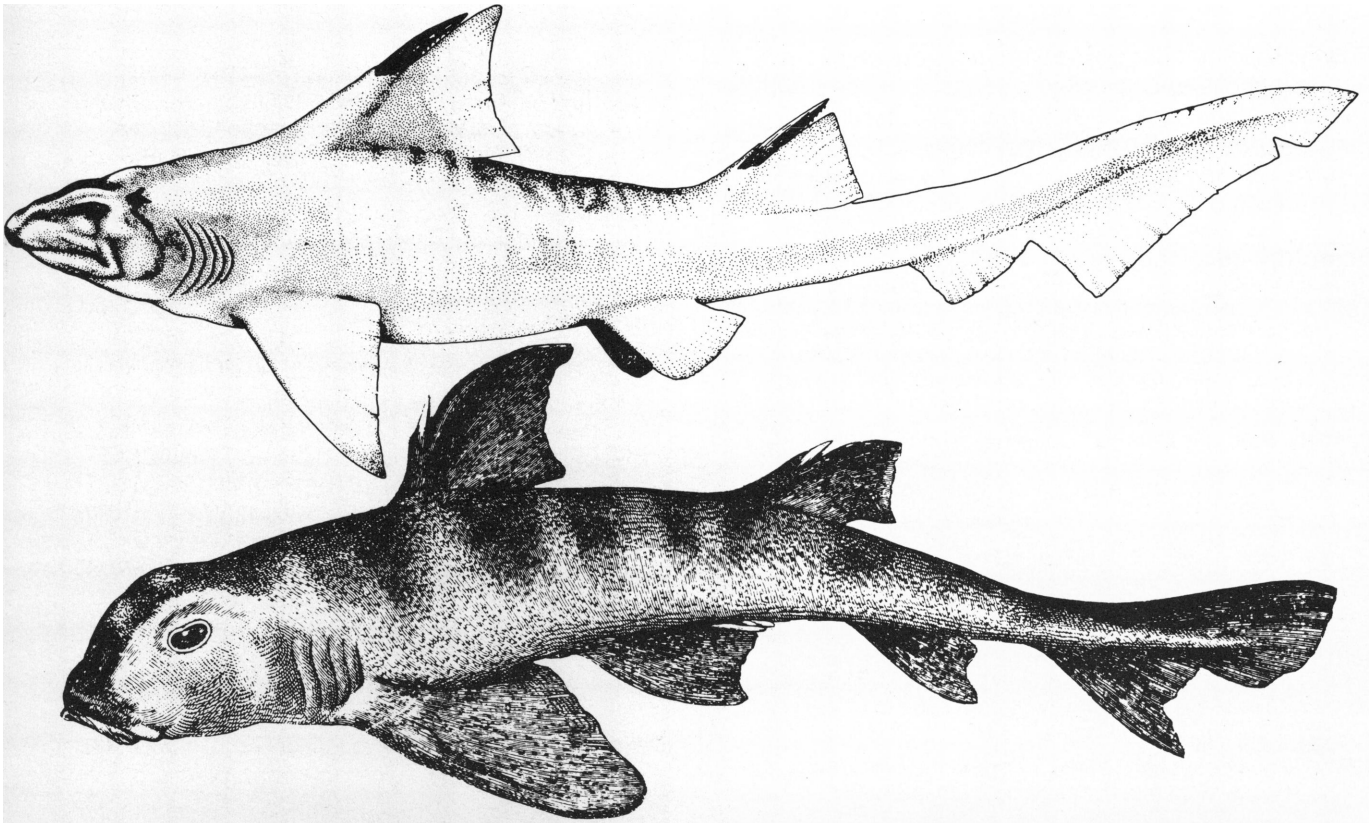
Later this year, Dr. Gaffney spent six weeks at the Staatliches Museum für Naturkunde in Stuttgart, West Germany, studying the museum's incomparable collection of the oldest known turtles from the Triassic era in Germany. The work was supported by a research grant from the National Science Foundation that included taking both department scientific illustrators to Stuttgart to make illustrations on the spot for a monographic description of these important specimens.

Shark Relationships Assistant Curator John G. Maisey continues working on various systematic and anatomical aspects of fossil and recent sharks. His works on the skeletons of Mesozoic hybodont sharks and the anatomy of jaw suspension in sharks and rays were finished and submitted for publication. These studies and others underway examine specific points in the anatomy of the sharks and rays that are critical in establishing the phyletic relationships among themselves and to other groups of fishes (and vertebrates generally).

Late this year, Dr. Maisey went to Tennessee to try to find the location and additional material of a remarkably preserved Carboniferous cladoselachian shark specimen that he located in the National Museum of Natural History collection. A considerable part of the soft anatomy of the head and anterior trunk is preserved in this specimen making the comparison of structures normally absent in fossils possible for the first time in such an ancient shark.

Curators Emeriti Frick Associate Curator Beryl E. Taylor retired after 43 years of service to the Frick Laboratory and the Museum. His important contributions on camels, ruminants and carnivores were the product of years of intensive study of the Frick Collection. His familiarity with that collection and willingness to make his broad experience available to the profession are personal characteristics cherished by his colleagues.

Active retirement continued for Curator Emeritus Bobb Schaeffer whose work on Jurassic fishes and morphogenesis of the skeleton continues; Frick Curator Emeritus Morris F. Skinner continued his stratigraphic and equid studies; Curator Emeritus



John Maisey, Assistant Curator in the Department of Vertebrate Paleontology, studies sharks through the ages using the Museum's collection of fossils and skeletons. This 180-million-year-old fossil (bottom) gives an excellent record of an early shark, Palaeospinax. From fossils, Dr. Maisey was able to determine the appearance of Hybodus (middle), a shark that disappeared from earth nearly 65 million years ago. Another primitive species, the Port Jackson shark (top), still lives today in the Pacific Ocean.

Edwin H. Colbert carried forward his work on Antarctic reptiles, *Coelophysis*, Triassic reptiles and *Pentaceratops*; and Curator Emeritus George G. Simpson undertook a number of writing projects from a reexamination of Darwin to the evidence of the fossil record on evolutionary principles.

Scientific Publications:

Baird, Donald

1980. A prosauropod dinosaur trackway from the Navajo Sandstone (lower Jurassic) of Arizona. *In Aspects of vertebrate history: Essays in honor of Edwin H. Colbert*, Jacobs, L. L., ed. Museum of Northern Arizona Press, Flagstaff, pp. 219-230.

Baird, Donald and Peter M. Galton

1981. Pterosaur bones from the upper Cretaceous of Delaware. *Jour. Vert. Paleo.*, vol. 1, no. 1, pp. 67-71.

Cifelli, Richard* (sponsor: Malcolm C. McKenna)

1980. A reassessment of labyrinthodont paleolatitudinal distribution. *Palaeogeogr., Palaeoclimatol., Palaeoecol.*, vol. 30, pp. 121-131.

1981. Patterns of evolution among the Artiodactyla and Perissodactyla (Mammalia). *Evolution*, vol. 35, no. 3, pp. 433-440.

Colbert, Edwin H.

1981. The distribution of tetrapods and the break-up of Gondwanaland. *Proceedings, 5th Internatl. Gondwana Symposium*. A. A. Balkema, Rotterdam, pp. 277-282.

1981. A primitive ornithischian dinosaur from the Kayenta of Arizona. *Mus. Northern Arizona Bull. Ser.*, no. 53, pp. 1-61.

Colbert, Edwin H. and James W. Kitching

1981. Scaloposaurian reptiles from the Triassic of Antarctica. *Amer. Mus. Novitates*, no. 2709, pp. 1-22.

Delson, Eric

1980. A study of fossil Old World monkeys of the Circum-Mediterranean region. *Natl. Geographic Soc. Res. Reports, 1971 projects*, vol. 12, pp. 125-128.

Delson, Eric and Alfred Rosenberger

1980. Phyletic perspective on platyrrhine origins and anthropoid relationships. *In Evolutionary biology of New World monkeys and continental drift*, Ciochon, R. S. and A. B. Chiarelli, eds. Plenum Press, New York, pp. 445-458.

Emry, Robert J.

1981. New material of the Oligocene murid rodent *Nonomys*, and its bearing on murid origins. *Amer. Mus. Novitates*, no. 2712, pp. 1-14.

1981. Additions to the mammalian fauna of the type Duchesnean, with comments on the status of the Duchesnean "Age." *Jour. Paleo.*, vol. 61, no. 3, pp. 563-570.

Emry, Robert J. and Robert M. Hunt

1980. Maxillary dentition and new records of *Daphoenictis*, an Oligocene amphicyonid carnivore. *Jour. Mammalogy*, vol. 61, no. 4, pp. 720-723.

Emry, Robert J. and John E. Storer

1981. The hornless protoceratid *Pseudoprotoceras* (Tylopoda, Artiodactyla) in the early Oligocene of Saskatchewan and Wyoming. *Jour. Vert. Paleo.*, vol. 1, no. 1, pp. 101-110.

Gaffney, Eugene S.

1980. Phylogenetic relationships of the major groups of amniotes. *In The terrestrial environment and the origin of land vertebrates*, Panchen, A. L., ed. Systematic Assoc., Special volume, no. 15. Academic Press, New York, pp. 593-610.

Hecht, Max K., W. Steere and B. Wallace (eds.)

1980. *Evolutionary Biology*, vol. 13. Plenum Press, New York, 301 pp.

MacFadden, Bruce J.

1980. The Miocene horse *Hipparion* from North America and from the type locality in southern France. *Palaeontology*, vol. 23, pt. 3, pp. 617-635.

MacFadden, Bruce J. and Henry Galiano

1981. Late Hemphillian cat (Mammalia, Felidae) from the Bone Valley Formation of central Florida. *Jour. Paleo.*, vol. 54, no. 1, pp. 218-226.

MacFadden, Bruce J. and Morris F. Skinner

1981. Earliest holarctic hipparion, *Cormohipparion goorisi*, n. sp. (Mammalia, Equidae), from the Barstovian (medial Miocene), Texas Gulf Coastal Plain. *Jour. Paleo.*, vol. 55, no. 3, pp. 619-627.

MacFadden, Bruce J. and R. G. Wolff

1981. Geological investigations of late Cenozoic vertebrate-bearing deposits in southern Bolivia. *Anais II Congr. Latino-Americano de Paleontologia*, Porto Alegre, Brazil, pp. 765-778.

Maisey, John G.

1980. An evaluation of jaw suspension in sharks. *Amer. Mus. Novitates*, no. 2706, pp. 1-17.

McKenna, Malcolm C.

1980. Remaining evidence of Oligocene rocks previously present across the Bighorn Basin, Wyoming. *Papers on Paleont., Mus. Paleont., Univ. Michigan*, no. 24, pp. 143-146.

1980. Late Cretaceous and early Tertiary vertebrate paleontological reconnaissance, Togwotee Pass area, northwestern Wyoming. *In Aspects of vertebrate history: Essays in honor of Edwin H. Colbert*, Jacobs, L. L., ed. Museum of Northern Arizona Press, Flagstaff, pp. 321-343.

1980. Early history and biogeography of South America's extinct land mammals. *In Evolutionary history of the New World monkeys and continental drift*, Ciochon, R. S. and A. B. Chiarelli, eds. Plenum Press, New York, pp. 43-77.

1981. [Discussion of] Relative importance of plate movements, eustasy, and climate in controlling major biogeographic changes since the early Mesozoic, by A. Hallam. *In Vicariance biogeography: a critique*, Nelson, G. and D. E. Rosen, eds. Columbia Univ. Press, New York, pp. 335-338.

Ostrom, John H.

1980. *Coelurus* and *Ornitholestes*: Are they the same? *In Aspects of vertebrate history: Essays in honor of Edwin H. Colbert*, Jacobs, L. L., ed. Museum of Northern Arizona Press, Flagstaff, pp. 245-256.

Prothero, Donald R.* (Sponsor: Malcolm C. McKenna)

1981. New Jurassic mammals from Como Bluff, Wyoming, and the interrelationships of non-tribosphenic theria. *Bull. Amer. Mus. Nat. Hist.*, vol. 167, pp. 277-326.

*Prothero, Donald R.** (Sponsor: Malcolm C. McKenna) and *Richard Estes*

1980. Late Jurassic lizards from Como Bluff, Wyoming and their paleobiogeographic significance. *Nature*, vol. 286, no. 5772, pp. 484-486.

*Prothero, Donald R.** (Sponsor: Malcolm C. McKenna) and *D. B. Lazarus*

1980. Planktonic microfossils and the recognition of ancestors. *Syst. Zool.*, vol. 29, no. 2, pp. 119-129.

Radinsky, Leonard and *S. Emerson*

1980. Functional analysis of sabertooth cranial morphology. *Paleobiol.*, vol. 6, pp. 295-321.

Radinsky, Leonard and *J. Hopson*

1980. Vertebrate paleontology: new approaches and new insights. *Paleobiol.*, vol. 6, pp. 250-270.

Rosenberger, Alfred and *Frederick S. Szalay*

1980. On the tarsiiform origins of the Anthroidea. In *Evolutionary biology of the New World monkeys and continental drift*. Ciochon, R. L. and A.B. Chiarelli, eds. Plenum Press, New York, pp. 139-157.

Schaeffer, Bobb and *Keith S. Thomson*

1980. Reflections on agnathan-gnathostome relationships. In *Aspects of vertebrate history: Essays in honor of Edwin H. Colbert*, Jacobs, L. L., ed. Museum of Northern Arizona Press, Flagstaff, pp. 19-33.

Simpson, George G.

1980. Colbert as paleomammalogist. In *Aspects of vertebrate history: Essays in honor of Edwin H. Colbert*, Jacobs, L. L., ed. Museum of Northern Arizona Press, Flagstaff, pp. 295-298.

1980. Fossil birds and evolution. *Contr. Sci., Nat. Hist. Mus.*, Los Angeles, no. 330, pp. 3-8.

Szalay, Frederick S.

1981. Functional analysis and the practice of the phylogenetic method as reflected by some mammalian studies. *Amer. Zool.*, vol. 21, no. 1, pp. 37-45.

Szalay, Frederick S. and *Eric Delson*

1979. *Evolutionary history of the primates*. Academic Press, New York, 580 pp.

Szalay, Frederick S. and *M. Dagosto*

1980. Locomotor adaptations as reflected on the humerus of Paleogene primates. *Folia Primat.*, vol. 34, pp. 1-45.

Szalay, Frederick S. and *G. Drawhorn*

1980. Evolution and diversification of the Archonta in an arboreal milieu. In *Comparative biology and evolutionary relationships of tree shrews*. Lockett, W. P., ed. Plenum Press, New York, pp. 133-169.

Tedford, Richard H.

1981. [Discussion of] Lost Pacifica Continent: a mobilistic speculation, by Nur, A. and Z. Ben-Avraham. In *Vicariance biogeography: a critique*. Nelson, G. and D. E. Rosen, eds. pp. 367-370.

Webb, S. David, Bruce J. MacFadden, and *J. A. Baskin*

1981. Geology and paleontology of the Love Bone Bed from the late Miocene of Florida. *Amer. Jour. Sci.* vol. 281, no. 5, pp. 513-544.

Webb, S. David and *Beryl E. Taylor*

1980. The phylogeny of hornless ruminants and a description of the cranium of *Archaeomeryx*. *Bull. Amer. Mus. Nat. Hist.*, vol. 167, pp. 117-158.

Abstracts and Popular Publications:

Baird, Donald

1980. America's first dinosaur in stereo. c. 1876. *Stereo World*, vol. 7, no. 4, p. 12.

Barghoorn, Steven F.

1981. Geomagnetic polarity stratigraphy of Type Tesuque Formation, Santa Fe Group, in Espanola Valley, New Mexico. *Abstract, Bull. Amer. Assoc. Petro. Geol.*, vol. 65, no. 3, p. 555.

Colbert, Edwin H.

1980. *A fossil hunter's notebook*. E. P. Dutton, New York, 242 pp.

1981. Dinosaurs with horns. *Terra*, vol. 19, no. 3, pp. 23-29.

1981. Nebraska remembered. *Soc. Vert. Paleo. News Bull.*, no. 121, pp. 56-57.

Delson, Eric

1981. Academic exchange between U.S. and Chinese paleontologists. *Current Anthro.*, vol. 22, pp. 195-196.

1981. Chinese scientists visit the U.S. The L. S. Leakey Foundation News, no. 19, pp. 3-4.

1981. Primates (in part). In *McGraw-Hill Yearbook of Science and Technology*. McGraw-Hill, New York, pp. 325-327.

McKenna, Malcolm C.

1981. Cenozoic terrestrial sediments and their vertebrate fossils in and around the North Atlantic. Abstract in *Structure and development of the Greenland-Scotland Ridge—new methods and concepts*. NATO Adv. Res. Inst., Bressanone, Italy, 11-15 May, 1981, pp. 23-24.

1981. More museums (letter). *Nature*, vol. 289, no. 5799, pp. 626-627.

McKenna, Malcolm C., *James A. Hopson*, *Hans-Peter Schultze*

1981. Vertebrate paleontology. *Geotimes*, vol. 26, no. 2, pp. 56-57.

Radinsky, Leonard

1980. Analysis of carnivore skull morphology. *Abstract, Amer. Zool.*, vol. 20, p. 784.

*Rowe, Timothy, Richard Cifelli** (Sponsor: Malcolm C. McKenna) and *Barry Kues*

1980. Fossils of New Mexico—and a new natural history museum. Museum of Northern Arizona Press, Flagstaff, 12 pp.

Simpson, George G.

1980. Why and how, some problems and methods in historical biology. Pergamon Press, New York, 263 pp.

1981. Exhibit dismay. *Nature*, vol. 290, p. 286.

Tedford, Richard H.

1981. Mammalian biochronology of the late Cenozoic basins of New Mexico. *Abstract, Bull. Amer. Assoc. Petro. Geol.*, vol. 65, no. 3, p. 571.

Archbold Biological Station

The Archbold Biological Station is extensively equipped to support a full range of biological studies. Radio-tracking of indigo snakes, photographic studies of the leaf-folding response of plants, monitoring screech owls' breeding biology, and studying the area's vegetation patterns are samples of the nine-member staff's diverse projects. Over the years, its visiting scientists have published more than 500 books and papers based on research carried out at the Station.

The Archbold Biological Station, founded by Richard Archbold in 1941, is located on the southern end of the Lake Wales Ridge near the town of Lake Placid in south-central peninsular Florida. This region is one of the most distinctive biogeographic areas of southeastern United States. The most characteristic vegetation is sand pine scrub, which contains a number of endemic species and subspecies of plants and animals. The 3900-acre main Station property and eight-acre Price Memorial Tract on nearby Lake Placid include excellent examples of scrub habitat, as well as other major natural habitat types of the southern Lake Wales Ridge. In addition to its basic scientific value, the knowledge gained from research carried out at the Station frequently has direct practical applications, such as contributing to more effective management of threatened and endangered species or habitats and providing baseline data for assessing environmental changes resulting from human activities. The Station also plays an important role in the training of biologists and is active in environmental education and public service. Tours and lectures are given to numerous visiting school classes and other interested groups each year. A total of 284 individual visitors and 38 educational and community groups consisting of 1026 individuals visited the Station during the year. Staff members frequently consult with state and federal environmental agencies and serve on advisory boards of various private organizations and governmental agencies concerned with the environment.

Staff Activities. Resident Director James N. Layne continued his long-term projects on the mammals of Florida and habitat relationships, population trends, and other aspects of the ecology and life history of the vertebrates of the Station. He again monitored the seasonal movement and the breeding biology of the southeastern kestrel, a threatened subspecies in Florida. The present Station population of this small falcon consists of only one breeding pair and two nonbreeding adult females that frequently visit the territory of the pair. One objective of the study this year was to document in as much detail as possible the

nature of the interactions between the breeding pair and the nonbreeding females.

Dr. Layne also began a study of the ecology and life history of the eastern indigo snake at the Station and its environs. Small temperature-sensitive radio transmitters are implanted beneath the skin of snakes and their movements tracked by means of a directional antenna and receiver. Todd M. Steiner, a graduate of the University of Maryland, is assisting in this research. Dr. Layne continued to serve as a member of the Florida Panther Recovery Team and was appointed Co-chairman of the Rodent Specialist Group of the Species Survival Commission of the International Union for the Conservation of Nature and Natural Resources.

Screech Owl Studies Fred E. Lohrer, Scientific Assistant, continued his research on the breeding biology of the screech owl by monitoring nests in nest boxes and banding nestlings and adult females. He also analyzed the mortality rates of adult females from banding data obtained during the period 1973-1980. He continued as editor of the *Florida Field Naturalist* published by the Florida Ornithological Society.

Scientific Assistant Chester E. Winegarner also continued his study of reproduction of the great-crested flycatcher at the Station. Twenty-one nests were studied and 36 young banded during the year.

Warren G. Abrahamson, Research Associate, synthesized four years of data from permanent study sites established in 1977 and 1978 to monitor the effects of fire on various Lake Wales Ridge vegetative associations represented on the Station. His study constitutes the first comprehensive investigation of fire ecology in this region of Florida and has revealed significant differences in the response of Lake Wales vegetation to fire compared with that of vegetative types in other parts of the state.

Mast Production Dr. Abrahamson also conducted a comparative study of fruit size and weight, moisture content, energetic content, mineral content, nutrient composition, level of predation, and other characteristics of major mast producers in various Station habitats. The survey included six species of oaks, scrub hickory, and two species of palmettos and involved analysis of some 3900 fruits. Besides its value in providing knowledge of the ecological relationships of the mast species themselves, the study will contribute importantly to research projects involving birds and mammals for which mast constitutes an important food resource. Dr. Abrahamson was promoted to Chairman of the Botanical Society of America's Ecological Section for 1980-81.

Thomas Eisner, Research Associate, and William Conner, Duke University, completed a major phase of their study of the role of a pheromone derived from

dietary alkaloids in the courtship of the moth *Utetheisa ornatrix*. In addition to demonstrating the use of pyrrolizidine alkaloids sequestered from food plants by the larval moths in the formation of hydroxydanaidal used by adult males to attract females, they hypothesized that the substance also provides a means whereby the female can assess the alkaloid content of the male and thus his degree of chemical protection from predators.

Dr. Eisner also completed a study dealing with the adaptive function of leaf-folding in the sensitive plant *Schrankia microphylla*. By means of photographic evidence, he was able to show that the leaf-folding response accompanying the sensitive reaction results in a pronounced increase in thorn exposure, thus suggesting a defensive function. Dr. Eisner continued to serve as Chairperson of the Section of Biology of the American Association for the Advancement of Science.

Scrub Jay Socialization Glen E. Woolfenden, Research Associate, and his co-worker, John W. Fitzpatrick, of the Field Museum of Natural History, continued their comprehensive long-term investigation of the social biology of the Florida scrub jay. In addition to a monthly census of the study population during the nonbreeding season and more intensive monitoring and banding of nestlings during the breeding season, they made further progress on a manuscript dealing with the demography and social organization of the species based on their first 10 years of field work at the Station. Dr. Woolfenden was elected vice-president of the American Ornithologists' Union and vice-president of the Florida Ornithological Society.

Ann F. Johnson, Archbold Postdoctoral Research Fellow, completed her research on the demography of the Florida rosemary, *Ceratiola ericoides*, one of the most characteristic plants of the sand pine scrub habitat. This year her investigation centered on the seed banks associated with stands of different ages, sources of seed predation, seed longevity in natural stands, and factors affecting seed germination.

Bobcat Activities Douglas M. Wassmer continued his master's thesis research on the bobcat under Dr. Layne's sponsorship. Measurements were made, and the daily activity of five radio-collared individuals was closely monitored during the year to obtain data on home range size, seasonal and daily activity patterns, habitat usage, and social organization.

Visitors Thirty-seven scientists representing 17 universities, three museums, and two other organizations worked at the Station during the year. Among the projects pursued was a study of the adaptive significance of pair-forming and territorial

behavior in damselflies and dragonflies, the habitat requirements of the Florida scrub jay, the locomotory biomechanics of various species of ground beetles, and an investigation of the ability of individual honey bees to discriminate between sugar solutions on the basis of their nutritive value. David A. Breil, Longwood College, worked at the Station in February and April on the preparation of a manual on the liverwort and anthocerotite flora of peninsular Florida. Among the results of Dr. Breil's study was the rediscovery of one species thought to be extinct and the collection of another species previously known from a single locality in two new areas, including the Station.

Scientific Publications:

Aneshansley, D. J., and T. Eisner

1980. Digital readouts on television pictures. *Science*, vol. 209, no. 4464, p. 1472.

Conner, W. E., T. Eisner, R. K. Vander Meer, A. Guerreo, D. Ghiringelli, and J. Meinwald

1980. Sex attractant of an arctiid moth (*Utetheisa ornatrix*): a pulsed chemical signal. *Behav. Ecol. Sociobiol.*, vol. 7, pp. 55-63.

Eisner, T.

1980. Leaf folding in a sensitive plant: a defensive thorn-exposure mechanism? *Proc. Natl. Acad. Sci.*, vol. 78, no. 1, pp. 402-404.

1980. Chemistry, defense, and survival: case studies and selected topics. *In Insect biology in the future*, Locke, M., and D. S. Smith, eds. Academic Press, New York, pp. 847-878.

Johnson, A. F.

1981. Plant communities of the Napeague Dunes. *Torreyia*, vol. 108, no. 1, pp. 76-84.

Lohrer, F. E. (compiler)

1980. Florida birds in the periodical literature, 1979. *Fla. Field Nat.*, vol. 8, no. 2, pp. 52-54.

Lohrer, F. E., and C. E. Winegarner

1980. Swallow-tailed kite predation on the nestling mockingbird and loggerhead shrike. *Fla. Field Nat.*, vol. 8, no. 2, pp. 47-48.

Great Gull Island

Thousands of terns nest annually on the Great Gull Island reserve at the east end of Long Island Sound. Staff and visitors closely follow this colony from 25 observation towers. More than 2300 young terns, a record number, were banded last year.

In 1980 David Allen, a Long Island contractor, donated the use of a bulldozer for a day to the Great Gull Island Project. Two areas in the central portion of the island were cleared and researchers look forward to determining how many terns were nested in these areas during the 1981 season.

The season as a whole was an extremely successful

one for the colony. Over 2300 young were banded, more than in any previous field season. Matthew Male built eight more observation towers bringing the total to twenty-five. The nests in front of each tower were mapped, and mapping will continue in 1982.

A cover story on the Great Gull Island project appeared in the August issue of *Smithsonian Magazine* with superb photographs by George Silk. An excellent article on the project by Robert Kessler appeared in *Newsday*, with photos by Don Jacobsen.

Miss Hays showed Michael Male's file "Ternwatch" and lectured on the Great Gull Island Project for seven groups during the winter. The Great Gull Island Birdathon raised \$17,000 for the project, providing substantial support for the 1980 field season.

Scientific Publications:

**Dicostanzo, Joseph [Sponsor: Helen Hays]*

1980. Population Dynamics of a Common Tern Colony. *Journ. Field Ornithol.*, vol. 51, no. 3, pp. 229-243

Southwestern Research Station

Located in the Chiricahua Mountains, the Southwestern Research Station is the Museum's outpost in Arizona. Scientists and naturalists from 65 institutions worked at the field station this year on numerous projects including plant surveys, geological studies and research on evolutionary biology and animal behavior. With habitats ranging from low desert to a 10,000-foot mountain, the station offers a wide variety of opportunities for field work.

This year, Resident Director Vincent D. Roth completed a research project—a description of a new genus of spider from Southern California. He will soon conclude another project, a description of a new species of daisy, *Erigeron*, from the Chiricahua Mountains in collaboration with Guy Nesom, Department of Biology, Memphis State University, Memphis, Tenn. In addition, his study of autotomy (actually autospasy) is turning up much new and interesting information on spiders and opilions.

Through the efforts of a volunteer, David Hawkes, and through gifts of Willis Gertsch, Curator Emeritus, the butterfly collection was revamped and 20 new species were added. A few new flies and beetles were also added. Sixteen new plants were added to the regular herbarium and 20 to the miniherbarium.

Station staff presented talks to 23 science classes with 486 students, and 11 tours were conducted with 159 people staying at the station. Weekly slide shows and seminars open to the public throughout the spring and summer provide both entertainment and



A unique species of flowering daisy (*Erigeron*) was discovered in a rock crevice and in an area surrounding a falls near the American Museum's Southwestern Research Station in Portal, Arizona. The plant was found by Vincent D. Roth, Resident Director. The Museum maintains research stations in several locations. These stations are actively used by Museum scientists and their colleagues from other institutions.

educational opportunities to the scientific community, as well as to other visitors.

The Station received the 25-year award from the United States Weather Bureau for weather observations.

Station attendance dropped about 10 percent to 1014 for the 1980-1981 season; but the total man days gained slightly, edging over 6500. The number of researchers remained about the same with a slight drop in the number of tours and classes but a slight increase in the number of in-state visitors.

American Museum of Natural History staff visiting the Station included Jerome G. Rozen, Deputy Director for Research, Randall Schuh, Chairman of the Department of Entomology, Sylvia Hope and Dean Amadon of the Department of Ornithology, Carol Simon of the Department of Herpetology, and Howard Topoff of the Department of Entomology. Representatives of 65 institutions worked at the Station. In addition, representatives of 18 biological field stations visited for the annual meeting of the Organization of Biological Field Stations.

Visiting Researchers Outside projects at the Station covered many phases of science. The research was

weighted towards behavior and bionomics of animals. Taxonomic studies centered on ants, camel crickets, beetles, solitary bees, true bugs and jumping spiders. Behavioral ecology and life history studies centered on acorn woodpeckers, kingbirds, Mexican jays, titmice, grasshopper mice, kangaroo rats, spadefoot toads, horned lizards, whiptail lizards, bats, fence lizards, social spiders, hackberry butterflies, *Pheidole*, carpenter and army ants, solitary bees and robberflies.

Gene Flow Measurement Marie Simovich, Department of Biology, University of California at Riverside, is attempting to measure genetic selection in hybrid genotypes and determine the extent of gene flow between two species of the spadefoot toads, *Scaphiopus multiplicatus* and *S. bombifrons*. They can be distinguished both morphologically and electrophoretically, the latter enabling identification of hybrids and backcrosses and hence providing a measure of introgression.

Steller's Jay Call Repertoire Sylvia Hope, of the Museum's Department of Ornithology, studied the call repertoire of the Steller's jay. Studies of two widely separated populations in California and Colorado have

been made, and recordings from other parts of the range were available.

The studies and recordings indicate that there are considerable geographic differences in call repertoire. The repertoire at Rustler Park, in the Chiricahua Mountains, shares certain calls with the well-studied populations near Boulder, Colorado, and Berkeley, California. Some of these shared calls are represented in all three populations, but as distinctly variant forms. In addition, each population has one or more completely unique calls. The relation of call variation to call function is still being analyzed.

Kangaroo Rat Communication Jan Randall, Department of Biology, Central Missouri State University, Warransburg, Missouri, has started a long-term investigation of the behavior and communication of two species of kangaroo rat. Preliminary findings show that the bannertail kangaroo rat is extremely territorial and defends its large dirt mounds from all intruders. Ownership of the mound is communicated by drumming with the enlarged hind feet. The Merriam's kangaroo rats seem less territorial, occupying a number of burrows and having overlapping home ranges. They do not footdrum

An elephant carries home its evening meal in this photograph taken in India by Catherine Pessino, Assistant Chairwoman of the Department of Education. Miss Pessino and Malcolm Arth, Department Chairman, went to India on a visit sponsored by the Indo-U.S. Sub-Commission on Education and Culture. Miss Pessino worked with the education staff at the National Museum of Natural History in New Delhi. Dr. Arth participated in an environmental workshop in New Delhi. They returned to the American Museum with materials to supplement the Department of Education's teaching collections.



and probably communicate with olfactory signals at sandbathing sites and with their urine.

Lichen Ecophysiology Stephen Link, Department of Botany, Arizona State University, is studying a facet of lichen ecophysiology dealing with gas exchange. The lichen, *Parmelia praesignis*, grows abundantly on the evergreen oak, *Quercus hypoleucooides*. It was found that this lichen shows a significant amount of photosynthetic activity at temperatures near zero degrees Centigrade and at low light levels.

Department of Education

Through programs and activities ranging from lecture series for adults, workshops for children, and courses for teachers to music and dance performances, this department enriches the public's understanding of the Museum's exhibitions. The Department of Education staff also operates the Alexander M. White Natural Science Center, the People Center and the Discovery Room. An energetic group of teaching volunteers supplements the programmed instruction given by the professional staff with informal interpretation for school groups in selected exhibition halls. Combined public attendance in these functions exceeds 400,000 persons annually.

In conjunction with the opening of the Gardner D. Stout Hall of Asian Peoples, a number of events and activities presented this year by the Department were Asia-related. Many were free to all visitors, thanks to generous support from the Vincent Astor Foundation, the Helena Rubinstein Foundation, and gifts from Evelyn Sharp and the Evelyn Sharp Foundation. These events included live music and dance performances, as well as film screenings focusing on Japan, China, India and Tibet. Other events supported were four performances by the Little Theater of the Deaf, a nature film festival, a family film festival and the premieres of two important new films, each of which warranted a separate occasion.

Performances by the Asian American Dance Company, the Alvin Ailey Repertory Ensemble, the Allnations Dance Company and the graduating dance class of the High School of Performing Arts rounded out an extraordinary year of auditorium programs free to visitors. Combined attendance at these activities approached 20,000 persons.

Margaret Mead Film Festival Not included in the above statistic, and worthy of particular note, was the

fourth annual Margaret Mead Film Festival with a weekend audience estimated at 6500 persons. This event has come to be one of our most important adult activities and symbolizes the increasing role of film as an educational tool at the Museum.

While films and performing arts play an important role in enhancing public understanding of the subjects with which the Museum deals, and of particular permanent or special exhibitions, more conventional forms including lectures and symposia are also used. They too have demonstrated great public acceptance. This year, for example, a lecture on mythology and one on the grammatical capacity of apes each brought near capacity audiences to the main auditorium.

Special Exhibition Programming Several years ago, when the Museum began to have large special exhibitions in Gallery 3 and Gallery 77, the department set out to provide supplementary programming to enhance visitor understanding of those shows. This year, for example, in conjunction with the "Hopi Kachina: Spirit of Life" exhibition, a weekend of films on Hopi culture was held in the auditorium, an important series on the Hopi was offered in the Evening Lecture Series for Adults, and a weekend of activities devoted to the Hopi Indians was held in the People Center.

In June, the exhibition "Shakespeare: The Globe and The World" opened, and activities supplementing the exhibition were supported by grants from the National Endowment for the Humanities, Metropolitan Life Insurance Company and Exxon Corporation. A lecture by the distinguished playwright Tom Stoppard led off these events, and readings by actors, demonstrations of music from Shakespeare's time, and short talks in the exhibition and in other areas provided hundreds of visitors with a broader cultural context within which to experience the exhibition materials.

Outreach Programming In the broadest sense, all the Museum's educational activities aim to attract the broadest possible audience. However, in an attempt to attract greater participation from African-American and Caribbean populations in the area, a series of special activities is carried out to heighten community awareness of the Museum as an educational resource. Outreach programming is directed at all age levels and encompasses all modes of instruction, from individual classes or lectures to short courses, film screenings and live music to dance performances. Total attendance at programs held at the Museum exceeded 30,000 persons, and some 2000 more benefited from programs carried into local communities, particularly to the South Bronx area.

Capacity audiences attended auditorium programs, which included an international musical tribute to Martin Luther King, a program honoring the diplomatic

corps of the Spanish-American nations, the New York premiere of performing artists from Suriname, and several films and lectures exploring African influences in the New World.

More intimate small-scale outreach activities are of equal importance, however, and these include free workshops for young people and scores of individual natural science and social studies instructional sessions, many of which are given by bilingual instructors specially employed with grant funds.

Development of this outreach effort is one of the principal achievements of the Department during the past decade. Generous gifts this year from the William Randolph Hearst Foundation, The New York Community Trust, The Leonhardt Foundation, Avon Products Foundation, Inc., Evelyn Sharp and the Evelyn Sharp Foundation enabled this effort to repeat its extraordinary success.

Programs for Schools Combining the number of classes served by our core programs for schools in New York City together with outreach classes and groups taught by Department volunteers reveals that more than 65,000 young people had the opportunity of having someone representing the Museum work with their class. Of this total number, more than 4000 were taught in the Alexander M. White Natural Science Center, nearly 4700 others had a mini-course that brought them for an intensive three-session series, and more than 8000 experienced a lecture program held at the Museum or carried to their school assemblies. The largest program, in terms of numbers, remains the single visit taught by a Museum staff member, a program which this year served nearly 12,000 youngsters.

There also are smaller programs encompassed in the total. For example, more than 500 youngsters in school classes were taught in a half-day laboratory science program introduced last year. And, the Junior High School Natural Science Project, supported by the International Paper Foundation, provided a group of 20 pupils the opportunity of studying science at the Museum two afternoons a week throughout the academic year. This special project, carried out with the cooperation of two public school districts in upper Manhattan, is intended to encourage bright inner-city youngsters to consider pursuing careers in science.

This was the final year for a service which has been provided by the Department for many years to schools in New York City—the delivery of small boxed exhibits and specimens. More than 1100 exhibit kits were delivered this year to schools in two of the city's boroughs. Staff reductions have limited this service during the past decade.

Education Volunteers Trained and supervised by staff, volunteers have become an important adjunct to

the Department's effort to serve school groups. In addition to the many classes which arrive daily for a reserved program taught by staff, the Museum admits up to 75 additional classes each school day to visit under the guidance of their own teachers. While there is no formal instruction scheduled for them, each day finds a core of volunteers stationed in several exhibition halls, and they greet and talk informally with many of these groups. Sometimes their main teaching tools are words and ideas, but often they add a hands-on dimension to their interpretive efforts using specimens from our teaching collections. This year more than 26,600 students from 949 school classes had the experience of working with volunteers in this way.

Volunteers also offer a special learning experience for small groups of the handicapped in the Discovery Room two mornings each week. Among the 29 schools and organizations participating this year were the Helen Keller National Institute for the Deaf-Blind, the La Valle School for the Blind and the New York Stroke Foundation. Nearly 400 individuals were served by volunteers in this special activity. On weekends, the Discovery Room functions as a unique learning environment for families with children.

Adult Education The Department of Education continues to program lecture series, accredited courses for teachers and field walks directed toward an adult audience; this year there were also a symposium and several ticketed performing arts events. Twenty-five lecture series, more than ever before, were offered and, for the first time in more than a decade, several were offered in the afternoon, as well as in the evening. Nearly 2850 persons registered for the lecture series. One on "Asian Civilizations" enrolled more than 650 persons, and another, "Anthropology Through Films," had more than 480 registered. Other subject areas touched many of the Museum's areas of scientific interest: ecology, mammalogy, mineral sciences, ornithology, and animal behavior, for example.

Sixteen courses for teachers in New York City were conducted and more than 400 teachers enrolled for this full-semester experience. These courses, taught by our staff, are accredited by the City College of the City University of New York.

Five special ticketed programs were held in the auditorium and drew capacity or near-capacity audiences. These included a lecture-demonstration by the renowned sitarist, Ravi Shankar; a concert by the famed folk-singer, Odetta, and a two-evening series on Egyptian dance featuring dance authority Walter Terry and Egyptian dancer and scholar Magda Saleh.

Weekend field trips are offered each semester to local areas by several staff members, and Education staff also lead the Museum's Discovery Tours to Morocco and Alaska.



Farida A. Wiley, Honorary Associate in Natural Science Education.

Last, but certainly not least, Honorary Associate Farida A. Wiley celebrated her 94th birthday shortly after completing her spring series of walks in Central Park called "Natural Science for the Layman."

Interpretive Facilities The Alexander M. White Natural Science Center serves a dual function. On weekday mornings it operates as a teaching space for school programs, and on weekday afternoons and weekends it is open to the general public. Focusing on the natural world existing within an urban environment, its exhibitions and activities, specially designed for youngsters, have broad appeal for all ages.

Like its neighboring facility, the People Center, it attracts some 8000 weekend visitors per month. A. M. White Center weekend operations this year were made possible by gifts from the Killock Fund and from Mrs. Alexander M. White. Generous grants from the Surdna Foundation and the Henry Nias Foundation supported the People Center weekend programs.

The People Center also functions as a classroom facility for school programs on weekday mornings and as a setting for afternoon courses for teachers and for lecture series. The adjacent Louis Calder Laboratory, supported by the Louis Calder Foundation, remains the Department's only laboratory-classroom facility, and is the principal facility used for the Weekend Workshops for Young People and the Junior High School Natural Science Project.

Independent Visits There is no museum in this city more accessible to groups of school children than this one. More than 117,000 pupils visited in groups this year under the guidance of their own teachers, who had made arrangements through the Department's school reservations office. This figure does not include pupils arriving daily in classes after 1 p.m., the hundreds of classes that make reservations directly with the Hayden Planetarium and have free access to the Museum, the many groups from schools and day-care centers that visit in summer, and finally those young people visiting with their families.

Department of Exhibition and Graphics

From casting lifelike mannequins, to manufacturing foliage, to creating signs, this department brought to life the newest and largest anthropological exhibition in the Museum, the Gardner D. Stout Hall of the Asian Peoples. At the same time, the staff was completing the Arthur Ross Hall of the Meteorites for its spring opening as well as designing and installing a constantly changing round of exhibitions on everything from butterflies to volcanoes.

After 14 years of planning and more than five years of construction and installation, the Gardner D. Stout Hall of Asian Peoples was finally opened to the public. This magnificent array of artifacts, costumes, scale models, musical instruments, religious objects and other treasures of Asia is the largest anthropology hall in the Museum and artfully displays more than 3000 specimens from our collections, as well as 25 dioramas of various sizes.

This year also marked the opening of the Arthur Ross Hall of Meteorites on April 30. A year and a half earlier, the 31-ton Ahnighito meteorite had been moved from the Planetarium to its new site in a mighty feat of engineering. A dynamic new exhibition has been designed around this visitor from outer space. Artwork, photographs and audio-visual stories augmenting the display of smaller meteorites explain what scientists are learning about our planetary system from these meteorites.

Special exhibitions staged in Gallery 3, the largest space devoted to exhibitions of this kind, included "Hopi Kachina: Spirit of Life," which was designed by the California Academy of Sciences, and "Shakespeare: The Globe and the World," created and toured by the Folger Shakespeare Library.

Gallery 77 was the home for six months of an exhibition designed and organized here at the

American Museum and based on the geology of the American Southwest. Entitled "Profiles of the Past: Three Southwest Canyons," it featured three huge panoramic color photographs of Bryce, Zion, and Grand Canyons. The exhibition will travel next year to the Denver Museum of Natural History.

A second show opened in the gallery in June, — "Traditional Japanese Designs: Textiles, Stencils and Costumes." Based on the collection of Tom and Francis Blakemore, it explored the techniques used by the Japanese to cut stencils for the printing of intricate and beautiful textile patterns.

A wide variety of exhibit themes was included in the program of Exhibits of the Month, funded in part by the Arthur Ross Foundation. These included "Action at Mt. St. Helens," a videotaped story of the volcanic eruption; "California Condor: A Species in Peril;" "Masks by Mail: Indian Art Stamps;" "Flying Fantasies: Butterflies and Moths;" photo contest winners from Natural History magazine; "Glories of the Sea: The Munyan Collection of Cone Shells;" "Bird, Cloud, Snake: Hopi Symbols;" and the holiday origami tree.

Two unusual exhibits occupied Roosevelt Memorial Hall in May. One featured traditional Saudi Arabian artifacts complete with a 31-foot Bedouin tent and all of its accouterments. At the same time, the human-powered flying machine, Gossamer Albatross, hung suspended overhead in the great hall.

A comprehensive, three-year renovation program was begun in the Sanford Memorial Hall of the Biology of Birds, as well as minor projects in three other bird halls. Design continues on two more new permanent halls, the reinstallation of the Margaret Mead Hall of Pacific Peoples and the creation of the new Hall of South American Peoples.

Library

The Museum Library is one of the world's finest natural history collections and is looked to for leadership and guidance by other natural history libraries. In order to provide this leadership and the necessary collections and services to the Museum's scientific staff, the last decade has been devoted to building on existing strengths and to modernizing procedures. This year the Library continued its planned course of development: existing projects were carried forward, new projects were begun, and future projects were planned.

The Archives of the Museum were physically transferred to a newly refurbished area adjacent to the Photographic Collection, and a review of archival policies and procedures was begun. A grant for

\$61,950 to survey the Museum's anthropological photographs and to publish a guide was received from the National Endowment for the Humanities. The grant project under the management of Chairwoman Nina Root and the supervision of Pamela Haas, Assistant Librarian for Archives and Photographic Collection, is one of the first of its kind in the country and provides funds for personnel and a microcomputer to organize the collected data. The project is the first step in a long-term program to reorganize and preserve Museum photographs. In addition, a grant for \$10,000 was received from the Exxon Foundation for cataloging and preservation.

The continuing U.S. Department of Education grant to acquire retrospective materials and to join the national bibliographic network, the Ohio College Library Center (OCLC), is now in its final year. Some 1185 retrospective volumes were added to the collection, and 14,070 retrospective catalog records were added to the OCLC data base.

The OCLC now plays an important role in the Library's daily work; interlibrary loan requests from the scientific staff are verified through the national data base and requests from other libraries are received on the terminals. Cataloging information for new serials is checked on the data base, as well as exhibit captions and bibliographies being prepared by the scientific staff.

As a resource center for the New York State Interlibrary Loan Network, major bibliographic data bases have been made available to the scientific staff via a terminal connected to the State Library in Albany. The service is free.

"Recent Publications in Natural History," a quarterly bibliographic listing begun in *Curator* last year, received 510 titles for review; a total of 1025 titles were listed over the year.

Services and Acquisitions The provision of services to the scientific staff, the public and the scholarly community remains the Library's primary occupation. For the some 7500 people visiting the Library, more than 37,000 items were circulated and nearly 8800 reference questions were answered. More than 4000 interlibrary loan requests were received from other libraries. Some 6200 orders for photographic images were filled, generating a substantial income. In addition, over 28,515 issues of Museum scientific publications were distributed, also generating an income.

Some 1050 new monographs and 134 journal titles were added to the collection through purchase, gift and exchange; 45,400 cards filed into the public catalog; 25,700 journal issues received; 188 journal titles reported to *New Serial Titles*; and nearly 1000 images cataloged. In addition, an unprecedented 8722 volumes of journals and books were sent to a commercial bindery or restoration studio.

The review of the Anthropology collection continued this year: 337 volumes were transferred to the security of the Rare Book Room; 77 books were identified for restoration; and some 200 books were withdrawn from the collection. Out-of-scope and duplicate books sold at auction brought in a gross income of \$58,600.

Lack of space continues to be a problem. To somewhat alleviate overcrowding in the stacks, older long runs of journals, space-consuming folio volumes and maps have been moved to the remote storage area in the old Mineral Hall.

Exhibits and Gifts Two exhibits, both executed by Ms. Root, were mounted in the Library Gallery: "Asia in Books" and "Joseph Wolf—Natural History Artist." The Audubon copperplate of the American Turkey donated by Honorary Trustee Cleveland E. Dodge was restored and framed and now hangs in the Library Gallery. Two volumes from the Rare Book Room—John Gould's "Birds of Asia" volume 11 and William Hamilton's "Campi Phlegraei"—were loaned to the Grolier Club for an exhibition "Color in Books." Another exhibit in the Library entrance, "Asian Zoology," was mounted by Acquisitions Librarian Mary Genett.

Two major additions of important collections were accepted by the Library this year, including approximately 200 volumes from Margaret Mead's research collection. The Library also received Dr. Mead's personally kept bibliography of all her writings, with a copy of every article and book included.

Approximately 100 volumes were received from the defunct Eugenics Society, and many papers and records belonging to the society have been added to the collection. A collection of materials of E. T. Seton was received from John Samson. Gifts of slides and tapes were received from Richard Erdoes, Edward McCartan, Harvey Stein, and Juan Carlos Colin. Mrs. Stanley Reed donated an extensive collection of Gurnee Dyer slides and audio tapes. Mrs. Alfred L. Loomis, Jr., made a \$3000 gift to the Library, and a \$480 gift was received from Cyril dos Passos.

Staff Activities The Library staff was active in the profession, attending meetings and presenting papers. Ms. Root was elected the first chairperson of the newly formed Preservation of Library Materials Section of the American Library Association. She surveyed the major photographic collections in England, served as the chairperson of the Administrative Services Committee of METRO, and planned and delivered the keynote address at the First Annual Preservation of Library Materials Conference.

Ms. Haas was elected chairperson of the New York Museums, Arts and Humanities Group of the Special Libraries Association. She spoke at the Boston chapter of the American Society of Picture Professionals on the Museum's photographic collection and its services

and delivered a talk on photographic conservation at the First Annual Preservation of Library Materials Conference.

Miriam Tam, Assistant Librarian for Technical Services, served on the Technical Services Committee of METRO. She is the project manager for the U.S. Department of Education Title II-C grant.

Ms. Genett attended the London Book Fair and the American Booksellers Association Conference. She serves on the ALA Preservation of Library Materials Section, Quality of Library Materials Committee, as well as on a subcommittee to determine the needs for future preservation workshops, and is the editor of "Recent Publications in Natural History."

Diana Shih, Cataloging Librarian, is chairing the Library's committee to investigate subject headings.

Two library school students, Bonnie Marshak and Charles Matyas, served their internships in the Library and participated in daily routines and special projects.

Publications:

Genett, Mary, editor

1979. Recent Publications in Natural History. Curator, vol. 22, no. 2, pp. 115-180.

1979. Recent Publications in Natural History. Curator, vol. 22, no. 3, pp. 233-259.

1979. Recent Publications in Natural History. Curator, vol. 22, no. 4, pp. 310-331.

1980. Recent Publications in Natural History. Curator, vol. 23, no. 2, pp. 118-158

Haas, Pamela

1981. [Review of] The North American Indian: The Southwest by Edward S. Curtis (Classic Gravure reprint). Curator, vol. 23, no. 2.

1981. Photographic conservation: Selected bibliography for administrators. Paper delivered at the First Annual Preservation of Library Materials Conference, New York, May 13-14.

Root, Nina J.

1979. [Review of] The Google Book by Vincent Cartwright Vickers. Curator, vol. 22, no. 2, pp. 119-120.

1980. Role of the Museum Library. Session Proceedings, Joint Annual Meeting American Association of Museums/Canadian Museums Association, Boston, June 1980.

Publications

Curator

The circulation of *Curator* continued to grow during the year and is now at an all-time high. Article submissions have increased substantially due to intensified solicitation. The increased rate of submission of articles has allowed *Curator* to improve its publication schedule. Six issues were published in fiscal 1980-81, for a total of 475 pages. A thematic issue focusing

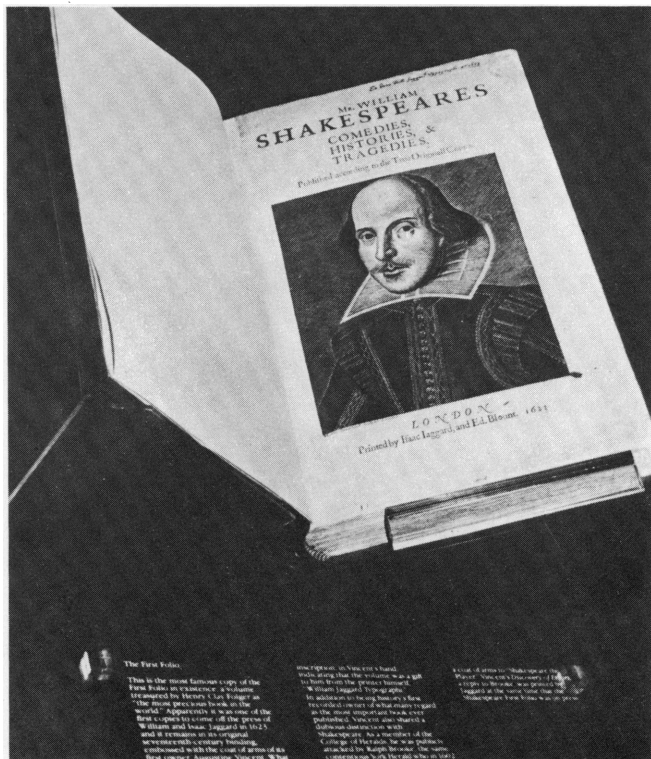
on "The Curation of Archaeological Collections" was highly successful, and more thematic issues are planned. An active editorial board drawn from science, art and historical museums contributed to this year's successes. An analysis of *Curator's* subscriber list revealed that the journal circulates among a surprisingly broad segment of the academic and museum community, both in North America and overseas. The analysis will be useful for a major circulation promotion planned for late 1982.

Scientific Publications

The office of Scientific Publications published 13 articles in the *Bulletin*, totaling 1023 pages; 18 numbers in *American Museum Novitates*, totaling 387 pages; and one part in *Anthropological Papers*, totaling 56 pages—a combined total of 1466 printed pages for the year.

Six numbers in *American Museum Novitates*, eight articles for *Bulletin*, and two parts for *Anthropological Papers* are currently in press.

A precious First Folio of William Shakespeare's plays was among the many treasures featured in the special exhibition, "Shakespeare: The Globe and the World." The exhibition, which attracted more than 250,000 visitors during its three months at the American Museum, also was the center of a "Shakespeare Summerfest" in which area schools, theaters, institutions, colleges and universities sponsored Shakespeare-related programs.



Museum workers construct a booth in the Auditorium to house a 10-foot by 12-foot IMAX projector. With the addition of a four-story retractable screen, this projector and a six-directional sound system, the Auditorium will be equipped to show the spectacular film, "To Fly." This 27-minute film depicts the history of aviation in America through scenes which show the inventiveness of the American people and the country's grandeur. Viewers experience the sensation of flight. As with the IMAX project, much of the Museum's design work and construction is done in-house by the Department of Plant Operations, Maintenance and Construction.

Administration

Plant Operations, Maintenance and Construction

This office moves easily from day-to-day plant and maintenance operations to often more challenging design and construction projects.

Designed in-house this year were outline plans to add an IMAX projection capability to the Auditorium's regular programming, and to convert Education Hall into two theaters seating 150 and 300 people. Museum crews began work on the Auditorium to prepare for the installation of an oversized, retractable screen and an IMAX projector. The two smaller theaters will be fully equipped for a variety of events and will share a new lobby, restrooms and a coat-checking area.

The staff planned future improvements for the fifth floor: a new staff lounge, spaces for the newly purchased scanning electron microscope, computer and word-processing equipment.

A major in-house project was the construction of a fourth-floor bridge between the Library and the Education Building. Staff and visitors will be able to move more easily between the Library and the offices of the Photo Collection and the newly installed archives.

Construction also began this year on an expansion of the Herpetology Department's offices and laboratories onto the second floor. The department is increasing its space approximately 45 percent.

Even as Museum crews completed the extensive work on the Arthur Ross Hall of Meteorites, others were installing special exhibitions such as

"Shakespeare: The Globe and the World." Work also progressed on the Margaret Mead Hall of Pacific Peoples; 30 percent of the project has been completed.

During the year, Museum workers handled 15 major renovation projects ranging from plaster repair to installation of emergency lighting and improvement of offices.

Outside contractors progressed on projects directly funded by the City of New York, including major rehabilitation of the buildings' exteriors, construction of a fourth-floor mezzanine for the anthropology collection in Building 8, and automation of elevators in the Roosevelt Memorial and School Services Buildings.

Office of the Controller This office expanded its staff to include an internal auditor and cash control manager. The internal auditor is preparing programs which will serve as the bases for financial and operational audits of various Museum activities.

The cash control manager supervises the newly created Cash Control Office which reconciles cash intake against supporting data. The cash control manager is also responsible for the preparation of cash reports, deposits, and the staffing and supervision of admissions cashiers.

Museum Shop Specialized items are rapidly becoming a feature of the Museum Shop, whether created for the Museum or related specifically to exhibitions.

Its successful collection of dinosaur ties was expanded to include *Tyrannosaurus rex*, dinosaur pins in gold and silver were developed, and a Chinese toy tiger from the 19th century was adapted from the collection within the Gardner D. Stout Hall of Asian Peoples. Totes, T shirts, scarves, posters and cards are a few of the items developed for sale during special and permanent exhibitions.

With the opening of the Hall of Asian Peoples, the shop's collection of Asian items was expanded and now ranges from toys to fine porcelain. Many of these pieces were also highlighted in the third issue of the Museum Shop Catalog, which proved to be the most successful since it began three years ago.

A satellite shop on the third floor specializes in merchandise relating to the current exhibition in Gallery 3. The gallery and adjoining shop changed their contents three times during the year for the exhibitions, "Feather Arts," "Hopi Kachina" and "Shakespeare: The Globe and the World."

The staff developed plans to increase the shop's selling space more than 50 percent. A balcony will overlook the present shop and extend into the hallway near the 77th Street elevators, adding a mezzanine to the hallway. This addition will allow a more extensive selection of books, posters and records and will free downstairs space for additional clothing and accessories.

Building Services To streamline the hiring and training of attendant-guards throughout the institution, the security forces of the Museum and the Planetarium were merged under the supervision of this office.

Attendant-guards are now hired in groups of 10 or more and receive formal instruction as a group. An earlier, pilot program had proved the effectiveness of this procedure. Previously, individually hired employees learned on the job. The result of the more structured training is a staff which is more knowledgeable about the Museum and better prepared for their own roles.

General Services The Department of General Services consists of five subunits: Photo Studio, Print Shop, Shipping and Receiving, Switchboard and Mail Room. In the past year, the Photo Studio completed more than 400 projects ranging from photographing exhibitions, artifacts and people for Museum departments to printing photos ordered by outside customers through the Photographic Collection. The department also printed some 150 brochures and flyers.

Development and Communications

As a private institution nourishing a unique public trust, the Museum must rely extensively upon individuals, corporations and foundations. The Museum has used this private support to constantly improve its permanent exhibitions, attract fascinating special exhibitions, and enrich its research and teaching capabilities.

In these years of shrinking governmental dollars, increasing amounts of private support are required, even as the Museum builds new sources of revenue. Fortunately, the Museum has a strong roster of members and friends who believe firmly in the Museum's contribution to the advancement of science and to the cultural enrichment of our society.

Development A sound financial base for the Museum—its collections, exhibitions, research and teaching capabilities—is the goal of the Development Office. Important steps toward that goal were made this year with the solid support of Trustees, corporations and foundations.

Crucial to this building process are the Trustees, who were active in all areas of financial development. They served on fund raising committees, increased their own contributions and were instrumental in generating additional grant support of \$1,061,000.

Trustee Arthur Ross is typical of supporters whose contributions are shaping the Museum and bringing

new learning experiences to thousands of visitors. The Arthur Ross Hall of Meteorites opened in April to make the Museum's matchless collection of these space travelers accessible and understandable to the general public.

As Honorary Trustee and President Emeritus, Gardner D. Stout saw the culmination of 14 years of work with the opening of the Gardner D. Stout Hall of Asian Peoples, the Museum's largest permanent anthropological exhibition. The Starr Foundation assisted with \$60,000 to print the descriptive brochure and visitor's guide for the hall.

Corporate giving topped the million dollar mark in fiscal 1980-81, under the able leadership of Trustee Donald C. Platten, general chairman of the Annual Corporate Campaign. The final total of \$1,121,352 represented a 25 percent increase over the previous year's donations.

Unrestricted contributions jumped 38 percent this year to \$830,822. In addition, 36 corporations gave \$293,530 in grants earmarked for special purposes.

The Employee Admission Program continued to grow, with 35 corporations of the 46 making contributions of more than \$5,000 to the Museum electing to participate.

Assistance from Exxon Corporation and Metropolitan Life Insurance Company enabled the Museum to open and promote a special exhibition of the Folger Shakespeare Library, "Shakespeare: The Globe and the World."

Trustee Plato Malozemoff is spearheading the drive for the Economic Mineralogy Program. Fifteen mining companies have thus far donated funds to this recently launched program which will create a new curatorial position for research into the critical area of ore development and exploration.

Foundations have been quite responsive to Museum needs—27 foundations awarded grants totaling \$680,000 for special projects and another 10 pledged \$780,000 in future support.

The Richard Lounsbery Foundation has committed \$500,000 over five years to create the Richard Lounsbery Fund for Research in Anthropology which will support fieldwork and provide grants to students and scholars. It also will establish a laboratory for biological anthropology, the study of man and his closest relatives from a biological standpoint rather than on a cultural level.

The L.A.W. Fund has set up a \$1,300,000 trust, the Lila Acheson Wallace/American Museum of Natural History Fund. Administered by the New York Community Trust, the fund's income will support general programming.

With assistance from the Robert Sterling Clark Foundation, computerization of Development Office records began. This step will streamline record-keeping systems and make possible more sophisticated direct mail campaigns.

Headed by Chairpersons Frank G. Lyon and Mrs. Robert V. Lindsay, the Men's and Women's Committees raised \$116,051 in personal contributions and hosted several successful benefits.

Natural History To satisfy an avid and growing public interest in the world we live in, *Natural History* magazine responded this year by increasing publication frequency from 10 to 12 issues.

While editors seek articles from scientists throughout the world, they continue to find fascinating material among the Museum staff, such as an article on trilobites by Curator Niles Eldredge and Curator Enid Schildkrout's piece on children in northern Nigeria. Former Curator Colin M. Turnbull contributed a year-long series of columns based upon his around-the-world tour.

Four of the magazine's covers featured illustrations related to Museum exhibitions and programs: the Gardner D. Stout Hall of Asian Peoples, the Arthur Ross Hall of Meteorites, the special exhibition, "Shakespeare: The Globe and the World," and the annual photographic competition, which later formed an exhibition. These covers and associated articles help keep members informed about Museum activities.

Natural History maintained a print run of about 500,000 and delivered each issue to more than 460,000 associate members. Advertising sales followed industrywide trends, dropping slightly. However, advertising forecasts for the fiscal year 1981-82 and the number of pages sold for the first three months show an upward trend.

Because the annual rate for associate membership (which includes *Natural History*) was increased from \$10 to \$15, membership promotion was particularly heavy during the year. As members become more accustomed to the new rate and renew their memberships more readily, the Museum will receive a steady contribution from this unique membership/publishing activity.

To help defray the higher costs of benefits, rates for participating membership were increased from \$20 to \$30. Additional revenue more than offset the small, temporary drop in renewals. The number of members in the donor category (\$50 to \$100) jumped 70 percent.

The monthly membership programs were particularly well attended this year; 80 percent of these events were filled to capacity. Highlights of the season were performances of the Fujian Hand Puppets from the People's Republic of China and a lecture program featuring chimpanzee researcher Jane Goodall.

Public Affairs This office reaches the public through the mass media, informing them of coming exhibitions, educational programs and scientific

findings.

The opening of two major permanent exhibitions this year—the Gardner D. Stout Hall of Asian Peoples and the Arthur Ross Hall of Meteorites—generated heavy promotional campaigns. Both successfully attracted national coverage in radio, television and print media. Television coverage included a live broadcast of ABC's network show, "Good Morning America," from the Hall of Meteorites and a taping of the NBC network program, "First Estate," which explored the religious themes in the Hall of Asian Peoples. News and special interest magazines responded strongly, as did newspapers across the nation.

Henry Kissinger invited listeners to visit the Hall of Asian Peoples in a radio advertisement created by Ogilvy and Mather. Other advertising agencies—Interart, McCaffrey and McCall—also helped develop advertisements and public service messages for radio, television and print media.

The office continued to concentrate efforts on expanding its national magazine and television outreach and on placing information before potential Museum-goers in hotels, motor inns and tourist information centers.

Special visits to the Museum and meetings with its scientists and administrators by editors and other media representatives were arranged in order to bring our story directly to those charged with disseminating information to the public.

Discovery Tours Discovery Tours spanned the globe with 534 members and friends of the Museum in 12 trips to 22 countries. The number of travelers attracted to these unusual tours has more than doubled. Their hallmark is a carefully planned educational program combined with meticulous travel arrangements.

With Museum staff as lecturers, groups explored the Galapagos Islands and highland Ecuador, cultural wildlife areas of Papua New Guinea and Australia, art and archeological sites in the People's Republic of China, Morocco's countryside and ancient towns, Mayan archeological centers in Mexico and Guatemala, Alaska's wildlife areas and game reserves in Kenya and Tanzania.

Director Thomas D. Nicholson and six other lecturers circumnavigated the British Isles with 200 participants in the year's largest single tour. They visited ancient landmarks, bird reserves and botanical gardens throughout the islands.

Discovery Tours further developed the principle of tailoring itineraries which parallel the extensive work of the Museum's scientific staff and exhibition departments. The new Indonesian Odyssey, scheduled for February, 1982, is a result of this effort. This cruise program will explore the Indonesian Islands where Museum researchers have studied culture and

wildlife for more than 50 years.

Guest Services This office touches every visitor, from school child to movie producer, who contacts the Museum. Its recorded telephone message provided Museum information to 190,147 prospective visitors last year. Seventy-eight thousand brochures were placed in information offices, hotels and airline agencies. More than 390,000 floor plans guided visitors through the Museum, and the constantly changing television monitors alerted guests to the latest events.

Guest Services coordinates arrangements for every event, whether a lecture, meeting, screening or dinner-dance. A sampling of the year's events includes an all-day professional seminar of the American Society of Magazine Editors, celebrations of openings of exhibitions, and four days of filming for the movie "Rollover," starring Jane Fonda.

Looking ahead to the coming year, Guest Services began planning for a new restaurant, an outdoor cafe and a renovated cafeteria.

Volunteer Office Volunteer employees contributed a record 93,919 hours of service last year, working both behind the scenes and in the public areas. They led tours, staffed information desks, sold memberships and gifts, answered children's letters, worked in laboratories, arranged special programs and provided invaluable temporary assistance in many Museum departments.

Developed and organized by volunteers, the Museum Highlight Tours attracted 40,181 visitors in 2034 tours. The volunteer guides also led 67 VIP tours and 35 special membership tours.

An extensive training program enables the volunteers to represent the Museum with insight and professional authority. A total of 4476 hours were spent in classroom orientation sessions.

New this year was the Dino Cart, staffed by volunteers and located near the Halls of Early and Late Dinosaurs. Stocked with merchandise related to these prehistoric vertebrates, the cart accounted for approximately 10 percent of the volunteers' total sales in its first five months of operation. Volunteers' sale of membership and merchandise totaled \$100,892.

The Volunteer Office worked closely with corporations to encourage their employees to "moonlight" at the Museum. Most of the volunteers working on weekends came to the Museum from this corporate outreach program.

Corporate encouragement of volunteers extends beyond recruiting. Exxon, for example, gives financial grants to its employees and annuitants to pursue special research and other projects as volunteers. For training tour guides, Exxon also contributed recording equipment while McCall Pattern Co. reproduced training materials.

Treasurer's Report

The statements reflecting the financial condition of the American Museum of Natural History appear on the following pages. These statements, consisting of the Balance Sheet, Statement of Revenue and Expenses of Current Funds, and Statement of Changes in Fund Balances, have been audited by Coopers and Lybrand and their notes on these statements appear on pages 62–63.

The Balance Sheet reports that investments in marketable securities, recorded at a cost of \$64,753,601, are included in the following funds: General Fund of \$4,673,932, Special Funds of \$5,684,959 and Endowment Funds of \$54,394,710. The total market value of these securities on June 30, 1981, amounted to \$73,018,790, which is \$8,265,189 greater than cost; this increase in value occurred largely in the Endowment Funds, as detailed in Note 1 of the financial statements.

The General Fund investments of \$4,673,932 largely represent advance payments by Museum members for benefits due them in future years. This asset offsets, for the most part, the liability for unearned membership income amounting to \$5,137,213. Special Funds investments of \$5,684,959 consist of amounts reserved for the completion of special programs and projects funded by grants from individuals, private foundations and government agencies, as well as Museum funds set aside for specific programs to be completed in future years. The Endowment Funds investments of \$54,394,710 represent the balance of funds allocated by donors or the Board of Trustees for endowment purposes since its organization in 1869.

The revenue and expenses of the General Fund and Special Funds appear on the Statement of Revenue and Expenses of Current Funds, page 60. The total revenue for these funds for 1980–1981 was \$22,946,356; the total expenses amounted to \$24,046,595. After adjusting for the support grants of \$601,000, expenses exceeded revenue by \$499,239. While the combined operation of both of these funds shows an excess of expenses over revenue, individually the General Fund had an excess of expenses over revenue of \$892,809, and the Special Funds, which cover programs that are restricted in nature and may take several years to complete, had an excess of revenue over expenses of \$393,570.

In reviewing operations of the General Fund, it should be noted that the total revenues amounted to \$17,680,238 compared to \$16,691,945 for the preceding year, an increase of about 6 percent.

It should be noted that while the contribution from the City of New York was substantially more in 1981 than in 1980, the level of support for Museum activities actually increased about \$70,000, since the current year's appropriation included negotiated and other salary

increases for the current and prior years of more than \$500,000.

Revenue from Gifts, Bequests and Grants were substantially higher than the previous year as a result of strong support from the corporate sector, trustees and private foundations.

The decrease in distribution from Endowment Funds in the current year resulted from the adoption of a policy introduced July 1, 1980, whereby distributions would be fixed annually at a set percentage of the average market value of the Endowment Funds as of March 31 for the three preceding years. This policy was introduced in order to furnish a stable basis for operations and to preserve the capital of Endowment Funds in an inflationary economy. The percentage allocated in fiscal 1981 was 5 percent. It should be noted that prior to July 1, 1980, the allocations from endowments for budgetary purposes were also based on this principle, but that all interest and dividends received were distributed. In years when such interest and dividend distribution was less than 5 percent, additional distributions were made from principal as required.

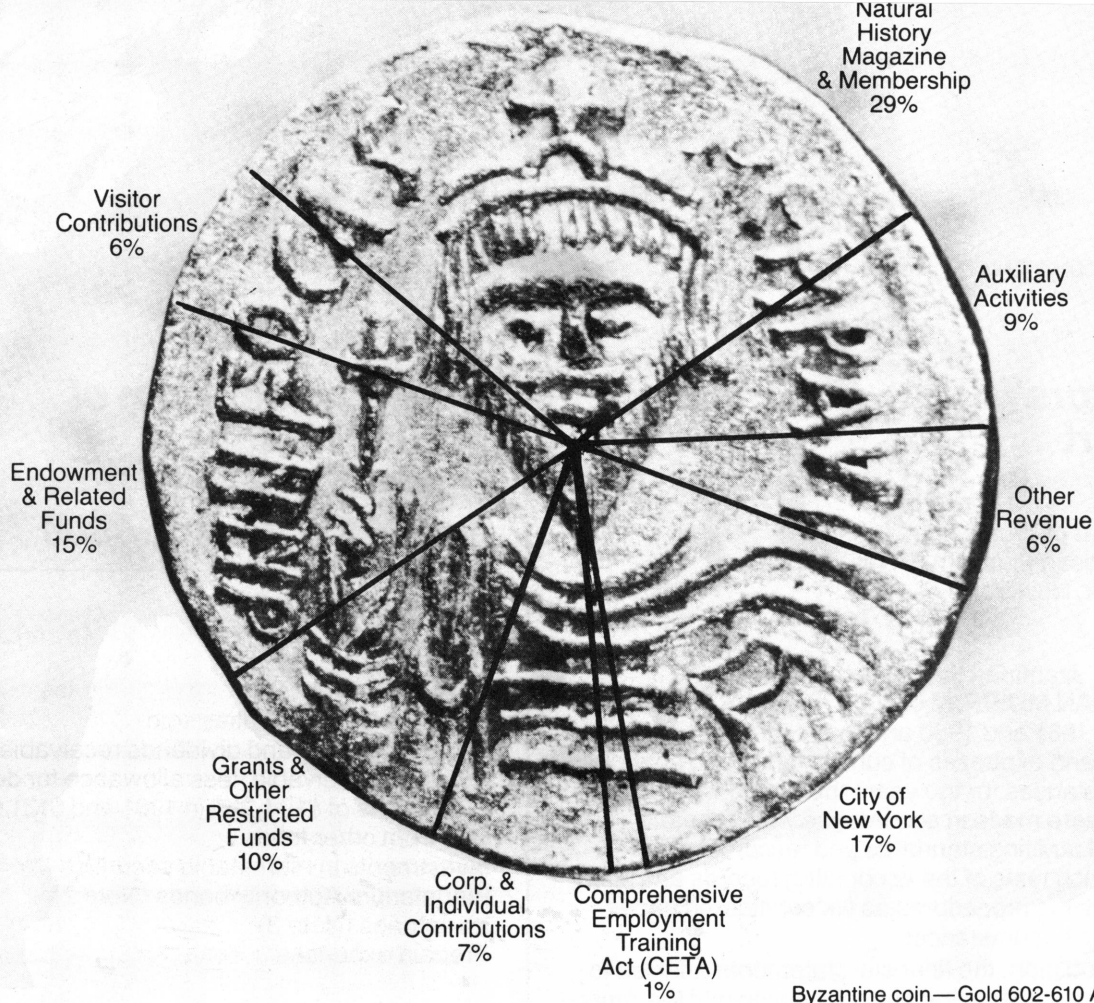
General Fund expenses for the year amounted to \$19,174,047 compared to \$17,585,215, an increase of about 9 percent. The increases in General Fund expenses in fiscal 1981 include cost of living adjustments to the salaries of employees and the increased costs of personal services and supplies the Museum purchases from outside sources. The large increase in Natural History and Membership expenses reflects the substantial promotional outlays made to maintain membership levels in the face of the higher membership dues initiated in 1979–1980.

At this writing, the long predicted recession seems to have taken effect. This factor, together with the curtailment of Federal funds which support the arts, humanities and science programs of museums and other institutions, raises the question as to whether the private sector will be able to maintain the level of support provided in former years, much less provide the additional support necessary to counteract the reduction in Federal support. The recession may also affect the revenues and economies in cities and states and the abilities of local regions to support cultural programs and institutions.

In spite of these uncertainties, the American Museum of Natural History will continue to strive to maintain the quality and scope of services that have made it one of the leading museums in the world. We hope that continued support from the public will enable us to carry out these programs.

Frederick A. Klingenstein,
Treasurer

Revenue
\$22,946,356



Byzantine coin—Gold 602-610 AD (AMNH cat. # 75.0/76)

Expenses
\$24,046,595



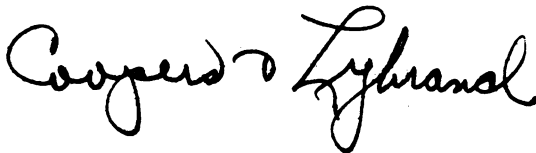
Chinese Coin—Shun Zhi Period 1644-1662 AD (AMNH cat. # 70/12)

Auditors' Report

The Board of Trustees of
the American Museum of Natural History,
New York, New York:

We have examined the balance sheets of the AMERICAN MUSEUM of NATURAL HISTORY as of June 30, 1981 and 1980 and the related statements of revenue and expenses of current funds and changes in fund balances for the years then ended. Our examinations were 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 financial statements referred to above present fairly the financial position of the American Museum of Natural History as of June 30, 1981 and 1980 and the results of its operations for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.



1251 Avenue of the Americas
New York, New York 10020
October 9, 1981

American Museum of Natural History Balance Sheets, June 30, 1981 and 1980

ASSETS:

Cash
Receivable for securities sold
Accrued interest and dividends receivable
Accounts receivable, less allowance for doubtful
accounts of \$194,266 in 1981 and \$151,636 in 1980
Due from other funds
Investments in marketable securities (Note 1)
Planetarium Authority bonds (Note 2)
Inventories (Note 3)
Prepaid expenses

LIABILITIES and FUNDS:

Accounts payable and accrued liabilities
Accrued employee benefit costs
Payable for securities purchased
Due to other funds
Unearned membership income
Funds:
General Fund (deficit)
Special Funds (Notes 4 and 5)
Endowment Funds (Notes 6 and 7)

| 1981 | | | | 1980 | | | |
|--------------------|--------------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|
| Current Funds | | | | Current Funds | | | |
| General Fund | Special Funds | Endowment Funds | Total | General Fund | Special Funds | Endowment Funds | Total |
| \$ 331,251 | \$ 228 | \$ 196,378 | \$ 527,857 | \$ 196,151 | \$ 6,409 | \$ 202,560 | \$ 202,560 |
| 96,430 | 113,127 | 609,428 | 609,428 | 351,720 | 71,680 | \$ 358,297 | 358,297 |
| 958,333 | 329,125 | 593,933 | 803,490 | 861,359 | 369,849 | | 1,231,208 |
| | 50,689 | | 1,287,458 | | 44,450 | | 44,450 |
| 4,673,932 | 5,684,959 | 54,394,710 | 64,753,601 | 4,182,801 | 6,097,409 | 48,466,097 | 58,746,307 |
| | 425,000 | | 425,000 | | 425,000 | | 425,000 |
| 851,460 | | | 851,460 | 753,396 | | | 753,396 |
| 1,235,118 | 79,223 | | 1,314,341 | 1,459,526 | 53,024 | | 1,512,550 |
| <u>\$8,146,524</u> | <u>\$6,682,351</u> | <u>\$55,794,449</u> | <u>\$70,623,324</u> | <u>\$7,804,953</u> | <u>\$7,067,821</u> | <u>\$48,824,394</u> | <u>\$63,697,168</u> |
| \$1,784,687 | \$ 297,193 | \$ 61,317 | \$ 2,143,197 | \$2,147,757 | \$ 162,085 | \$ 40,912 | \$ 2,350,754 |
| 1,509,488 | | | 1,509,488 | 1,395,990 | | | 1,395,990 |
| | | 906,346 | 906,346 | | | 1,510,140 | 1,510,140 |
| 2,645 | | 48,044 | 50,689 | | | 44,450 | 44,450 |
| 5,137,213 | | | 5,137,213 | 4,668,260 | | | 4,668,260 |
| (287,509) | | | (287,509) | (407,054) | | | (407,054) |
| | 6,385,158 | | 6,385,158 | | 6,905,736 | | 6,905,736 |
| | | 54,778,742 | 54,778,742 | | | 47,228,892 | 47,228,892 |
| <u>\$8,146,524</u> | <u>\$6,682,351</u> | <u>\$55,794,449</u> | <u>\$70,623,324</u> | <u>\$7,804,953</u> | <u>\$7,067,821</u> | <u>\$48,824,394</u> | <u>\$63,697,168</u> |

Statements of Revenue and Expenses of Current Funds for the years ended June 30, 1981 and 1980

| | General Fund | | Special Funds | | Total | |
|--|---------------------|---------------------|-------------------|-------------------|---------------------|-------------------|
| | 1981 | 1980 | 1981 | 1980 | 1981 | 1980 |
| Revenue: | | | | | | |
| Appropriation from the City of New York | \$ 3,773,867 | \$ 3,180,709 | | | \$ 3,773,867 | \$ 3,180,709 |
| Comprehensive Employees Training Act (CETA) | 192,595 | 230,556 | | | 192,595 | 230,556 |
| Gifts, bequests and grants | 1,491,392 | 937,233 | \$2,347,839 | \$3,017,355 | 3,839,231 | 3,954,588 |
| Distribution from Endowment Funds (Note 7) | 1,713,000 | 2,355,704 | 494,830 | 640,890 | 2,207,830 | 2,996,594 |
| Interest on short-term investments | 928,542 | 555,939 | 318,345 | 320,027 | 1,246,887 | 875,966 |
| Visitors' contributions | | | 1,425,451 | 1,385,431 | 1,425,451 | 1,385,431 |
| Natural History magazine and membership | 6,732,224 | 6,842,273 | | | 6,732,224 | 6,842,273 |
| Other revenue | 702,053 | 602,776 | 679,653 | 876,859 | 1,381,706 | 1,479,635 |
| Auxiliary activities | 2,146,565 | 1,986,755 | | | 2,146,565 | 1,986,755 |
| Total revenue | 17,680,238 | 16,691,945 | 5,266,118 | 6,240,562 | 22,946,356 | 22,932,507 |
| Expenses: | | | | | | |
| Scientific and educational activities | 3,538,242 | 3,272,380 | | | 3,538,242 | 3,272,380 |
| Exhibition halls and exhibits | | | 1,213,310 | 1,456,612 | 1,213,310 | 1,456,612 |
| Other special purpose programs and projects | | | 3,044,724 | 3,654,161 | 3,044,724 | 3,654,161 |
| Administrative and general | 2,165,243 | 2,035,678 | 401,456 | 166,484 | 2,566,699 | 2,202,162 |
| Plant operating and maintenance | 3,150,750 | 2,760,952 | | | 3,150,750 | 2,760,952 |
| Pension and other social benefits (Note 8) | 1,454,903 | 1,148,637 | 213,058 | 210,881 | 1,667,961 | 1,359,518 |
| Natural History magazine and membership | 7,352,073 | 6,753,754 | | | 7,352,073 | 6,753,754 |
| Auxiliary activities | 1,512,836 | 1,613,814 | | | 1,512,836 | 1,613,814 |
| Total expenses | 19,174,047 | 17,585,215 | 4,872,548 | 5,488,138 | 24,046,595 | 23,073,353 |
| Excess of revenue over expenses (expenses over revenue) before support grant | (1,493,809) | (893,270) | 393,570 | 752,424 | (1,100,239) | (140,846) |
| Support grant (Note 9) | 601,000 | 623,000 | | | 601,000 | 623,000 |
| Excess of revenue over expenses (expenses over revenue) | (\$ 892,809) | (\$ 270,270) | \$ 393,570 | \$ 752,424 | (\$ 499,239) | \$ 482,154 |

The accompanying statement of significant accounting policies and notes are an integral part of these financial statements.

**Statements of Changes in
Fund Balances
for the years ended
June 30, 1981 and 1980**

| | Current Funds | | | | Endowment Funds | |
|---|---------------|-------------|---------------|-------------|-----------------|--------------|
| | General Fund | | Special Funds | | 1981 | 1980 |
| | 1981 | 1980 | 1981 | 1980 | | |
| Balance (deficit), beginning of year | (\$407,054) | (\$353,482) | \$6,905,736 | \$6,183,675 | \$47,228,892 | \$45,056,118 |
| Additions: | | | | | | |
| Gifts, bequests and grants | | | | | 109,594 | 106,477 |
| Interest and dividend income (Note 7) | | | | | 1,415,946 | 144,818 |
| Net gain on sale of investments | | | | | 6,550,723 | 2,378,160 |
| Excess of revenue over expenses, as annexed | | | 393,570 | 752,424 | | |
| Total additions | | | 393,570 | 752,424 | 8,076,263 | 2,629,455 |
| Deductions: | | | | | | |
| Excess of expenses over revenue, as annexed | 892,809 | 270,270 | | | | |
| Administrative and general expenses | | | | | 308,576 | 149,372 |
| Prior service contributions to CIRS (Note 8) | | | | | 119,631 | 120,974 |
| Total deductions | 892,809 | 270,270 | | | 428,207 | 270,346 |
| Transfers between funds: | | | | | | |
| Financing of: | | | | | | |
| 1980 and 1979 General Fund deficits | 407,054 | 353,482 | (172,639) | (164,044) | (234,415) | (189,438) |
| Special Funds activities | (8,552) | (136,784) | 59,241 | 133,681 | (50,689) | 3,103 |
| Other (Note 10) | 613,852 | | (800,750) | | 186,898 | |
| Total transfers | 1,012,354 | 216,698 | (914,148) | (30,363) | (98,206) | (186,335) |
| Balance (deficit), end of year | (\$ 287,509) | (\$407,054) | \$6,385,158 | \$6,905,736 | \$54,778,742 | \$47,228,892 |

The accompanying statement of significant accounting policies and notes are an integral part of these financial statements.

Statement of Significant Accounting Policies

The American Museum of Natural History ("Museum") maintains its accounts principally on the accrual basis.

The land and buildings utilized by the Museum (most of which are owned by the City of New York), fixed assets (which are charged off at time of purchase), exhibits, collections and the Library are not reflected in the balance sheets.

To ensure observance of limitations and restrictions placed on the use of the resources available to the Museum, the accounts of the Museum are maintained in accordance with the principles of "fund accounting." This is the procedure by which resources for various purposes are classified for accounting and financial reporting purposes into funds that are in accordance with activities and objectives specified. Separate accounts are maintained for each fund; however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups.

Within current funds, fund balances restricted by outside sources or by the Board of Trustees ("Trustees") are so indicated (Special Funds) and are segregated from the General Fund. These Special Funds may be utilized only in accordance with the purposes established for them as contrasted with the General Fund over which the Trustees retain full control to use for the general operation of the Museum.

Endowment Funds include (a) funds subject to restrictions established by the donor requiring that the original principal be invested in perpetuity, and (b) funds established by donors or Trustees (funds functioning as endowments) where the principal may be expended with the approval of the donor or the Trustees.

Interest and dividend income derived from investments of Endowment Funds is distributed to the current funds on a unit basis which reflects the ratio of the related funds invested in the pooled portfolio at market value (see Note 7).

Investments are stated at cost or, if acquired by gift, at fair value at date of acquisition. Non-marketable securities are valued by the Finance Committee of the Museum and approved by the Trustees.

Inventories are stated at the lower of cost (first-in, first-out method) or market.

Membership income is recognized as income ratable over the membership term.

The Museum accrues and funds annually the normal cost for eligible employees participating in the Cultural Institutions Pension Plan ("CIRS Plan") administered by the Cultural Institutions Retirement System ("CIRS"). The unfunded prior service cost, with interest, is being funded over 30 years ending in fiscal 2004.

Notes to Financial Statements

1. Cost and market quotations of investments at June 30 are as follows:

General Fund
Special Funds
Endowment Funds

The Museum's investments consist of the following:

Short-term obligations
Bonds
Common Stocks

2. The investment in bonds (\$570,000 principal amount) of the American Museum of Natural History Planetarium Authority ("Planetarium") is carried at cost. The Planetarium is operated under the supervision of the Museum. Interest income of \$25,650 received from the Planetarium in the years ended June 30, 1981 and 1980 is included in net income from investments of the General Fund.

| | | | |
|---------------------------|------------------|------------------|--|
| 3. Inventories comprise: | <u>1981</u> | <u>1980</u> | |
| Paper for Natural History | | | |
| Magazine | \$559,773 | \$506,683 | |
| Merchandise | 291,687 | 246,713 | |
| | <u>\$851,460</u> | <u>\$753,396</u> | |

4. Included at June 30, 1981 in Special Funds (funds which are received or appropriated for specific purposes) is approximately \$3,080,000 of funds restricted by the donor as to use.
5. The balances at June 30, 1981 and 1980 of Special Funds are net of overdrafts of certain of these funds of approximately \$898,000 and \$395,000, respectively. These overdrafts represent expenditures in anticipation of transfers from Endowment Funds and/or General Fund, receipt of gifts and grants, or the sale of property and equipment utilized by the Special Funds.
6. Endowment Funds (including funds functioning as Endowment Funds) are summarized as follows:

Endowment Funds, income available for:

Restricted purposes
Unrestricted purposes

Funds functioning as endowment, principal and income available for:

Restricted purposes
Unrestricted purposes

| 1981 | | 1980 | |
|---------------------|---------------------|---------------------|---------------------|
| Cost | Market | Cost | Market |
| \$ 4,673,932 | \$ 4,394,612 | \$ 4,182,801 | \$ 4,146,345 |
| 5,684,959 | 5,371,192 | 6,097,409 | 6,044,266 |
| 54,394,710 | 63,252,986 | 48,466,097 | 53,628,701 |
| <u>\$64,753,601</u> | <u>\$73,018,790</u> | <u>\$58,746,307</u> | <u>\$63,819,312</u> |
| | | | |
| \$15,365,392 | \$15,328,180 | \$11,949,466 | \$11,984,946 |
| 13,057,750 | 11,501,475 | 13,347,173 | 13,435,223 |
| 36,330,459 | 46,189,135 | 33,449,668 | 38,399,143 |
| <u>\$64,753,601</u> | <u>\$73,018,790</u> | <u>\$58,746,307</u> | <u>\$63,819,312</u> |

7. Effective in fiscal 1981, the Trustees adopted a policy whereby distributions from Endowment Funds to the General and Special Funds would be fixed annually at a percentage of the average market value of the Endowment Funds as at March 31 of the three preceding years. The average market value of Endowment Funds for the three years ended March 31, 1980, was \$46,522,740. For fiscal 1981, 5% thereof or \$2,326,137 was distributed as follows: \$1,713,000 to General Funds, \$494,830 to Special Funds and \$118,307 to the Pension Support Endowment Fund. The latter figure (\$118,307) is included in the interest and dividend income of \$1,415,946 for Endowment Funds in the Statement of Changes in Fund Balances. If this policy had been followed in fiscal 1980 using the same percentage, the distribution from Endowment Funds to the General and Special Funds would have decreased by \$641,704 and \$159,550, respectively, with a corresponding increase in the Endowment Funds.
8. Pension costs amounted to approximately \$704,000 in fiscal 1981 and \$680,000 in fiscal 1980. Of these amounts, approximately \$120,000 in fiscal 1981 and \$121,000 in fiscal 1980 were funded through pension support Endowment Funds. The balance of approximately \$584,000 in fiscal 1981 and \$559,000 in fiscal 1980 (representing normal service cost and amortization of

unfunded prior service cost over a 20-year period) was charged to current funds. The CIRS Plan is a multiemployer plan and, as such, its actuarial present value of vested and nonvested accumulated plan benefits and net assets available for benefits are not determinable on an individual institution basis.

9. In fiscal 1981 and 1980, grants of \$601,000 and \$598,000, respectively, were received from the New York State Council on the Arts towards the support of the General Fund's operations. Additionally, a grant of \$25,000 was received from the Federal Institute of Museum Services in fiscal 1980.
10. In fiscal 1981, there were transfers from Special Funds of \$613,852 to the General Fund and of \$186,898 to Endowment Funds. Such amounts were transferred in accordance with the authorization of the donor, grantor or Trustees.
11. The Museum provides certain services, including accounting and maintenance services, for which the Planetarium was charged an aggregate amount of \$108,539 in fiscal 1981 and \$82,331 in fiscal 1980.
12. Certain amounts in the fiscal 1980 financial statements have been reclassified to conform with the fiscal 1981 presentation.
13. The Museum is a nonprofit organization exempt from income tax under Section 501(c)(3) of the Internal Revenue Code.

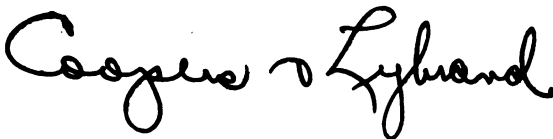
| June 30 | 1981 | 1980 |
|---------|---------------------|---------------------|
| | \$24,796,693 | \$21,604,874 |
| | 9,116,879 | 7,929,552 |
| | | |
| | 7,225,283 | 5,432,722 |
| | 13,639,887 | 12,261,744 |
| | <u>\$54,778,742</u> | <u>\$47,228,892</u> |

Auditors' Report

The Members of the American Museum of Natural History Planetarium Authority, New York, New York:

We have examined the balance sheets of the AMERICAN MUSEUM of NATURAL HISTORY PLANETARIUM AUTHORITY as of June 30, 1981 and 1980 and the related statements of income and expenses and changes in fund balances for the years then ended. Our examinations were 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 financial statements referred to above present fairly the financial position of the American Museum of Natural History Planetarium Authority at June 30, 1981 and 1980 and the results of its operations for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.



1251 Avenue of the Americas
New York, New York 10020
October 9, 1981.

American Museum of Natural History Planetarium Authority Balance Sheets, June 30, 1981 and 1980

ASSETS:

Cash
Short-term investments
Accounts receivable
Planetarium Shop inventory

Equipment, fixtures, etc.:
Zeiss planetarium instrument, at cost
Building improvements, at cost

Less, Allowance for depreciation
(Note 5)

Furniture, fixtures and equipment

Buildings, at cost

LIABILITIES:

Accounts payable
Accrued employee benefit costs
4½% Refunding Serial Revenue bonds,
past due (Note 1)
Accrued interest, past due

CONTRIBUTED CAPITAL and FUNDS:

Contributed capital:
Charles Hayden
Charles Hayden Foundation
The Perkin Fund

Funds:
Unrestricted fund (deficit)
Restricted funds

The accompanying statement of significant accounting policies and notes are an integral part of these financial statements.

Statements of Income and Expenses for the years ended June 30, 1981 and 1980

| 1981 | 1980 |
|--------------------|--------------------|
| \$ 64,735 | \$ 62,314 |
| 500,000 | 350,000 |
| 24,460 | 19,102 |
| 50,198 | 43,285 |
| <u>639,393</u> | <u>474,701</u> |
| 221,928 | 221,928 |
| 316,681 | 307,668 |
| <u>538,609</u> | <u>529,596</u> |
| (282,573) | (230,455) |
| 256,036 | 299,141 |
| 1 | 1 |
| <u>256,037</u> | <u>299,142</u> |
| 1,019,210 | 1,019,210 |
| <u>\$1,914,640</u> | <u>\$1,793,053</u> |
| 1981 | 1980 |
| \$ 196,262 | \$ 160,562 |
| 75,959 | 83,940 |
| 570,000 | 570,000 |
| 315,450 | 315,450 |
| <u>1,157,671</u> | <u>1,129,952</u> |
| 156,869 | 156,869 |
| 429,455 | 429,455 |
| 400,000 | 400,000 |
| <u>986,324</u> | <u>986,324</u> |
| (753,633) | (763,962) |
| 524,278 | 440,739 |
| 756,969 | 663,101 |
| <u>\$1,914,640</u> | <u>\$1,793,053</u> |

| | 1981 | 1980 |
|---|--------------------|--------------------|
| Income: | | |
| Admission fees, less allowances and commissions | \$701,923 | \$665,853 |
| Auxiliary activity, sales booth | 166,248 | 134,885 |
| Special lectures and courses | 49,763 | 43,375 |
| Other income and grants | 12,594 | 42,037 |
| Total income | <u>930,528</u> | <u>886,150</u> |
| Expenses: | | |
| Preparation, presentation and promotional | 409,844 | 411,825 |
| Operation and maintenance | 189,766 | 193,443 |
| Auxiliary activity, sales booth | 147,937 | 117,169 |
| Administrative and general | 63,552 | 56,225 |
| Pension and other social benefits (Note 3) | 72,344 | 77,018 |
| Total expenses | <u>883,443</u> | <u>855,680</u> |
| Income before interest and depreciation | 47,085 | 30,470 |
| Interest on past due 4½% Refunding Serial Revenue bonds | (25,650) | (25,650) |
| Provision for depreciation | (52,118) | (50,765) |
| Net loss | <u>(\$ 30,683)</u> | <u>(\$ 45,945)</u> |

The accompanying statement of significant accounting policies and notes are an integral part of these financial statements.

**Statements of Changes in
Fund Balances
for the years ended
June 30, 1981 and 1980**

| | Unrestricted Fund | | Restricted Funds | |
|--|--------------------|--------------------|------------------|------------------|
| | 1981 | 1980 | 1981 | 1980 |
| Balance (deficit), beginning of year | (\$763,962) | (\$757,676) | \$440,739 | \$393,138 |
| Additions: | | | | |
| Contributions | | | 14,250 | 20,500 |
| Proceeds from special presentations (Note 2) | | | 181,522 | 140,935 |
| Income from investments | | | 53,129 | 39,056 |
| Expenditures: | | | | |
| Special purpose programs and projects | | | (4,703) | (13,293) |
| Special presentation expenses (Note 2) | | | (119,647) | (99,938) |
| Transfers between funds (Note 5) | 41,012 | 39,659 | (41,012) | (39,659) |
| Net loss, as annexed | (30,683) | (45,945) | | |
| Balance (deficit), end of year | <u>(\$753,633)</u> | <u>(\$763,962)</u> | <u>\$524,278</u> | <u>\$440,739</u> |

The accompanying statement of significant accounting policies and notes are an integral part of these financial statements.

Statement of Significant Accounting Policies

The American Museum of Natural History Planetarium Authority's ("Planetarium") corporate charter terminates when all its liabilities, including bonds, have been paid in full or otherwise discharged. At that time, its personal property passes to the American Museum of Natural History ("Museum") and real property to the City of New York to be maintained and operated in the same manner as other city property occupied by the Museum. The land utilized by the Planetarium was donated by the City of New York.

The policy of the Planetarium is to capitalize only major plant additions and replacements of equipment, machinery and other items and to depreciate such items on the straight-line method over their useful lives. Fully depreciated assets are carried at nominal value. Because of the nature of the ownership of the property, provision for depreciation of the buildings is considered unnecessary.

Short-term investments are stated at cost, which approximates market value.

Inventories are stated at the lower of cost (first-in, first-out method) or market.

Fund balances restricted by outside sources or by the Board of Trustees are so indicated (restricted funds). These restricted funds may only be utilized in accordance with the purposes established by the source of such funds.

The Planetarium and its employees participate in the Cultural Institutions Pension Plan ("CIRS Plan") administered by the Cultural Institutions Retirement System ("CIRS"). The Planetarium's policy is to fund pension expense accrued.

Notes to Financial Statements

1. The Planetarium Authority bonds were purchased by the Museum in 1948. The Charles Hayden Foundation contributed \$200,000 to the Museum toward the purchase of such bonds.
2. The Board of Trustees of the Planetarium has designated that the net income from special presentations be set aside in a board designated restricted fund to finance current and future improvements and renovations.
3. Pension expense for fiscal 1981 and 1980 was \$33,493 and \$33,098, respectively. The CIRS Plan is a multiemployer plan and as such its actuarial present value of vested and nonvested accumulated plan benefits and net assets available for benefits are not determinable on an individual institution basis.
4. The Planetarium receives certain services, including accounting and maintenance services, from the Museum. The aggregate charges for such services in fiscal 1981 and 1980 aggregated \$108,539 and \$82,331, respectively.
5. Depreciation on major plant additions and replacements which have been financed from cash generated by restricted funds is being funded by transfers from restricted funds.

OFFICERS

PRESIDENT:

Robert G. Goelet

PRESIDENT EMERITUS:

Gardner D. Stout

VICE PRESIDENTS:

William T. Golden

Plato Malozemoff

David D. Ryus, III

SECRETARY:

L. F. Boker Doyle

TREASURER:

Frederick A. Klingenstein

BOARD OF TRUSTEES

ELECTIVE

Class of 1981

William S. Beinecke

Howard L. Clark

Joseph F. Cullman, 3rd

Mrs. Hart Fessenden

Elbridge T. Gerry

Mrs. Page Hufty

John F. McGillicuddy

Charles H. Mott

Albert C. Stewart

Class of 1982

Charles J. Hedlund

Lansing Lamont

Mrs. John Macomber

William F. May

Gerard Piel

Jack Rudin

Alfred R. Stern

Oscar S. Straus, II

Henry G. Walter, Jr.

Class of 1983

Frank T. Cary

Alfred W. Crompton

William T. Golden

Arthur Gray, Jr.

Samuel C. Johnson

Frederick A. Klingenstein

Mrs. John V. Lindsay

Mrs. Constantine Sidamon-Eristoff

Class of 1984

Robert R. Barker

Thomas D. Barrow

Robert G. Goelet

Earl G. Graves

Frank Y. Larkin

Donal C. O'Brien, Jr.

Donald C. Platten

Arthur Ross

Carroll L. Wainwright, Jr.

Class of 1985

L. F. Boker Doyle

Henry Clay Frick, II

Caryl P. Haskins

Plato Malozemoff

Edwin H. Morgens

Fergus Reid, III

Frederick Seitz

EX-OFFICIO

Edward I. Koch, Mayor of the City of New York

Andrew J. Stein, President of the Borough of Manhattan

Harrison J. Goldin, Comptroller of the City of New York

Gordon J. Davis, Commissioner, Department of Parks and Recreation

Henry Geldzahler, Commissioner, Department of Cultural Affairs

Frank J. Macchiarola, Chancellor, Board of Education, City of New York

HONORARY

Malcolm P. Aldrich

August Belmont

Robert E. Blum

Benjamin S. Clark

Cleveland E. Dodge

Fredrick M. Eaton

John M. Olin

James S. Rockefeller

David A. Shepard

Gardner D. Stout

Edwin Thorne

Thomas J. Watson, Jr.

COUNSEL

Milbank, Tweed, Hadley & McCloy

COMMITTEES OF THE BOARD*

MANAGEMENT COMMITTEE

ELECTIVE

Robert R. Barker

Joseph F. Cullman, 3rd.

Mrs. Hart Fessenden

Elbridge T. Gerry

Caryl P. Haskins

Charles J. Hedlund

Lansing Lamont

Frank Y. Larkin

Mrs. John Macomber

Charles H. Mott

Gerard Piel

Arthur Ross

Alfred R. Stern

Albert C. Stewart

Oscar S. Straus, II

EX-OFFICIO

Robert G. Goelet

William T. Golden

Plato Malozemoff

L. F. Boker Doyle

Frederick A. Klingenstein

Henry Geldzahler, Commissioner,
Department of Cultural Affairs

AUDIT AND EXAMINING COMMITTEE

Fergus Reid, III, Chairman

Howard L. Clark

Elbridge T. Gerry

Arthur Gray, Jr.

Donal C. O'Brien, Jr.

FINANCE COMMITTEE

Frederick A. Klingenstein, Chairman

Robert R. Barker

L. F. Boker Doyle, Alternate

Elbridge T. Gerry

Charles H. Mott

Oscar S. Straus, II

Carroll L. Wainwright, Jr., Alternate

NOMINATING COMMITTEE

Charles H. Mott, Chairman

Frank Y. Larkin

Donal C. O'Brien, Jr.

COMMITTEES OF THE MUSEUM*

BUDGET COMMITTEE

Frank Y. Larkin, Chairman

Treasurer Frederick A. Klingenstein, Ex-Officio

Director Thomas D. Nicholson, Ex-Officio

Controller Pauline G. Meisler, Ex-Officio

Thomas D. Barrow

Mrs. Hart Fessenden

Charles J. Hedlund

SPECIAL ADVISORY COMMITTEES*

ANNUAL CORPORATE DRIVE COMMITTEE

Donald C. Platten, Chairman

Thomas D. Barrow

William S. Beinecke

Howard L. Clark

William F. May
David D. Ryus, III

DEVELOPMENT COMMITTEE

William T. Golden, Chairman
Joseph F. Cullman, 3rd
Frank Y. Larkin
Plato Malozemoff
Charles H. Mott
Donald C. Platten
Mrs. Constantine Sidamon-Eristoff
Oscar S. Straus, II
Henry G. Walter, Jr.

EDUCATION POLICY COMMITTEE

Alfred R. Stern, Chairman
Malcolm Arth
Mrs. William Chappell
Mrs. Hart Fessenden
Earl G. Graves
George Harlow
William F. May
Edwin H. Morgens
Thomas D. Nicholson
Donn E. Rosen
Enid Schildkrout
Allen Seltzer

EXHIBITION POLICY COMMITTEE

Lansing Lamont, Chairman
Malcolm Arth
William S. Beinecke
Eugene B. Bergmann
Robert L. Carneiro
George S. Gardner
Charles J. Hedlund
Walter F. Koenig
Frank Y. Larkin
Mrs. John V. Lindsay
Mrs. John Macomber
Ann Breen Metcalfe
Thomas D. Nicholson
Gerard Piel
Martin Prinz
Fergus Reid, III
Arthur Ross
Jerome G. Rozen, Jr.
Alfred R. Stern
Richard H. Tedford
Mrs. Halsted W. Wheeler

HONORS AND AWARDS COMMITTEE

William T. Golden, Chairman
James W. Atz
Niles R. Eldredge
Caryl P. Haskins
Jerome G. Rozen, Jr.
Enid Schildkrout
Charles A. Weaver, Jr.

MEN'S COMMITTEE

Frank Lyon, Chairman
William W. Reese, Vice-Chairman

PLANETARIUM POLICY COMMITTEE

L. F. Boker Doyle, Chairman
Isaac Asimov
Ned W. Bandler, Jr.
William S. Beinecke
Frank T. Cary
Mrs. Hart Fessenden
Mrs. Maurice Goodgold
Dorrit Hoffleit
Richard Korn
Mrs. James Magid
Thomas D. Nicholson
Richard T. Perkin
Jack Rudin
Jeanette Watson Sanger

Daniel W. Seitz
Allen Seltzer
Benjamin S. P. Shen

SCIENCE POLICY COMMITTEE

Caryl P. Haskins, Chairman
Alfred W. Crompton
Mrs. Hart Fessenden
Henry Clay Frick, II
William T. Golden
Lee H. Herman, Jr.
James Layne
John G. Maisey
Plato Malozemoff
Craig Morris
Gareth J. Nelson
Thomas D. Nicholson
Gerard Piel
Martin Prinz
Jerome G. Rozen, Jr.
Frederick Seitz
Lester L. Short
Richard H. Tedford
Bruce N. Haugh, Secretary

WOMEN'S COMMITTEE

Mrs. Robert V. Lindsay, Chairwoman

SPECIAL ADVISORY BOARDS*

FRANK M. CHAPMAN MEMORIAL COMMITTEE

Lester L. Short, Chairman
A. H. Brush
James C. Greenway, Jr.
Wesley E. Lanyon
Frank Y. Larkin
Thomas D. Nicholson
Jerome G. Rozen, Jr.
François Vuilleumier
Richard G. Zweifel

LERNER-GRAY ADVISORY COMMITTEE

Arthur Gray, Jr., Chairman
Arland L. Carsten
William K. Emerson
Henry Clay Frick, II
Nixon Griffis
Gareth J. Nelson
Thomas D. Nicholson
Jerome G. Rozen, Jr.
Jack Rudin
Mrs. Constantine Sidamon-Eristoff

OGDEN MILLS FELLOWSHIP COMMITTEE

David Hurst Thomas, Chairman
Robert L. Carneiro
Stanley A. Freed
Craig Morris
Thomas D. Nicholson
Jerome G. Rozen, Jr.
Enid Schildkrout
Ian Tattersall

SANFORD COMMITTEE

Edward C. Childs
Wesley E. Lanyon
Thomas D. Nicholson
William F. Sanford

THEODORE ROOSEVELT MEMORIAL COMMITTEE

Lansing Lamont, Chairman
John Gable
Mrs. Page Hufty
William D. Johnston
Ernst Kirsteuer
Mrs. John Macomber
Edwin H. Morgens

Thomas D. Nicholson
Anna Roosevelt
Elizabeth Roosevelt
Jerome G. Rozen, Jr.
David D. Ryus, III
Richard G. Van Gelder

*The President is an Ex Officio member of all committees.

THE STAFF 1981

Thomas D. Nicholson, Ph.D., Director
Charles A. Weaver, Jr., B.A.
Deputy Director for Administration
Jerome G. Rozen, Jr., Ph.D.
Deputy Director for Research
David D. Ryus, B.A.
Vice President
Pauline G. Meisler, M.B.A.
Assistant Director for Financial
Operations and Controller
James A. Oliver, Ph.D.
Director Emeritus
Albert E. Parr, Sc.D.
Director Emeritus

SCIENCE, EDUCATION AND EXHIBITION DEPARTMENTS

ANTHROPOLOGY

David Hurst Thomas, Ph.D.,
Chairman and Associate Curator
Robert L. Carneiro, Ph.D., Curator
Stanley A. Freed, Ph.D., Curator
Ian Tattersall, Ph.D., Associate Curator
Craig Morris, Ph.D., Associate Curator
Enid Schildkrout, Ph.D., Associate Curator
Junius B. Bird, D.Sc., Curator Emeritus
Gordon F. Ekholm, Ph.D., Curator Emeritus
Harry L. Shapiro, Ph.D., Curator Emeritus
Bella Weitzner, Curator Emerita
Philip C. Gifford, Jr., Ph.D.,
Scientific Assistant
Priscilla Ward, B.S., Scientific Assistant
Robert Bettinger, Ph.D., Research Associate
Richard W. Casteel, Ph.D.,
Research Associate
Gertrude E. Dole, Ph.D., Research Associate
Walter A. Fairservis, Jr., Ph.D.,
Research Associate
Ruth S. Freed, Ph.D., Research Associate
Richard A. Gould, Ph.D., Research Associate
Donald K. Grayson, Ph.D.,
Research Associate
Grant D. Jones, Ph.D., Research Associate
Frederica de Laguna, Ph.D.,
Research Associate
Clark Spencer Larsen, Ph.D., Research
Associate
Morton H. Levine, Ph.D., Research Associate
Rhoda Metraux, Ph.D., Research Associate
Jeffrey Schwartz, Ph.D., Research Associate
Colin M. Turnbull, M.A., (Oxon.), D. Phil.,
Research Associate
Donald S. McClain, M.S., Field Associate
Carin Burrows, Associate

ASTRONOMY AND THE AMERICAN MUSEUM-HAYDEN PLANETARIUM

Alan Seltzer, M.A., Acting Manager
Kenneth L. Franklin, Ph.D., Astronomer
Franklyn M. Branley, Ed.D.,
Astronomer Emeritus
David S. Roth, Planetarium Shop Manager
Charles F. Lucker, B.A., Assistant
Planetarium Shop Manager
Helmut K. Wimmer, Art Supervisor
Gwendolyn P. Gwyn, B.A.,
Public Affairs Coordinator
Thomas A. Lesser, M.A., Senior Lecturer
Clarence A. Brown, B.S., Assistant Producer

ENTOMOLOGY

Randall T. Schuh, Ph.D.,
Chairman and Associate Curator
Lee H. Herman, Jr., Ph.D., Curator
Frederick H. Rindge, Ph.D., Curator
Jerome G. Rozen, Jr., Ph.D., Curator
Pedro Wygodzinsky, Ph.D., (Sc.Nat.), Curator
Norman I. Platnick, Ph.D., Associate Curator
Mont A. Cazier, Ph.D., Curator Emeritus
Willis J. Gertsch, Ph.D., Curator Emeritus
Sarfray Lodhi, M.Sc., Scientific Assistant
Kathleen Schmidt, M.S., Scientific Assistant
Mohammad Umar Shadab, Ph.D.,
Scientific Assistant
Louis N. Sorkin, B.A., Scientific Assistant
Marjorie Statham Favreau,
Scientific Assistant Emerita
Alice Gray, M.S., Scientific Assistant Emerita
Thomas C. Barr, Jr., Ph.D.,
Research Associate
Sixto Coscarón, D.Nat.Sc.,
Research Associate
Frederick Coyle, Ph.D., Research Associate

Betty L. Faber, Ph.D., Research Associate
Raymond R. Forster, Ph.D.,
Research Associate
Kumar Krishna, Ph.D., Research Associate
Charles D. Michener, Ph.D.,
Research Associate
Cyril F. dos Passos, LL.B., D.Sc.,
Research Associate
William A. Shear, Ph.D., Research Associate
James A. Slater, Ph.D., Research Associate
Howard R. Topoff, Ph.D., Research Associate
Patricia Vaurie, B.A., Research Associate
Raymond Mendez, Field Associate
James Reddell, B.A., Field Associate
Noel L. H. Krauss, Associate
Bryant Mather, D.Sc., Associate
Charles Mitter, Ph.D., Associate
John T. Polhemus, Ph.D., Associate
Joe Schuh, M.S., Associate
John Stamatov, D.D.S., Associate

HERPETOLOGY

Charles W. Myers, Ph.D.,
Chairman and Curator
Charles J. Cole, Ph.D., Curator
Richard G. Zweifel, Ph.D., Curator
Charles M. Bogert, A.M., LL.D.,
Curator Emeritus
Michael W. Klemens, M.S.,
Scientific Assistant
Carol R. Townsend, B.A., Scientific Assistant
Archie F. Carr, Jr., Ph.D., Research Associate
Roger Conant, Sc.D., Research Associate
Martha L. Crump, Ph.D., Research Associate
Herbert C. Dessauer, Ph.D., Research
Associate
Carl Gans, Ph.D., Research Associate
John A. Moore, Ph.D., Research Associate
Janis A. Roze, Ph.D., Research Associate
Carol Ann Simon, Ph.D., Research Associate
Itzhak Gilboa, B.A., Associate

ICHTHYOLOGY

C. Lavett Smith, Ph.D., Chairman and Curator
James W. Atz, Ph.D., Curator
Gareth J. Nelson, Ph.D., Curator
Donn E. Rosen, Ph.D., Curator
Charles M. Breder, Jr., Sc.D.,
Curator Emeritus
Francesca R. LaMonte, B.A., Curator Emerita
M. Norma Feinberg, A.B., Scientific Assistant
Carol G. Schliefer, B.A., Scientific Assistant
Reeve M. Bailey, Ph.D., Research Associate
Eugenie Clarke, Ph.D., Research Associate
L. J. V. Compagno, Ph.D.,
Research Associate
Madeline L. Cooper, M.S.,
Research Associate
James S. Farris, Ph.D., Research Associate
P. Humphry Greenwood, D.Sc.,
Research Associate
Klaus D. Kallman, Ph.D., Research Associate
Richard Lund, Ph.D., Research Associate
Mary Frances Mickevich, Ph.D.,
Research Associate
Peter Moller, Ph.D., Research Associate
Colin Patterson, Ph.D., Research Associate
Joseph Rachlin, Ph.D., Research Associate
Gilbert T. Rowe, Ph.D., Research Associate
James C. Tyler, Ph.D., Research Associate
Richard P. Vari, Ph.D., Research Associate
Willard Brownell, M.S., Field Associate
W. H. Butler, C.B.E., Field Associate
Guido Dingerkus, M.S., Field Associate
Donald S. Erdman, B.S., Field Associate
Richard F. Heller, Ph.D., Associate

INVERTEBRATES

Ernst Kirsteuer, Ph.D., Chairman and Curator

Roger Lyman Batten, Ph.D., Curator
 Niles Eldredge, Ph.D., Curator
 William K. Emerson, Ph.D., Curator
 Judith E. Winston, Ph.D., Assistant Curator
 Dorothy E. Bliss, Ph.D., Sc.D.,
 Curator Emerita
 Norman D. Newell, Ph.D., Curator Emeritus
 Harold S. Feinberg, B.A., Scientific Assistant
 Sidney E. Horenstein, A.B.,
 Scientific Assistant
 William E. Old, Jr., Scientific Assistant
 Allan Bé, Ph.D., Research Associate
 William A. Berggren, Ph.D.,
 Research Associate
 Donald W. Boyd, Ph.D., Research Associate
 William J. Clench, Ph.D., Sc.D.,
 Research Associate
 Harold L. Cousminer, Ph.D.,
 Research Associate
 Howard R. Feldman, Ph.D.,
 Research Associate
 Stephen Jay Gould, Ph.D.,
 Research Associate
 James D. Hays, Ph.D., Research Associate
 John J. Lee, Ph.D., Research Associate
 Linda Habas Mantel, Ph.D.,
 Research Associate
 Leslie F. Marcus, Ph.D., Research Associate
 Lawrence W. Powers, Ph.D.,
 Research Associate
 Harold B. Rollins, Ph.D., Research Associate
 George A. Schultz, Ph.D.,
 Research Associate
 John D. Soule, Ph.D., Research Associate
 Horace W. Stunkard, Ph.D., Sc.D.,
 Research Associate
 Douglas G. Smith, B.S., Consultant

MICROPALEONTOLOGY PRESS

John A. Van Couvering, Ph.D., Editor
 Norman S. Hillman, M.S., Associate Editor
 Ruth D. Manoff, B.A., Associate Editor

MAMMALOGY

Guy G. Musser, Ph.D., Chairman
 and Archbold Curator
 Sydney Anderson, Ph.D., Curator
 Karl F. Koopman, Ph.D., Curator
 James N. Layne, Ph.D., Archbold Curator
 Ethel Tobach, Ph.D., D.Sc., Curator
 Richard G. Van Gelder, Ph.D., Curator
 Joseph L. De Santis, Ph.D.,
 Scientific Assistant
 Marie A. Lawrence, M.S., Scientific Assistant
 Helmut E. Adler, Ph.D., Research Associate
 David J. Klingener, Ph.D.,
 Research Associate
 Alfredo Langguth, Ph.D., Research Associate
 George B. Schaller, Ph.D.,
 Research Associate
 Thomas L. Blakemore, Field Associate
 Ronald H. Pine, Ph.D., Field Associate

MINERAL SCIENCES

Martin Prinz, Ph.D., Chairman and Curator
 George E. Harlow, Ph.D., Associate Curator
 Joseph J. Peters, M.S., Scientific Assistant
 Eric Dowty, Ph.D., Research Associate
 Klaus Keil, Ph.D., Research Associate
 Arthur M. Langer, Ph.D., Research Associate
 C. E. Nehru, Ph.D., Research Associate
 Thomas A. Peters, M.S., Associate
 Joseph Rothstein, Associate
 Julius Weber, Hon. D.Sc., Associate

ORNITHOLOGY

Lester L. Short, Ph.D., Chairman and Curator
 Wesley E. Lanyon, Ph.D.,
 Lamont Curator of Birds

François Vuilleumier, Ph.D., Curator
 George F. Barrowclough, Ph.D.,
 Assistant Curator
 Dean Amadon, Ph.D., Sc.D.,
 Lamont Curator Emeritus of Birds
 Ernst Mayr, Ph.D., Curator Emeritus
 Charles E. O'Brien, Curator Emeritus
 John Bull, Scientific Assistant
 Mary LeCroy, B.S., Scientific Assistant
 Helen Hays, B.A., Chairwoman,
 Great Gull Island Committee
 Walter J. Bock, Ph.D., Research Associate
 Jean Delacour, Lic. Sci., Research Associate
 Jared Diamond, Ph.D., Research Associate
 Robert W. Dickerman, Ph.D.,
 Research Associate
 Eugene Eisenmann, J.D.,
 Research Associate
 Crawford H. Greenwalt, Sc.D.,
 Research Associate
 James C. Greenway, Jr., A.B.,
 Research Associate
 Cheryl F. Harding, Ph.D., Research Associate
 G. Stuart Keith, M.A. (Oxon.),
 Research Associate
 William H. Phelps, Jr., B.Sc.,
 Research Associate
 H. Philip Zeigler, Ph.D., Research Associate
 John Eleuthère du Pont, Sc.D.,
 Field Associate
 Gardner D. Stout, B.A., Sc.D., Field Associate
 Ruth Trimble Chapin, M.S., Associate
 Ruth DeLynn, Associate
 John Farrand, Jr., M.S., Associate
 Lowrie S. Flagg, Associate

VERTEBRATE PALEONTOLOGY

Richard H. Tedford, Ph.D.,
 Chairman and Curator
 Eugene S. Gaffney, Ph.D., Curator
 Malcolm C. McKenna, Ph.D., Frick Curator
 John G. Maisey, Ph.D., Assistant Curator
 Edwin H. Colbert, Ph.D., Sc.D.,
 Curator Emeritus
 Bobb Schaeffer, Ph.D., Curator Emeritus
 George Gaylord Simpson, Ph.D., Sc.D., LL.S.,
 Dr. Hon. Causa, Curator Emeritus
 Morris F. Skinner, Sc.D., Frick Curator Emeritus
 Beryl E. Taylor, Frick Curator Emeritus
 Susan Koelle Bell, A.B., Scientific Assistant
 Raymond J. Gooris, B.F.A.,
 Scientific Assistant
 Charlotte P. Holton, B.A., Scientific Assistant
 George Krochak, Scientific Assistant
 Katherine E. Wolfram, M.S.,
 Scientific Assistant
 Donald Baird, Ph.D., Research Associate
 Eric Delson, Ph.D., Research Associate
 David H. Dunkle, Ph.D., Research Associate
 Robert J. Emry, Ph.D., Research Associate
 Max K. Hecht, Ph.D., Research Associate
 Robert M. Hunt, Jr., Ph.D.,
 Research Associate
 Bruce J. MacFadden, Ph.D.,
 Research Associate
 John H. Ostrom, Ph.D., Research Associate
 Leonard B. Radinsky, Ph.D.,
 Research Associate
 Frederick S. Szalay, Ph.D.,
 Research Associate
 John H. Wahlert, Ph.D., Associate

COUNCIL OF THE SCIENTIFIC STAFF

Richard H. Tedford, Ph.D., Dean
 Ernst Kirsteuer, Ph.D., Assistant Dean
 François Vuilleumier, Ph.D., Secretary
 The Chairmen of the Scientific and
 Educational Departments and Six Elected
 Members at Large.

FIELD STATIONS

Archbold Biological Station

James N. Layne, Ph.D., Resident Director
 David B. Johnston, B.S., Station Manager
 Fred E. Lohrer, M.S., Scientific Assistant
 Chester E. Winegarner, B.A.,
 Scientific Assistant
 Warren Abrahamson, Ph.D.,
 Research Associate
 Thomas Eisner, Ph.D., Research Associate
 Austin L. Rand, Ph.D., Research Associate
 Glen E. Woolfenden, Ph.D.,
 Research Associate

Southwestern Research Station

Vincent D. Roth, M.S., Resident Director

EDUCATION

Malcolm J. Arth, Ph.D., Chairman and Curator
 Catherine M. Pessino, B.A., Assistant
 Chairwoman
 Kenneth A. Chambers, M.S., Coordinator
 for Adult Programs
 Gloria Davis, B.A., Registrar
 Ismael Calderon, B.S., Coordinator, Junior
 High School Natural Science Project
 Florence Stone, B.A.,
 Special Programs Coordinator
 Maria Uyehara, M.S.W., Caribbean
 Programs Coordinator
 Marjorie M. Ransom, M.A., Supervising
 Museum Instructor
 Robert Aylward, B.A., Senior Museum
 Instructor
 Nathaniel Johnson, Jr., M.S.,
 Senior Museum Instructor
 Phyllis Mandel, B.A.,
 Senior Museum Instructor
 Paul J. Sanfaçon, M.A.,
 Senior Museum Instructor
 Helmut W. Schiller, B.S.,
 Senior Museum Instructor
 Sydney Buffum, B.S., Museum Instructor
 Mary B. Croft, M.S., Museum Instructor
 Brian L. Moss, B.S., Museum Instructor
 Juanita Munoz, B.A., Museum Instructor
 Farida A. Wiley, Honorary Associate in Natural
 Science Education
 Elizabeth A. Guthrie, B.A.,
 Associate in Nature Education
 Sarah E. Flanders, M.D., Associate
 Robin Lehman, Associate in Photography

EXHIBITION AND GRAPHICS

George S. Gardner, B.I.D., B.F.A., Chairman

Exhibition

Ralph J.T. Bauer, B.F.A., Manager
 Eugene B. Bergmann, B.I.D.,
 Exhibit Designer
 Michael D. Blakeslee, M.F.A., Exhibit
 Designer

Graphics

Joseph M. Sedacca, B.A., Manager

Audio-Visual

Larry Van Praag, Chief Projectionist

LIBRARY SERVICES

Nina J. Root, M.S.L.S., Chairwoman
 April Carlucci, M.L.S., Assistant Librarian for
 Reference Services
 Pamela B. Haas, M.S.L.S., Assistant Librarian
 for Archives and Photographic Collection
 Miriam Tam, M.S.L.S., Assistant Librarian for
 Technical Services
 Bernice D'Aquino, M.L.S., Photographic
 Collection Librarian

Mary Genett, M.L.S., Acquisitions Librarian
Diana Shih, M.S.L.S., Cataloging Librarian
James Wassenich, M.L.S., Reference Librarian
Russel Rak, M.A., Administrative Assistant
Hazel Gay, Librarian Emerita
Mary V. Wissler, M.L.S., Librarian Emerita
Ronald Wilkinson, Ph.D., Associate in Bibliography

PUBLICATIONS

Curator

Thomas D. Nicholson, Ph.D., Editor-in-Chief
Douglas J. Preston, B.A., Managing Editor

Scientific Publications

Jerome G. Rozen, Jr., Ph.D., Managing Editor
Joseph M. Sedacca, B.A., Manager
Florence Brauner, B.A., Editor

DEVELOPMENT AND PUBLIC AFFAIRS

Ann Breen Metcalfe, B.A., Chairwoman
Marilyn Badaracco, Manager for Guest Services
Stanley E. Gornish, B.A., Manager for Development
Herbert Kurz, B.A., Manager for Public Affairs
R. Todd Nielsen, B.A., Manager for Discovery Tours
Miriam J. Johnson, Coordinator of Volunteer and Information Desk Services
Kay R. Brief, B.A., Public Affairs Associate
Anthony Flynn, B.A., Development Associate
Richard Sheridan, M.S., Public Affairs Associate
Marjorie Bhavnani, Assistant Volunteer Coordinator
Sheryl Drew, B.A., Assistant Volunteer Coordinator
Lorraine Airall, Contributors' Assistant
Dennis Grillo, B.A., Guest Services Assistant
Frank J. Post, B.A., Public Affairs Assistant

NATURAL HISTORY MAGAZINE

David D. Ryus, B.A., Publisher
Alan Ternes, M.Ph., Editor
Judith Friedman, M.A., Managing Editor
Thomas Page, Designer
Florence Edelstein, Copy Chief
Frederick R. Hartmann, A.B.J., Senior Editor
Sally Lindsay, M.F.A., Senior Editor
Rebecca Finnell, B.A., Associate Editor
Vittorio Maestro, B.A., Associate Editor
Bradford Smith, M.B.A., Business Manager
Frederick Grossman, A.B., Production Manager
Robert Bruno, M.S., Fulfillment Manager
Elaine Callender, Advertising Production Manager
Debra McCord, B.A., Assistant Production Manager
Karen Bennett-Mendez, M.S., Manager of Membership Services
Henry Schulson, A.B., Membership Associate

ADMINISTRATIVE AND SCIENTIFIC RESEARCH SERVICES

Thomas D. Nicholson, Ph.D., Executive Secretary
Robert J. Dombroski, Assistant to the Deputy Director for Administration
Halcyon Hines, Assistant Executive Secretary
Valerie Hrebicek, Assistant to the Director
Diane Menditto, B.A., Assistant to the Deputy Director for Research
Robert Stolberg, A.B. Scientific Assistant, Interdepartmental Laboratory
Pearlie Tillman, B.P.S., Secretary to the President

Joan Whelan, M.A., Technical Specialist, Interdepartmental Laboratory

BUILDING SERVICES

Charles L. Miles, Manager
Norene L. Brooks, B.B.A., Senior Associate Manager
Sankar Gokool, Senior Assistant Manager
Peter F. Clarke, Assistant Manager
Robert B. Hill, Assistant Manager
Julio Marrero, B.A., Assistant Manager
Frank P. Masavage, Assistant Manager
Betty Weems, Assistant Manager
Darlene D. Slade, Assistant to the Manager
Douglas Bonham, Supervising Museum Attendant-Guard
Mary Dillon, Supervising Museum Attendant-Guard
Edwin Garcia, Supervising Museum Attendant-Guard
Albert Pontecorvo, Supervising Museum Attendant-Guard

GENERAL SERVICES

James Koo, M.S., Manager

MUSEUM SHOP

Martin Tekulsky, A.B., Marketing Manager
Eleanor T. Forbes, Assistant Manager
Charles L. Hopkins, B.S., Assistant Manager
Charles Kanarick, B.A., Assistant Manager
Jeffrey Maer, B.A., Assistant Manager
Felice T. Zukowski, Assistant Manager

OFFICE OF THE CONTROLLER

Pauline G. Meisler, M.B.A., Assistant Director for Financial Operations and Controller
George B. Decker, Assistant Treasurer
Robert Applebaum, Payroll Manager
Ethel Brill, Manager, General Accounting
Wendy D. Forman, M.B.A., Purchasing Manager
Stanley R. Krasnow, B.A., Cash Control Manager
Jason S. Lau, M.B.A., Accounting Manager
John Alinovi, B.B.A., Assistant to the Controller
William H. Humber, B.S., Assistant to the Controller
Mildred Wise, Assistant to the Controller
Robert M. Acker, B.A., Internal Auditor
Donald R. Kossar, B.S., Budget Accountant
Fred R. Quijano, B.S., Computer Auditor Accountant
Audrey Yuille, Computer Coordinator
Barbara A. Armond, Assistant Manager, Cash Control
Walter S. Ellison, A.A.S., Assistant Manager, Cash Control

PERSONNEL

Geraldine M. Smith, B.A., Personnel Manager
Jerome Williams, M.A., Senior Personnel Assistant
Susan L. Kroll, Personnel Assistant

PLANT OPERATIONS, CONSTRUCTION AND MAINTENANCE

Walter F. Koenig, Manager of Construction and Maintenance
William A. Graham, Assistant to the Manager
William J. Barbieri, Foreman of Carpenters
Anthony W. Gallardo, A.A.S., Foreman of Electricians
Carl Hilgers, Foreman of Sheet Metal Workers
Vincent J. LePore, Plant Engineer
Klaus A. Wolters, Foreman of Painters

MEMBERS ELECTED BY THE BOARD OF TRUSTEES TO HIGHER CATEGORIES OF MEMBERSHIP

BENEFACTOR

Mrs. Zoe B. Larimer
William F. Sanford
Evelyn Sharp

ASSOCIATE FOUNDER

Dr. Richard Heck
Mabel C. Lamb

ASSOCIATE BENEFACTOR

Stephen Byer
Allan Caplan
Mr. & Mrs. Ralph E. Hansmann
S. Howard Leblang
Frederick H. Leonhardt
Roy Mallady
Richard Shields
Seymour B. Walzer

PATRON

Dr. Dorothy Bliss
Jerry J. Brown
Bruce H. Fellows
Charles Gradante
Drs. Arthur & Pauline Hecht
Shiro Matsunaga
John A. McKesson
Tom Morris
Thomas H. Munyan
Eugene L. Notkin
Dr. Ralph Reichert
Lawrence A. Wien

ASSOCIATE PATRON

Roderic H. Blackburn
Steven Bleiweiss
Brewster J. Chase
John de Cuevas
H. Avery Freeman
Hannah D. Gaines
Joseph Hazen
A. Grant Heidrich, III
Mr. & Mrs. Benjamin S. Herskowitz
Ellen Keller
William Larson
Henry Lipschitz
Mrs. Judith S. Randal
Mrs. Stanley Reed
Richard Salomon

HONORARY LIFE MEMBERS

Sam Castelli
Edward J. Collins
William T. Coull
William K. Emerson
Walter F. Koenig
Frederick Schaefer
Joseph M. Sedacca
Richard G. Van Gelder

CORRESPONDING MEMBERS

Dr. Frank A. Beach, Professor of Psychology, University of California, Berkeley, California
Dr. Kaj Birket-Smith, National Museum, Copenhagen, Denmark
Dr. François Bourlière, Département de Physiologie, Faculté de Médecine de Paris, 45 Rue des Saints-Pères, Paris, France
Mr. William G. Conway, General Director, New York Zoological Society, New York, New York

Dr. G.A. Cooper, Department of Paleontology & Paleobotany, National Museum of Natural History, Smithsonian Institution, Washington, D.C.
 Dr. Leon Croizat, Apartado 7344, Coro, (Estado Falcón), Venezuela
 Dr. Frank K. Edmondson, Astronomy Department, Indiana University, Bloomington, Indiana
 Dr. Clifford Frondel, Department of Mineralogy, Harvard University, Cambridge, Massachusetts
 Dr. Caryl P. Haskins, former President, Carnegie Institute of Washington, 2100 M Street, N.W., Washington, D.C.
 Dr. Tetsuo Koyama, New York Botanical Garden, New York, New York
 Dr. Claude Lévi-Strauss, 2 Rue des Marronniers, Paris, France
 Professor Benjamin S.P. Shen, Professor of Astronomy, University of Pennsylvania, Philadelphia
 Dr. Nikolas Tinbergen, Department of Zoology, University Museum, Oxford, England
 Dr. Ethelwynn Trewavas, British Museum (Natural History), London, England
 Dr. Bernardo Villa R. Instituto de Biología, Ciudad Universitaria San Angel, D.F., Mexico
 Professor T.S. Westoll, Professor of Geology, University of Durham at King's College, Newcastle-upon-Tyne, England

Bristol-Myers Company Foundation
 Bunge Corp.
 Burlington Industries, Inc.
 Capital Cities Foundation, Inc.
 Guy Carpenter & Company, Inc.
 Carter-Wallace, Inc.
 CBS Inc.
 Celanese Corp.
 The Chase Manhattan Bank, N.A.
 Chemical Bank
 Chesebrough-Pond's Inc.
 Chevron U.S.A., Inc.
 Chicago Pneumatic Tool Company
 Chiquita Brands, Inc.
 Chubb & Son, Inc.
 CIBA-GEIGY Corp.
 Citibank, N.A.
 Coach Leatherware
 The Coca-Cola Bottling Company of New York, Inc.
 The Coca-Cola Company
 Colgate-Palmolive Company
 Consolidated Edison Company of New York, Inc.
 Constans-Culver Foundation, Inc.
 Continental Bank International
 The Continental Corporation Foundation
 The Continental Group Foundation, Inc.
 Conoco, Inc.
 Coopers & Lybrand
 Corning Glass Works Foundation
 The Cowles Charitable Trust
 Crum and Forster Insurance Company
 Louise B. and Edgar Cullman Foundation
 D'Agostino Supermarkets
 The Daily News Foundation
 Dancer Fitzgerald Sample, Inc.
 Dean Witter Reynolds, Inc.
 Deloitte Haskins & Sells
 Dextra Baldwin McGonagle Foundation, Inc.
 Diamond International Corp.
 The Dime Savings Bank of New York
 Discount Corp. of New York
 Doyle Dane Bernbach, Inc.
 East River Savings Bank
 Emigrant Savings Bank
 Charles Englehard Foundation
 Engelhard Minerals and Chemicals Corp.
 Equitable Life Assurance Society of the United States
 Esquire, Inc.
 Ethan Allen, Inc.
 Ethyl Corp.
 The T. M. Evans Foundation, Inc.
 Exxon Corp.
 The First Boston Foundation Trust
 Fluor Corp.
 Flying Tiger Line
 Ford Motor Company Fund
 Franklin Savings Bank
 Freeport Minerals Company
 Fribourg Foundation, Inc.
 GAF Corp.
 General Foods Corp.
 General Reinsurance Corp.
 General Signal Corp.
 General Telephone & Electronics Corp.
 Getty Oil Corp.
 The Gilman Foundation
 Goldfarb and Fleece
 Grace Foundation, Inc.
 Graham & Sons, Inc.
 The Greater New York Savings Bank
 The Greenwich Savings Bank
 The Guardian Life Insurance Company of America
 Gulf + Western Foundation
 Frank B. Hall & Company, Inc.
 Harcourt Brace Jovanovich, Inc.
 Harlem Savings Bank

The Hearst Foundation, Inc.
 Heeramaneck Galleries
 H. J. Heinz II Charitable and Family Trust
 Home Life Insurance Company
 Homestake Mining Company
 International Business Machines Corp.
 The IFF Foundation, Inc.
 INCO United States, Inc.
 International Paper Company Foundation
 Irving One Wall Street Foundation
 Jaros, Baum & Bolles
 Johnson & Higgins
 The Johnson's Wax Fund, Inc.
 Joyce Beverages/New York
 Kennecott Corp.
 Kidder Peabody & Company
 Kimberly-Clark Foundation
 F. M. Kirby Foundation
 Kliklok Corp.
 Leberthal and Company, Inc.
 Lehman Brothers Kuhn Loeb, Inc.
 Leonhardt Foundation, Inc.
 Lever Brothers Company Foundation, Inc.
 The Lionel Corp.
 Thomas J. Lipton Foundation, Inc.
 Lord and Taylor
 Leon Lowenstein Foundation, Inc.
 R. H. Macy and Company, Inc.
 Main Hurdman Foundation
 Manufacturers Hanover Foundation
 Marine Midland Bank
 Marsh and McLennan Companies, Inc.
 McCann-Erikson, Inc.
 McGraw-Hill, Inc.
 McKinsey & Company, Inc.
 Melville Corp.
 Mercedes-Benz of N.A.
 Merck & Company, Inc.
 Merrill Lynch & Company, Inc.
 Metropolitan Life Foundation
 Miles Metal
 Mitsubishi International Corp.
 Mitsui and Company
 Mobil Foundation, Inc.
 MONY Trust
 Moore McCormack Resources, Inc.
 Morgan Guaranty Trust Company of New York
 Morgan Stanley and Company, Inc.
 William T. Morris Foundation
 National Bank of N.A.
 National Broadcasting Company
 National Distillers & Chemical Corp.
 NCR Corp.
 New York Life Foundation
 New York Telephone Company
 The New York Times Company Foundation, Inc.
 Newmont Mining Corp.
 Newsweek, Inc.
 The NL Industries Foundation, Inc.
 Noranda Mines Limited
 North American Philips Corp.
 North American Reinsurance Corp.
 Occidental Exploration and Production Co.
 Ogilvy & Mather, Inc.
 Olin Corporation Charitable Trust
 Oppenheimer and Company, Inc.
 Otis Elevator Company
 Owens-Corning Fiberglas Corp.
 Pacific Transducer Corp.
 Paine, Webber, Jackson & Curtis, Inc.
 Peat, Marwick, Mitchell & Company
 Pechiney Ugine Kuhlman Corp.
 J. C. Penney Company, Inc.
 The Pfizer Foundation, Inc.
 Phelps Dodge Foundation
 Philip Morris, Inc.
 The Pren-Hall Foundation, Inc.
 Price-Waterhouse & Company

CONTRIBUTORS JULY 1, 1980—JUNE 30, 1981

CORPORATIONS AND CORPORATE FOUNDATIONS

ACF Foundation, Inc.
 AIRCO, Inc.
 Alcoa Foundation
 Allied Stores Foundation
 AMAX Foundation, Inc.
 Amerace Corp.
 Amerada Hess Corp.
 American Bank Note Company
 American Broadcasting Company
 American Can Company Foundation
 American Electric Power Service Corp.
 American Express Foundation
 American Re-Insurance Company
 American Standard Foundation, Inc.
 American Telephone & Telegraph Company
 Ametek, Inc.
 AMF Foundation
 Amstar Corp.
 The Anaconda Company
 Arthur Andersen & Company
 ASARCO Inc.
 Ashland Oil, Inc.
 Atlantic Bank of New York
 Atlantic Ritchfield Foundation
 Avco Corporation
 AVNET, Inc.
 The Bank of New York
 Bankers Trust Company
 Barclays Bank International, Ltd. Charitable Trust
 Beneficial Foundation, Inc.
 Bergdorf Goodman Company
 Block Drug Corp.
 Bloomingdale's
 Booz, Allen & Hamilton, Inc.
 The Bowery Savings Bank
 Bowne & Company, Inc.

The Procter & Gamble Fund
 The Prudential Insurance Company of America
 RCA Corp.
 Reading and Bates Offshore Drilling Co.
 Reliance Group, Inc.
 Republic National Bank of New York
 Helena Rubinstein Foundation, Inc.
 Russell Reynolds Associates
 Richardson-Vicks, Inc.
 Rockefeller Center, Inc.
 Rollins Burdick Hunter of New York, Inc.
 Royal Insurance Company
 The Rudin Foundation, Inc.
 St. Joe Minerals Corp.
 St. Regis Paper Company
 Salomon Brothers Foundation, Inc.
 Schering-Plough Foundation, Inc.
 Schlumberger Horizons, Inc.
 Scientific American
 Scovill Foundation, Inc.
 Scudder, Stevens & Clark
 Sears, Roebuck & Company
 Shell Oil Company
 Siemens Corp.
 Simplicity Pattern Company, Inc.
 The Smith Barney Foundation
 Sony Corporation of America Foundation, Inc.
 Sotheby Parke Bernet, Inc.
 Speidel Newspapers Charitable Foundation
 The Sperry & Hutchinson Company
 Sperry Corp.
 Sprague Electric Company
 Squibb Corp.
 The Starr Foundation
 Sterling Drug, Inc.
 Sugar Foods Corp.
 Swig Weiler and Arnow Management Co., Inc.
 Swiss American Securities, Inc.
 Swiss Bank Corporation
 Teachers Insurance & Annuity Association of America
 Tenneco Chemicals, Inc.
 Texaco Inc.
 Texasgulf, Inc.
 Thomas & Betts Charitable Trust
 J. Walter Thompson Fund, Inc.
 The Oakleigh L. Thorne Foundation
 Ticor Foundation
 Tiffany and Company
 Time Inc.
 Touche Ross & Company
 Transway International Foundation
 The Travelers Insurance Company
 Tudor Foundation, Inc.
 Unilever United States, Inc.
 Union Carbide Corp.
 Union Pacific Foundation
 United Airlines Foundation
 United Brands Foundation
 United Industrial Corp.
 U.S. Industries, Inc.
 United States Life Corp.
 United States Steel Foundation, Inc.
 United States Trust Company
 Universal Leaf Tobacco Company, Inc.
 Uris Brothers Foundation
 Wallace-Murray Foundation
 Warner Communications, Inc.
 The Raymond John Wean Foundation
 Pierre J. Wertheimer Foundation
 Western Electric Fund
 Westvaco Foundation
 The Wheelabrator Foundation, Inc.
 The Widder Foundation, Inc.
 Lawrence A. Wien Foundation
 John Wiley and Sons, Inc.
 The H.W. Wilson Foundation, Inc.
 Harry Winston Inc.
 Wyssmont Company, Inc.

Arthur Young & Company
 Young and Rubicam, Inc.
 Carl Zeiss, Inc.

FOUNDATIONS, INDIVIDUALS AND OTHERS

AKC Fund, Inc.
 Estate of Seraphine E. Albisser
 Malcolm P. Aldrich
 Nathan Ancell
 The Annenberg Fund, Inc.
 Archbold Expeditions Fund
 Arlen Charitable Trust
 Robert E. Aronheim
 The Vincent Astor Foundation
 Mrs. Douglas Auchincloss
 Isabel H. Ault
 Robert & Ellen Bach Foundation
 Estate of Alice K. Bache
 J.M.R. Barker Foundation
 Barker Welfare Foundation
 Mrs. Howard J. Barnett
 Mr. and Mrs. Thomas D. Barrow
 The Theodore H. Barth Foundation
 Phillip Bastedo
 The Howard Bayne Fund
 Beaupré Charitable Trust
 Mrs. F. Henry Berlin
 Harry P. Bingham, Jr.
 The William Bingham Foundation
 Stephen & Mary Birch Foundation
 Dr. and Mrs. Junius Bird
 Eleanor L. Bissinger
 Elmer M. Block
 Leonard Block
 The Bodman Foundation
 Shirley Burden
 Estate of Samuel J. Bush
 Dr. Peter Buttenwieser
 C.A.L. Foundation, Inc.
 Mr. and Mrs. John P. Carroll, Jr.
 Frank T. Cary
 Mary Flagler Cary Charitable Trust
 Charitable Income Trust
 Trust Under the Will of Ruth Auchincloss Child
 Howard L. Clark
 The Clark Foundation
 Donald K. Clifford, Jr.
 Mr. & Mrs. Stewart Clifford
 Francis X. Coleman, Jr.
 The Commonwealth Fund
 Mrs. Ursula Corning
 John A. Corroon
 Estate of Martha P. Creighton
 Mrs. Cornelius Crone
 Joseph F. Cullman, III
 Mrs. L. Butler Davey
 John De Cuevas
 George Delacorte
 Margarita V. Delacorte
 Cleveland E. Dodge
 Cleveland E. Dodge Foundation, Inc.
 Mrs. Nicholas Doman
 The Dover Fund, Inc.
 Mrs. Robert N. Downs
 The Camille and Henry Dreyfus Foundation, Inc.
 Mrs. James C. Dudley
 The Caleb C. and Julia W. Dula Educational and Charitable Foundation
 David J. Dunn
 Gertrude H. Dunn
 John S. Dunning
 The Lincoln Ellsworth Foundation
 Eppley Foundation for Research
 Estate of Elizabeth Paine Estabrook
 Mrs. Marsha W. Feinhandler
 Mrs. Hart Fessenden
 Mr. and Mrs. John H. Fester
 Hildegard W. Fife

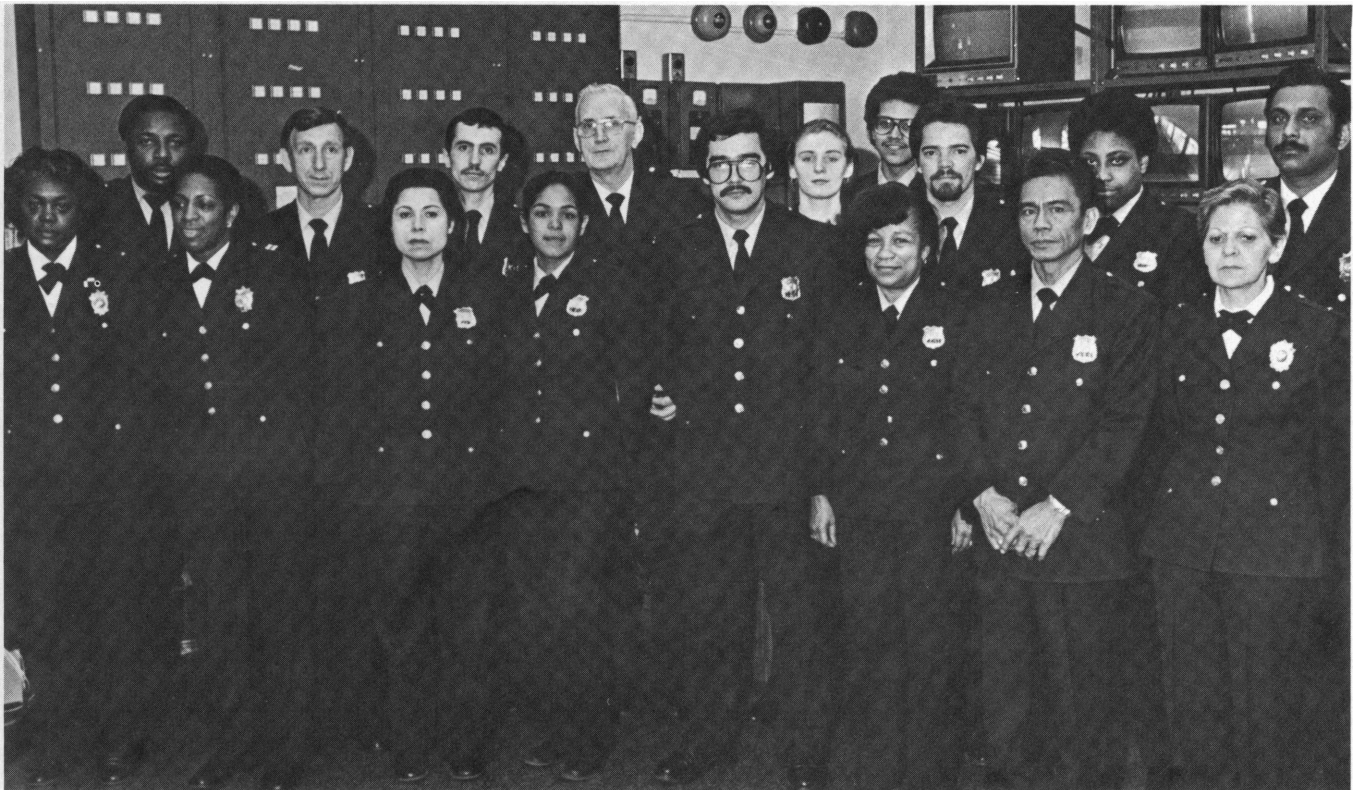
Mr. and Mrs. John H. Foster
 Foundation for North American Wild Sheep Service
 Walter Henry Freygang Foundation
 Mr. and Mrs. Henry Clay Frick, II
 Mrs. Seaton Gales
 Lawrence M. Gelb Foundation, Inc.
 C.H. Coster Gerard
 Elbridge T. Gerry
 Mr. and Mrs. Robert A. Gilliam, Jr.
 Alfred Glassell, Jr.
 Robert G. Goelet
 Mr. and Mrs. Henry L. Goldberg
 William T. Golden
 Mr. Frances A. Goodhues
 Rodney C. Gott
 William Caspar Graustein Memorial Fund
 Susan Greenwall Foundation, Inc.
 The Griffis Foundation, Inc.
 Jay V. Grimm
 Mr. and Mrs. Henry B. Griswold
 John H. Hall
 Gregory Halpern
 Nathan L. and Edith Halpern Designated Trust
 Mrs. John W. Hanes
 Trust of Manry Turck Hanscomb
 Ralph E. Hansmann
 Mrs. Gladys F. Harriman
 Mary W. Harriman Foundation
 Caryl P. Haskins
 Mrs. Clarence L. Hay
 Joseph Hayes
 Mrs. Douglas Hays
 Charles T. Hedlund
 A. Grant Heidrich, III
 Mrs. Arthur G. Heidrich, Jr.
 Mr. and Mrs. Wayne Hicklin
 High Winds Fund, Inc.
 Mr. and Mrs. George W. Hill, Jr.
 Christian Hohenlohe
 Eugene B. Hotchiss
 Huber Foundation
 Helen Imperatore
 Institute for Intercultural Studies, Inc.
 Paul J. Isaac
 Mr. and Mrs. L. Robert Johnson
 Ralph B. Johnson
 Kane Lodge Foundation, Inc.
 The Killock Fund
 Lyndon King, Jr., M.D.
 The Knapp Foundation, Inc.
 Dr. Karl F. Koopman
 Samuel H. Kress Foundation
 L.A.W. Fund, Inc.
 Lakeside Foundation
 Mrs. Samuel W. Lambert, Jr.
 Lansing Lamont
 Mrs. Frederick E. Landmann
 Alexander M. and Judith W. Laughlin Foundation
 Lerner Gray Foundation
 Alfred G. Baker Lewis
 Harold F. Linder
 Susan E. Linder
 Troland S. Link
 Mrs. Luke B. Lockwood
 Frances and John L. Loeb Foundation
 Richard Lounsbury Foundation
 Mrs. V. Theodore Low
 Frank Lyon
 James A. MacDonald Foundation
 Mr. and Mrs. John D. Macomber
 George W. Maker
 Mrs. Hubert T. Mandeville
 Berthe Manent
 Mrs. Hayward F. Manice
 Miss Pamela Manice
 Mr. and Mrs. Henry B. Martin
 Townsend B. Martin

William McChesney Martin, Jr.
 Robert Earle McConnell Foundation
 Mr. John F. McGillicuddy
 Christine Hayward McKee Fund
 Dr. Malcolm C. McKenna
 Mrs. J. Thorne McLane
 Mrs. Joseph McMullen
 The Andrew W. Mellon Foundation
 The Memton Fund, Inc.
 Mrs. G. Macculloch Miller
 The Ambrose Monell Foundation, Inc.
 Edward S. Moore Foundation
 Edwin H. Morgens
 Charles H. Mott
 Mulber Fund
 Laura Jane Musser
 National Endowment for the Humanities
 National Energy Foundation
 National Science Foundation
 The New York Community Trust
 New York Council on the Arts
 Mr. and Mrs. Howard A. Newman
 Henry Nias Foundation
 Acosta Nichols
 Edward John Noble Foundation
 O'Donnell Iselin Foundation, Inc.
 Donal C. O'Brien, Jr.
 John M. Olin
 Dr. and Mrs. Nikit Ordjanian
 Estate of Elmer C. Otto
 Mrs. Walter T. Page

Mrs. John Parkinson, Jr.
 Mr. and Mrs. John W. Payson
 Clara S. Peck
 Perkin Fund
 Milton Petrie
 The Pew Memorial Trust
 William H. Phelps Jr.
 Mr. and Mrs. Howard Phipps, Jr.
 Howard Phipps Foundation
 Ogden Phipps Charitable Trust
 The Henry B. Plant Memorial Fund, Inc.
 Donald C. Platten
 Alexander M. Power
 Heloise B. Power
 Robert K. Raisler Foundation, Inc.
 Mrs. Judith S. Randal
 Mrs. William D. Redfield
 William W. Reese
 Fergus Reid, III
 Mrs. William C. Ridgway
 Gerald and Mary Ellen Ritter Memorial Fund
 A. Sydney Roberts
 The Maurice R. Robinson Fund, Inc.
 Avery Rockefeller
 Mrs. John D. Rockefeller, III
 David Rockefeller
 James S. Rockefeller, Esq.
 J. Sterling Rockefeller
 Mrs. Richard Rodgers
 Ronthelym Charitable Trust
 The Estate of Nicholas Rosenbaum

Mr. and Mrs. Milton F. Rosenthal
 Mrs. Axel G. Rosin
 Arthur Ross
 Mary A. H. Rumsey
 Christine H. Russell
 Richard Salomon
 William F. Sanford
 Olga Saridkis
 SASCO Foundation
 Sarah I. Schieffelin Charitable Residuary Trust
 The Schiff Foundation
 Seiden and De Cuevas, Inc.
 Mr. and Mrs. Norman Segal
 The Evelyn Sharp Foundation
 Richard Shields
 Estate of Jean Walker Simpson
 The William and Hope Simpson Foundation
 Louis Slavitz
 Smart Family Foundation
 Alexandra M. Smith
 Estate of Claire D. Smith
 Frank B. Smithe
 Mrs. Jane I. Sollinger
 The Seth Sprague Educational and Charitable
 Foundation
 Special Fund #14
 Mrs. Barbara H. Stanton
 Estate of Sylvia W. Stark
 Susan B. Stearns
 Mrs. Doris B. Stein
 Alfred R. Stein

Approximately 85 attendant-guards staff the elevators, entrances and exhibition halls in the Museum and Planetarium. Standing in the communications control room of the Building Services Department before going to their assigned posts are attendant-guards and their supervisors: (front row, from left) Barbara Armond, supervising attendant-guard; Betty Weems, assistant manager; Eugenia Lanes, attendant-guard; Inez Rivera, attendant-guard; Gabriel Flores, senior attendant-guard; Ardella Smith, senior attendant-guard; Vitaliano Viaje, attendant-guard; Mary Dillon, supervising attendant-guard; (second row, from left) Richard Singletary, senior attendant-guard; Felice Bartoletti, attendant-guard; Michael Dupré, attendant-guard; Frank Peter Clarke, assistant manager; Margaret Androvett, attendant-guard; Edward Garcia, supervising attendant-guard; Giselle Kirkland, senior attendant-guard; Sankar Gokool, senior assistant manager; (back) Joseph Vega, senior attendant-guard.



Faith Stewart-Gordon
 Lester Stone
 Mr. and Mrs. Gardner D. Stout
 Oscar S. Straus, II
 Horace W. Stunkard
 Evelyn Marshall Suarez Foundation
 Mrs. Arthur Hays Sulzberger
 Surdna Foundation, Inc.
 Ruth and Vernon Taylor Foundation
 Edwin Thorne
 Michael Tuch Foundation, Inc.
 The Lawrence Valenstein Fund, Inc.
 Trust of U/W Arthur S. Vernay
 G. Unger Vetlesen Foundation
 Mrs. Jephtha H. Wade
 Carroll L. Wainwright, Jr.
 Miriam and Ira D. Wallach Foundation
 Mr. and Mrs. Otto K. Wetzell, Jr.
 Mrs. Victor Weybright
 Mrs. Alexander M. White
 Mr. George C. White
 Mrs. John Campbell White
 The Hon. John Hay Whitney
 Peter A. B. Widener
 Mrs. Elizabeth A. Widenmann
 Mrs. H. A. Wilmerding
 Mr. and Mrs. Paul Windels, Jr.
 Robert Winthrop
 Mrs. Knight Woolley
 Rudolf Wunderlich

GIFTS-IN-KIND (Over \$1,000)

- Art Collectors, Ltd.,—an extensive collection of Indonesian artifacts from various parts of the country.
- Dr. Roderic H. Blackburn—a gift of Okeik material from the Narok district of Kenya.
- Dr. Roderic H. Blackburn—a collection of ethnographic artifacts of the Okeik tribe of the Narok District of Kenya.
- Steven Bleiweiss—a gift of a collection of five gem-quality minerals.
- Dr. Dorothy Bliss—a gift of a reprint collection on Crustacea (estimated to number 7,000 publications).
- Fred Bloom—a collection of thirty-three mineral specimens, including a bertrandite (Brazil), carrollite (Zaire), and an azurite (Russia).
- Jerry J. Brown—a collection of fifty crystallized minerals.
- Stephen Byer—a collection of crystallized minerals.
- Allan Caplan—a gift of a cluster of beryl (variety emerald) crystals with quartz on matrix from the Chivor district of Colombia.
- Gerald Case—a collection of fossil specimens.
- Brewster J. Chase—a gift of five gems: one blue sapphire, two star rubies, one topaz and one amethyst.
- David Eidahl—a gift of three mineral specimens.
- Bruce H. Fellows—a gift of forty-nine crystallized mineral specimens.
- H. Avery Freeman—a collection of Mexican Hesperidiidae.
- Mrs. Hannah D. Gaines—a gift of an elbaite (variety rubellite) tourmaline crystal group from Minas Gerais, Brazil.
- Charles Gradante—a collection of 103 topaz crystals from the Thomas Range of Utah.
- Peter Greenfield—a gem beryl carved in the form of a parrot.
- Drs. Arthur and Pauline Hecht—a gift of three faceted beryls and a topaz.
- Dr. Richard Heck—two specialized collections of minerals totalling 239 specimens, and one collection of miscellaneous minerals.
- Richard Holland—a gift of eighty-two paratypes of butterfly.
- Ellen Keller—a collection of minerals: clinozoisite (Salinas, Brazil); elbaite (Brazil); beryl (Colombia); quartz-variety amethyst (Zambia); topaz on matrix (Brazil); beryl-variety cat's eye (Haddam, Connecticut).
- Dr. David Kistner—a gift of 960 paratypes and 480 specimens of African myrmecophilous rove beetles (staphylinidae).
- Carl Krotki—a gift of two faceted gems: prehnite (Australia) and a vayryenite (Afghanistan).
- Mabel C. Lamb—a collection of sixty-eight crystallized minerals from the St. Joseph's Lead District in Missouri.
- Dr. Frederick E. Landmann—a gift of twenty-nine Peruvian artifacts.
- Mrs. Zoe B. Larimer—a gift of a Ch'ien Lung period Chinese Jade (nephrite) vase and a lady's ring consisting of a blue star sapphire cab surrounded by eighteen diamonds set in platinum.
- William Larson—a gift of 150 crystallized minerals.
- Howard LeBlang—a gift of an elbaite tourmaline crystal from Haddam Neck, Connecticut.
- Henry Lipschitz—a collection of five beryl crystals from Mt. Antero, Colorado, five elbaite crystals from Brazil and one beryl crystal also from Brazil.
- Roy Mallady—a gift of a spodumene crystal from Afghanistan and an irradiated blue topaz.
- Mr. and Mrs. Cedric Marks, a gift of twenty-two ethnographic artifacts from northwestern Brazil.
- Dr. Bryant Mather—a gift of 2,593 specimens of Lepidoptera.
- Shiro Matsunaga—a gift of twenty-nine mineral specimens.
- Dr. John McKesson—a gift of African artifacts.
- Tom Morris—a collection of six carvings of elbaite carved in the form of fish.
- Thomas H. Munyan—a gift of a Conidae Collection.
- Eugene L. Notkin—a collection of twelve gem-quality crystals from various parts of the world.
- Elanora Ordjanian solicited over 100 donors for gifts of 120 Armenian artifacts for the Gardner D. Stout Hall of Asian Peoples.
- Mr. and Mrs. Arthur Rasch—a gift of an opal cabochon from Piaui State of Northern Brazil.
- Mrs. Stanley Reed—a gift of 1,600 slides and 80 reels of tapes from the estate of her father, Gurnee Dyer.
- Dr. Ralph Reichert—a collection of seven crystals.
- John Samson—a gift of Ernest Thompson Seton manuscripts and drawings.
- Dr. Radall T. Schuh—a gift of 1,741 insect specimens.
- Dr. Louis Schwartz—a collection of eight mineral specimens.
- Sidney Singer, Jr.—a collection of ten gem-quality elbaite crystals from Nuristan, Afghanistan.
- Sidney Singer, Sr.—a gift of 526 crystallized mineral specimens.
- Donald Smeaton—a gift of the fossil fish *Diplomystus dentatus* from the Green River Formation of Wyoming.
- Ed Swoboda—a gift of molluscan specimens.
- Seymour B. Walzer—a collection of faceted gems.
- David Wolkenberg—a gift of aquariums and fish-keeping supplies.

FOR FUTURE GENERATIONS:

You may establish a gift that will perpetuate your memory and help assure that the fruits of the American Museum's research, education and exhibition programs are handed down to future generations.

You may make a gift reserving income for life to yourself and your beneficiaries, or designate a gift of income interest to the Museum, with the remainder to you or your beneficiaries. Gifts may be made in your will or outright, through a bequest.

If you wish to discuss in confidence these special opportunities for giving, please contact Robert G. Goelet, President, or Stanley E. Gornish, Manager for Development, American Museum of Natural History, Central Park West at 79th Street, New York, New York, 10024. Telephone: (212) 873-5927.

