113th ANNUAL REPORT 81 82

AMERICAN MUSEUM OF NATURAL HISTORY

American Museum of Natural History
Central Park West at 79th Street
New York, New York 10024

When, on April 6, 1869, the American Museum was founded, the act of incorporation passed by the New York State Legislature unambiguously set forth the institution's direction: "...of encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects, and to that end of furnishing popular instruction and recreation."

At the American Museum of Natural History, that course is as clear today as it was 113 years ago. The Museum stands as a preeminent center of basic inquiry in anthropology, astronomy, mineralogy and zoology. And from its research flow imaginative, innovative and enjoyable programs of exhibition and education.

The Museum's first home was in the Arsenal in Central Park. Today, the Museum complex, including the American Museum-Hayden Planetarium, occupies 22 interconnected buildings on 25 acres—four square blocks—on the upper west side of Manhattan, with Central Park at its doorstep. Its public service areas make up two-thirds of its total floor space. Some 2.5 million persons visit the complex's 38 exhibition halls each year.

Behind the scenes, 200 scientists and their assistants carry forward their research; their findings are shared with other investigators throughout the world, forming the basis of continuing inquiry and application.

The Museum's collections include some 35 million artifacts and specimens. Among them are eight million anthropological artifacts, more than 16 million insect specimens, 230,000 amphibians and reptiles, 600,000 fish, 8.5 million invertebrates, 250,000 mammals, 120,000 rocks, minerals, gems and meteorites, one million birds and 330,000 fossil vertebrates. The exhibition and research collections of dinosaurs are the largest in the world.

The American Museum receives support from the City of New York, New York State Council on the Arts, National Endowments for the Arts and Humanities, the National Science Foundation, and from corporations, foundations and individuals. It has a nationwide membership of a half-million. Visitor contributions and fees for special services also provide a significant and growing source of revenue.

1981-1982 HIGHLIGHTS

- Naturemax Theater opens in February with the IMAX® motion pictures "To Fly" and "Living Planet" showing on the largest indoor movie screen (four stories high and 66 feet wide) in New York. In June, the film "Hail Columbia!" is added to the schedule.
- "Traditional Japanese Designs in Textiles, Stencils and Costumes," a special exhibition, opens June 25, closes Oct. 1.
- "Through the Looking Glass: A History of Microscopes," a special exhibition, opens Sept. 23, closes Dec. 30.
- "Afro-American Arts from the Suriname Rain Forest," a special exhibition, opens Oct. 28, closes Jan. 24.
- "Patterns of Paradise," a special exhibition, opens Nov. 18, closes Feb. 14.
- "Champions of American Sport," a special exhibition, opens March 19, closes June 27.
- A central computer system, serving all areas of the Museum, is installed.
- A new Education Center is created, unifying educational facilities and expanding educational programs. The Center is supported by grants totaling more than $1.3 million from the Charles A. Dana Foundation, the Leonhardt Foundation and other donors.
- Fifth Annual Margaret Mead Film Festival, Oct. 17-18, featuring anthropological films on the peoples of the world, draws 11,000 visitors.
- Construction of a balcony addition to the Museum Shop and a new cafeteria/restaurant complex is begun.
- A $500,000 challenge grant proposal is submitted to the National Endowment for the Arts to help finance physical changes aimed at improving the Museum's earned income position.
- A total of 2,441,575 persons visit the American Museum and the Hayden Planetarium—1,979,544 the Museum, and 462,031 the Planetarium.

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One hundred and thirteenth Annual Report of the President

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

In these times fraught with budget cutbacks and economic stress, the American Museum has managed to substantially expand its hours and its services to visitors, while maintaining its vital missions of research, exhibition and education. The Museum has embarked on a massive program to increase its earned income, particularly by broadening the scope and heightening the quality of its offerings to the visiting public. Donors and granting agencies from all sectors are increasingly selective in their distribution of funds. Nevertheless, they continue to select the Museum as an outstanding institution that has demonstrated an ability to use such funds for revenue-producing expansion, furthering research and improving service to its visitors.

Two grants this year are particularly significant to the Museum's educational goals. These gifts, totaling more than $1.3 million, will enable the Museum to unify its present educational facilities and expand its educational programs. The Charles A. Dana Education Wing is being established at the Museum under a grant from the Charles A. Dana Foundation. The Dana Wing will include new education spaces and a two-story structure that will be added in an interior yard of the Museum. A grant from the Leonhardt Foundation in honor of Frederick H. Leonhardt will expand the operation of the Museum's People Center to 11 months a year and continue to provide a "living" anthropology experience there. A gift from the Edith C. Blum Foundation will establish the Edith C. Blum Lecture Hall. The Henry Kaufmann Foundation and the Harold F. Linder Foundation provided funding for the construction of two new theaters in Education Hall.

A challenge grant requested from the National Endowment for the Arts would support new construction of earned income projects, including the Education Center; a mezzanine book shop for the Museum Shop and new publication and membership services offices for *Natural History* magazine as well as exhibit cases for the Hall of South American Peoples.

In February, our new Naturemax Theater opened in the Museum's Main Auditorium to rave reviews from the press. The theater houses New York City's largest indoor motion picture screen—four stories high and 66 feet wide. With a picture surface 10 times the size of a conventional movie screen and an omni-directional stereophonic speaker system, Naturemax envelopes the audience in a unique and captivating audio and visual experience. It gives Museum visitors a new perspective on the world around them. The screen can be lowered into the stage, enabling the Museum to use the theater for music, dance and other programs. "To Fly" and "Living Planet" were the two featured films, with "Hail Columbia!" added to the offerings late in June. The Naturemax Theater is a major permanent addition to the attractions at the Museum. It constitutes an innovative improvement in services to visitors and is an important source of earned income.

Another area in which the Museum has expanded its visitor services is in hours. Effective in February, a generous grant from Mobil allowed the Museum to remain open to the public free of charge on Fridays and Saturdays from 5 p.m. to 9 p.m. In April, the hours during which the Museum remains open to visitors were also extended by one hour to 6 p.m. on Monday, Tuesday, Thursday and Sunday, and on Wednesday until 9 p.m. The American Museum now has the longest visitor hours of any of the major museums in New York City and it keeps its doors open during prime entertainment hours on weekend evenings. It is closed only two days a year.

A wide variety of special exhibitions were featured at the Museum during the year. A major multi-media exhibition on the Elizabethan Era, "Shakespeare: The Globe and the World," ran from June 18 through Sept. 20. The exhibition was supported by grants from the National Endowment for the Humanities, Metropolitan Life Insurance Company, Exxon Corporation and the Corporation for Public Broadcasting. The "Shakespeare Summerfest," a city-wide series of cultural presentations organized by a consortium of metropolitan area colleges and universities, accompanied the exhibition.

The first breaths of spring brought sports fans into the Museum to view a major exhibition devoted to outstanding sports personalities of the United States and pointing up the impact of mankind's cultural preoccupation with sports. A cameo sports hall of fame, "Champions of American Sport," was a multi-media presentation featuring memorabilia, film and videotape, sculpture, paintings and photographs. The exhibition was sponsored by Philip Morris Incorporated and its operating company, the Miller Brewing Company.

Other special exhibitions over the year also pointed up the range and scope of the Museum's interests and fields of research. The history of the microscope's evolution and the impact of its revelations were the themes of "Through the Looking Glass: The History of Microscopes," organized by the Museum and the New York Microscopical Society. An exhibition entitled, "Afro-American Arts from the Suriname Rain Forest," focused on the Suriname Maroons who, from childhood, are encouraged to express ideas in art and performance. "Patterns of Paradise," was the first Museum exhibition devoted to one of the most overlooked of traditional handicrafts, tapa cloth made from the inner bark of mulberry and similar trees. It was organized by the Field Museum of Natural History in Chicago. Support for this exhibition and for the Suriname exhibition came from the National Endowment for the Humanities. And, at the end of the fiscal year, the finishing touches were put on "Confiscated!", an exhibition dramatizing the worldwide problem of the illegal traffic in products made from endangered species.

Over the year, plans and preparatory work were completed for the major exhi-

A workman ascends a scaffold inside Education Hall which is being converted into two new theaters—the 150-seat Harold F. Linder Theater and the 300-seat Henry Kaufmann Theater. They will be part of the Museum's new Charles A. Dana Education Wing, which will also include the Edith C. Blum Lecture Hall, the Frederick H. Leonhardt People Center, the Alexander M. White Natural Science Center, the Louis Calder Laboratory and an activities room.

bition of the summer of 1982, "Aztec Mexico: Discovery of Templo Mayor." More than 100 objects that had been uncovered when the main ceremonial center of the Aztecs was discovered in 1978 beneath the streets of Mexico City were loaned by Mexico's National Institute of Anthropology and History. The objects—some hauntingly striking—were scheduled for exhibition at the American Museum from July 27 to Oct. 6, 1982, their first time on view in the United States.

The foundation for the exhibitions and the educational activities of the Museum is its extremely able scientific staff and their research. Whether they are discovering the world's smallest known diatom or carrying out archeological research at the highest altitude in North America to date, Museum scientists continue to aim at new horizons.

A symposium on "Humans and Apes: Pathways in the Search for Human Origins" brought together three of the world's leading primatologists on May 15. Jane Goodall, Dian Fossey and Biruté Galdikas discussed their work on the great apes and the relationship of their studies to an understanding of human evolution. Donald C. Johanson, discoverer of the famed "Lucy" fossil, was the moderator.

A special conference, Nov. 1-10, attended by vertebrate paleontologists from around the world, marked the first time that scientists from that discipline had met to compare their data and their fossil specimens of the three-toed *Hipparion* horse. The *Hipparion*, which is related to but is not considered a direct ancestor of the modern horse, has been the subject of lively scientific debate. It was natural for the conference to take place here since the Museum has the world's largest and most complete collection of *Hipparion* fossils. The conference was supported by a grant from the National Science Foundation.

The importance of the tropical rain forests to the ecological balance of the earth was discussed in a major symposium here on Dec. 9. Its participants were Thomas E. Lovejoy, Vice President for Science of the World Wildlife Fund U.S.; Ghillean T. Prance, Senior Vice President and Director of the Institute of Economic Botany at the New York Botanical Garden, and George M. Woodwell, Director of the Ecosystems Center of the Marine Biological Laboratory in Woods Hole, Mass. Russell E. Train, President of the World Wildlife Fund U.S. and former Administrator of the Environmental Protection Agency, was the moderator for the evening.

Warm thanks are due to our 287 corporate givers who have for the most part been able to maintain and in many cases increase their support. Contributions from corporate sources totaled some $1.277 million, $884,000 of which was in unrestricted support and $393,000 in restricted gifts. In the face of the real economic strains that business has been facing, it is most encouraging that our corporate friends have identified those institutions which they feel are most important to the community at large and have continued to support them. Much of the credit for the success of our corporate giving program should go to Trustee Donald C. Platten, who serves as Chairman of the Museum's Corporate Campaign.

Continued support for the economic mineralogy fund, established under the leadership of Vice President and Trustee Plato Malozemoff and made possible by substantial contributions from the nonferrous metals industry, totaled $113,300 for the year. The accumulated funds will support an endowed curatorship and related research in the Department of Mineral Sciences, with special emphasis on exploration, potential ore reserves and identifying the mineral resources of the United States.

The Trustees of the Museum were, as always, helpful with their advice and guidance. They were also generous, both in the gifts they made and with their assistance in helping to generate other contributions. With regret, we note the resignation of two trustees: Alfred W. Crompton and Samuel C. Johnson.

We report with sadness that James A. Oliver, Director Emeritus, died on Dec. 2. Dr. Oliver, also the former Director of the New York Zoological Society and the retired Director of the New York Aquarium, was the only person ever to have been director of all three institutions. As Director of the Museum, Dr. Oliver guided it through an important period of growth and activity, establishing a 10-year program of constructing new buildings and exhibitions and modernizing existing ones.

We welcome to the board three new trustees: Philip F. Anschutz, founder and President of the Anschutz Corporation, a Denver-based oil company; Frank G. Lyon, a private investor who has served as the chairman of the Museum's Men's Committee and as director of several organizations, and William Barnabas McHenry, General Counsel for the Readers Digest Association, who, as former chairman of the Commission for Cultural Affairs of the City of New York, brings a wealth of experience to the Museum.

I wish to offer particular thanks to Trustee William T. Golden, who, in December, completed 10 years of service as Vice President of the Museum. Mr. Golden, a member of the American Philosophical Society, was presented in April with the Distinguished Public Service Award of the National Science Foundation. Mr. Golden was influential in the establishment of the Mack Lipkin "Man and Nature Lectures" at the Museum. This promises to be an unusual lecture series that will communicate knowledge of the natural sciences to a wide audience.

Many people, including a number of trustees with close ties to the Museum, first came to us through the Men's and Women's Committees, which had a long and highly successful history of personalized fund raising. This year a steering committee was established to consider and plan a restructuring of the Museum's fund raising approach to individuals.

A new group, "Friends of the American Museum of Natural History," was also established and its council is now in the formative stage.

A benefit committee was formed with Mrs. Charles A. Dana, Jr., Arthur Ross and Mrs. R. G. Goelet serving as co-chairpersons. A benefit dinner-dance will be held on Dec. 7, 1982.

This has been a historic year for the Museum, one in which many important changes have been made, but also one of solid commitment to the basic research, exhibition and education programs that have made us a great institution. With the help of our friends and supporters, this center for the study of the natural history of the world around us will continue to thrive and evolve.

Robert G. Goelet,
President

Director's Message

When the concept of exhibiting animals in dioramas was pioneered at the American Museum of Natural History more than 60 years ago, it was revolutionary. From posed, stuffed animals, and from skeletons and pelts laid row on row in curio cabinets there evolved the art of creating "habitat groups," as the famed dioramas came to be known. Animals were shown in lifelike settings, recreating as closely as possible the environments in which they lived. Who would have thought that depictions of the natural world would one day take on even more realism—with motion and sound?

This realism is what Museum visitors can now enjoy when they attend Naturemax, the new theater that opened last February in the Museum's 90-year-old Auditorium. Naturemax presents motion pictures, of course. But its presentations are of a revolutionary kind, recreating the impact of nature on the human senses as closely as modern technology has yet been able to achieve. That is precisely why we installed the Naturemax theater, for we see in its realistic presentation of nature's awesome beauty and grandeur an extension of the diorama concept in a new dimension. The animal habitat diorama was created to enrich our understanding by showing us a lifelike recreation of nature. What would it be like if the recreation could seem to come alive? In the Naturemax theater it does, with startling clarity and brilliance.

The Naturemax theater achieves its marvels by presenting motion pictures in the new film format known as IMAX, using unique and innovative technology, equipment and artistry developed by the IMAX Corporation of Toronto, Canada. When it opened last February, it was one of only 26 theaters in the world equipped to present films of this kind. The Naturemax theater at the Museum is the only location in the Greater New York area where these spectacular film productions can be seen.

IMAX motion pictures are produced on film that has a full 70 millimeter picture

Famed Alaska Brown Bear diorama, Ursus gyas Merriam, *in the Hall of North American Mammals, is a stunning example of the habitat group technique that the American Museum pioneered more than 60 years ago. This lifelike diorama and others like it continue to captivate and intrigue the Museum's visitors. New attractions, such as the Naturemax Theater, serve to generate additional visitor interest and motivate repeat visits. Some 2.5 million persons come to the Museum annually.*

frame. This huge frame size, 10 times larger than that of the 35 millimeter film used in most large theaters, requires special cameras for photographing the production, and even more complex and revolutionary projection equipment to show it in a theater. Because the frames are 10 times larger than those of a conventional film, the screen also can be 10 times greater in area. In the Museum's Naturemax theater the screen covers the entire front wall of the hall: 66 feet across and four stories high.

The IMAX motion picture system used in our Naturemax theater delivers much more than size, however. It creates an extremely realistic impression of nature. Naturemax takes the imagination on a journey into nature that will never be forgotten. And, like nature, each time more can be learned.

At the American Museum, we think of Naturemax as exhibition more than motion picture—as an extension of our objective to illustrate and teach with nature, from nature and through nature. We have been doing this in innovative ways all during the 113 years of the Museum's existence. The first Director, Albert Bickmore, pioneered in the use of lantern slides to illustrate his public school lectures on natural science, hand coloring them to enhance their realism. Before World War I, diorama techniques were first introduced here to create lifelike animal habitats in exhibition halls. In the 1920s, we organized the first motion picture lending library to serve the schools of the New York area with nature films, many of which were produced by or for the Museum.

The habitat group exhibition technique reached its zenith with the completion during the middle 1930s of the two-level Hall of African Mammals, which made consistent use of animal mounts based on the revolutionary taxidermy developed by Carl Akeley. Timeless in their beauty and their message, the dioramas in the Hall of African Mammals are still an outstanding attraction, the most ambitious and successful application of this exhibition technique ever produced.

When the Museum opened its Hayden Planetarium in 1935, its window into nature widened to encompass the whole universe. And over the years, the innovations begun here in teaching and illustrating concepts in astronomy have influenced the growth and popularity of these unique "sky theaters" worldwide. We are now on our *third* Zeiss projector, and are in the process of installing a computer controlled automation system to further expand our technical and teaching capability with the support of the Charles Hayden Foundation which helped make possible the establishment of the Planetarium nearly 50 years ago.

During the post-World War II period, standards in design and presentation in display and exhibition began to reflect the higher educational levels, the more sophisticated and diverse tastes and the broader experiences and observations of a more traveled and better informed population. Recognizing these changes, the Museum added diverse and imaginative design talents to its staff of skilled and experienced preparators, artists, technicians and craftsmen. Their task: to produce, under the scientific direction of its curators, exhibitions that reflected the very best and latest in display innovations while retaining the quality and integrity for which the Museum had become world-famous. No permanent exhibition halls in the world are more beautiful or more effective than our own Hall of Man in Africa (1968), Hall of Asian Peoples (1980), Hall of Ocean Life and Biology of Fishes (1969), and the three halls in the Section of Meteorites, Minerals and Gems (1976 to 1981).

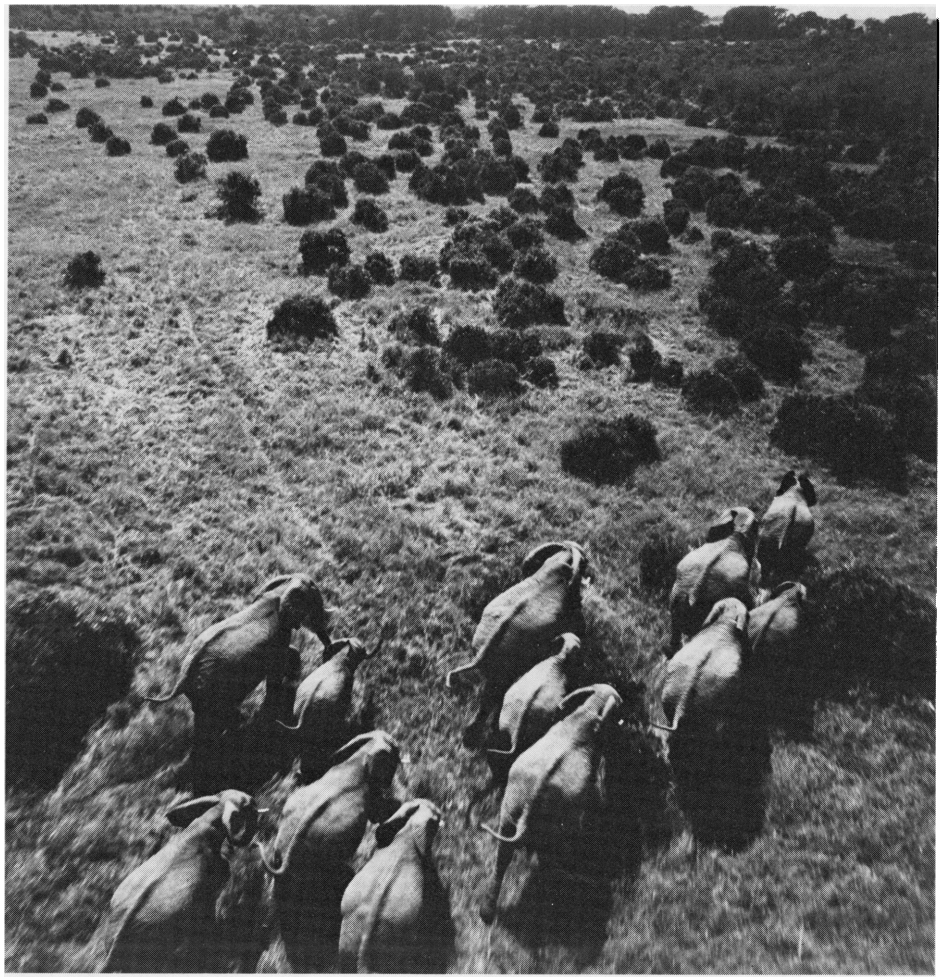
Another major change in exhibition policy and practice in natural history museums came about in the late 1960s and the 1970s with the construction of galleries for major special exhibitions designed to be temporary in nature. Until then, virtually all exhibitions in natural history museums were permanent displays of objects that illustrated the range and diversity of the collections.

This practice tended to foster relatively slow replacement schedules for modernization or reconstruction in exhibition halls; the very high cost of constructing large permanent exhibits made it most practical to keep such halls for 30 years or more. It also tended to limit the number of specimens and artifacts shown to a very small fraction of what each museum held in its collections. At the American Museum of Natural History, for example, permanent exhibition halls contain far less than one percent of the 35 million objects in the collections.

Major special exhibits bring several advantages to natural history museums and to their visitors. Because of their long planning and preparation time, and because of their very high cost, new permanent exhibition halls or major renovations in existing halls can be completed only as often as one every 18 to 24 months. Major, high quality special exhibitions can be presented in a fraction of that time and at much lower cost, especially if the exhibitions are shared by a number of museums and travel from one to another without major change. This allows us to present three to five new exhibition attractions each year.

Special exhibitions also allow the museum to present displays of specimens or of parts of collections that are not on permanent exhibition. Very often, these materials are as interesting, as attractive and as culturally or educationally enriching as the collections in the permanent exhibition halls.

Only so much can be shown in our permanent halls, vast as they are. The opportunity to create new exhibitions out of the 99 percent of our holdings that are not on display is very great. And when the opportunities that arise out of the collections in other institutions world-wide are added, the possibilities for creating imaginative, effective, enriching special exhibitions become limitless. These opportunities not only broaden the horizons of our imagination and resources for creating exhibitions, they allow us to plan and present special exhibitions that may appeal to special groups in the community. Thus they help to attract new visitors and to bring back others who have not visited in some time. In coming to see a special show that may appeal to their interests, these visitors, we are sure, will find a great deal more to see, enjoy and learn from. After all, our visitor studies show that the average person goes to only



African elephants, Lorodonia africani peeli, *move across Kenya's Masai-Mara Plain in this scene from the Naturemax Theater feature, "Living Planet." Filmed from an airplane as they moved, the elephants provided excellent subject matter for the super-screen IMAX projection technology. Naturemax Theater-goers gain new perspectives of the natural world on a screen four stories high and 66 feet wide.*

six or seven out of the 38 halls during a visit. Visitors return, often stimulated to do so by a new special exhibition, and find much else in the Museum to make return visits worthwhile.

Special exhibitions have been criticized, however, on the ground that their success in attracting visitors, and the visitor-related income that often follows, may tend to influence the Museum in its choice of exhibitions. The criticism has also been made, especially of natural history museums, that special exhibitions are replacing those major, permanent exhibition halls which have long been the basis for their success and reputation.

I do not believe that either of these is a real concern of the American Museum of Natural History. We see special exhibitions as a supplement *to*, not a substitute *for* our great permanent exhibition halls. Our plans to build or renovate permanent halls are not materially affected by the program for presenting temporary exhibitions on special subjects or from special collections. Even though our special exhibitions today are larger and more significant, permanent exhibitions from our collections still comprise more than 95 percent of the exhibition resources available to the visitor.

As for the potential effects of economic dependency resulting from special exhibitions, the problem is one of emphasis. I have always maintained that a public institution such as the American Museum will never be successful financially or otherwise if it is founded or operated with profitability as its sole goal. I have seen many so-called public educational or cultural institutions try to do so and fail. But I am also convinced that a well-managed public institution—with goals that are realistic in terms of its community and its constituency—can generate the income it needs if it plans and conducts its programs responsibly, with quality and integrity.

Translated in terms of exhibition, this means that we do not choose exhibits because they will be profitable. But we do believe that high quality, attractive, interesting and responsible exhibits, based on good collections and reflecting the highest standards of educational and scientific integrity, will bring substantial income to the Museum both directly and indirectly. Exhibition is our business, along with scientific research, education and other aspects of public service related to our role as a collection oriented institution. If we do it well, I am convinced, we will find the community support we need.

The Naturemax Theater is another aspect of the broad, diverse plan of exhibition that the Museum offers to the public. It is the latest and most innovative, but surely not the last, for we must continue to seek and to implement and create new opportunities.

All of us at the Museum are proud of Naturemax, of what it does and how it came into being. We are proud of and grateful to our Trustees, who supported us in authorizing the large capital expense needed to purchase and install the equipment and renovate the auditorium. We are proud of our designers, technicians, craftsmen and supervisors, who applied imagination and energy to the renovation. With their help, the gracious auditorium was modified for this most modern of film technologies while retaining its traditional style and elegance. And we are proud of our community, the press, our benefactors and our members and visitors for responding so enthusiastically to what we accomplished. The Museum's community is broad and responsive; the Museum's members and friends deserve and, I believe, get the best.

T. D. Nicholson

Thomas D. Nicholson,
Director

Department of Anthropology

Junius Bouton Bird, Curator Emeritus and the world's leading authority on pre-Columbian textiles, died in April. The Department he left behind was involved in many of the Museum's special exhibitions, including preparations for "Aztec Mexico: Discovery of Templo Mayor" and the planning of permanent halls such as the Hall of Peoples of South America. Departmental interests are not limited to cultures south of the American border, however. North American Indian archeology, village life in India, the economic roles of children in West Africa, and the evolutionary relationships of Malagasy primates were but some subjects of this year's research.

Digging Above the Clouds David Hurst Thomas, Chairman and Associate Curator, led a field expedition of 15 people to excavate Alta Toquima Village, located on Mount Jefferson, Nevada. This project is a continuation of the long-term American Museum excavations at Gatecliff Shelter. Located in a wilderness area accessible only by backpacking, Alta Toquima Village is the highest American Indian site ever excavated in North America. A total of 18 aboriginal houses were exposed and an intensive surface collection showed evidence from more than 100 prehistoric bighorn hunting features. The hunting complex seems to span at least 6000 years, while the residential village seems to be less than 800 years old.

Dr. Thomas also led two months of excavation and fieldwork on St. Catherines Island, Georgia, supported by the Edward John Noble Foundation. The field crew concentrated on excavating ruins of a 16th and 17th century Spanish mission site, Santa Catalina de Guale. This important and previously lost mission site was detected by means of a proton magnetometer. To date, two structures, in addition to the mission well, have been excavated. Two additional volumes of the *Anthropology of St. Catherines* series were also completed this year.

Robert L. Carneiro, Curator, has been preparing a regional ethnology of Amazonia, to be entitled *Indians of the Tropical Forest*. Dr. Carneiro also completed a manuscript dealing with the theory of village splitting as a function of population size. He began research on punctuated equilibria, a concept in some ways anticipated by Herbert Spencer.

Village Life Stanley A. Freed, Curator, collaborated with Ruth S. Freed, Research Associate. The Freeds are analyzing data collected during their 1977-1978 field work in India, an area they first studied in 1958-1959. Their research centers on the general problem of urban influences upon traditional village life. While some areas of village life have undergone significant change, other aspects of culture and society remain largely unchanged. Two papers analyzing census data have been completed, and are scheduled for publication in *Ethnology* and in the *American Ethnologist*.

Dr. Enid Schildkrout, Associate Curator, carried on with research on the economic roles of children in West Africa. Dr. Schildkrout and Carol Gelber, a Research Assistant, conducted a follow-up study of children and women in northern Nigeria (Kano). Three years after the original work they were still able to gather data on all of the families studied and to follow the careers of the children and women in the original study. Dr. Schildkrout also researched widowhood in Hausa society and traveled to Venice to deliver a paper about early African ethnological collections of the American Museum.

Ian Tattersall, Associate Curator, and Jeffrey Schwartz, Research Associate, visited several museums in Europe to study Eocene primate fossils. In January, Dr. Tattersall, in collaboration with John Van Couvering, Editor of Micropaleontology Press, began a survey of the fossil potential of Sokoto Basin in northwestern Nigeria and of southern Sudan. Dr. Tattersall also continued work on the evolutionary relationships of the Malagasy primates. With Niles Eldredge, Curator, Department of Invertebrates, he completed a manuscript about patterns of change in paleontological and historical records. The book is entitled "Myths of Human Evolution."

Inca Urbanism Craig Morris, Associate Curator, pursued his long-term research on Inca urbanism. Field and laboratory data from more than 3500 buildings at Huanuco Pampa have been analyzed, and data from nearly two million pottery sherds and other artifacts have been computerized for final analysis. Dr. Morris traveled to Peru to analyze collections from sites occupied by Inca colonists sent to the Huallaga Valley from the Cuzco region and began preliminary planning for a long-term project in the territory of the Chincha kingdom on the Peruvian South Coast. That project, scheduled to begin in 1983, will be conducted by the Museum in collaboration with the Institute of Andean Research and the Massachusetts Institute of Technology.

Harry L. Shapiro, Curator Emeritus, was awarded the Physical Anthropology Section Award of the American Academy of Forensic Sciences. The award will be conferred at the Academy's annual meeting in Cincinnati in February, 1983. Dr. Shapiro finished an article on human evolution and a biography of the late Earnest Hooton, professor of anthropology at Harvard.

Gordon Ekholm, Curator Emeritus, continued to assist in the curatorial supervision of the Middle American collections.

New Space Barbara Conklin, Registrar and Coordinator of the Curatorial Service Program, supervised the

Her Majesty Queen Sirikit of Thailand, center, admires an embroidered apron with pendants, a costume piece from Southeast Asia. Lisa Whittall, Curatorial Assistant in the Department of Anthropology, right, describes the piece to the Queen and members of the royal entourage. Queen Sirikit visited the Museum in May, accompanied by a party of 25 persons.

basic construction of new storage space. Environmental control systems will be installed, and bid specifications are being prepared for compact storage units. The storage space will accept particularly vulnerable ethnographic collections.

A new space was prepared for the Richard Lounsbery Laboratory of Biological Anthropology, and laboratories for North and South American archeology were relocated. Construction of the new Hall of Peoples of South America began, following the inventory and removal of all Latin American archeological collections from temporary storage. Textile cabinets were also installed to accommodate much needed expansion of ethnographic textile storage.

The South American textile conservation program, established by the late Dr. Bird, has progressed successfully, resulting, this year, in the conserving of several important textiles. Some of these will be installed in the new Hall of Peoples of South America. Three trainees under the supervision of Vuka Roussakis, Conservation Specialist, have developed the special skills required for this work.

The Department continued the Lounsbery-American Museum Fellowship program. Last year, eight grants-in-aid were provided to qualified scholars on a variety of topics. During the 1982-1983 year, a Lounsbery-American Museum Postdoctoral Fellow will be in residence at the Lounsbery Laboratory of Biological Anthropology. Additionally, the Lounsbery-American Museum Predoctoral Fellowship program awarded nine grants to deserving graduate students working on the archeology of North America.

Junius Bouton Bird, Curator Emeritus of South American Archeology, died on April 2 at the age of 74. Dr. Bird was one of the world's leading archeologists and authorities on pre-Columbian textiles. During his 54 years with the Museum, he developed its extensive textile collection and organized popular exhibitions such as "Gold of the Americas." Dr. Bird conducted expeditions throughout the Western Hemisphere, but he was best known for his excavations in southern Patagonia and on the north coast of Peru. On an expedition to southern Chile, he discovered the earliest human remains found up to that time in South America.

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Carneiro, Robert L.

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1981. The chiefdom: precursor of the state. *In* The transition to statehood in the New World, Grant D. Jones and Robert R. Kautz, eds., Cambridge Univ. Press, New York, pp. 37-79.

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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.

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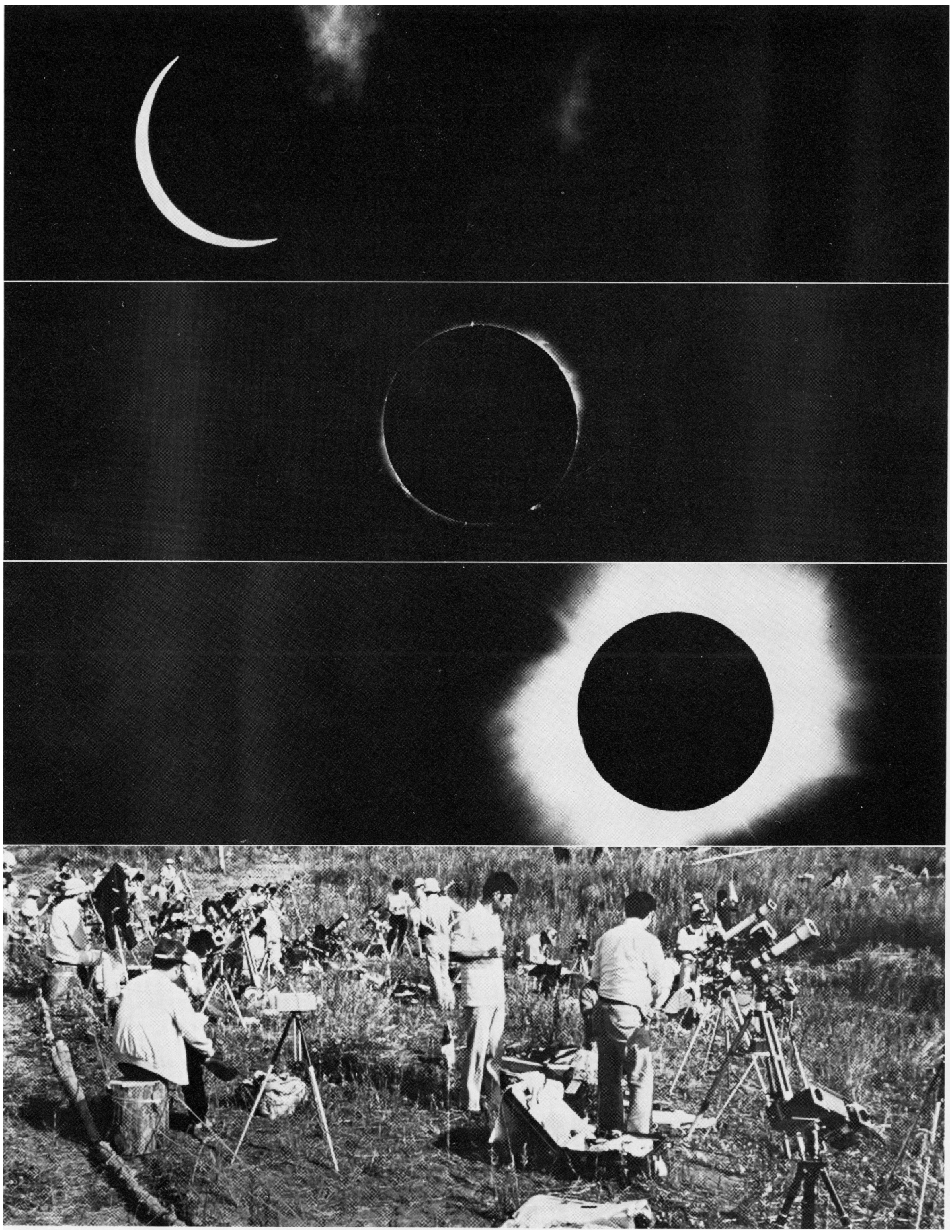
Astronomy and the American Museum—Hayden Planetarium

Around the world, the American Museum-Hayden Planetarium is known for its long-standing tradition of bringing the vast and intricate universe down to earth. Through its shows and courses, exhibitions and displays, it continues to attract hundreds of thousands of visitors each year. In addition, its varied and talented staff, calling upon the resources of the Richard S. Perkin Library, annually provide the answers to countless inquiries from elementary school children, the international news media and the scientific community, supplying a wealth of information on astronomy and space science.

Sky Shows During the fiscal year, four Sky Shows were presented in the world-famous Sky Theater. In the summer of 1981, the offering was "The Drama of the Universe." This show introduced a new "magazine" style format into Planetarium programming, in which a number of interesting but unrelated astronomical topics were presented in lengths deemed appropriate to public interest levels. The program was hosted by Isaac Asimov. It was followed by "Night of the Hunter," a show illustrating the fascinating variety of celestial objects to be found in even one small section of the sky, namely the constellation Orion. At year's end, the Planetarium presented the annual holiday favorite, "Star of Wonder." The show recounts the story of the birth of Christ and explores a number of astronomical phenomena which might account for the "star" that guided the magi to Bethlehem.

In the spring of 1982, the Planetarium introduced its latest offering, "The Incredible Universe of Albert Einstein." Narrated by ABC's Hugh Downs, the show took an in-depth look at the life and theories of the famous mathematician and humanitarian whose works have had such a



profound effect on modern science and philosophy. The production and presentation of this program was made possible through a generous grant from the Joseph H. Hazen Foundation. Also in the spring of 1982, writing and production efforts got underway for our next attraction, "Wanderers in the Night," a show that deals with many of the latest discoveries about our planetary neighbors.

During the year, a total of 363,431 persons attended public performances in the Planetarium.

Courses During the three academic terms of the past year, the Planetarium continued its diverse teaching traditions by offering a total of 22 courses in areas ranging from astronomy and meteorology to aviation and navigation. Enrollment totaled 672.

Laserium For the ninth consecutive year, the Planetarium featured shows created by Laser Images of Van Nuys, California. This year saw a greater number of different presentations than ever before, including the debut of "Crystal Odyssey," the first such program based totally on the use of classical music. Attendance for Laserium programs for the year was 85,000.

Special Presentations This year, as in the past, the Planetarium hosted a number of special presentations which included a two-day commemoration of man's first landing on the moon sponsored by *OMNI* magazine as well as special events and programs for such groups as the New York State Power Authority and the Federal Aviation Administration.

The Perkin Library Through the continuing generous support of the Perkin family, the Planetarium's Perkin Library grew as one of the most extensive and valuable collections of reference and popular-level astronomical publications in the East. Of particular note this year were the acquisition of more than 200 new books, the purchase of more than 2000 transparent overlays for use with the Library's Palomar Sky Atlas, the use of the Library as a reference resource by authors as well as newspaper and television journalists, and the assistance the Library provided to more than 500 visiting students and 2500 others who sought reference information over the phone or through the mails.

Exhibitions, New Acquisitions and Special Projects This year saw a major exhibition of works by the Planetarium's Art Supervisor Helmut Wimmer, as well as displays of large, full-color prints of some of the latest images of Saturn taken by the Voyager spacecraft and prepared by Planetarium Education Coordinator and Acting Manager Allen Seltzer, and a collection of touching, personal glimpses into both the professional and private life of Albert Einstein. The latter display was timed to complement the presentation of "The Incredible Universe of Albert Einstein" in the Planetarium's Sky Theater. The display and the show were funded by a grant from the Joseph H. Hazen Foundation.

Also supported by generous funding from the Joseph H. Hazen Foundation was the acquisition of an Oxberry Pro-Copy 81 copy and animation stand. This addition to the Planetarium's photographic facilities allowed for the creation and introduction of unique and technically sophisticated visual imaging in the Planetarium's production, "The Incredible Universe of Albert Einstein."

New Automation System Progress also continued this past year on the Planetarium's new automation system. To be installed during the summer and fall of 1982, it will allow for computer control of much of the Sky Theater's sophisticated visual imagery. When complete, the automation system will give the Planetarium the potential to create a degree and density of visual imagery unprecedented in its history.

In addition to the acquisition of the computers and interfacing hardware to be wired into existing and future projectors, the automation project will also significantly update and improve the Planetarium's sound capabilities.

Much of the cost of the automation system planning and installation is being met through generous appropriations by the Charles Hayden Foundation with additional monies being provided the Planetarium through special funds.

A new round of renovations and refurbishments was begun in the Hall of the Sun. This work is being supported through an anonymous grant, with additional funding provided by the New York State Council on the Arts.

Staff Activities On April 5, William Gutsch became chairman of the American Museum-Hayden Planetarium. Dr. Gutsch came from Rochester, N.Y., where for eight years he had been staff astronomer and script writer for the Strasenburgh Planetarium of the Rochester Museum and Science Center. While in Rochester, he created and wrote programs ranging in style from documentary to science fiction, which have been presented in dozens of planetariums across the U.S. and Canada as well as in Hong Kong and Europe. Dr. Gutsch has also written and produced science reports and features for ABC and NBC television in Rochester and for the PBS network. He writes a bi-weekly column on astronomy and space science for the Rochester Times-Union.

In April, Dr. Gutsch delivered an invited lecture on planetarium education and production techniques at the Armagh Planetarium in Northern Ireland. While there he appeared on Ulster Television, seen throughout Ireland and Scotland.

Before Dr. Gutsch's arrival, Allen Seltzer served as the Planetarium's Acting Manager as well as Education Coordinator.

Mr. Seltzer engaged in other Planetarium activities including overseeing the presentation of Planetarium Sky Shows, preparing an exhibition of Voyager-Saturn imagery, coordinating an FAA Safety Seminar in the Sky Theater for more than 600 area pilots, and preparing the Planetarium's course catalogue and coordinating its course

A total eclipse of the sun on July 31 brought amateur and professional astronomers from around the world to the tiny village of Tarma, Siberia. The American Museum-Hayden Planetarium's Education Coordinator, Allen Seltzer, took these photographs of the event: From top, a view of a partial phase two minutes before the beginning of totality; the total eclipse, showing prominences and the inner atmosphere of the sun; the total eclipse, showing the Sun's outer atmosphere or corona; one of the several observation parties setting up cameras and telescopes. Museum staff members traveled to more than 35 countries on six continents to carry out research and accompany Museum-organized tours.

offerings for academic 1981/82. In addition, Mr. Seltzer represented the Planetarium at the Planetarium Executive's Conference in San Diego, Los Angeles and San Francisco during October.

Sky Show Author Kenneth L. Franklin, the Planetarium's Astronomer, was the principal author of two Sky Shows: "Night of the Hunter" and "The Incredible Universe of Albert Einstein." Dr. Franklin is the Planetarium's leading expert on astronomical subject matter. He addressed himself to letter and phone inquiries, the writing of press releases and numerous appearances on both local and network radio and television programs on subjects such as eclipses, meteor showers, the fly-by of the Saturn system by Voyager 2 and the so-called "Jupiter Effect."

Dr. Franklin also taught courses ranging from basic and intermediate astronomy through celestial mechanics and the search for extraterrestrial life. On June 2, he delivered an invited paper on the events surrounding the discovery of radio emissions from Jupiter at a meeting of the American Geophysical Union in Philadelphia.

Thomas A. Lesser, Senior Lecturer, was responsible for a wide range of Planetarium production and presentation operations. These included coordinating and overseeing the activities of all production personnel in Sky Shows and exhibitions, working on the design and vendor selection for the Planetarium's new automation equipment and working with Laser Images, Inc., on the installation of "Crystal Odyssey."

Clarence A. Brown, as Assistant Producer, worked closely with Mr. Lesser on production and coordination. He was the principal author and producer of "Wanderers in the Night." With other staff members, he represented the Planetarium at the 1982 meeting of the Middle Atlantic Planetarium Society held in Washington. During the past year Mr. Brown served as consultant to the Cormack Planetarium in Rhode Island.

Internship Program Joseph Kelch began an internship program at the Planetarium in July, and represents the latest in a long line of young people who have served in that capacity before either joining the staff or moving on to executive-level positions in other planetariums. The position is partially funded by a grant from the New York State Council on the Arts.

Mr. Kelch organized an experimental program in which volunteers answer questions pertaining to exhibition areas, as well as shows especially designed for children who visit the Planetarium from summer day camps throughout the metropolitan area.

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Franklin, Kenneth L.

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Department of Entomology

Entomologists work in the world of the minute, where a spider may be less than one-thirtieth of an inch long, an eye smaller than a period or a claw invisible to the unaided eye. With the Museum's acquisition of a new scanning electron microscope, this world is becoming even clearer. Departmental scientists can now acquire heretofore unknown information on the classification of insects and spiders with a measure of accuracy never before thought possible.

Several events of 1981-82 significantly affected the activities of the Department and particularly its Coleoptera collection. The Department lost three coleopterists, close friends and colleagues, who had worked with the collection for many years.

Patricia Vaurie, Research Associate, who had been with the Department since 1944, died in March. She was a specialist on weevils and scarab beetles. During her career she published 77 papers, the last three of which were in press at the time of her death.

Joe Schuh, Associate, died in July. During his lifetime, he amassed a truly representative collection of North American beetles containing some 8000 species, about half of the known fauna and more than 100,000 specimens. This beetle collection and his collection of 14,000 true bugs from North America were donated to the Museum. Mr. Schuh was a consulting agricultural entomologist by profession.

David C. Miller, professor of biology at the City University of New York and longtime departmental friend, died in October. He was a specialist on water scavenger beetles. His revisionary studies relied heavily on the Museum's collections. Dr. Miller left to the Museum a collection of 29,948 specimens.

In addition to acquiring the Schuh and Miller collections, the Department purchased a collection of 18,886

specimens representing 1000 species of European and North African rove beetles. Of the 149,446 specimens accessioned this year, about 60 percent were beetles.

The Department completed the second year of a three-year grant from the National Science Foundation to improve the organization of the collection. New insect storage cases and drawers were purchased, and substantial portions of the collections of beetles and smaller orders of insects were moved into these new facilities.

Curatorial staff research was facilitated by the Museum's new Cambridge 240 series scanning electron microscope with operating features such as zoom magnification and image rotation.

Taxonomic Congruence Randall T. Schuh, Associate Curator and Chairman, with James S. Farris, Research Associate in the Department of Ichthyology, presented results of new congruence studies based on character selection and taxon selection experiments in a paper, "Methods for Investigating Taxonomic Congruence and their Application to the Leptopodomorpha," published in *Systematic Zoology.*

Dr. Schuh worked intensively on completing his studies on the phyline plant bug fauna of Indomalaya and the southwestern Pacific. He prepared descriptions and character analyses of most of the ant-like forms. Using the Museum's scanning electron microscope, Dr. Schuh studied the claws, femoral trichobothria, scent gland evaporatory areas, and setae of representatives of the Indomalayan phyline fauna. Scientific Assistant Kathleen Schmidt prepared dorsal view illustrations of representatives of several tribes.

In October, Dr. Schuh began 10 weeks of collecting in Chile, Argentina and Venezuela. Collections of special note included large numbers of plant bugs in central Chile and Argentina, many shore bugs in most locations (including a shore bug of the genus *Pseudosaldula* from near Tucuman, Argentina, remarkable for its rock-dwelling habits) and a long series of *Oiosalda caboti* from near Merida, Venezuela. This species, a shore bug, was previously known from a single collection of only three specimens from the Sierra Nevada de Santa Marta, Colombia.

Dr. Schuh received three years' funding from the NSF in the amount of $47,916 to support a research project, "Historical Biogeography and the Evolution of Host Associations in the Phyline Plant Bugs." He began these studies by sorting about 20,000 previously unworked specimens of Miridae in the University of Kansas collections.

Rove Beetle Species Lee H. Herman, Curator, completed the third part of a monograph on the staphylinid beetle genus *Bledius.* To investigate a few problematical species and find certain rarely collected species of *Bledius,* Dr. Herman went to the mountains surrounding Los Angeles and San Diego, to Arizona, and to the Black Hills in South Dakota. The trip's success is reflected in part by his collection of 6100 specimens of 35 species of *Bledius.* More significant, however, are his findings of six species previously represented by fewer than a dozen specimens, his resolution of four problematical species and the discovery of three new species.

One new species is unique in that the females have a pronotal horn. Some of the nearly 450 species of *Bledius* are sexually dimorphic, with males possessing cephalic and/or pronotal horns and the females lacking both. This new species, collected on the Gulf coast of Texas, is sexually dimorphic; the males have cephalic and pronotal horns and the females a short pronotal horn. Included among the rarely collected species is *Bledius phytosinus,* previously known only from a callow adult and a misidentified specimen; Dr. Herman collected a third specimen.

In Part III of Dr. Herman's study of *Bledius,* 34 species are recognized as valid, nine are placed in an unresolved species complex and three are undeterminable, 13 species are newly described, and 13 are placed as junior synonyms. For this manuscript, Dr. Herman studied more than 28,000 specimens.

With the completion of three parts of the revision of *Bledius,* Dr. Herman has examined more than 42,000 specimens (more than 50 percent of which he collected), dealt with 124 nominal species, described 18 new species and placed 39 species as junior synonyms.

Continuing work on Part IV, Dr. Herman concentrated on finding the sister group of the genus. At present, he is studying several small, Old World genera as possibilities. Part IV will include a definition of the species groups of *Bledius,* the phylogenetic relationships among the groups, the assignment to groups of the nearly 450 species of the genus and a summary of the natural history of the genus.

Revisionary Studies Frederick H. Rindge, Curator, worked on his long-range systematic studies of the moths of the family Geometridae, with particular emphasis on the very large subfamily Ennominae. He is continuing his revisionary study of the genera of the Nacophorini from the New World. Approximately 40 genera have now been identified; half of these will be described as new.

With the exception of the Azelini (containing but three genera) no one has ever attempted a tribal revision of the New World Ennominae. Some of the difficulties include the inadequate definition of the tribe, the paucity of published revisionary studies with information on genitalic structures and the shortage of specimens. There is no check list of species or a grouping of genera into tribes. Only one paper (1981) has been published on the possible occurrence of the Nacophorini in any other part of the world, and it does not describe relationships or tribal positions.

Silverfish and Unique-Headed Bugs Pedro Wygodzinsky, Curator, published the description of a new species of silverfish, *Trichatelura rettenmeyeri,* which is associated with army ants of the genus *Eciton.* Although army ants are normally predators, in this case the thysanurans are not attacked by the ants. The new thysanuran occurs in the eastern lowlands of Ecuador; other *Trichatelura* species are known only from Brazil, Bolivia and Panama.

Also published was a paper by Dr. Wygodzinsky and Research Associate Sixto Coscaron which describes three unusual black flies from

Colombia belonging to the subgenus *Simulium (Ectemnaspis).* These three high-altitude species differ from all others of the subgenus by the extreme structural modification of their thoracic respiratory organs. Dr. Wygodzinsky, aided by Dr. Coscaron, continued work on their revision of the black fly genus *Gigantodax.*

With Scientific Assistant Kathleen Schmidt, Dr. Wygodzinsky progressed in the revision of the New World Enicocephalidae (Hemiptera). In this work, two new genera are described: *Chiricocoris* and *Thryligmatocoris,* both from Panama and both monotypic. Another genus studied, *Hymenocoris,* occurs from northern California to Baja California and has also been found in Arizona. The genus was monotypic until now, but at least three species exist. *Hymenocoris formicin* (and presumably the other species of the genus) is unique among Western Hemisphere enicocephalids because it shows extreme sexual dimorphism. The male is fully winged and has frequently been observed in flight; the female is apterous and physogastrous, and has greatly reduced eyes. The females are found in cracks of the ground and under rocks.

Dr. Wygodzinsky and Scientific Assistant Sarfraz Lodhi progressed on their study of the antennal trichobothria of Reduviidae (assassin bugs). The evidence indicates that congeneric species have a comparable trichobothrial distribution pattern, but that within a given subfamily there may be more than one pattern.

Smallest Tarantula-like Spider Norman I. Platnick, Associate Curator, carried out research in systematics and biogeography. His taxonomic work, conducted with the assistance of Mohammad Umar Shadab, Scientific Assistant, concentrated on the spider families Microstigmatidae and Gnaphosidae. In conjunction with Research Associate Raymond R. Forster, he described a new subfamily, genus and species of microstigmatid from Panama. This remarkable animal is the world's smallest known mygalomorph (tarantula-like) spider. Adult males are less than one-thirtieth of an inch long. It is also unique among mygalomorphs in that it completely lacks lungs and has lost six of the primitive eight eyes. It obtains oxygen directly through the skin. Because of the animal's tiny size, the Museum's scanning electron microscope was crucial in observing the characters required to classify the species.

Dr. Platnick's gnaphosid work concentrated on the New World members of the *Zelotes* complex, a worldwide and speciose group. The genera *Drassyllus* and *Camillina* were each redefined on the basis of derived genitalic features and were shown to have largely disjunct distributions. *Drassyllus* is found in Europe and in the Americas from southern Canada to southern Mexico, *Camillina* in Africa, southern Mexico and the West Indies south to Chile (with two species apparently introduced into Florida and Alabama). Revisions of the 59 American species of *Drassyllus* and 40 of *Camillina* were completed.

A grant from the Eppley Foundation for Research enabled Dr. Platnick to spend six weeks collecting *Camillina* and other gnaphosids in central Chile. This fieldwork, carried out with Dr. Schuh, will be instrumental in determining whether any general biogeographic patterns exist within the peculiar Chilean spider fauna.

Willis J. Gertsch, Curator Emeritus, continued his work on the spider families Loxoscelidae and Pholcidae. Mont Cazier, Curator Emeritus, saw through to publication his monograph of the fly genus *Apiocera.*

Kumar Kishna, Research Associate, in collaboration with Cheryl Adams, completed a revision of the termite genus *Labritermes.* Two new species, *Labritermes emersoni* and *L. kistneri,* were added to this hitherto monotypic genus. *Labritermes,* an oriental genus, was determined to be the sister group of the African genus *Formaninitermes.* Dr. Krishna worked on the description of a new fossil termite, *Mastotermes electromexicus,* (about 26-35 million years old), in late Oligocene to early Miocene amber, from Chiapas, Mexico. The genus *Mastotermes* is represented by six fossil species from Europe and one living species, *Mastotermes darwiniensis,* from tropical parts of Australia. *Mastotermes electromexicus* will be the first representative of this genus from the New World and the first fossil termite described from the soldier caste.

Howard Topoff, Research Associate, in association with graduate students under his direction, continued his studies on ant behavior. This work, conducted in the Museum and at the Southwestern Research Station in Portal, Arizona, emphasized the behavioral ecology of slave-making ants, the nomadic behavior of army ants, emigration behavior in *Pheidole* and the ontogenetic development of behavior in the ant *Novomessor.*

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Coyle, Frederick A.
1981. The mygalomorph spider genus *Microhexura* (Araneae, Dipluridae). Bull. Amer. Mus. Nat. Hist., vol. 170, pp. 64-75, figs. 1-44, 1 map.

Droual, Robert and Howard Topoff
1981. Emigration behavior of two species of the ant genus *Pheidole.* Psyche, vol. 88, pp. 135-150.

Forster, Raymond R. and Norman I. Platnick
1981. A textricellid spider from Chile (Araneae, Textricellidae). Bull. Amer. Mus. Nat. Hist., vol. 170, pp. 263-270, figs. 1-27.

Gertsch, Willis J.
1982. Troglobitic mygalomorphs of the Americas (Arachnida, Araneae). Assoc. Mexican Cave Studies Bull., vol. 8, pp. 79-94, figs. 1-17.

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1981. Contributions to arachnid systematics in honor of Willis J. Gertsch on the occasion of his seventy-fifth birthday. Bull. Amer. Mus. Nat. Hist., vol. 170, pp. 1-270, 137 figs., 12 tables.

Krishna, Kumar and *Cheryl Adams*
1982. The Oriental termite genus *Labritermes* Holmgren (Isoptera, Termitidae, Termitinae). Amer. Mus. Novitates, no. 2735, pp. 1-14, figs. 1-8, tables 1-4.

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1981. Avoiding predation by army ants: defensive behaviors of three species of the ant genus *Camponotus.* Anim. Behav., vol. 29, pp. 1070-1081.

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1981. On *Liphistius desultor* Schiodte (Araneae, Liphistiidae). Bull. Amer. Mus. Nat. Hist., vol. 170, pp. 46-56, figs. 1-27.

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1981. Widespread taxa and biogeographic congruence. *In* Advances in cladistics: proceedings of the first meeting of the Willi Hennig Society, V. A. Funk and D. R. Brooks, eds., New York Botanical Garden, Bronx, pp. 223-227, figs. 1-7.

Platnick, Norman I. and Raymond R. Forster
1982. On the Micromygalinae, a new subfamily of mygalomorph spiders (Araneae, Microstigmatidae). Amer. Mus. Novitates, no. 2734, pp. 1-13, figs. 1-28.

Platnick, Norman I. and *Gunther Pass*
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1981. The milliped family Tingupidae (Diplopoda, Chrodeumatidae, Brannerioidea). Amer. Mus. Novitates, no. 2715, pp. 1-20, figs. 1-33, 1 map.

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1982. Description of three unusual species of the black fly genus *Simulium* (*Ectemnaspis*) from the Andes of Colombia (Diptera, Simuliidae). Amer. Mus. Novitates, no. 2736, pp. 1-13, figs. 1-8.

Wygodzinsky, Pedro and *Pavel Stys*
1982. Two new primitive genera and species of Enicocephalidae from Singapore (Heteroptera). Acta Ent. Bohemoslavica, vol. 79, pp. 127-142, figs. 1-47.

Department of Herpetology

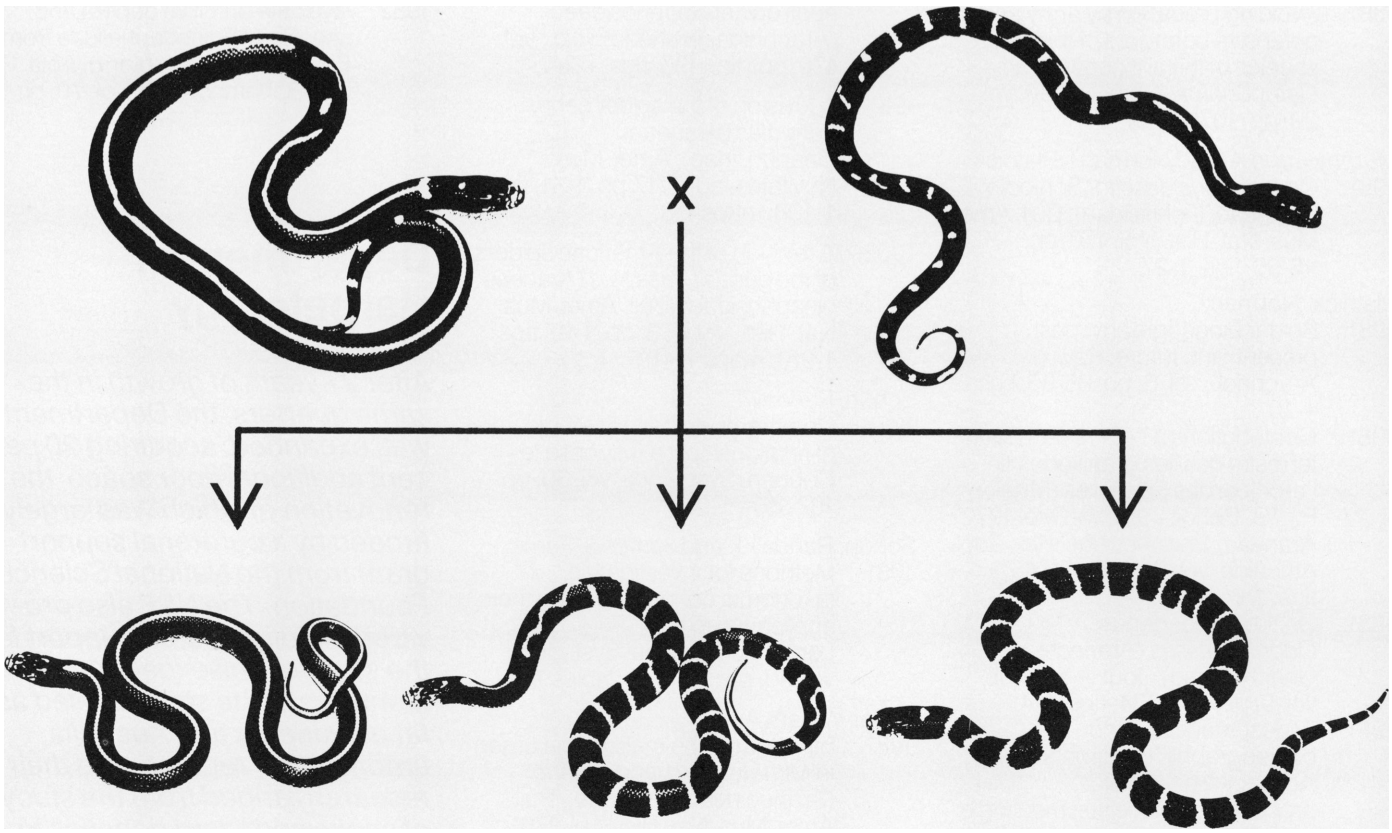
After 27 years of growth in the same quarters, the Department was expanded, acquiring 20 percent additional floor space, the renovation of which was largely funded by a curatorial support grant from the National Science Foundation. The NSF also provided major research support for the study of unisexual lizards. Members of the staff traveled as far as Panama and Australia, among other regions, and their research ranged from the study of snake and lizard genetics to the systematics of frogs.

Panamanian Poison Frogs

Charles W. Myers, Chairman and Curator, conducted two field trips to lower Central America as part of his studies on tropical poison frogs and the amphibian and reptile fauna of the Isthmus of Panama. Fieldwork was concentrated on the Atlantic coast of extreme western Panama, especially around Chiriquí Lagoon and in the Archipelago of Bocas del Toro.

Earlier exploration by Dr. Myers had revealed that this Pleistocene-flooded coastal area harbors amazingly diverse populations of what seem to be a single species of small poison frog, *Dendrobates pumilio*. Even frogs in adjacent populations are quite differently pigmented. Their colors encompass the visible spectrum from red to blue, as well as achromatic black and white. Microgeographic variability in the frogs' defensive skin toxins is even more astonishing.

Using sophisticated analytical techniques recently perfected by John Daly at the National Institutes of Health, it was possible to repeat a 1967 study by Drs. Daly and Myers,



*Curator Richard G. Zweifel, of the Department of Herpetology, has been studying the inheritance of color patterns in the California Kingsnake (*Lampropeltis getulus*). The two snakes at top, when bred, produced the three color patterns among their young shown at bottom. Dr. Zweifel's research is helping to explain some puzzling snake color patterns found in nature. Scientists in the Department are involved in basic research ranging from snake and lizard genetics to the systematics of Australasian frogs.*

who originally had succeeded in isolating only a few compounds of a new class of alkaloids that they named "pumiliotoxins." New samples from 19 populations of the *D. pumilio* complex have so far yielded more than 80 alkaloids, with some 30 of these being new compounds not previously found in related species of poison frogs. Continuing fieldwork on this study is being supported by annual grants from the Merck Sharp & Dohme Research Laboratories. An award also was received from the Research and Development Laboratories of Astra Läkemedel AB, Sweden, to help defray expenses involved in the study of South American poison frogs.

Lizard Genetics Curator Charles J. Cole collected in the vicinity of the Museum's Southwestern Research Station in Arizona for several weeks in July and August. Specimens of several species of whiptail lizards (*Cnemidophorus*) were obtained for use in studies of the reproduction, genetics, origin and systematics of unisexual (all-female) lizards. In October, the National Science Foundation awarded the Museum a five-year grant in support of Dr. Cole's research, which will involve considerable fieldwork and long-term studies of laboratory-reared lizards through several generations. This study is intended to improve understanding of natural parthenogenesis, cloning and polyploidy in vertebrates.

One collaborative paper published by Dr. Cole this year dealt with microscopic study of some 6000 serial histological sections of the reproductive tracts of laboratory-reared lizards of known genealogies. This provided necessary corroboration that at least some, if not all, unisexual lizards contain only typical female reproductive organs and reproduce in complete absence of spermatozoa. An unexpected result of this work was the discovery that adult females of bisexual and unisexual species of *Cnemidophorus* have functional mesonephric kidneys in addition to the metanephros.

Australasian Frogs Curator Richard G. Zweifel studied the systematics of frogs of Australia and New Guinea. He published a summary of the Amphibia of New Guinea which forms one chapter of a multiauthored, two-volume work on the ecology and biogeography of New Guinea. Another paper describes a new species of frog from Papua New Guinea. Dr. Zweifel worked on a revision of the Australian frogs of the family Microhylidae, based on data gathered in Australia while he was on a fellowship there last year.

Snake Genetics Two papers published this year represent results of the Department's long-term commitment to maintaining a breeding colony of kingsnakes. One, by Dr. Zweifel, explains the possible genetic basis for the inheritance of several strikingly different color patterns found in the same populations of kingsnakes in southern California. The second, by Research Associate Herbert C. Dessauer and Dr. Zweifel, reports on the

mode of inheritance of blood proteins.

Research on other topics includes experimental demonstration of multiple fatherhood of single broods of snakes, and the relative importance of temperature and inheritance on scale characters of snakes.

Lizard Behavior A study by Charles M. Bogert, Curator Emeritus, on behavioral thermoregulation in the curly-tailed lizard *Leiocephalus carinatus* was published. The fieldwork had been done on Bimini near the Museum's former field station, the Lerner Marine Laboratory.

Research Associate Carol A. Simon studied the effects of habitat structure on territory size in the spiny lizard *Sceloporus jarrovi*, and also investigated the relationship of the olfactory and vomeronasal systems in this species.

Departmental Outreach Owing to gifts and fieldwork by the staff, specimens were accessioned from 19 countries on five continents (including 33 American states) and from eight island nations in the Pacific Ocean and the West Indies. Specimens were lent to investigators in the United States and at 14 foreign institutions. The resources of the Department were broadly utilized by 63 professional visitors. A total of 3075 specimens were lent to or returned by 105 researchers at other institutions in this country and abroad. One-third of the newly accessioned specimens resulted from the collecting activities of the curators and scientific assistants.

The largest single accession was the collection of the Toledo Museum of Health and Natural History—a gift from the Toledo Zoological Society. Most of this historically important collection was accumulated in the period 1929-1935 by Research Associate Roger Conant, who at that time was Curator of the Toledo Zoo. The collection includes the specimens that form the primary documentation for Dr. Conant's book *The Reptiles of Ohio*, published in 1938.

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"1980" [1981]. Investigations in the field and laboratory of behavioural thermoregulation in an iguanid lizard. *In* P. E. P. Deraniyagala Commemoration Vol., P. L. Prematilleke et al. eds., Sri Lanka, pp. 90-102.

Cole, Charles J. and *Laurence M. Hardy*
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Dessauer, Herbert C. and Richard G. Zweifel
1981. Inheritance of transferrin, phosphoglucomutase, 6-phosphogluconate dehydrogenase, and prolidase in a breeding colony of kingsnakes. Jour. Hered., vol. 72, pp. 453-455, figs. 1-3, table 1.

Hardy, Laurence M. and Charles J. Cole
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Myers, Charles W.
1982. Spotted poison frogs: Descriptions of three new *Dendrobates* from western Amazonia, and resurrection of a lost species from "Chiriquí." Amer. Mus. Novitates, no. 2721, pp. 1-23, figs. 1-12.

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Russell, Findlay E. and Charles M. Bogert
1981. Gila monster: Its biology, venom and bite—a review. Toxicon, vol. 19, no. 3, pp. 341-359, figs. 1-4.

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1981. Genetics of color pattern polymorphism in the California kingsnake. Jour. Hered., vol. 72, pp. 238-244, figs. 1, 2, tables 1, 2.

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1982. A new montane microhylid frog from Papua New Guinea, and comments on the status of the genus *Aphantophryne*. Amer. Mus. Novitates, no. 2723, pp. 1-14, figs. 1-10.

Zweifel, Richard G. and *Michael J. Tyler*
1982. Amphibia of New Guinea. *In* Biogeography and ecology of New Guinea., J. L. Gressit, ed., The Hague, Boston and London, W. Junk, pp. 759-801, figs. 1-7, tables 1-3.

Department of Ichthyology

The Department of Ichthyology's primary responsibility is high-quality original and synthetic research. Its second responsibility is the care and improvement of its collections. The Department also recognizes the growing obligation for major museums to assume active roles in training future generations of systematists and to serve as repositories of environmentally significant specimens and data.

During the past few years many major universities have chosen to channel their resources toward currently fashionable (and well funded) areas such as molecular and cellular biology, biochemical genetics and theoretical ecology. Each year more of these institutions are turning away from "whole animal" biology and reducing or eliminating training programs and staff positions in systematic biology. A number of smaller institutions have abandoned their collections, turning them over to larger museums or placing them in inactive storage.

This trend toward centralization has affected larger museums in several ways. While it has placed greater demand on resources, it has increased opportunities for acquiring important specimens, expanding the scope of remaining collections and recruiting top graduate students.

The trend toward fewer institutions committed to maintaining extensive specimens collections is not a reflection of the overall viability of the fields of systematics, biogeography and evolutionary biology. These fields are continuing to grow as evidenced by increased Federal funding, increased memberships in relevant professional

societies, increased use of collections, increased number of students applying for graduate study and, perhaps most significant, an explosive increase in the number of publications in these fields.

Collection Expansion The fish collection of the American Museum reflects all of these changes, and the staff of the Department has responded to the challenges and opportunities of the present trends.

Cataloging has proceeded this year with 2,455 lots totaling 88,136 specimens being processed for the permanent collection. The collection has grown especially rapidly. Important collections from Lebanon, Venezuela, Tennessee, West Africa, California and South America have been received, and a large collection consisting of 106 fifteen-gallon drums of specimens from the Hudson River was deposited with the Department by the consulting engineering firm of Lawler, Matusky & Skelly. The LMS collection included some 20,000 lots of larval fishes collected in the Hudson River during the past 10 years. Donn E. Rosen, Curator, also negotiated with the Virginia Polytechnic Institute and State University for its fish collection, which the University can no longer support. It is anticipated that this collection—an estimated 15,000 lots—will be received during the summer or fall of 1982. As a result of these acquisitions, the backlog of unassimilated specimens has grown enormously, and plans to expand the collection space of the department are now being formulated.

Staff Activities Members of the department continue to carry on an active teaching program as part of the cooperative program in systematics and evolutionary biology. Currently, 12 graduate students are in residence working on Ph.D or Master's degree programs.

Dr. Rosen has made progress on a major project on the interrelationships of the spiny rayed fishes.

Work in progress on the National Science Foundation-supported research on the interrelationships of the 250 families (ca. 8000-9000 species) of acanthopts includes analysis of the dorsal and ventral gill arches, jaw suspension, and dorsal, anal, caudal and pelvic fin skeletal supports in 400 species representing about 125 families. Results so far indicate that the 250 families fall into about 15 major groups, which can be further grouped into six higher taxa. A most preliminary indication is that these six taxa form two, or at most three, lineages. If true, this would show that groups like the Percomorpha are not natural.

Work on Central American fishes is moving forward, with description of new species of cichlids, eleotrids, and poeciliids in progress. Part of this is still being done with Reeve M. Bailey, Research Associate.

Work on Mexican poeciliids continues, with descriptions of five new species of *Xiphophorus* in progress with Klaus D. Kallman, Research Associate.

Revision of all Anchovy Species Gareth Nelson, Curator, is researching anchovies (family Engraulidae) and has completed two papers on the group. Because this is a complete revision of all species the world over, Dr. Nelson has been able to apply the concepts of vicariance biogeography to his understanding of the evolution of these important fishes. During the year he made trips to the Museum of Comparative Zoology, the U.S. National Museum and the Academy of Science of Philadelphia to X-ray types of anchovies and other specimens.

C. Lavett Smith, Chairman and Curator, is studying the fishes of New York and is editing the proceedings of a conference on the fisheries of the Hudson River that was held in September.

At the end of September, James W. Atz became Curator Emeritus. Dr. Atz joined the staff in 1964 as Dean Bibliographer and continued as Curator after the Bibliography of Fishes project was transferred to the Zoological Society of London. Dr. Atz is widely recognized for his command of the literature of fishes and for his synthetic studies of such diverse topics as the physiology of the pituitary gland of fishes, hermaphroditism in fishes and the evolution of cave-dwelling fishes. As Curator Emeritus he will work on such major projects as the evolution of viviparity in fishes, aquarium management and fish genetics.

Peter Moller, Research Associate, is involved in research on the ecology and ethology of electric fishes.

Cardinalfish Cytogenetics J. R. Rachlin, Research Associate, has begun research on the cytogenetics of five species of Cardinalfishes and has made progress on the life history and population dynamics of several pairs of closely related species with sympatric and allopatric populations.

In September, Wieslawa Szymczyk joined the Department as a visiting scholar. Dr. Szymczyk is internationally known for her studies of scales, skeletons and squamation in herrings. Her home institution is the Wroclaw University in Poland. During her stay, Dr. Szymczyk has expanded her study of *Clupea sardinites* by comparing fossil specimens from Poland with additional material in the American Museum collection; she also finished a comparison of the genera *Sardinella*, *Opisthonema* and *Harengula* based on lepidological features.

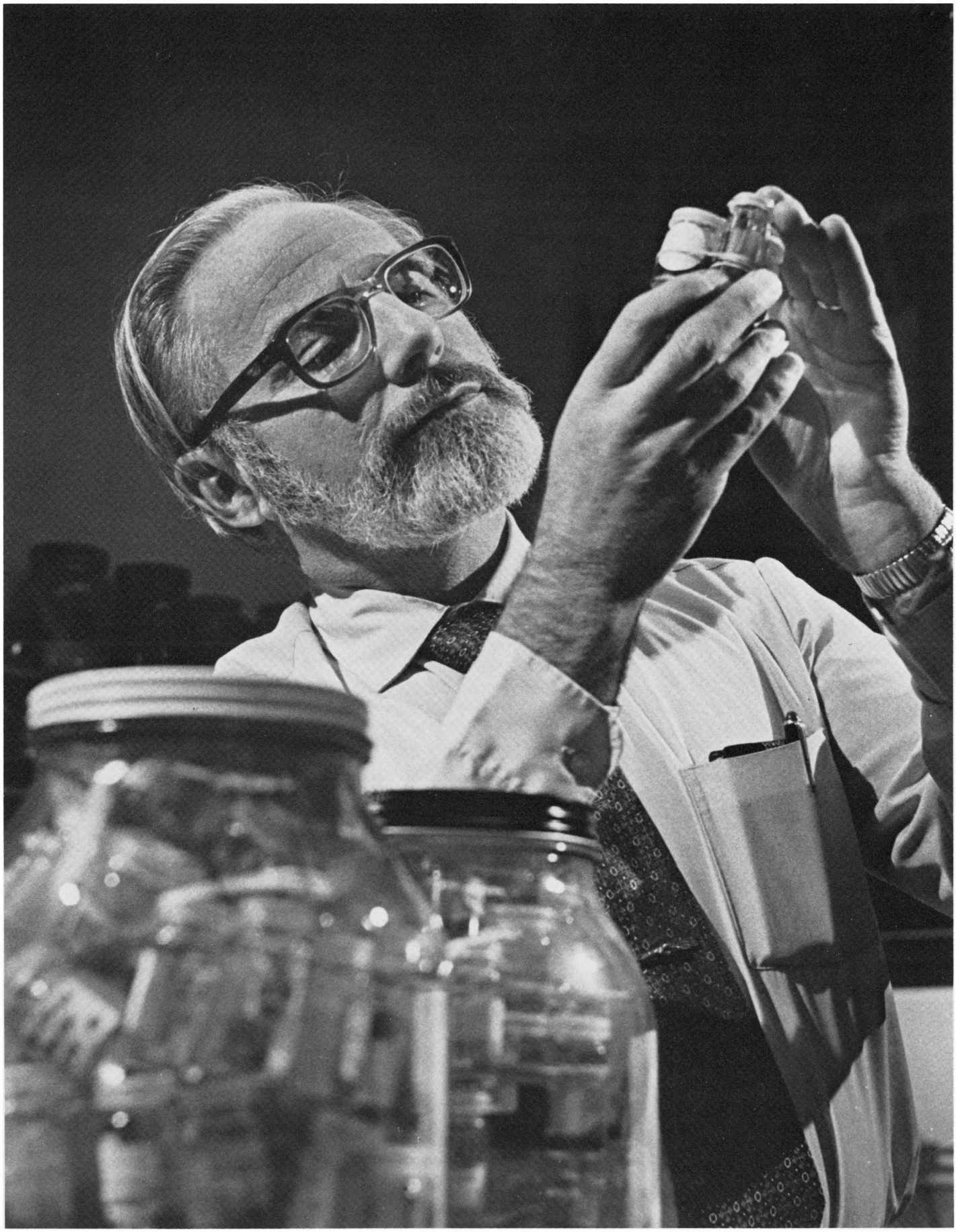
Scientific Publications:

Atz, James W.
1981. The evolution of hormones and their functions: A new approach. Ninth International Symposium on Comparative Endocrinology, Hong Kong, 7-11 December 1981. Abstracts of Papers, p. 224.

Dingerkus, Guido* (Sponsor: *Donn E. Rosen*)
1981. The use of various alcohols for alcian blue *in toto* staining of cartilage. Stain technology, vol. 56, pp. 129-129.

Grande, Lance* (Sponsor: *Donn E. Rosen*)
1980. The paleontology of the Green River formation with a review of the fish fauna. Geol. Survey of Wyoming, Bull. 63, pp. 1-334.

C. Lavett Smith, Curator in the Department of Ichthyology, examines larval fish specimens. The specimens were donated to the Department by Lowler, Matusky & Skelly Engineers, a consulting firm which had conducted impact studies on the Hudson River relating to power plant construction. More than one hundred 15-gallon barrels of adult fishes, in addition to numerous boxes of larval fishes, were received. There are plans to double the Department's space to accommodate this and other recent specimen donations. The Museum's collections include about one million fish specimens.



1982a A revision of the fossil genus *Diplomystus* with comments on the interrelationships of clupeomorph fishes. Amer. Mus. Novitates no. 2728, pp. 1-34.

1982b A revision of the fossil genus *Knightia*, with a description of a new genus from the Green River formation (Teleostei, Clupeidae). Amer. Mus. Novitates no. 2731, pp. 1-22.

Feldman, R. M., L. Grande, *C. Birkhimer, J. T. Hannibal* and *D. McCoy*
1981. Decapod fauna of the Green River formation (Eocene) of Wyoming. Jour. Paleontol., vol. 55, no. 4, pp. 788-799.

Serrier, J. and Moller, P.
1981. Social behavior in mormyrid fish (Mormyriformes, Pisces): Short and long-term changes associated with repeated interactions. Adv. Physiol. Sci. Vol. 31, T. Szabo, G. Czeh, eds., Pergamon Press, Akademiai Kiado, Budapest, pp. 221-233.

Moller, P. and *Szabo, T.*
1981. Lesions in the nucleus mesencephali exterolateralis: Effects on mormyrid electrocommunication. Jour. Comp. Physiol. Vol. 144, pp. 327-333

Squire, A. and Moller, P.
1982. Effects of water conductivity on electrocommunication in the weak-electric fish, *Brienomyrus niger.* Anim. Behav., Vol. 30, pp. 375-382.

Nelson, Gareth J.
1981. [Summary in] Vicariance biogeography: a critique. Nelson, G. and D. E. Rosen eds., Columbia Univ. Press, New York, pp. 527-537.

1981. [Review of] The illustrated origin of species , by R. L. Leakey. Curator, Vol. 22, no. 3, pp. 234-238.

1981. [Review of] Physiology and classification: historical relations , by J. Schiller. Syst. Zool., Vol. 30 no. 2, p. 217.

Platnick, N. I. and G. Nelson
1981. [Review of] Phylogenetic systematics, by W. Hennig. Phil. Sci. Assoc., pp. 499-502.

Nelson, G. and *N. I. Platnick*
1981. Author's reply. BioScience. Vol. 30, No. 9, p. 569.

Rosen, D. E.
1982. Do current theories of evolution satisfy the basic requirements of explanation? Syst. Zool., vol. 31, no. 1, pp. 76-85.

1982. Teleostean interrelationships, morphological function, and evolutionary inference. Amer. Zool., vol. 2, no. 2, pp. 261-273.

Rosen, D. E. and L. Parenti
1981. Relationships of *Oryzias*, and the groups of atherinomorph fishes. Amer. Mus. Novitates no. 2719, pp. 1-25.

Smith, C. Lavett
1982. Patterns of reproduction in coral reef fish. NOAA Tech Memoranda NMFS-SEFC-80, pp. 49-66.

Smith, C. Lavett, James C. Tyler and M. Norma Feinberg
1981. Population ecology and biology of the pearlfish (*Carapus bermudensis*) in the lagoon at Bimini, Bahamas. Bull. Mar. Sci., vol. 31, no. 4, pp. 876-902.

Department of Invertebrates

The Department again participated fully in the Museum's fourfold program of research, exhibition, collection management and education. Scientific investigations on fossil and recent invertebrates covered such disparate areas as the Philippines, New York State, South Africa, the Caribbean, the Red Sea and Antarctica. Substantial efforts went toward organizing the exhibitions "Evolution, Darwin and the Beagle," "Through a Looking Glass" and "Marie Sibylla Merian." During the year, thousands of specimens were accessioned and the computerization of collections was further improved. In the realm of educating the public, the Department maintained a strong frontline position in the battle against creationism.

Making its voluminous collections available for study is an important function of the Museum. During the year, the Department hosted 101 visiting scientists and sent 48 loans of specimens to institutions throughout the world. In addition, collectors, artists and writers made approximately 200 appointments to use the reference collections and the department handled another 173 collection-related inquiries as well.

Staff members held appointments at the City University of New York and Columbia University and served on dissertation committees at other universities. They also collaborated with the Museum's Department of Education, worked as lecturers on Discovery Tours, presented seminars and slide shows to amateur groups, published semi-popular books and appeared on radio and television programs.

Worms, Limpets and Trilobites

Ernst Kirsteuer, Chairman and Curator, continued his work on the anatomy and systematics of marine nemertean worms. He completed a study of the ultrastructure of the proboscis stylet in a species of the genus *Ototyphlonemertes* and prepared a chapter on interstitial nemerteans for the treatise "Stygofauna Mundi." Some progress was also made in a long-term project dealing with the reclassification of the phylum Nemertina.

Roger L. Batten, Curator, completed a thorough investigation of the ultrastructure and other features of the shell of the Galapagos Rift limpet, *Neomphalus fretterae*, and is preparing a paper on the results for the journal *Malacologia*. He also completed a 10-year study designed to elucidate the origin and evolution of the gastropod shell structure. In addition, Dr. Batten advanced his systematic work on mesogastropods of the Permian of Malaysia and initiated a systematic analysis of the Triassic gastropods in the Seven Devils fauna of Idaho.

Niles Eldredge, Curator, continued his investigation of the hierarchical nature of the evolutionary process. His analysis of evolutionary theory is being conducted with Elizabeth S. Vrba of the Transvaal Museum, South Africa, and Stanley Salthe of Brooklyn College. He completed a book "The Monkey Business," furthering his active role in combating creationism in the United States. Dr. Eldredge collected Devonian trilobites and examined the important museum collections in South Africa, materially aiding his study of the systematics

and distribution of the Calmoniidae, a family of trilobites endemic to the Southern Hemisphere Malvino-Kaffric faunal province.

Coral Eating Snails William K. Emerson, Curator, advanced his multifaceted studies on the systematics, ecology and zoogeography of marine mollusks. In collaboration with Jack T. Moyer of the Tatsuo Tanaka Memorial Biological Station, Ako, Japan, and Michael Ross of the Bureau of Fisheries and Aquatic Resources, Cebu City, Philippines, Dr. Emerson reported the first occurrences of massive destruction of reef-corals by polyp-eating muricacean gastropods. Large aggregations of these drupellid snails were observed nocturnally feeding on corals at sites on Miyake-jima, Japan, and at Mactan Island in the Philippines. Coral destruction amounted to 35 percent of the *Acropora*-reef studied during a two-year period in southern Japan. At Mactan Island, snail predation appears to exercise biological control on coral reef structure by weeding out fast growing forms and providing space and settlement sites for other species, thus increasing diversity over time.

Moss Animals and Crustacea Judith E. Winston, Assistant Curator, continued her studies of life histories and systematics of bryozoans from Caribbean reef environments. The knowledge gained from studies of bryozoans from tropical environments is being tested for its applicability to the life history characteristics observed in Antarctic bryozoans obtained from the collections of the Smithsonian Oceanographic Sorting Center. Using bryozoans from both tropical and Antarctic locations, Dr. Winston has begun a major study of the anatomy, function and phylogenetic importance of avicularia, specialized individuals of bryozoan colonies. These avicularia are most highly developed in colonies from very warm and very cold water.

Dorothy E. Bliss, Curator Emerita, continued to serve as editor-in-chief of the multi-volume treatise, "The Biology of Crustacea," being published by Academic Press, Inc. She and Linda Habas Mantel, Research Associate, are coeditors of one volume dealing with the integument, pigments and hormonal processes. In addition, Dr. Bliss completed and sent to press the book, "Shrimps, Lobsters, and Crabs," for the general reader and naturalist. This book is being published by New Century Publishers, Piscataway, N.J.

Fossil Scallops and Brachiopods Norman D. Newell, Curator Emeritus, and Donald W. Boyd, Research Associate, carried forward their long-term study of Permo-Triassic bivalves. During the year, they concentrated on the acquisition of similar features in separate lines of scallops. This phenomenon, called evolutionary convergence, occurs generally but is poorly understood in both plants and animals. The studies' objective focuses on the patterns of convergence and documentation of new data. Field work was undertaken during May and June in the western United States. Drs. Newell and Boyd filled gaps in information in the large collections already assembled for this study.

Howard R. Feldman, Research Associate, studied the systematics, paleoecology, morphologic variation and biostratigraphy of early Middle Devonian brachiopods of New York. He is also working on the brachiopod faunas of northern Sinai and collaborated with Francis Hirsch of the Geological Survey of Israel and Ellis F. Owen of the British Museum (Natural History) on a comparison of Devonian and Jurassic brachiopod communities.

Symbionts and Parasites John J. Lee, Research Associate, and his collaborators have just completed a very successful two-month expedition to Elat, Israel, on the Red Sea, where they studied the comparative biology of the algal endosymbionts of giant Foraminifera (Protozoa). Experiments incubated underwater conclusively demonstrated that there is a "pecking" order of diatom endosymbionts. They also succeeded in isolating in culture the only known endosymbiotic red alga which they found in one species of giant Foraminifera.

Linda Mantel, Research Associate, investigated the effects of low doses of the 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.

Horace W. Stunkard, Research Associate, pursued his NSF-supported investigations on the successive larval and developmental stages in the life-cycles of parasitic flatworms. Eggs from cestodes of selachian fishes were embryonated in sea water and then fed to various crustaceans. Eggs of *Lacistorhynchus tenue* liberated ciliated, swimming larvae which, in the copepod, *Acartia tonsa*, developed and transformed into procercoids. When infected copepods are eaten by small fishes, the procercoids grow to plerocercoids. Encysted plerocercoids occur in teleost fishes and squids, and mature in elasmobranch fishes.

Micropaleontology Press John A. Van Couvering, Editor in Chief, Norman Hillman and Ruth Manoff, Associate Editors, and Susan Carroll, Assistant Editor, report the publication of two volumes each of the "Catalogue of Foraminifera" and the "Catalogue of Ostracoda," for a total of more than 3000 pages; the 10th volume (in 12 issues) of the "Bibliography and Index of Micropaleontology," and five issues of the scientific journal *Micropaleontology*. Two new *Micropaleontology Special Papers* are in press and a new microfilm edition of the "Catalogue of Ostracoda," accompanied by a computerized key or index to its 19,000 descriptions of type-specimens, was announced.

Dr. Van Couvering joined Ian Tattersall, Associate Curator in the Department of Anthropology, in scouting for new fossil localities in Nigeria, Niger and Sudan. Dr. Van Couvering also contributed to a paper announcing new rodent finds in the Miocene of Israel. This helped to show when Africa and Asia became open to intercontinental migrations of mammals. With William A. Berggren, Research Associate, Dr. Van Couvering also studied the radiometric time scale of the past 65 million years and prepared for future publication a symposium volume on "Catastrophes in Earth History."

Scientific Publications:

Birchard, G., L. Drolet and Linda H. Mantel

1982. The effect of reduced salinity on osmoregulation and respiration in the Calico crab, *Ovalipes ocellatus*. Comp. Biochem. Physiol., vol. 71a, pp. 321-324.

Cantlemo, A. C., R. Lazell and Linda H. Mantel

1981. The effects of benzene on molting and limb regeneration in *Callinectes sapidus* Rathbun. Mar. Biol. Letters, vol. 2, pp. 333-343.

Eldredge, Niles

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A photomicrograph of a Halophila *leaf collected from the Red Sea shows communities of diatoms and bacteria on the leaf's surface. Diatoms are a form of algae which have glass-like shells. The leaf is magnified about 450 times. The Museum's scanning electron microscope, used to make this photomicrograph, also aided in the discovery here of the world's smallest diatom, found living in a symbiotic relationship with a giant protozoan. The Museum's SEM is used by the zoological, anthropological, and geological departments.*

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1981. Do gaps in the fossil record disprove descent with modification? Creation/Evolution, issue IV, pp. 17-19.

1981. The elusive eureka. Nat. History, vol. 90, no. 8, pp. 26, 27.

1981. [Review of] Life itself, by F. C. Crick. Science 81, vol. 2, No. 8, p. 94, 96, 99.

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Department of Mammalogy

A Departmental reorganization that began this year has led to expanded, better curated collections and has been accompanied by an exciting variety of research. Members of the staff journeyed to regions as diverse as Africa, Bolivia, Israel, Arizona and Puerto Rico. Research topics included the distributional patterns of New World nectar-feeding bats and the role of color pattern in communication among mammals.

Under the chairmanship of Guy G. Musser, whose seven-year term started this year, the Department began a reorganization. Many large groups of specimens were moved to new quarters and the collections were expanded and better curated. This reorganization is intended to provide safer and more efficient storage of specimens and better access to them by the staff, visiting scientists, and qualified students. Specimens are the core of each scientific department in the Museum. They represent primary sources of scientific data. Their care and accessibility to scholars constitute a main responsibility of curators and supporting staff in the Department.

Services to visitors and borrowers remained at a high level this year. By the end of April, the Department had 269 loans outstanding, including 2477 specimens. The Department had 175 visitors who spent 580 days studying at the Museum.

Research and Publication Curation and professional services are important activities of curators and supporting staff but constitute only part of their duties. Research and the preparation of results for publication are the other main and very important responsibilities of curators.

Sydney Anderson, Curator, continued research on the mammals of Bolivia, one of his long-range studies. Dr. Anderson has visited museums in Washington, Pittsburgh, Ann Arbor, East Lansing and Chicago to study Bolivian material and now has data on more than 16,000 specimens. First draft manuscripts to serve as a working basis for revision and refinement have been prepared for all species. An annotated gazetteer has been revised. In April and May another expedition to Bolivia was conducted.

Dr. Anderson worked toward completing reports resulting from earlier studies on the ecology of raccoons on St. Catherines Island, Georgia. With graduate student Nancy Olds, he investigated the demography of this population of raccoons.

In addition to research in Bolivia and with raccoons, Dr. Anderson has been busy with a broad range of work on mammals. He prepared a chapter on systematics of New World *Microtus* for a book to be published as a Special Publication of the American Society of Mammalogists.

Broad Scope of Bat Studies Karl F. Koopman, Curator, continued his studies of the world's bat faunas. The geographic scope of his research and nature of his inquiries are reflected by the subjects of the following reports either published or in press: the distributional patterns of New World nectar-feeding bats, two general problems involved in systematics and zoogeography of bats, a chapter on bats in the new edition of "Recent Mammals of the World," biogeography of the bats of South America, bats from Papua New Guinea and the islands off its east coast, and bats of Bolivia and the identities of certain fruit bats from the Celebes and the Philippine Islands, with notes on the relationship between the genera *Acerodon* and *Pteropus.* His paper dealing with distributional patterns of New World nectar-feeding bats is of special interest to biogeographers, especially botanists who study coevolution of animals and tropical forests.

Dr. Koopman joined Dr. Anderson to coauthor a report, "Does interspecific competition limit the sizes of ranges of species?," published as an *American Museum Novitates.* Much of the data on ranges in that paper come from Dr. Koopman's research into taxonomy and geographic distributions of bats.

Taxonomy of Asian Rodents

Dr. Musser's inquiries into taxonomy of Asian rodents of the family Muridae resulted in several reports that were published this year or are in press. The papers report Dr. Musser's partial results of research into phylogenetic relationships of murids native to the archipelagos and continent east of Borneo and Bali. Data were obtained from samples of Recent species and from examples of subfossil fragments found on the island of Flores that represent species still living on the island and extinct forms. Few places east of the Sunda Shelf have been sampled for fossils, and most of them that are available come from young deposits. Discerning past species-relationships and patterns of either dispersal or vicariant events that may help explain present distributions of the Recent fauna is difficult. Trying to unravel histories of the rodents within the framework of tectonics that shaped the Indo-Australian region into its present configuration is exasperating. The Indo-Australian area is geologically and tectonically extremely complex. Reconstructing palaeogeography during the Tertiary and Quaternary from either the data presented in classical studies or that derived from modern inquiries set in the context of plate tectonics is not easy and often not possible. Now, the best approach to understanding murid zoogeography in that vast region of islands is to analyze the phylogenetic relationships among living and extinct species and to allow the patterns emerging from those studies to provide clues to palaeogeography and past tectonic events.

Some clues about palaeogeography of certain islands on the Sunda Shelf were obtained by Dr. Musser's study of rodents native to the island of Java. From eastern Java come fragments of a rat obtained from Middle Pleistocene sediments at Trinil. These are the earliest fossil rats known from the shelf, and according to Dr. Musser's report, which is in press, they are not related to any species of native rodent now living either on Java or anywhere else in the Indo-Australian region. Judging from the endemicity of its living rat fauna (50 percent of the species occur on Java and nowhere else), Java has been an island or isolated peninsula for a long time. Fossils found at Trinil suggest that the area was isolated in Middle Pleistocene times.

Species Diversity Uncovered

Dr. Musser's long-range study of rats and mice native to the Philippine Islands and the Celebes continued to uncover the diversity of species native to those areas and their morphological and ecological characteristics. Preliminary data about altitudinal distributions, habitats and diets are presented for the two genera and three species native to the Celebes. All the rats are terrestrial, live on mountains in wet and cool moss forest and eat mostly earthworms.

Curator Richard G. Van Gelder's research has continued in two primary areas of mammalogy: systematics and behavior. In systematics, his current work is concerned with some conceptual components of the structure of the system of classification, primarily that category called the genus. In 1977, he proposed a partial definition of the genus and applied it in a general way for all living mammals. Subsequently, he combined the application of this concept with other criteria in a review of the dog family. Research this year centered on preparation of material for the application of this generic concept in a broader context, related to the period of time that species have been separated. In addition, he collected material to apply the concept to the classification of sheep and goats and to one major sub-family of Asian and African monkeys. Although his concept of the genus has not taken broad hold in mammalogy, during the year a French herpetologist published a paper announcing a "new" concept of the genus, which turns out to be an independent arrival at the same idea that Dr. Van Gelder had proposed earlier.

The behavioral aspects of Dr. Van Gelder's work are based largely on field research previously conducted in Africa, with particular emphasis on the role of color pattern in communicaton among mammals. Some aspects of this research have relevance to systematic studies, as a possible means by which mating selectivity affects modes of speciation. Other behavioral work involved progress on a manu-

A close-up photograph of a Burchell's zebra Equus burchelli, *taken at Rio Save in Mozambique by Richard G. Van Gelder, Curator in the Department of Mammalogy. Dr. Van Gelder has been studying the role of color pattern in communication among certain native African mammals. Aspects of color pattern may function in mate selection, affecting modes of speciation. Many of the some 2.5 million people who visit the Museum annually see mounted specimens of the Burchell's zebra, in the Serengeti Plains diorama of the popular Akeley Hall of African Mammals.*

script on nyala antelopes and on some aspects of the behavior of tsessebe and giraffes.

Varying Behavior Patterns Studied Curator Ethel Tobach's research for the last 30 years has focused on the relationship between two varying and complex behavioral patterns: social behavior and emotional behavior. Using a comparative method, she and her colleagues have studied invertebrates and vertebrates representing diversity in both patterns to gather data for the eventual formulation of general principles about coevolution of the two behavioral patterns.

The common spiny mouse (*Acomys cahirinus*) and the golden spiny mouse (*Acomys russatus*) have overlapping home ranges in Israel. The former is primarily active at night, the latter during the day, although both show peaks of activity at dawn and dusk. The social interactions of the two species with each other and within each species are being studied to understand whether behavioral patterns of aggression played a role in their speciation, as they are believed to have had a common ancestor.

With Joseph De Santis, Scientific Assistant, and others, Dr. Tobach continued looking at social organization, ecological relationship and emotional behavior of lagomorphs and rodents near the Southwestern Research Station in Arizona. They are investigating techniques for trapping and marking jack rabbits with a minimum of trauma for the animals, so they can study behavioral differences between jack rabbits and cottontails. In addition, the team observed flight responses of desert rodents when released from live traps. There is sufficient knowledge about social organization of the species they trapped to permit some analyses of the relationship between social organization and emotional behavior. This is part of a project in which the team also released trapped animals into novel environments which present a mildly stressful situation.

In the study of the relationship between social organization and emotional behavior, the role of genetic processes is a subject of lively debate. Dr. Tobach, Dr. De Santis and others are working with a spontaneously occurring mutant rat strain which presents a deficiency in serotonin, a neurotransmitter implicated in the study of depression in humans. Because the blood platelet is a reliable model for serotonin characteristics of central nervous system neurones, Dr. Tobach's team determined that serotonin levels in three strains of rats (Fawnhooded, Long-Evans, and Wistar), as well as in first generation reciprocal crosses of the three, relate to behavior differences among the strains. Results indicate that apparently coat color and serotonin deficiency are related to each other. This relationship, however, is complex, and further cross-breeding experiments are required.

Mouth Brooding Fish The relationship between social organization and emotional behavior is also being studied by Dr. Tobach and her colleagues in two species of mouth-brooding fish of the genus *Sarotherodon*. In one, the female picks up the fertilized eggs and incubates them in the mouth until the fry emerge; in the other species, the male incubates the fertilized eggs. The team has studied differences in response of fry of the two species to approaching light and dark areas of a Y-maze when there are either no fish present at the end of the maze or when fish of different sex and developmental stage are present.

To date, the team has only observed the fish incubated by the male. In that species, according to anecdotal reports, young fry will not re-enter the male's mouth when disturbed after emergence, whereas fry of the other species are reputed to do so. The team also studied the social behavior and organization of these animals in groups of varying size at different stages of development to understand any differences in behavior of the fry.

Dr. Tobach, joined by Dr. De Santis and others, studied one type of invertebrate social behavior in the hermaphroditic sea hare of the genus *Aplysia*, an animal that can act either as a sperm donor, sperm recipient or both simultaneously. The sea hares secrete purple ink when they are mechanically stressed in social situations. Dr. Tobach's group has been studying responses in the laboratory of sea hares to conspecifics in relation to the reproductive role assumed by an individual animal. In their field work at La Parguera, Puerto Rico, Dr. Tobach's team has been observing inking behavior of sea hares when found in social situations and when in the presence of possible predators.

Scientific Publications:

Anderson, Sydney and *Justine Anderson*
1982. Sixty-four skunks in our backyard. New Jersey Outdoors, vol. 9, no. 1, pp. 6-7.

Anderson, Sydney and Karl F. Koopman
1981. Does interspecific competition limit the sizes of ranges of species? Amer. Mus. Novitates, no. 2716, pp. 1-10, figs. 1-7.

Koopman, Karl F.
1981. The distributional patterns of New World Nectar-feeding Bats. Ann. Missouri Bot. Gard. 68, pp. 352-368, figs. 1-16.

1981. [Review of] DeBlase. The Bats of Iran: Systematics, distribution, ecology. Jour. Mammal., vol. 62, p. 861.

1981. [Review of] Corbet and Hill, A world list of mammalian species. Jour. Mammal., vol. 62, pp. 860-861.

Koopman, Karl F. and *J. E. Hill*
1981. The Status of *Lamingtona lophorhina* McKean and Calaby, 1968 (Chiroptera: Vespertilionidae). Bull. Br. Mus. Nat. Hist. (Zool.) Vol. 41, pp. 275-278.

See also Anderson and Koopman above, and Musser, Koopman and Califia below.

Musser, Guy G.
1981. The giant rat of Flores and its relatives east of Borneo and Bali. Bull. Amer. Mus. Nat. Hist., vol. 169, art. 2, pp. 67-176, figs. 1-40.

This cold, wet moss forest, elevation 7500 feet, on Sulawesi, Indonesia, is one of the sites of Guy G. Musser's research. Dr. Musser, Chairman of the Department of Mammalogy, has been studying the phylogenetic relationships of rodents native to the Indo-Australian region. Among the native rodents living in this forest are small-bodied shrew rats that eat earthworms and fly larvae. Dr. Musser has named 10 genera and 12 species of rodents in the course of his research. He will accompany the Museum's 1983 Indonesian Odyssey Discovery Tour as the tour's naturalist.

1982. Results of the Archbold Expeditions. No. 107. A new genus of arboreal rat from Luzon Island in the Philippines. Amer. Mus. Novitates, no. 2730, pp. 1-23, figs. 1-13.

Musser, Guy G. and Debra Califia
1982. Results of the Archbold Expeditions. No. 106. Identities of rats from Pulau Maratua and other islands off East Borneo. Amer. Mus. Novitates, no. 2726, pp. 1-30, figs. 1-5.

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Musser, Guy G., Karl F. Koopman and Debra Califia
1982. The Sulawesian *Pteropus arquatus* and *P. argentatus* are *Acerodon celebensis;* the Philippine *P. leucotis* is an *Acerodon.* Jour. Mammal., vol. 63, no. 2, pp. 319-328, figs. 1-5.

Musser, Guy G. and *Erica Piik*
1982. A new species of *Hydromys* (Muridae) from Western New Guinea (Irian Jaya). Zoologische Mededelingen, Rijksmuseum van Natuurlijke Historie, Leiden, vol. 56, no. 13, pp. 153-168, figs. 1-2, pls. 1-3.

Naples, Virginia
1982. Cranial Osteology and Function in the Tree Sloths, *Bradypus* and *Choleopus.* Amer. Mus. Novitates, no. 2739, pp. 1-41, figs. 1-21.

Olds, Nancy and *Hesheskel Shoshani*
1982. *Procavia capensis.* Mammalian Species (American Soc. Mammal.) no. 171, pp. 1-7, figs. 1-3.

Otsuka, C., L. Olivier, Y. Rouger and E. Tobach
1981. *Aplysia punctata* added to list of laboratory-cultured *Aplysia. Hydrobiologia*, no. 83, pp. 239-240.

Tobach, Ethel
1982. [Review of] "Psychology and society: In search of symbiosis." Houston Symposium, I. R. A. Kasschau and F. S. Kessel, eds., New York: Holt, Rinehart & Winston. Symbiosis: helotism or inquilinism. *Contemp. Psych.*, vol. 22, no. 1, pp. 36-37.

Van Gelder, Richard G.
1981. [Review of] Whitaker, John O., Jr., The Audubon Society field guide to North American mammals and Harper & Row's complete field guide to North American wildlife by Henry Hill Collins, Jr. and Jay Ellis Ransom. What's that (North American) animal? Nature, vol. 294, no. 5840, p. 498.

Abstracts and Popular Publications:

Tobach, Ethel
1981. Theodore C. Schneirla: 1902-1968. Amer. Jour. Psych., vol. 94, no. 2, 3 pp.

Tobach, Ethel, editor
1981. Book Review issue, Newsletter; The Center for the Study of Women and Sex Roles, City University of N.Y., May-June.

1981. Safari guide. Gondwana Consolidated, 60 pp.

1982. Mammals of the national parks. The Johns Hopkins University Press, Baltimore and London, 310 pp.

Wetzel, Ralph M.
1981. The hidden Chacoan peccary. Carnegie Magazine, vol. 55, no. 20, pp. 24-32., figs. 1-6.

Department of Mineral Sciences

Research into minerals, gems, rocks and meteorites results in new knowledge about the history of the Earth and the planets, and the processes they have undergone. Progress was made in studies as diverse as the crystal and melt chemistry of selected minerals, the origin and history of the basaltic achondrite planet, the classification of non-silicate minerals, and the origin of silicate inclusions inside iron meteorites.

A major tool which has greatly helped to expedite the Department's work was the gift from Citicorp of a Word Processing and Data Base Management computer system, valued at $1.8 million. Manuscript preparation and collections management capabilities have been vastly improved.

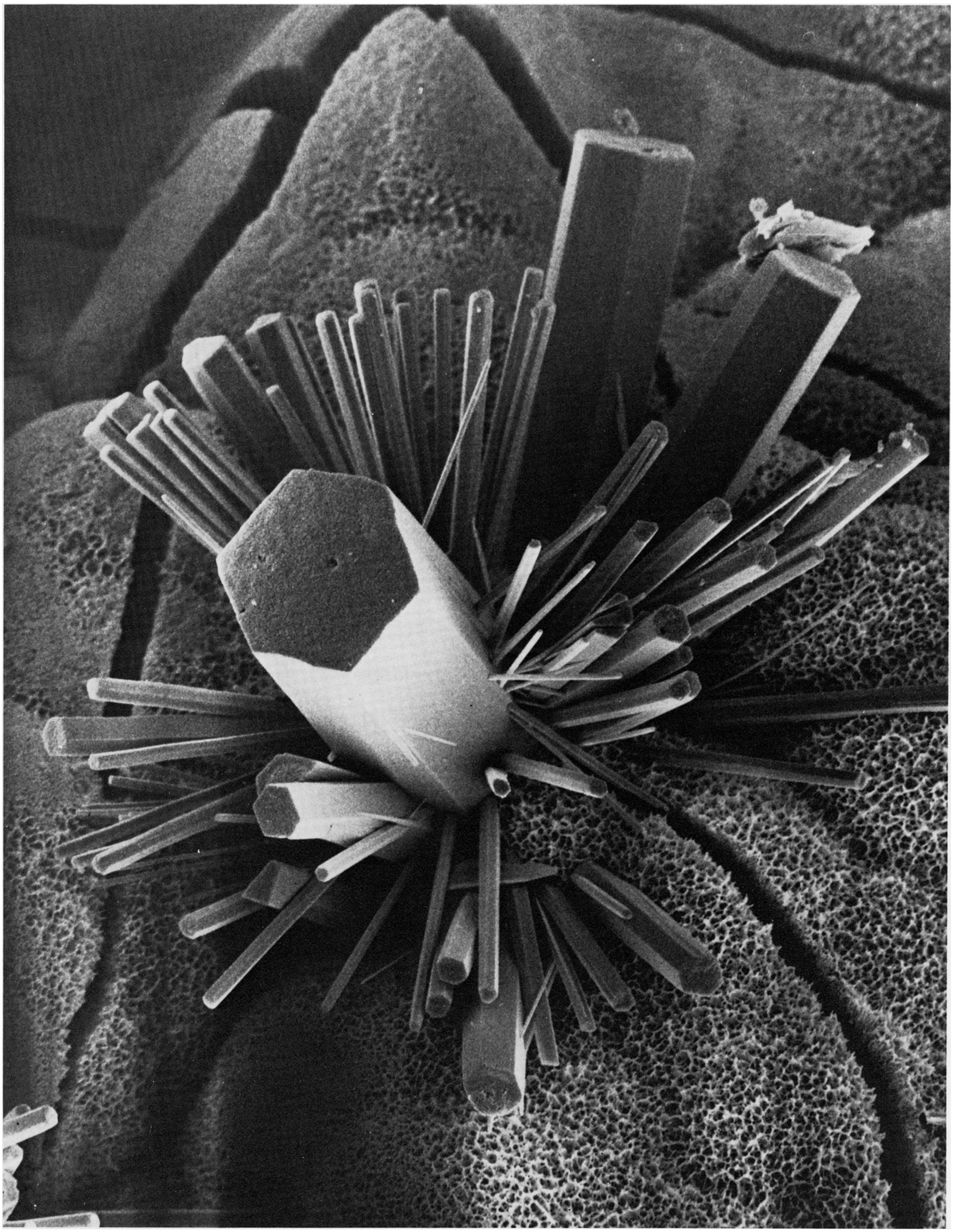
The Columbia University mineral collection, purchased uncataloged in 1980, now has about 10,000 entries in the computerized system. The meteorite collection is entirely listed on the computer and is being updated on a continuous basis as changes occur.

The Basaltic Achondrite Planet
A major research direction, using the extensive meteorite collection, is determining the history and origin of the small planet or planets from which the basaltic meteorites originated. This project is spearheaded by Jeremy S. Delaney, Postdoctoral Fellow. Information comes from a wide variety of meteoric groups such as eucrites (rocks consisting of basalts crushed by impact), polymict eucrites (similar to eucrites, but with wide variations within a sample as well as between samples), howardites (even more complex planetary "soil" made up of numerous rock types) and mesosiderites (complex rock types bound together with metallic iron which heated the fragments).

Comprising about 80 meteorites, some of which are newly discovered from Antarctica, these samples hold the key to the origin of a planet which formed 4.5 billion years ago, shortly after the birth of the solar system. One of the most difficult challenges is to distinguish between rocks produced by volcanism within the planet and melted rocks produced at the surface by abundant and pervasive impacts. Misinterpretation can result in a distorted concept of the planetary interior and its origin from the solar nebula.

Mineral Studies The pyroxene mineral group has been particularly informative in revealing the history of rocks which contain it. One subgroup, orthopyroxene, is common in rocks from all planets and has a character-

The mineral petersite, a calcium-copper rare earth phosphate, was named for Joseph J. Peters, Scientific Assistant, and Thomas Peters, Associate, both in the Department of Mineral Sciences. The name honors the brothers for their studies of New Jersey minerals. The mineral was found in June, 1981, in the Laurel Hill Quarry in Secaucus. In addition to research on the Earth's minerals and gems, the Department is renowned for its studies of meteorites and is responsible for the scientific content of the Arthur Ross Hall of Meteorites, home of the 31-metric-ton Ahnighito.



istic crystal structure. It was first noted in 1974 that this mineral within a deep-seated lunar sample may have had lower symmetry, inferring a more ordered structural state due to very slow cooling. George E. Harlow, Associate Curator, has found what appears to be low orthopyroxene in a number of samples in meteorites and on the Earth. He is actively exploring its possible occurrence, the nature of the modification and its significance in interpreting the formational environments of samples which contain it.

Other studies by Dr. Harlow include the enstatite in the Abee meteorite from Canada, which is being studied in consortium by a wide group of investigators. He is also studying a pyroxene called omphacite, found as inclusions in diamonds and sometimes containing a high amount of the element potassium, which is unexpected for a pyroxene. Since diamonds and the minerals they include form at very high pressures deep within the earth, and potassium is a heat-generating element, the presence of this potassium-bearing mineral in abundance at depth might signify a major unrecognized heat source.

Dr. Harlow has also studied the mineral gamagarite with Pete J. Dunn of the Smithsonian Institution. The mineral is a hydrated barium manganese vanadate found in only one locality, the Potmasburg district of Cape Province in South Africa. The study is concerned with determining the oxidation state of the manganese, which is related to temperature and to the role of water in the mineral's origin. By resolving these issues the formational environment can be better determined. Also, there are analogous minerals, with different chemical elements but similar structures, which can be compared and used for the same purpose.

Crystals and Melts Eric Dowty, Research Fellow, has been studying the growth of crystals and the structure of natural high-temperature melts in order to read more history into the minerals and rocks in which they occur. One area of study is the nature of chemical bonds and their relative energies, and the principles that govern which minerals will be stable under specific circumstances. These principles also apply to melts of varying complexity and composition. Another area of study is the nucleation of various crystals growing from a melt. Nucleation of crystals growing in laboratory experiments intended to simulate nature are compared with those actually produced by nature.

Drs. Dowty, Harlow and Arthur M. Langer, Research Associate, worked to develop techniques for analytical transmission electron microscopy, using the instrument at the Mt. Sinai School of Medicine. They have been preparing standards of many mineral substances and testing them for adequacy in analyzing extremely tiny areas at high magnifications. Developing this capability is a tedious, meticulous task which has been achieved in very few institutions. When these techniques are further developed, they will open new vistas for research into minerals.

Silicate Inclusions in Iron Meteorites Martin Prinz, Chairman and Curator, and C.E. Nehru, Research Associate, pursued the origin and significance of small inclusions of silicate minerals in iron meteorites. These inclusions have been recognized for some time but their presence within iron meteorites is puzzling. One question being asked is whether the silicates are related to those in other meteorites, or whether they are a source of types of materials not sampled elsewhere. How do silicates in different types of iron meteorites compare within and between groups? Have there been high temperature interactions between the metallic iron and the silicates which have modified each? Studies this year on a variety of meteorites have begun to answer these questions.

One study was on the Tucson iron meteorite which contains tiny inclusions in flow patterns. It was found that the unusual metal and silicate compositions came about through a sequence of events. These events included high-temperature melting of a metal-silicate assemblage by shock impact on a small planetary surface, followed by very rapid cooling of both and extreme volatile loss. By piecing together the details of the story, it was possible to relate Tucson to the enstatite meteorites, or a similar group, and learn about the nature of processes which can occur in planets.

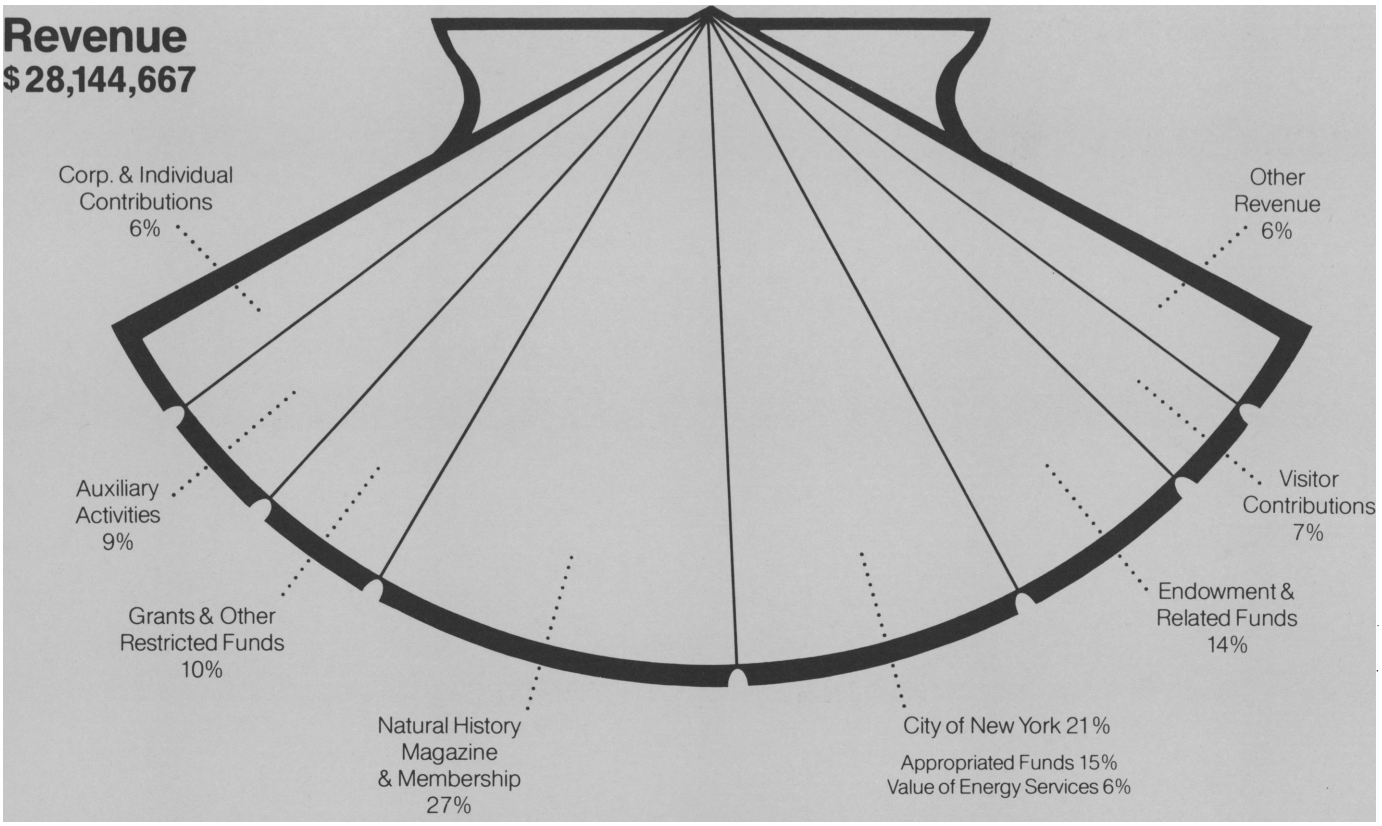
Sombrerete, a new iron meteorite with silicate inclusions found in Mexico only a few years ago, was studied and found to be unique. The inclusions are mostly glass, a consequence of rapid cooling. Mineral compositions indicate that the silicates are not formed by primitive processes in the solar system, but are the result of internal processes in a more evolved planet. Their association with an iron meteorite is problematical.

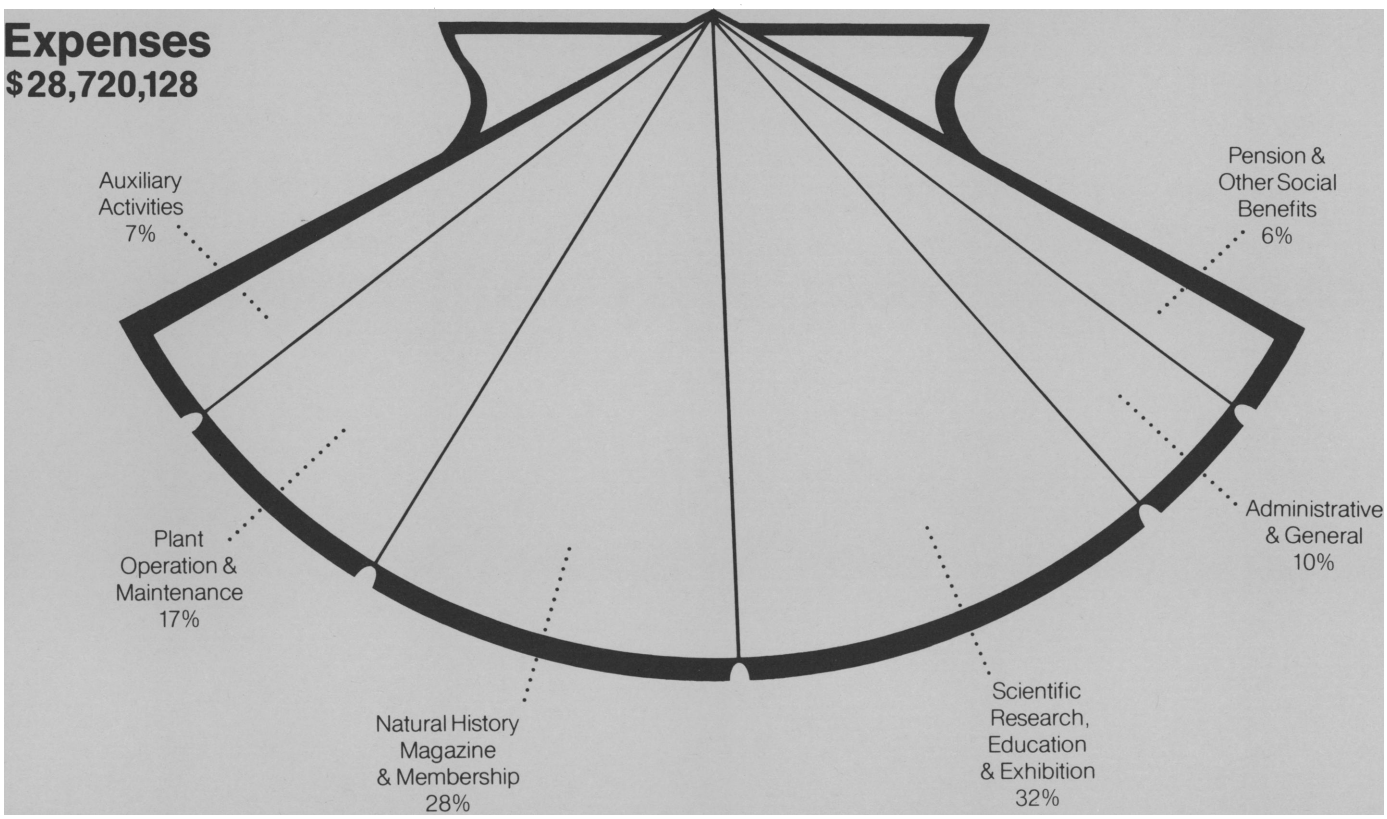
Classification of Nonsilicate Minerals James A. Ferraiolo, Mineralogy Project Coordinator, has published an exhaustive classification of all the nonsilicate minerals found in nature. This is the first time such an endeavor has been attempted in more than 30 years. During this period, an enormous amount of new information has surfaced. The work not only classifies 2200 species, but gives critical information on each and cites the original references that describe the species. The publication is already being recognized by mineralogists and collectors as a major source of information.

A new species, soon to be described, is the mineral Petersite, named after Joseph J. Peters, Scientific Assistant, and his brother Thomas A. Peters, Associate. The mineral is a calcium-copper rare earth phosphate, found at Laurel Hill, New Jersey, and named after them in recognition of theit work on the mineralogy of New Jersey. They have recently submitted a paper on the mineralogy within solution cavities in "sugary" dolomite from Franklin, New Jersey.

Collections During the past year, the mineral collection received 1272 new gems and minerals valued at $1,016,793 from 32 donors. In addition, Ellis Rudy of Houston, Texas, donated approximately 7500 items valued at $346,480, representing the correspondence, manuscripts and memorabilia of G. F. Kunz. Dr. Kunz was one of the foremost gemologists of his day, was affiliated with Tiffany and Co. for all of his professional life

Financial Statements


Revenue
$28,144,667
Corp. & Individual Contributions 6%
Other Revenue 6%
Auxiliary Activities 9%
Visitor Contributions 7%
Grants & Other Restricted Funds 10%
Endowment & Related Funds 14%
Natural History Magazine & Membership 27%
City of New York 21%
Appropriated Funds 15%
Value of Energy Services 6%


Expenses
$28,720,128
Auxiliary Activities 7%
Pension & Other Social Benefits 6%
Plant Operation & Maintenance 17%
Administrative & General 10%
Natural History Magazine & Membership 28%
Scientific Research, Education & Exhibition 32%

Treasurer's Report

The financial statements 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 and the related notes on pages A8 and A12 have been audited by Coopers and Lybrand.

In reviewing the Balance Sheet it should be noted that investments in marketable securities are recorded at cost and amount to $69,801,593. These investments include General Fund, $4,777,660; Special Funds, $5,808,220; Endowment Funds, $59,215,713. The total market value of these securities on June 30, 1982, was $70,331,602, as detailed in Note 1, page A4.

The General Fund investments of $4,777,660 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 $5,125,291. Special Funds investments of $5,808,220 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. Endowment Funds investments of $59,215,713 represent the balance of funds allocated by donors or the Board of Trustees for endowment purposes since its organization in 1869. The temporary investment of collateral received for securities loaned, amounting to $4,478,500, represents assets acquired under the Securities Lending Program and is offset by the liability, collateral deposited for securities loaned, in the amount of $4,478,500.

The Statement of Revenue and Expenses of Current Funds, which consists of the General Fund and Special Funds, appears on page A6. The total revenue for these funds for 1981-1982 was $28,144,667; the total expenses amounted to $28,720,128. After adjusting for the support grants of $634,460, revenue exceeded expenses by $58,999. While the combined operation of both of these funds shows an excess of revenue over expenses, the General Fund, which supports the day-to-day operations of the Museum, had an excess of expenses over revenue of $867,107, and the Special Funds, which cover programs restricted in nature and may take several years to complete, had an excess of revenue over expenses of $926,106.

A review of the operations of the General Fund shows that total revenues amounted to $21,487,876, compared to $18,988,331 for the previous year, an increase of about $2,500,000. The major areas contributing to this increase were: Appropriated funds from the City of New York, Value of energy service provided by the City of New York, Distribution from Endowment Funds.

Appropriated funds from the City of New York were about $520,000 greater than in 1981: approximately $250,000 represented an increase in the level of support for Museum activities and about $270,000 covered negotiated and other salary increases for current and prior years. Value of energy services provided by the City of New York increased about $268,000, and represents the increased costs to the City in providing heat, light and power for existing, improved and new Museum facilities.

The increase of about $200,000 in Distribution from Endowment Funds in fiscal 1982 over fiscal 1981 resulted from the growth of Endowment Funds. The policy adopted on July 1, 1980, provided that Endowment Fund distributions be fixed annually at a percentage of the average market value of the Endowment Funds at March 31 for the three preceding years. The percentage for fiscal 1982 and 1981 was five percent.

A significant increase occurred in Natural History magazine and membership revenue. Advertising revenue increased about $300,000 and membership revenue, reflecting the effect of the change in membership dues from $10 to $15 a year and the change in publication schedule to 12 issues a year, increased by $550,000.

General Fund expenses for the year amounted to $22,989,443, compared to $20,482,140, an increase of about $2,500,000. The increase in General Fund expenses for fiscal 1982 includes cost of living adjustments to the salaries of employees and increased costs of personal services and supplies the Museum purchases from outside sources.

With strong financial support from the Trustees, the corporate sector, foundations and government granting agencies, the Museum administration has been able to maintain existing programs, embark upon new programs and serve the general public and scientific community at a level equal to or better than in previous years. We look forward to continued support from the private and public sector so that we can not only maintain the existing programs, services and scientific research for which we are known, but also broaden the scope of these programs and add new services.

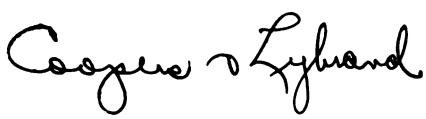
Frederick A. Klingenstein,
Treasurer

Auditors' Report

To 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, 1982, and 1981, 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, 1982, and 1981, and the results of its operations for the years then ended, in conformity with generally accepted accounting priniciples applied on a consistent basis.



1251 Avenue of the Americas
New York, New York 10020
September 30, 1982.

American Museum of Natural History Balance Sheets, June 30, 1982, and 1981

Assets:

Cash
Receivable for securities sold
Accrued interest and dividends receivable
Accounts receivable, less allowance for doubtful accounts of $112,000 in 1982 and $194,000 in 1981
Investments in marketable securities (Note 1)
Temporary investment of collateral received for securities loaned (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
Collateral deposited for securities loaned (Note 1)
Unearned membership income
Funds:
  General Fund (deficit)
  Special Funds (Notes 4 and 5)
  Endowment Funds (Notes 6 and 7)

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

1982				1981			
Current Funds				Current Funds			
General Fund	Special Funds	Endowment Funds	Total	General Fund	Special Funds	Endowment Funds	Total
$ 368,107		$ 262,527	$ 630,634	$ 331,251	$ 228	$ 196,378	$ 527,857
		149,859	149,859			609,428	609,428
163,805	$ 208,480	532,595	904,880	96,430	113,127	593,933	803,490
851,401	250,103		1,101,504	958,333	379,814		1,338,147
4,777,660	5,808,220	59,215,713	69,801,593	4,673,932	5,684,959	54,394,710	64,753,601
		4,478,500	4,478,500				
	425,000		425,000		425,000		425,000
690,044			690,044	851,460			851,460
865,691	52,544		918,235	1,235,118	79,223		1,314,341
$7,716,708	$6,744,347	$64,639,194	$79,100,249	$8,146,524	$6,682,351	$55,794,449	$70,623,324
$1,198,487	$ 184,575	$ 68,776	$ 1,451,838	$1,787,332	$ 297,193	$ 109,361	$ 2,193,886
1,659,334			1,659,334	1,509,488			1,509,488
		295,933	295,933			906,346	906,346
		4,478,500	4,478,500				
5,125,291			5,125,291	5,137,213			5,137,213
(266,404)			(266,404)	(287,509)			(287,509)
	6,559,772		6,559,772		6,385,158		6,385,158
		59,795,985	59,795,985			54,778,742	54,778,742
$7,716,708	$6,744,347	$64,639,194	$79,100,249	$8,146,524	$6,682,351	$55,794,449	$70,623,324

Statements of Revenue and Expenses of Current Funds for the years ended June 30, 1982, and 1981

	General Fund		Special Fund		Total	
Revenue:	1982	1981	1982	1981	1982	1981
The City of New York: Appropriated funds	$ 4,294,176	$ 3,773,867			$ 4,294,176	$ 3,773,867
Value of energy services (Note 9)	1,576,504	1,308,093			1,576,504	1,308,093
Gifts, bequests and grants (Note 10)	1,590,928	1,683,987	$2,738,568	$2,347,839	4,329,496	4,031,826
Distribution from Endowment Funds (Note 7)	1,933,000	1,713,000	569,124	494,830	2,502,124	2,207,830
Interest on other investments	962,360	928,542	436,313	318,345	1,398,673	1,246,887
Visitors' contributions			1,884,309	1,425,451	1,884,309	1,425,451
Natural History magazine and membership	7,688,653	6,732,224			7,688,653	6,732,224
Other revenue	788,033	702,053	1,028,477	679,653	1,816,510	1,381,706
Auxiliary activities (Note 8)	2,654,222	2,146,565			2,654,222	2,146,565
Total revenue	21,487,876	18,988,331	6,656,791	5,266,118	28,144,667	24,254,449
Expenses:						
Scientific and educational activities	3,851,212	3,538,242			3,851,212	3,538,242
Exhibition halls and exhibits			1,082,678	1,213,310	1,082,678	1,213,310
Other special purpose programs and projects			4,139,361	3,044,724	4,139,361	3,044,724
Administrative and general	2,567,392	2,165,243	332,557	401,456	2,899,949	2,566,699
Plant operating and maintenance (Note 9)	4,804,277	4,458,843			4,804,277	4,458,843
Pension and other social benefits (Note 11)	1,523,245	1,454,903	176,089	213,058	1,699,334	1,667,961
Natural History magazine and membership	8,216,982	7,352,073			8,216,982	7,352,073
Auxiliary activities (Note 8)	2,026,335	1,512,836			2,026,335	1,512,836
Total expenses	22,989,443	20,482,140	5,730,685	4,872,548	28,720,128	25,354,688
Excess of revenue over expenses (expenses over revenue) before support grant	(1,501,567)	(1,493,809)	926,106	393,570	(575,461)	(1,100,239)
Support grant (Note 12)	634,460	601,000			634,460	601,000
Excess of revenue over expenses (expenses over revenue)	($ 867,107)	($ 892,809)	$ 926,106	$ 393,570	$ 58,999	($ 499,239)

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, 1982, and 1981

	Current Funds					
	General Fund		Special Funds		Endowment Funds	
	1982	1981	1982	1981	1982	1981
Balance (deficit), beginning of year	($287,509)	($ 407,054)	$6,385,158	$6,905,736	$54,778,742	$47,228,892
Additions:						
Gifts, bequests and grants					1,472,969	109,594
Interest and dividend income (Note 7)					2,479,493	1,415,946
Net gain on sale of investments					1,661,361	6,550,723
Excess of revenue over expenses			926,106	393,570		
Total additions			926,106	393,570	5,613,823	8,076,263
Deductions:						
Excess of expenses over revenue, as annexed	867,107	892,809				
Administrative and general expenses					321,789	308,576
Prior service contributions to CIRS (Note 11)					138,071	119,631
Total deductions	867,107	892,809			459,860	428,207
Transfers between funds:						
Financing of:						
1981 and 1980 General Fund deficits	287,509	407,054	(150,789)	(172,639)	(136,720)	(234,415)
Special Funds activities	43,893	(8,552)	(43,893)	59,241		(50,689)
Other (Note 13)	556,810	613,852	(556,810)	(800,750)		186,898
Total transfers	888,212	1,012,354	(751,492)	(914,148)	(136,720)	(98,206)
Balance (deficit), end of year	($266,404)	($ 287,509)	$6,559,772	$6,385,158	$59,795,985	$54,778,742

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 to total market value (see Note 7).

Investments are stated at cost (average cost method) 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 ratably 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:	**1982**		**1981**	
	Cost	**Market**	**Cost**	**Market**
General Fund	$ 4,777,660	$ 4,554,349	$ 4,673,932	$ 4,394,612
Special Funds	5,808,220	5,536,826	5,684,959	5,371,192
Endowment Funds	59,215,713	60,240,427	54,394,710	63,252,986
	$69,801,593	$70,331,602	$64,753,601	$73,018,790
The Museum's investments consist of the following:				
Short-term obligations	$19,699,885	$19,822,700	$15,365,392	$15,328,180
Bonds	16,602,239	15,352,250	13,057,750	11,501,475
Common stocks	33,499,469	35,156,652	36,330,459	46,189,135
	$69,801,593	$70,331,602	$64,753,601	$73,018,790

On April 1, 1982, the Museum entered into a securities lending program with United States Trust Company of New York, whereby certain Endowment Fund investments were temporarily loaned to brokerage firms. The Museum receives in return cash or securities as collateral in an amount equal to the value of securities loaned. Cash received is reinvested in short-term investments. The income derived from these investments is included in Other Revenue of the General Fund. The Museum retains all rights of ownership to the securities loaned and, accordingly, receives all related interest and dividend income. Periodically, the collateral received is adjusted to maintain approximately a 100 percent market value relationship to securities loaned.

2. The American Museum of Natural History and the American Museum of Natural History Planetarium Authority ("Planetarium") are separate legal entities which share the same Board of Trustees and Officers. The Museum has an investment in bonds ($570,000 principal amount) of the Planetarium and carries this investment at cost. For the year ended June 30, 1982, and 1981, interest income on these bonds of $25,650 is included in the General Fund.

3. Inventories comprise:	**1982**	**1981**
Paper for Natural History magazine	$413,152	$559,773
Merchandise	276,892	291,687
	$690,044	$851,460

4. Included at June 30, 1982 in Special Funds (funds which are received or appropriated for specific purposes) is approximately $3,036,000 of funds restricted by the donor as to use.

5. The balances at June 30, 1982 and 1981 of Special Funds are net of overdrafts of certain of these funds of approximately $1,442,000 and $898,000, 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) are summarized as follows:

	June 30, 1982	June 30, 1981
Endowment Funds, income available for:		
Restricted purposes	$26,315,141	$24,796,693
Unrestricted purposes	9,379,755	9,116,879
Funds functioning as endowment, principal and income available for:		
Restricted purposes	9,445,297	7,225,283
Unrestricted purposes	14,655,792	13,639,887
	$59,795,985	$54,778,742

7. Total interest and dividend income for the Endowment Funds for fiscal 1982 and 1981 was $4,981,617 and $3,623,776, respectively. In accordance with the policy adopted by The Board of Trustees, distributions to the General Fund and Special Funds and funding of pension support were fixed at 5 percent of the average of the market value of the Endowment Funds for the three preceding years. The distributions are as follows:

	1982	1981
General Fund	$1,933,000	$1,713,000
Special Funds	569,124	494,830
	$2,502,124	$2,207,830

The excess of income over the distributions was retained in the Endowment Funds. This amount includes $136,876 and $118,307 for pension support in 1982 and 1981, respectively, which offsets in part prior service cost contributions to CIRS.

8. The revenue and expenses for auxiliary activities in fiscal 1982 and 1981 are as follows:

	1982		1981	
	Revenue	Expenses	Revenue	Expenses
Museum shops	$1,181,059	$1,007,819	$1,010,623	$ 862,004
Discovery tours	497,742	292,349	349,626	176,504
Naturemax (3 months)	279,675	275,964		
Other auxiliary activities	695,746	450,203	786,316	474,328
	$2,654,222	$2,026,335	$2,146,565	$1,512,836

9. Plant Operating and Maintenance expenses in fiscal 1982 and 1981 include the value of energy services supplied by the City of New York of $1,576,504 and $1,308,093, respectively.

10. In fiscal 1982 and 1981, gifts, bequests and grants included $9,527 and $192,595, respectively, which were received under the Comprehensive Employment Training Act (CETA).

11. Pension costs amounted to approximately $703,000 in fiscal 1982 and $704,000 in fiscal 1981. Of these amounts, $138,071 in fiscal 1982 and $119,631 in fiscal 1981 were funded through Pension Support Endowment Funds. The balance of approximately $565,000 in fiscal 1982 and $584,000 in fiscal 1981 (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 non-vested accumulated plan benefits and net assets available for benefits are not determinable on an individual institution basis.

12. In fiscal 1982 and 1981, grants of $601,000 were received each year from the New York State Council on the Arts toward the support of the General Fund's operations. In addition, in fiscal 1982 a grant of $33,460 was received from the Institute of Museum Services.

13. In fiscal 1982, there were transfers from Special Funds of $556,810 to the General Fund. Such amounts were transferred in accordance with authorization of the donor, grantor or Trustees.

14. The Museum provides certain sevices, including accounting, security and maintenance services for which the Planetarium was charged an aggregate amount of $181,200 in fiscal 1982 and $108,539 in fiscal 1981.

15. Certain amounts in the fiscal 1981 financial statements have been reclassified to conform to the fiscal 1982 presentation.

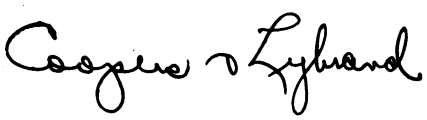
16. The Museum is a nonprofit organization exempt from income tax under Section 501(c) (3) of the Internal Revenue Code.

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, 1982, and 1981, 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, 1982, and 1981, 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
September 30, 1982.

American Museum of Natural History Planetarium Authority Balance Sheets, June 30, 1982, and 1981

Assets:

Cash
Short-term investments
Accounts receivable
Planetarium shop inventory

Equipment, fixtures, etc.:
  Zeiss planetarium instruments, 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 of Unrestricted Funds for the years ended June 30, 1982, and 1981

	1982	1981
	$ 21,822	$ 64,735
	545,688	500,000
	78,920	24,460
	48,760	50,198
	695,190	639,393
	221,928	221,928
	316,681	316,681
	538,609	538,609
	(335,141)	(282,573)
	203,468	256,036
	1	1
	203,469	256,037
	1,019,210	1,019,210
	$1,917,869	$1,914,640
	$ 105,211	$ 196,262
	78,983	75,959
	570,000	570,000
	315,450	315,450
	1,069,644	1,157,671
	156,869	156,869
	429,455	429,455
	400,000	400,000
	986,324	986,324
	(792,311)	(753,633)
	654,212	524,278
	848,225	756,969
	$1,917,869	$1,914,640

	1982	1981
Income:		
Admission fees, less allowances and commissions	$721,692	$701,923
Auxiliary activity, sales booth	167,605	166,248
Special lectures and courses	47,988	49,763
Other income and grants	17,691	12,594
Total income	954,976	930,528
Expenses:		
Preparation, presentation and promotional	395,499	380,280
Operation and maintenance	207,255	189,766
Auxiliary activity, sales booth	150,976	147,937
Administrative and general	108,908	63,552
Pension and other social benefits (Note 3)	63,884	72,344
Special lectures and courses	30,376	29,564
Total expenses	956,898	883,443
(Loss) income before interest and depreciation	(1,922)	47,085
Interest on past due 4½% Refunding Serial Revenue bonds	(25,650)	(25,650)
Provision for depreciation	(52,568)	(52,118)
Net loss	($ 80,140)	($ 30,683)

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, 1982, and 1981

	Unrestricted Fund		Restricted Funds	
	1982	1981	1982	1981
Balance (deficit), beginning of year	($753,633)	($763,962)	$524,278	$440,739
Additions:				
Contributions			174,050	14,250
Proceeds from special presentations (Note 2)			130,026	181,522
Income from investments			62,990	53,129
Expenditures:				
Special purpose programs and projects			(48,921)	(4,703)
Special presentation expenses (Note 2)			(146,749)	(119,647)
Transfers between funds (Note 5)	41,462	41,012	(41,462)	(41,012)
Net loss, as annexed	(80,140)	(30,683)		
Balance (deficit), end of year	($792,311)	($753,633)	$654,212	$524,278

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 1982 and 1981 was $30,450 and $33,493, respectively. The CIRS Plan is a multi-employer 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, security and maintenance services, from the Museum. The aggregate charges for such services in fiscal 1982 and 1981 aggregated $181,200 and $108,539, 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.

and was an honorary curator at the Museum. He was instrumental in establishing our gem collection, with the help of J.P. Morgan.

Some of the notable gifts this year include a gold and rose-diamond necklace designed by Richard Lounsbery and executed by Cartier and a five-carat Kashimir blue sapphire set in a platinum ring, both gifts from the estate of Vera Lounsbery. Also received were 189 cabachons of Australian precious opal; four superb faceted blue aquamarines set in platinum; a kunzite, spessartine garnet and beryl (aquamarine) from the Afghanistan and Pakistan areas; and various collections of minerals from individuals, including 542 minerals assembled by the late Helen Snyder of New York.

In addition, 17 exchanges were made, resulting in the receipt of 78 new specimens valued at $29,240. Some of the new specimens are an azurite crystal group from the Altai Mountains in the U.S.S.R.; rare earth minerals from Harriman State Park, New York; crystallized orpiment from China; and minerals from Franklin, New Jersey, Mt. St. Hilaire, Quebec, Butte, Montana and the Afganistan-Pakistan gem pegmatites. The purchase of 114 new minerals at a cost of $6004 added to the collection. The additions included a scorodite from Tsumeb, Namibia, and perhaps the finest lammerite from Bolivia.

Scientific Publications:

Delaney, J.S., C.E. Nehru, M. Prinz and G.E. Harlow
1981. Metamorphism in mesosiderites. Proceedings Twelfth Lunar and Planetary Science Conference, vol. 12B, pp. 1315-1342.

Delaney, J.S., M. Prinz, G.E. Harlow and C.E. Nehru
1981. Pristinity problems on a basaltic achondrite parent (BAP): Chondritic contamination of basalt clasts from polymict eucrites. *In* Comparisons between lunar breccias and soils and their meteoritic analogs. Lunar and Planetary Inst., Houston, Texas, 36-39.

Delaney, J.S.
1982. Minor components of basaltic achondrites—I. Sulphur. Lunar and Planetary Science XIII, Houston, Texas, pp. 148-149.
1982. Minor components of basaltic achondrites—II. Phosphorus. Lunar and Planetary Science XIII, Houston, Texas, pp. 150-151.

Delaney, J.S., G.E. Harlow, C.E. Nehru, *C. O'Neill** (Sponsor: M. Prinz) and M. Prinz
1982. Mount Padbury mafic "enclaves" and the petrogenesis of mesosiderite silicates. Lunar and Planetary Science XIII, Houston, Texas, pp. 152-153.

Delaney, J.S., *C. O'Neill** (Sponsor: M. Prinz), C.E. Nehru and M. Prinz
1982. Zoning of minerals in mafic clasts from basaltic achondrites. Lunar and Planetary Science XIII, Houston, Texas, pp. 154-155.

Delaney, J.S., M. Prinz, *C. O'Neill** (Sponsor: M. Prinz), G.E. Harlow and C.E. Nehru
1982. New type of polymict eucrite from Elephant Moraine, Antarctica. Lunar and Planetary Science XIII. Houston, Texas, pp. 156-157.

Ferraiolo, J.A.
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1982. Metamorphic reactions in mesosiderites: origin of abundant phosphate and silica. Geochimica et Cosmochimica Acta, vol. 46, pp. 339-348.

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1981. Antiphase domains and reverse thermoremanent magnetism in ilmenite-hematite. Science, vol. 213, pp. 1372-1374.

Nehru, C.E., M. Prinz and J.S. Delaney
1982. The Tucson iron and the aubrites. Lunar and Planetary Science XIII, Houston, Texas, pp. 586-587.

Prinz, M., C.E. Nehru and J.S. Delaney
1982. Reckling Peak A79015: an unusual mesosiderite. Lunar and Planetary Science XIII, Houston, Texas, pp. 631.

1982. Silicate inclusions in irons and metal-silicate assemblages. Lunar and Planetary Science XIII, Houston, Texas, pp. 632-633.

1982. Sombrerete: an iron with highly fractionated amphibole-bearing Na-P-rich silicate inclusions. Lunar and Planetary Science XIII, Houston, Texas, pp. 634-635.

Smith, J.V., J.S. Delaney, *R.L. Hervig* and *J.B. Dawson*
1981. Storage of F and Cl in the upper mantle: geochemical implications. Lithos, vol. 14, pp. 133-147.

Abstracts and Popular Publications:

Dowty, E.
1981. Thermodynamics of binary metal oxide—silica melts. Abstracts with programs, 1981, Geological Society of America Annual Meeting, Cincinnati, Ohio, vol. 13, p. 441.

Harlow, G.E.
1981. Geology under the AT: Hudson River to the New Jersey border. Trailwalker, vol. 19, no. 2, p. 5.

Harlow, G.E., J.S. Delaney, M. Prinz and C.E. Nehru
1981. Phosphorus in mesosiderite metal: A IIIAB correlation. Meteoritics, vol. 16, pp. 322-323.

Nehru, C.E., J.S. Delaney, *S. Frishman** (Sponsor: M. Prinz), G.E. Harlow and M. Prinz
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Department of Ornithology

The Department's unrivaled collection of one million specimens is the central focus of the staff's research into the systematics and related aspects of the biology of birds. Field trips to Africa, New Guinea, South America and western North America led to new knowledge and additional specimens. Scientists from six continents spent varying periods of time studying the Department's collections and in its laboratories, which also serve as a major teaching facility.

Research, the curation of the collection, receiving daily visitors, handling loans and exchanges, answering numerous requests for information about birds, and administering the Frank M. Chapman Memorial Fund grant and fellowship program are major staff activities. The collections are so representative that students of birds from any part of the world find they must visit them or borrow specimens for study. Among Department visitors were a member of the Soviet Academy of Sciences and the Queen of Thailand. Important acquisitions came from South America, Australia, Africa and western North America.

The Department mourned the passing in October of Eugene Eisenmann, for more than two decades a resident Research Associate specializing in New World birds and their classification and nomenclature. Dr. Eisenmann was a staunch supporter of the Department and a warm person who freely shared his knowledge with all. Former Associate John Kieran also died in December after many years of affiliation with the Department.

The Frank M. Chapman Memorial Fund Committee awarded 84 grants totaling $42,759, the bulk of it to young researchers.

Field Studies in Africa Lester L. Short, Chairman and Curator, continued his research on barbets, honeyguides and woodpeckers, with field studies in Kenya and Rwanda in association with Jennifer F. M. Horne, Research Associate, National Museums of Kenya. This research was supported by the L. C. Sanford Fund. New data suggest that barbet pairs are defended as part of the territories of honeyguides, nest parasites of the barbets. The Red-faced Barbet (*Lybius rubiifacies*) was photographed for the first time, and its duets and other calls recorded on tape, providing bases of comparison with its close relations elsewere.

The translocated, endangered Red-cockaded Woodpeckers released last year on St. Catherines Island, Georgia, produced one young on that island, and study of these birds continued with the support of the Edward John Noble Foundation.

Lamont Curator Wesley E. Lanyon continued his research on the systematics of tyrant flycatchers (Tyrannidae), with field studies in Surinam that yielded information on the breeding of one genus (*Rhytipterna*) and evidence for the breeding of Swainson's Flycatcher (*Myiarchus swainsoni*) there. He is using anatomical features (nasal septum of skull, structure of syrinx) in evaluating flycatcher relationships, one study of which allowed the placement of the Mexican *Deltarhynchus flammulatus* near the genus *Myiarchus*. An even closer relationship with *Myiarchus* was found for *Sirystes sibilator*, in collaboration with John Fitzpatrick of the Field Museum of Natural History.

Exhibitions Being Renovated Dr. Lanyon is supervising renovation of the Museum's bird exhibitions in time for the 1983 Centennial of the American Ornithologists' Union here. Background murals in the Hall of Birds of the World have been repaired and new maps and labels have been made. Exhibits, especially in the Sanford Hall of the Biology of Birds, are being altered and modernized, and in some cases redesigned.

Curator François Vuilleumier continued his zoogeographic and systematic studies of montane South American birds, with field investigations in the Andes of Venezuela. Several isolated and relatively unstudied mountain areas were visited, some on horseback, resulting in new data on nesting of certain species. Distributional and population density information gathered will require a reworking of the previous report by Dr. Vuilleumier and former graduate student David Ewert on the Venezuelan montane avifauna. The L. C. Sanford Fund provided financial support for the fieldwork.

With Jacques Blondel of the Centre National de la Recherche Scientifique, France, and Department of Invertebrates Research Associate Leslie Marcus, Dr. Vuilleumier completed a paper treating supposed ecomorphological convergences in bird communities of comparable bioclimates of France, California and Chile. The evidence does not support the bird community convergences, as distinct historical factors in each region play an important role in the ecology, structure and composition of the three bird communities.

Biochemistry and Systematics Assistant Curator George F. Barrowclough supervised completion of the Department's Biochemical Systematics Laboratory and conducted field studies of hybridizing taxa of the genus *Junco* in Nevada and Utah. The field work resulted in collection of many specimens for biochemical and other systematic analyses. A grant from the Eppley Foundation provided funding to complete outfitting of the laboratory. Field studies were supported by grants from the Eppley Foundation, the L. C. Sanford Fund and the National Science Foundation. Computer programs have been designed to permit rapid analysis of electrophoretic data. A manuscript reviewing the selective nature of population variation in electrophoretic

A wood sculpture of a Great Blue Heron, looking very much like the real bird, was on display in the Theodore Roosevelt Memorial Hall in December. The exhibition, entitled "A Wood Full of Birds," featured life-sized sculptures of the heron and a Wild Turkey by B. Porter Brown and his wife, Mary Brown, of Vermont. Each bird in the exhibition had approximately 1800 feathers made of translucently thin basswood. Even the habitat setting was carved of wood, simulating the natural environment of the birds. The Museum showcased 22 special exhibitions this year, many of which combined aspects of science and art as a reflection of nature.

characteristics was completed in collaboration with N. K. Johnson and R. M. Zink of the University of California, Berkeley.

Dr. Barrowclough also began analysis of the evolution of size and shape in a group of passerine birds, with preliminary work on *Junco hyemalis pinosus*, using various staining methods for bone and cartilage, and treating developmental stages.

Dean Amadon, Lamont Curator Emeritus, completed reports on birds of prey and conducted field studies of these birds at the Southwestern Research Station in Arizona, at the Archbold Biological Station in Florida, and in Israel. Scientific Assistant John Bull continued the major task of installing the Department Reference Series, a unique representative series of species of the world. Scientific Assistant Mary LeCroy conducted field studies of birds of paradise and bowerbirds in the Bewani and Prince Alexander mountains, Papua New Guinea.

New Guinea Birds Studied

Research Associate Jared M. Diamond did research on New Guinea birds, partly in cooperation with Ms. LeCroy. Various of his collections have been deposited in the Museum collection, and studies of these resulted in several significant articles. Research Associate Robert W. Dickerman completed revisions of several Central American species and prepared a report on the type localities of birds from Guatemala.

Up to the time of his death, Dr. Eisenmann continued his efforts as chairman of the committee of eight systematic ornithologists preparing the sixth edition of the "Check-list of North American Birds." The edition was essentially completed and is now in the hands of the printer. A volume commemorating Dr. Eisenmann's achievements, entitled "Neotropical Ornithology," is being prepared.

Research Associate James C. Greenway, Jr., worked on the annotated list of the Department's type specimens. His efforts were curtailed by health problems.

Cheryl F. Harding, Research Associate, and her graduate students studied control of male zebra finches' social behavior and effects of the male's behavior on the female's selection of a mate. Research Associate G. Stuart Keith worked as co-editor of the multi-volume handbook, "The Birds of Africa," for which he also is authoring several sections.

Scientific Publications:

Barrowclough, George F., *Kendall W. Corbin* and *Robert M. Zink*

1981. Genetic differentiation in the Procellariiformes. Comp. Biochem. Physiol., vol. 69B, pp. 629-632.

*Cannell, Peter** (Sponsor: Wesley E. Lanyon)

1982. Maine Breeding Bird Atlas Project: state report. *In* Proceedings of the Northeastern Breeding Bird Atlas Conference, S. B. Laughlin, ed., Vermont Inst. of Natural Sciences.

Diamond, Jared M.

1982. Mimicry of friarbirds by orioles. Auk, vol. 99, pp. 187-196, fig. 1, table 1.

1982. Rediscovery of the Yellow-fronted Gardener Bowerbird. Science, vol. 216, pp. 431-434, fig. 1, table 1.

1982. Effect of species pool size on species occurrence frequencies: musical chairs on islands. Proc. Nat. Acad. Sci. USA 79, pp. 2420-2424, figs. 1-2, tables 1-4.

Diamond, Jared M. and *M. E. Gilpin*

1982. Examination of the 'null' model of Connor and Simberloff for species co-occurrences on islands. Oecologia, vol. 52, pp. 64-74, figs. 1-6, table 1.

Dickerman, R. W.

1981. Preliminary review of the Clay-coloured Robin *Turdus grayi* with redesignation of the type locality of the nominate form and description of a new subspecies. Bull. Brit. Ornith. Club, vol. 101, pp. 285-290.

1981. Geographic variation in the juvenal plumage of the Lesser Nighthawk (*Chordeiles acuitpennis*). Auk, vol. 98, pp. 619-621.

"1981" [1982]. Geographic variation in the Scrub Euphonia. Occas. Papers Mus. Zool., Louisiana State Univ., vol. 59, pp. 1-6.

1982. A taxonomic review of the Spotted-breasted Oriole. Nemouria, vol. 26, pp. 1-10.

Dickerman, R. W., K. F. Koopman and *C. Seymour*

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Dickerman, R. W., *R. M. Zink* and *Susan L. Frye*

"1980" [1981]. Migration of the Purple Martin in southern Mexico. Western Birds, vol. 11, pp. 203-204.

M. E. Gilpin and J. M. Diamond

1982. Factors contributing to non-randomness in species co-occurrences on islands. Oecologia, vol. 52, pp. 75-84, figs. 1-5, tables 1-3.

LeCroy, Mary

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

1981. Records of *Aplonis* starlings on the Sepik. Papua New Guinea Bird Soc. Newsl., no. 179-180, p.10.

1981. Letter to the editor. Notornis, vol. 28, p. 148.

*Pitocchelli, J.** (Sponsor: Wesley E. Lanyon)

1981. A field guide to bird vocalizations of Newfoundland. Tape (vols. 1 and 2) and accompanying booklet. Memorial Univ. of Newfoundland.

*Pitocchelli, J.** (Sponsor: Wesley E. Lanyon), *I. Kirkham* and *W. A. Montevecchi*

1981. Initial listing of birds observed on Baccalieu Island. Osprey, vol. 12, no. 1, pp. 14-17.

Short, L. L.

1981. Speciation in South American woodpeckers. *Acta XVII Congr. Int. Ornith.*, vol. 2, pp. 1268-1272.

Short, L. L. and *J. F. M. Horne*

1981. Bird observations along the Egyptian Nile. Sandgrouse, no. 3, pp. 43-61, 1 fig.

1982. Vocal and other behaviour of Kenyan Black-collared Barbets *Lybius torquatus*. Ibis, vol. 124, pp. 27-43, 2 pls, 1 table.

Vuilleumier, F.

1981. Speciation in birds of the high Andes. *Acta XVII Congr. Int. Ornith.*, vol. 2, pp. 1256-2161.

1981. Reconstructing the course of speciation. *Acta XVII Congr. Int. Ornith.*, vol. 2, pp. 1296-1301.

1981. Ecological aspects of speciation in birds, with special reference to South American birds. *In* Ecologia y genética de la especiación animal / Ecology and genetics of animal speciation, Osvaldo A. Reig, ed. Equinoccio, Editorial de la Universidad Simón Bolivar, Caracas, Venezuela, pp. 101-148, 12 tables, 10 figs.

Abstracts and Popular Publications:

Amadon, Dean
1981. [Preface to] Elliott Coues: Naturalist and frontier historian, by Paul R. Cutright and Michael J. Brodhead, p. ix.

1981. [Review of] Birds of prey of the world, by F. Weick. Quart. Rev. of Biol., vol. 56, p. 489.

Amadon Dean and *Peter Steyn*
1981. Leslie Brown: Some memories. Raptor Res., vol. 15, pp. 65-67.

Barrowclough, George F.
1981. Mammalian population genetics: Progress report on a world view in transition. Evolution, vol. 35, pp. 1255-1256.

Bull, John, editor
1981. Guide to birds of the world. Simon and Schuster, New York, 511 pp.

Bull, John and Charles Cole
1981. Natural history on the Discovery Tour to Ecuador and the Galapagos Islands, June 1981. 12 pp., mimeographed report.

*Cannell, P.F.** (Sponsor: Wesley E. Lanyon)
1981. Migratory behavior of Blue Jays over Central Park. The Linnaean Newsletter, vol. 35, no. 7, pp. 3-4.

1982. The Fish Crow (*Corvus ossifragus*) in Maine. Maine Birdlife, vol. 4, pp. 7-8.

Diamond, J. M.
1982. Birds of paradise and the theory of sexual selection. Nature, vol. 293, pp. 257-258.

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1981. [Review of] Handbook of the birds of Europe, the Middle East and North Africa. The birds of the Western Palearctic. Vols. 1 and 2, Stanley Cramp, chief ed. Wilson Bull., vol. 93, pp. 430-432.

1982. The A.B.A. Checklist: Birds of continental United States and Canada, second edition. American Birding Association.

Lanyon, Wesley E.
1982. Fallow field guide to birds. Nat. History, vol. 91, no. 5, pp. 60-67.

Short, L. L.
1982. [Review of] The birds of Cameroon. An annotated check-list. Auk, vol. 99, p. 176.

1982. Current Ornithology Department activities. Linnaean Newsletter, vol. 35, no. 9, pp. 1-3.

Short, L. L. and *J. F. M. Horne*
1981. 1981 Western European cruise—wildlife report. Amer. Mus. Nat. Hist. (photo-reproduced), 22 pp.

Vuilleumier, F.
1981. The origin of high Andean birds. Nat. History, vol. 90, no. 7, pp. 50-57, 6 figs.
1982. [Review of] Oiseaux de N^lle^ Calédonie et des Loyautés. Auk, vol. 99, p. 400.
1982. [Review of] Ecology and evolution of birds. Auk, vol. 99, p. 401.

Department of Vertebrate Paleontology

Once thought to be the cradle of mankind as well as many other vertebrate species, east-central Asia was the focus of several major Museum expeditions and studies dating back to the early 1900s. As a result, the Department has the world's largest collection of fossils from that part of the world. In the 1930s, politics severed working relationships. Now, paleontologists from the People's Republic of China and the American Museum are actively developing programs for joint research.

Diversity in research and public service, a recurrent theme in this Department, continues to characterize the activities of curators and staff. Research in the systematics of fossil vertebrates runs nearly to the limits of the class and carries this perspective 300 million years into the past.

Chinese Studies Recent international events have made it possible to seriously consider reactivation of the Department's historic preoccupation with the history of the vertebrates of eastern Asia. Working relationships with our Chinese colleagues, broken since the early 1930's, appear to be possible again in the new atmosphere of the "four modernizations" priorities of the People's Republic of China.

In May, 1980, areas of cooperation were first discussed face-to-face during the visit of paleontologists from Academia Sinica, Beijing. This year, both Richard H. Tedford, Chairman and Curator, and Frick Curator Malcolm C. McKenna visited the People's Republic as guests of the Academia Sinica and participated in field excursions and laboratory research to more firmly establish the bases for collaboration.

The nature of the Department's collections acquired in the 1920's and 1930's and current research by the Chinese strongly direct the collaborative work in two areas: the Eocene and Oligocene deposits explored by the Central Asiatic Expeditions in Inner Mongolia, and the Miocene and Pliocene rocks that provided the Frick Chinese collection from Shanxi Province in east central China. Dr. McKenna reviewed the first area in the field in August, and Dr. Tedford visited the latter in May. These trips resulted in the acquisition of important new data and the development of programs for joint research.

Other fossil mammal studies were also pursued by Drs. Tedford and McKenna. Dr. Tedford continued work on the extinct sthenurine kangaroos, the fossil Canidae and biochronology in the field and lab on Miocene and Pliocene faunas of the southwestern United States. Dr. McKenna pushed ahead with work on the cranial morphology of insectivores and supposed insectivores, the phylogeny of lagomorphs and the evolution of the Tethytheria (elephants, sea cows and desmostyliens). He has resumed a major field project in the late Cretaceous Lance Formation of the Powder River Basin in Wyoming.

Lord Howe Island and Meiolania. Associate Curator Eugene S. Gaffney directed most of his research toward the reconstruction and study of all the known remains of the extinct horned turtle *Meiolania platyceps* from Lord Howe Island, a spectacular volcanic edifice in the Tasman Sea nearly 600 miles northeast of Sydney, Australia. A complete reconstruction of the skeleton of this remarkable terrestrial animal was an Arthur Ross Exhibit of the Month this spring in the Museum Rotunda. Dr. Gaffney

returned to the island in June to continue geological studies with Steven Barghoorn that will place the horned turtle-bearing deposits in the sequence of Pleistocene strand-line changes recorded on the island. Work on a monograph on the skull of *Meiolania* will be finished this fall.

Dr. Gaffney also completed studies on the skull and jaws of the baenids, primitive cryptodiran turtles. He continued supervision of the project, supported by the National Science Foundation, to renovate the fossil reptile and amphibian collections. The work now concentrates on the voluminous and unwieldy dinosaur collection.

Vertebrate paleontologists met during an international conference at the Museum to compare the fossil record of the extinct, three-toed Hipparion *horse, which died out about a million years ago. The conference marked the first time that vertebrate paleontologists had met to compare the most significant fossil specimens of* Hipparions *from around the world. The Museum has the world's largest and most complete collection of* Hipparion *fossils. In addition to representatives of the Museum and other institutions in the United States, the conference attracted vertebrate paleontologists from as far away as the People's Republic of China.*

Shark Studies Assistant Curator John G. Maisey continued his studies of Paleozoic shark finspines, publishing two papers and preparing a third that review all the known taxa and consider the systematic relationships of the animals that possessed them. Dr. Maisey has published a review of all the available data on Mesozoic hybodont sharks and is now proceeding with detailed studies of the best represented members of the group. The relationships of the fossil and modern hornsharks have also been explored in a paper now in press. Dr. Maisey persuaded Ohio Wesleyan University to donate to the Department more than 100 specimens of fossil fishes from the important 19th century Linney collection referred to by Newberry in his historic "Paleozoic Fishes of North America" (1889).

Hipparion Horses For 10 days in early November, the department hosted a unique international working symposium on the extinct three-toed horse genus *Hipparion* and its phylogenetic allies. These horses achieved nearly worldwide distribution in late Miocene time and form an important part of the world's fossil record. The meeting was attended by leading specialists from the United States, western Europe and China. They discussed and conducted group studies designed to develop a common methodology for description of fossil horse remains, and reviewed the latest conclusions on the phylogeny, zoogeography and functional anatomy of these horses.

Curator Emeriti Active research and writing continued to characterize our retired curators now scattered across the country. At the Museum of Northern Arizona, Curator Emeritus Edwin H. Colbert continues his work on Antarctic Triassic tetrapods and Triassic reptiles of the southwestern United States. He also reports completion of a new book on dinosaurs. Working in conjunction with Colin Patterson of the British Museum (Natural History), Curator Emeritus Bobb Schaeffer continues his work in this Department on the Jurassic fishes of the western United States. Published this year were his study of the braincase of the Paleozoic shark *Xenacanthus* and comments on the question of the unique phylogenetic relationships of the sharks and allies. Curator Emeritus George G. Simpson, in Tucson, Arizona, reports that he is working on South American materials from Argentine collections and writing papers on the problem of extinction and phylogenetic patterns in the fossil record. Curator Emeritus Morris F. Skinner, in Ainsworth, Nebraska, has finished his review, with Museum Volunteer F. Walker Johnson, of the late Tertiary stratigraphy along the Niobrara River in northern Nebraska. Studies of fossil horses of the Miocene through Pleistocene age continue to occupy his attention.

Scientific Publications:

Barghoorn, Steven

1981. Magnetic-polarity stratigraphy of the Miocene type Tesuque Formation, Santa Fe Group, in the Espanola Valley, N.M. Geol. Soc. Amer. Bull., vol. 92, pp. 1027-1041.

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1982. The petrosal structure of *Hyopsodus* with respect to that of some other ungulates, and its phylogenetic implications. Jour. Paleontol., vol. 56, no. 3, pp. 795-805.

Colbert, Edwin H., *Timothy Rowe* and *J. Dale Nations*

1981. The occurrence of *Pentaceratops* (Ornithischia: Ceratopsia) with a description of its frill. *In* Advances in San Juan Basin paleontology, Spencer C. Lucas, J. Keith Rigby and Barry S. Kues, eds. Univ. New Mexico Press, pp. 29-48.

Colbert, Edwin H.

1982. Mesozoic vertebrates of Antarctica. *In* Antarctic geosciences, Craddock Campbell, ed. Internatl. Union Geol. Sci., ser. B, no. 4, Univ. Wisconsin Press, Madison, pp. 619-627.

Delson, Eric

1981. Paleoanthropology: Pliocene and Pleistocene human evolution. Paleobiol., vol. 7, pp. 298-305.

Dene, Howard, Morris Goodman, Malcolm C. McKenna, and *A. E. Romero-Herrera*
1982. *Ochotona princeps* (pika) myoglobin: An appraisal of lagomorph phylogeny. Proc. Natl. Acad. Sci., vol. 79, pp. 1917-1920.

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Emry, Robert J. and *R. W. Thorington, Jr.*
1982. Description and comparative osteology of the oldest fossil squirrel, *Protosciurus* (Rodentia: Sciuridae). Smithsonian Contr. Paleobiol., no. 47, iv + 35 pp.

*Flynn, John J.** (sponsor: Malcolm C. McKenna) and *Henry Galiano*
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Research Station Programs

Although most of the research activities associated with the Museum are carried out in its laboratories or in field situations where there are no laboratories, the Museum operates or is responsible for several field stations. These are permanent research sites at which studies may be carried out year after year. They normally have living accommodations and laboratories and include such facilities as collections of the local fauna and flora, scientific equipment and libraries. The field stations are used, not only by American Museum scientists, but by scientists from other museums and universities throughout the world.

Archbold Biological Station From its founding in 1941 by Richard Archbold until this year, the Archbold Biological Station, supported by Archbold Expeditions, Inc., has operated as a field station of the Museum. In January, the Station became administratively independent. However, in recognition of the long and mutual beneficial relationship between the two organizations, the Museum and Station are continuing an affiliation.

Executive Director James N. Layne completed a paper on a seven-year study of productivity of Florida Sandhill Cranes in south-central Florida. A major finding of this investigation was that breeding success is strongly correlated with winter rainfall. Evidence suggests that one of the factors accounting for the long-term decline in the population of the Florida Sandhill Crane, which is classified as a threatened species by the state, is the drainage of wetland nesting habitats. With the assistance of David R. Smith, Volunteer Research Intern, Dr. Layne monitored intensively the small population of resident American Kestrels on Station property and investigated several aspects of sexual differences in habitat selection and feeding ecology of wintering northern kestrels.

The program of long-term studies of the life histories and ecology of the Station's mammals and selected species of other vertebrates, such as the gopher tortoise and Eastern indigo snake, also continued with the assistance of Scientific Assistants Fred E. Lohrer and Chester E. Winegarner.

Dr. Layne was appointed to the Reclamation Research Committee of the Florida Institute of Phosphate Research. The organization is interested in the possibilties of creating analogues of the natural scrub-type habitats that characterize much of the Station property. He serves as cochairman of the Rodent Specialist Group of the Species Survival Commission of the International Union for the Conservation of Nature and Natural Resources.

Scientific Assistant Fred E. Lohrer prepared reports on studies of comparative growth and development of nestling Screech Owls and Kestrels and the development of thermoregulation in nestling Screech Owls. He continued his long-term study of the breeding biology of Screech Owls on the Station property.

As part of a long-term project, Chester E. Winegarner, Scientific Assistant, investigated the breeding biology of the Great-crested Flycatcher by monitoring nests and banding young in 125 nest boxes distributed over a one-thousand-acre portion of the property.

Research Associate Warren G. Abrahamson resurveyed vegetative transects in unburned and burned habitat types in connection with his research on the effects of fire on southern Lake Wales Ridge plant communities. In addition, he monitored leaf turnover, fruit production and other aspects of the ecology of saw palmetto, a key plant species in most of the vegetative associations on the Station. With Ann Johnson,

former Archbold Postdoctoral Fellow, and Dr. Layne, he completed a large scale, detailed vegetative map of the entire main property and made further progress on a comprehensive report on the vegetation of the southern Lake Wales Ridge as exemplified on the Station.

Glen E. Woolfenden, Research Associate, and his colleague, John W. Fitzpatrick of the Field Museum of Natural History, continued work on a book dealing with the first 10 years of their long-term investigation of the demography and social organization of the Florida Scrub Jay on the Station. Dr. Woolfenden also conducted field work for producing a Scrub Jay ethogram with co-worker Jack Hailman of the University of Wisconsin and further studied the molt patterns of the Blue Jay with his doctoral student G.T. Bancroft. He was elected Vice President of the Florida Ornithological Society.

The Station continued to serve as a sampling site for an investigation of acid rain and air pollution by the Florida Department of Environmental Regulation. Water table monitoring wells were also established on the property by the United States Geological Survey, and a detailed soil survey was carried out by the Soil Conservation Service.

Great Gull Island Great Gull Island, a field station of the Museum at the east end of Long Island Sound, is the nesting place for thousands of terns. The year 1981 marked a very successful season for the terns on Great Gull. Some 1000 more individual birds came to breed than had nested on the island in previous seasons. This increase may have occurred because extensive new areas were cleared and made available for nesting.

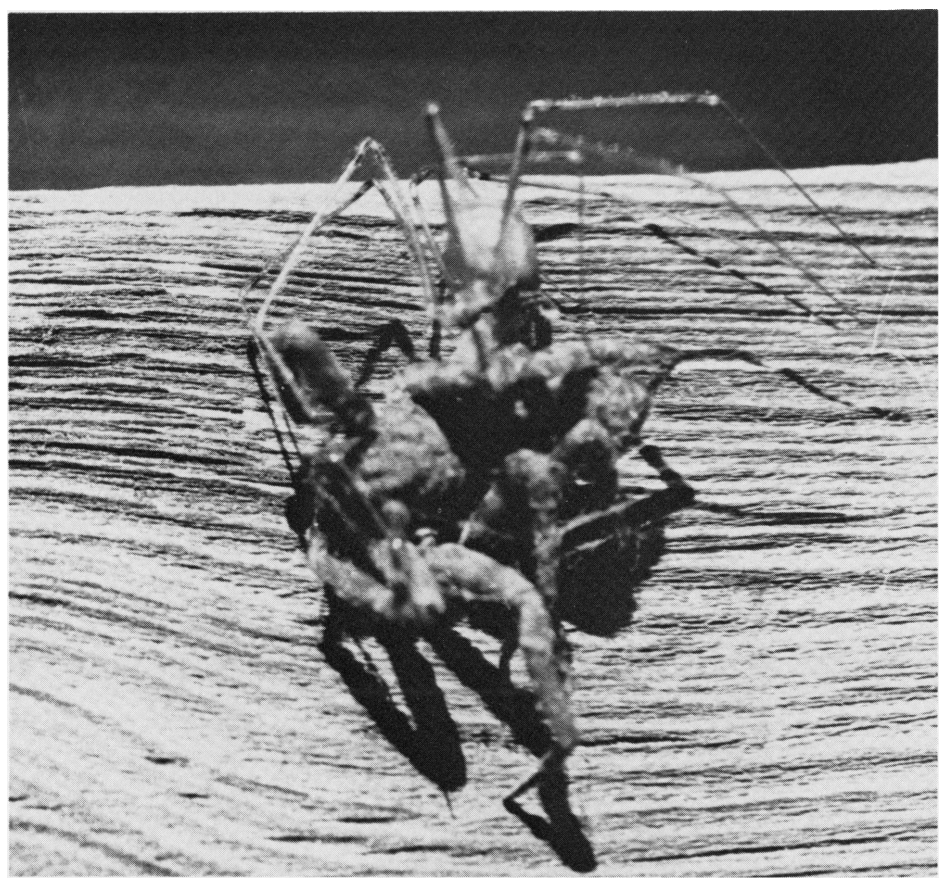
In April, volunteers Matthew Male and Joan Walsh built six more observation towers giving the Station a total of 33 towers. Nests around the towers will be mapped using aerial photographs taken by Paul Miscisco, a photographer working with the Technology Transfer Program of the Naval Underwater Systems Center, New London, Connecticut.

Through a generous grant from the Anne S. Richardson Fund, the Great Gull Island Project will have a computer delivered in July, 1982. Data from the tern colony will be put into the computer in the fall of 1982.

Since 1979, Loraine Utter of the Thames Science Center in New London has organized a work party in the fall and in the spring to come to Great Gull Island and help open or close the research season. This spring, Ms. Utter brought 18 people. They set up 27 blinds, painted sides of blinds and cleared the major portion of one of the nesting areas.

It is with deep regret that the Great Gull Island Project reports the death of volunteer Robert Stephenson last winter. Mr. Stephenson did a great deal between 1972 and 1978 to help make it possible to live on the island, installing equipment and refurbishing facilities.

Helen Hays, Chairwoman, presented Michael Male's film about Great Gull Island, "Ternwatch," to the Foote School in New Haven and to the North Fork Audubon Society on Long Island. The Great Gull Island Birdathon raised $12,000 toward support of the field season.



Atop a wood wall at the Southwestern Research Station in Arizona, a pholcid spider, Physocyclus tanneri, *feeds on a clubionid spider,* Lauricius sp., *foreground. The photograph was taken by Vincent D. Roth, Resident Director of the Museum's Southwestern Research Station. Mr. Roth is completing a handbook of spider identification which will be the most complete such guide for North America. The Museum's collection of spiders, numbering more than one million specimens, is the largest in the world.*

St. Catherines Island Located off the coast of Georgia, St. Catherines Island is owned by the Edward J. Noble Foundation. With support from the Foundation, the Museum administers a number of research projects pertaining to the zoology, geology and archeology of the Island. Emphasis is placed on research projects that are pertinent to the isolated and unique environment of St. Catherines Island. Projects are also encouraged that instruct doctoral students and provide valuable training for their careers in the sciences.

This year, Dr. Short, Chairman and

Curator of the Department of Ornithology, and his wife, J.F.M. Horne, a bioacoustician, moved ahead on a project dealing with the breeding behavior, ecological requirements and vocalizations of the Red-cockaded Woodpecker. This project, begun the year before with the help of the Georgia Department of Natural Resources, provided placement on the Island for 12 individuals of this endangered species. This year Drs. Short and Horne found a pair of these birds associated with a breeding cavity, a hopeful indication that the species may eventually become established on the Island.

Dr. Rozen, Deputy Director for Research and Curator, accompanied by Marjorie Favreau, Scientific Assistant Emerita, carried on the first intensive life history study of the ground nesting bee, *Colletes brimleyi,* and, for the first time, associated it with the cuckoo bee *Epeolus ilicis.* The brood cells of *Colletes brimleyi* are lined with a transparent, waterproof, cellophane-like lining secreted and applied by the females, as are those of all other species belonging to this large, nearly world-wide genus. A major discovery was the fact that this species folds the lining closed at the entrance of the cell in a distinct, species-specific way. Subsequent studies on a number of other species of *Colletes* show that they, too, provide distinctive folding patterns to the brood cell lining. Dr. Rozen is studying the adaptive significance of these species-specific closures.

David A. Evans, Associate Professor of Biology at Kalamazoo College, Michigan, initiated a preliminary study of the biology of the velvet ant genus *Dasymutilla* and its hosts belonging to the solitary wasp of the genus *Bembix*. Velvet ants are actually wasps, the females of which are wingless and resemble ants, and they parasitize the nests of various kinds of wasps and bees. Dr. Evans investigated the magnitude of the effect of the velvet ants on the wasp population, the specific nature of the host-parasite association and the general diversity of the velvet wasp fauna of the Island, compared with that of the mainland.

Robert W. Frey, Professor of Geology at the University of Georgia, Athens, and his graduate students, John A. Groce and Glen A. Duncan, carried out a series of studies on the physical and biological properties of various sedimentary deposits on St. Catherines Island, the erosional and accretional natures of the sediments and the sediment transport pattern along the beaches.

Over the years, Dr. Thomas, Chairman and Curator, Department of Anthropology, has carried on a study of the archeology of the peoples that have inhabited the Island over the last 4000 years. The record that he and his crew have unearthed shows nearly continuous occupation of the Island throughout the long pre-Columbian period, through Spanish and British habitation, continuing through the Revolutionary and Civil War periods to the present time.

James Oliver, Director of the Institute of Arthropodology and Parasitology and Head of Biology at Georgia Southern College, began a significant two-year study involving ticks endemic to Georgia and their association with warm-blooded animals. The research will fill in some of the large gaps in our knowledge about species composition and natural history of ticks found along coastal Georgia.

Southwestern Research Station

The goals outlined in the original proposal for the Southwestern Research Station in 1955 were that it "would be available to all scientists who could profitably study and utilize the materials and subjects available at or near the proposed site." The Station, which is owned by the Museum, functions as the Museum's western arm. The scientific publications emanating from former researchers as a result of work done at the Station are testimony to its success in reaching the goals set 27 years ago.

This year, visits to the Station increased 20 percent to an all-time high of 1227. Fifteen technical seminars were presented to guests, local residents and visiting scientists.

The annual number of researchers visiting the Station increased this year to 137. They included investigators from England, Australia, Germany and Switzerland. American Museum of Natural History researchers visiting the Station included Philip Gaddis of the Department of Ornithology, Howard Topoff and Brent LaMon of the Department of Entomology, Ethel Tobach and Joe DeSantis of the Department of Mammalogy, and Jay Cole, Carol Townsend and Carol Simon of the Department of Herpetology. Sixteen papers based upon work done at the Station were published.

Research done at the Station is divided into taxonomic groupings. Most researchers worked in entomology (40), herpetology (25) and ornithology (22). Others worked in arachnology (10), mammalogy (8) and botany (7), with ecology, geology and other disciplines also represented. The researchers' studies included: vocal behavior of titmice, ecology of helping behavior in jays, hummingbird ecology, social behavior in tetragnatha spiders, communication and social organization of kangaroo rats, chemotaxonomy of hymenoptera, color discrimination in hummingbirds, Brown Creeper behavioral ecology, survey of Nearctic fairy wasps, role of the parietal eye in the homing behavior of Yarrow's spiny lizard, behavioral ecology of army ants and slave making ants, social biology and behavorial ecology of grasshopper mice, emigrations and anti-predator defense strategies in the ant genus *Pheidole*, evolution of spider competitive behavior, cynipid diversity of galls and patrolling systems in harvester ants. Other research:

Resident Director Vincent D. Roth continued work on a "Preliminary Handbook for the Identification of Spider Genera in America North of Mexico." The book will consist of keys to all families and genera; two families will have only lists of genera and one subfamily will be incomplete. Mr. Roth

surveyed the daisy genus *Erigeron* of the Chiricahua Mountains with Guy Nesom of Memphis State University. Descriptions of the new *Erigeron* and of a new genus of spider with a third type of autospasy were completed and published.

Charles J. Cole, Curator, and Carol R. Townsend, Senior Scientific Assistant, of the Museum's Department of Herpetology, gathered live specimens of unisexual and bisexual species of whiptail lizards, *Cnemidophorus,* for interdisciplinary research at the Museum on reptilian parthenogenesis. Their research aims are to improve understanding of natural parthenogenesis, cloning and polyploidy in vertebrates and of the origin and best taxonomic treatment of unisexual species.

Dr. LaMon and his wife, Madelon, examined "Age Polyethism and Behavioral Development in the Ant, *Novomessor cockerelli.*" They studied the division of labor in colonies of the ants, with particular emphasis on behavioral development and the sequence of behaviors exhibited during individual ontogeny. The results of their study showed that these ants first act as nurses tending the brood, then begin working in the nest, grooming the queen and distributing food, before finally becoming foragers that venture outside the nest. The timing of this sequence can be altered by social factors such as an increased number of larval broods in a nest.

Sue Justis of the Department of Zoology, Miami University, Ohio, had as her project, "Ultrastructural and Biochemical Development of the Gastric Mucosa during Metamorphosis in Larval Spadefoots." Larvae of two species of Arizona spadefoot toads (*Scaphiopus multiplicatus* and *S. bombifrons,* subgenus *Spea*) exhibit an anatomical and behavioral polymorphism associated with a carnivorous or omnivorous diet. Her study revealed no physiological or ultrastructural differences between the carnivore form and the omnivore form.

Karl Tsuji, a graduate student in the Department of Geosciences, University of Arizona, geochemically sampled and mapped an area of 30 square miles around the El Tigre mine, located in Pinery Canyon about 11 miles across the Chiricahua Mountains from the Southwestern Research Station. The project was part of his master's thesis on volcanism and epithermal mineralization.

David Peckham, State University of New York, Upstate Medical Center at Syracuse, studied the wasp genus *Oxybelus.* Virtually nothing is known of the ethology of southwestern *Oxybelus,* and the purpose of this study was to locate and examine under natural conditions as many species of *Oxybelus* as possible. Last year at Portal, Dr. Peckham located six species of wasps. He collected extensive data on the nesting behavior of two species and assembled notes on two others.

Department of Education

The Education Department adds depth and dimension to the public's understanding of the Museum's exhibitions and scientific disciplines. This is accomplished through lecture series, symposiums, films, courses for teachers, workshops for young people and programs for school classes. The arts, too, are represented through music and dance performances as well as drawing classes. Through its interpretive facilities—the Alexander M. White Natural Science Center, the People Center and the Discovery Room—the Department gives visitors opportunities to learn in informal environments. Through these means, it reaches more than 350,000 visitors a year.

Two major gifts set the tone and direction of the Department this year. One, in honor of the Frederick H. Leonhardt family, endows the People Center and insures that this facility will continue to provide the weekend programs of performance and demonstration for which it has become known. The second, by the Charles A. Dana Foundation, establishes an Education Wing which will encompass existing educational facilities and will create several new ones. Among the new areas will be two theaters in the space formerly occupied by Education Hall—the Harold F. Linder Theater and the Henry Kaufmann Theater—and a two-level classroom and lecture hall unit. Construction of these facilities has begun.

Other Grants A gift from the Culpeper Foundation enabled the Department to add to the staff an instructor to work with handicapped groups. Considerable pre-planning goes into such programming, and, because individual attention is more necessary, such classes tend to be smaller than classes for non-handicapped students. Still, in a seven-month period, 113 groups totalling 1300 youngsters, were served. Included were classes of individuals with learning disabilities or emotional disturbances, as well as groups with some degree of mental retardation or physical handicap. A grant from the New York State Council on the Arts enabled the Department to employ a specialist to lecture on Asia, adding strength to its offerings in this subject area.

School Classes This institution continues to be among the most accessible to school classes of any in the region, and the attraction of its exhibitions for young people and their teachers remains unparalleled. More than 133,000 pupils, with teachers and adult chaperones, came in organized class groups during the school year. Classes register in advance through the Department's School Reservations Office.

For classes registered to visit independently, there is no formal teaching

program provided by staff. However, an able group of trained volunteers under staff supervision does provide special opportunities for many of these groups. Each day, a core of volunteers is stationed in one or more exhibition halls where they meet and talk informally with such classes. Using specimens from the teaching collection, youngsters are given the chance to handle materials directly. This year, some 26,000 were able to experience these unplanned encounters.

Additional classes utilize the Museum as an educational resource, although their numbers are only recorded in total Museum attendance figures. For example, classes arriving at the Museum after 1 p.m. on any school day do not need to pre-register. College and university groups are counted as adult visitors, and therefore reservations are not required. And, from mid-June through September, any class may come without advance registration.

More than 25,000 youngsters and their teachers from New York City schools took advantage of programs taught by Education staff. Most were involved with single-visit teaching programs, but 2000 experienced more in-depth programs, such as mini-courses, which a class attends several times. The single-visit program gives youngsters an excellent introduction to a subject pre-selected by the teacher. Whether the topic is anthropological, biological, zoological, or from the field of mineral sciences, the class works briefly in a classroom environment with our staff and handles materials from the teaching collection. Afterwards, instruction continues in a related exhibition hall, providing a combination of experiences that cannot be matched at any school.

Adult Programming Lecture series, special lectures and weekend trips attracted enthusiastic crowds. These activities covered many of the disciplines represented by the Museum's scientific departments. Topics included: African mammals, Tibet, ethnobotany, genetics and social evolution, entomology and mineral sciences. While the range of offerings was broad, classical archeology continued to draw the largest audience, with more than 600 enrolled for a single series entitled "Lost Cities". Total enrollment for lecture series was more than 2700.

Two new activities were fully booked shortly after they were announced. More than 450 persons enrolled for a late afternoon boat trip around Manhattan to examine the geology of the region. Forty-five others registered for a whale watching weekend off the eastern shore of Long Island. Response to both ventures assures that they will be offered again.

One of the important services the Department provides is college-accredited courses for teachers given in cooperation with the Graduate School of Education at the College of the City of New York. These semester-long courses, taught by Department staff, carry the same requirements of examination and written work as any class taught on the campus. Subjects reflect the special areas of expertise at the Museum. A distinguishing feature of these courses for teachers is that instructors draw extensively on the Museum's collections and exhibitions for material and examples. More than 325 teachers enrolled in the 16 courses.

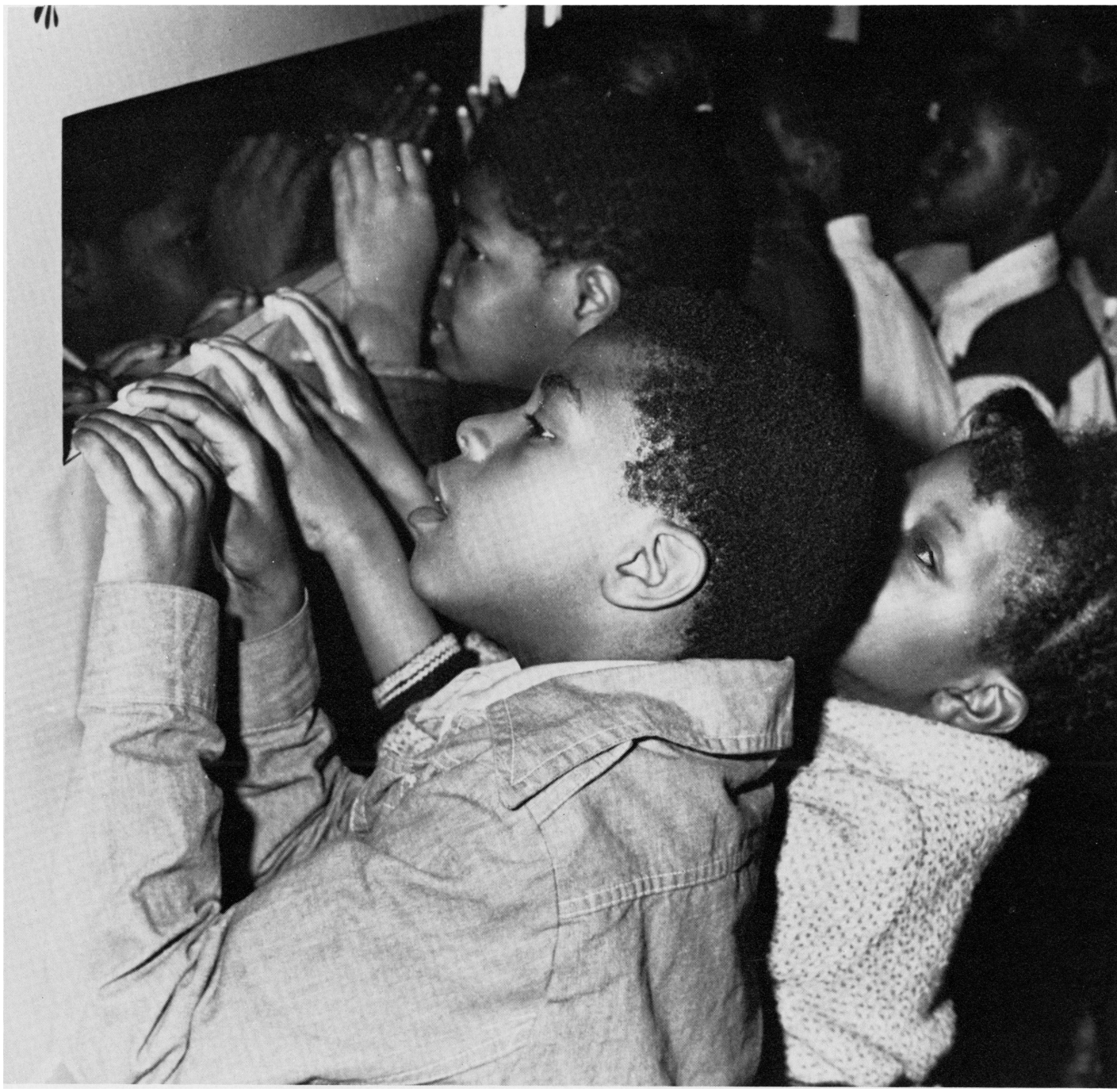
Interpretive Facilities The People Center, the Alexander M. White Natural Science Center and the Discovery Room are examples of multiple-use facilities. During the week each space is used as a learning environment in which classes are taught. On weekends they become areas for special learning, open to all visitors. An estimated 75,000 persons each year visit the People Center, and an equal number are introduced to nature in an urban environment through the Natural Science Center's exhibits and activities.

During the week, the Discovery Room is the site of programs for special education groups including the visually impaired. On weekends it becomes a place where youngsters can examine the contents of "discovery boxes." The Discovery Room is the smallest of the three interpretive facilities, limited to 250 participants each weekend.

The Louis Calder Foundation established and continues to support the Louis Calder Laboratory classroom. Chief among its activities are weekend workshops for young people. It offers opportunities for taking short courses on herpetology, nature photography, use of the microscope, dinosaurs and other topics. Several hundred youngsters participated in these classes and, thanks to the Calder Foundation, 20 percent of the places were given free to deserving youngsters.

The Calder Laboratory is also the site of another program, the Junior High School Natural Science Project. In its fifth and final year, this experimental undertaking was aided by gifts from the International Paper Foundation, the Exxon Education Foundation and the Henry Nias Foundation. The project gives a select group of 20 pupils a year the chance to study an intensive science curriculum at the Museum two afternoons a week throughout the academic year. Its goal is to encourage students from public schools in Harlem or East Harlem to consider careers in science.

Special Programming For more than a decade the Department has carried out an ambitious program of activities directed toward African-American and Caribbean populations in the area. Its purpose has been to enlarging the audiences and to increase local awareness of the Museum's educational resources. Some 20,000 persons participated in community programs this year. Activities were directed at all age levels and



Schoolchildren peer at an exhibit in the American Museum-Hayden Planetarium that demonstrates a method of determining the relative distances to stars. The exhibit is part of Astronomia, an exhibition sponsored and maintained by the International Business Machines Corp. The Museum and the Planetarium are open to school classes on all school days, offering more visiting opportunities to schoolchildren than most other cultural institutions in the region. More than a quarter million pupils came in organized class groups to the Museum-Planetarium complex during the last school year.

used formats ranging from lectures to workshops and performances.

A William Randolph Hearst Foundation gift proved a mainstay in supporting an array of African-American programming throughout the year. These included a lecture series for adults, Saturday workshops for young people, music and dance performances, and other special events, such as a weekend devoted to African and African-American textiles. The Avon Products Foundation supported a single spring weekend African-American program which was attended by more than 3000 persons.

The Hearst Foundation gift also made possible a range of activities related to the Caribbean. These included sessions on history, folklore

and archeology for bilingual classes and weekends focusing on Haiti, Jamaica and Puerto Rico. A two-evening film program alone drew a combined audience of almost 2000 persons. Caribbean programming extended beyond the Museum for a three-month period during which weekend classes were conducted at a community center located in the Bronx.

Dance and other performing arts were utilized extensively this year, bringing large and sometimes new audiences to the Museum. Such performances often serve to add a facet to the understanding of materials on exhibit. It is one thing to see a costume or mask in an exhibit hall and quite another to watch it in motion as it was originally intended to be seen. More than 7000 visitors were able to see live performances by the Dinizulu Company, the Garifuna Folk Dance Ensemble, Khmer classical dancers from Cambodia, the Allnations Dance Company, Solaris/Lakota, Sundance and the Ibo Dancers. Some presented traditional works from cultures around the world; others used traditional themes as inspiration for modern interpretations. Gifts from the Vincent Astor Foundation, the Helena Rubinstein Foundation and Evelyn Sharp helped make these and other performances possible.

Events Drew Visitors Other special events which drew thousands of additional visitors included a public lecture on dinosaurs, four afternoon programs of new natural history films, a weekend program of special films for children and two evenings of versions of poetry of Native American peoples. These programs, and others such as one on naturalist John Burroughs and another on the Galapagos Islands, were available at no additional cost to visitors beyond the admission fee required to enter the Museum. This open policy applied to the largest single event, the annual Margaret Mead Film Festival. Some 8000 additional visitors swelled the normal attendance on the October weekend of the festival. Five screening areas were filled from morning to evening on both days during the two-day event. There were 40 films—17 were premieres—describing cultures from every continent. Each was introduced and discussed.

Two events were held in conjunction with special exhibitions: a demonstration of Japanese weaving related to the exhibition, "Traditional Beauty: Designs from Nature," and a slide lecture related to the exhibition, "Afro-American Arts from the Suriname Rain Forest."

A symposium of scholars exploring the issue of tropical rain forest environments drew several hundred, and a lecture by the late Claireve Grandjouan, Professor of Classics at Hunter College, on divinities of the ancient Mediterranean world filled the auditorium with 1000 persons. Combined attendance at all special events was almost 50,000. The great increase in the number of such activities is one of the achievements of the Department over the past decade.

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Chambers, Kenneth A.

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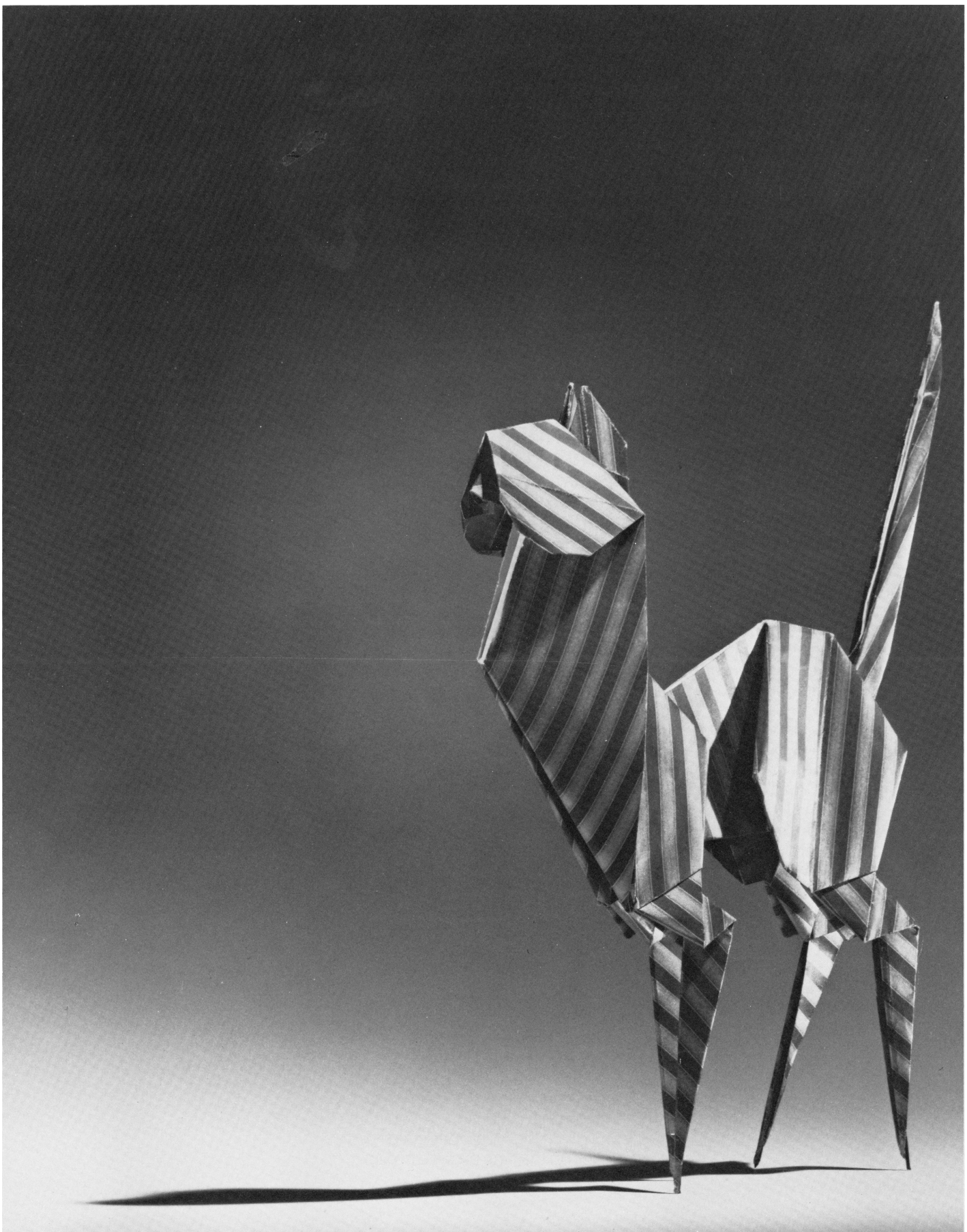
Department of Exhibition and Graphics

Emphasis in the Department has shifted somewhat from the design and building of new halls to the refurbishing of existing halls. A great deal of work is being done on the redesigning and the cleaning of exhibits in the Sanford Memorial Hall of the Biology of Birds. Accompanying this ongoing effort to upgrade existing exhibits and dioramas was an ambitious program of special exhibitions on a variety of subjects.

Refurbishing of a major part of the Hall of the Biology of Birds is to be completed by September, 1983, when the American Ornithologists' Union meets at the American Museum. Bird mounts are being cleaned, labels are being rewritten and rescreened and introductory exhibits on such topics as "What is a Bird?," "Origin of Flight" and "Archaeopteryx" are being designed and installed. Preparators are also devoting considerable time to cleaning and refurbishing exhibits in the Halls of Birds of the World, North American Birds, and Oceanic Birds.

Special Exhibitions In the sphere of special exhibitions, the year brought visitors to see "Afro-American Arts from the Suriname Rain Forest"

Named after a circus knife-thrower and card shark, this paper figure is known in origami circles as Adolpho's Elegant Cat. Origami is the intricate Oriental art of paper folding. This piece was folded by Joan Appel, a Museum volunteer employee. A New York holiday tradition, the Museum's 25-foot origami tree glitters in the Theodore Roosevelt Memorial Hall each winter.



and "Champions of American Sport," both staged in Gallery 3. "Champions" was an example of a major, popular exhibition organized by another institution (in this case the National Portrait Gallery) and presented in New York at the American Museum of Natural History. This show was sponsored by Philip Morris, Inc. "Patterns of Paradise," a collection of Tapa cloth specimens from cultures around the world, was on loan from the Field Museum of Natural History and was the feature attraction in Gallery 77. The Exhibit of the Month program, partially funded by the Arthur Ross Foundation, included "The Art of Animal Anatomy," "Horned Turtle From Down Under," "A Wood Full of Birds," "To the Ends of the Earth," the Natural History Photo Contest Winners and the Holiday Origami Tree. Exhibits of a topical nature included "Evolution, Darwin and the Beagle" on the 150th anniversary of the voyage of the Beagle, "Scorpion" and "The Medfly and the Woolly Bear Caterpillar."

An exhibition was designed and installed in Akeley Gallery on the history of microscopy. "Through the Looking Glass: A History of Microscopes" featured historical and contemporary examples of microscopes from Leeuwenhoek's lens to a videotape of views through the Museum's new scanning electron microscope. Akeley Gallery also housed the exhibition called "The Museum and The Creative Artist."

Habitat Group Refurbishment

The emphasis on refurbishing also included extensive work during the year on five habitat groups. These classic examples of the diorama-builder's art are among the finest in the world. The Department of Exhibition and Graphics recognizes its responsibilities to maintain them in the best possible condition. In the Akeley Hall of African Mammals, the Lesser Koodoo group on the third floor has been completely refurbished. In the North American Mammal Hall on the first floor, the Big Horn Sheep, Grizzly Bear, Mule Deer and Mountain Lion habitat groups have been cleaned and refurbished.

The Audio-Visual section of the Department, under the guidance of Chief Projectionist Larry Van Praag, completed a training program by technicians from the Imax Systems Corporation to enable them to operate Naturemax Theater presentations in the redesigned Museum Auditorium.

Work continues on the reinstallation of the Margaret Mead Hall of Pacific Peoples, and preliminary design is complete on plans for a new Hall of South American Peoples.

Library

With 385,000 volumes, the Museum Library's research collection constitutes the most valuable library resource on natural history in North America. The Library staff and collections support the work of the Museum in research, exhibition and education. In addition, the Library is a valuable resource for the public and scientific community at large, providing inter-library loans and reference services.

Over the past four years the Library received grant funds for several projects that will enable the Library to better support the work and objectives of the Museum. The two-year U.S. Department of Education Title II-C grant allowed the Library to acquire retrospective materials to fill gaps in the collection and to join the Online Computer Library Center international library network. The National Endowment for the Humanities grant made possible the inventorying of the Museum's anthropological photographs. This year, a grant for $166,539 from the U.S. Department of Education, Title II-C, permitted the Library to inventory the balance of the photographic collection. A grant of $6566 from the New York State Council on the Arts allowed continuation of the conversion of nitrate negatives to safety film.

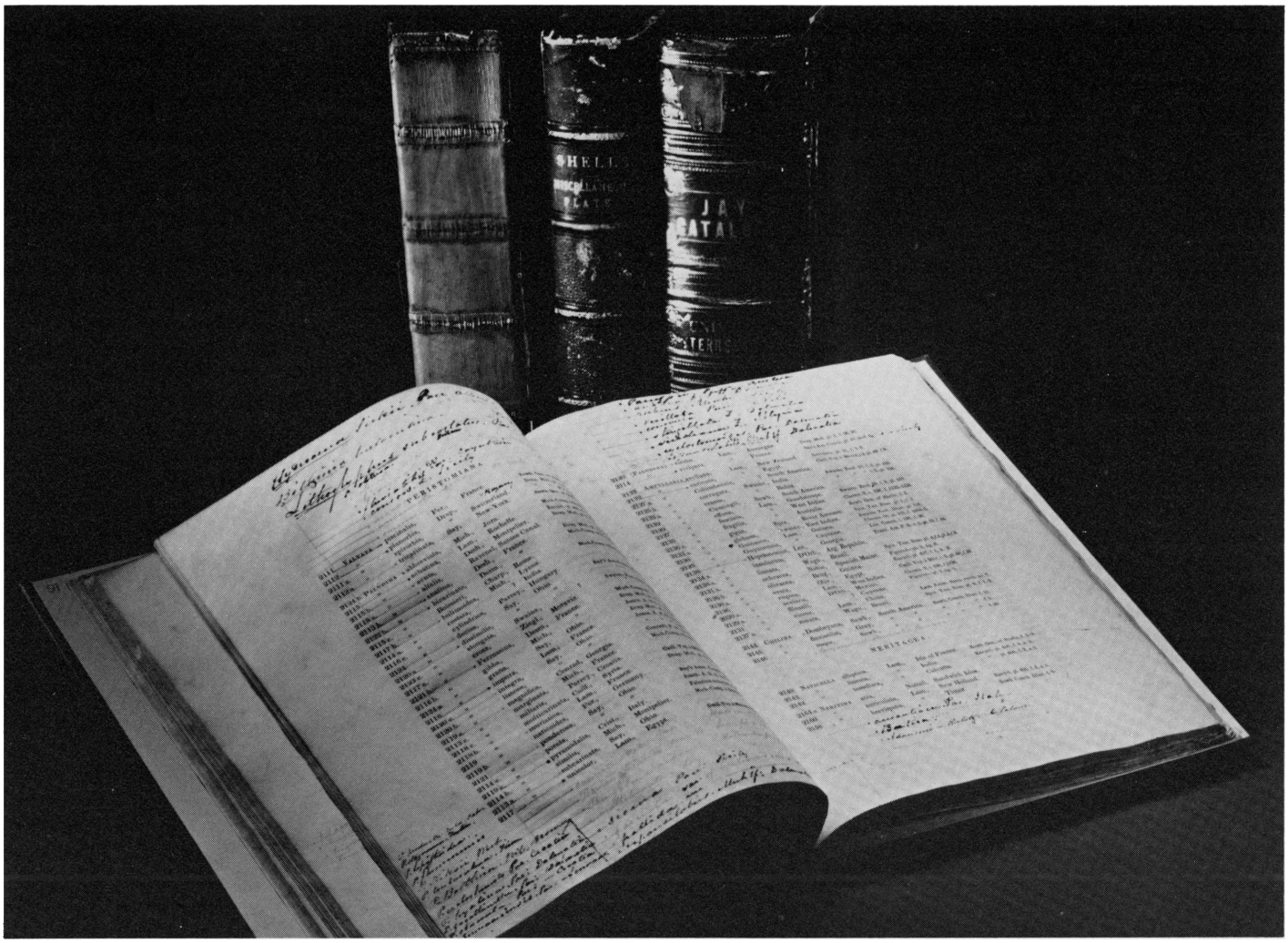
Under grants, 883 retrospective volumes were acquired and cataloged and the remaining 1284 retrospective cataloging records were put into the OCLC data base, while more than 200,000 anthropological photographs in nearly 3000 collections and more than 103,000 photographs on other subjects were inventoried. A guide to the anthropological photographs has been produced and remains to be edited.

A contract to publish a supplement to the *Research Catalog* has been signed with G.K. Hall, and publication is scheduled for 1983. "Recent Publications in Natural History," a quarterly bibliographic listing in *Curator*, received 296 titles for review; a total of 1030 titles were listed during the year.

Services and Acquistions

Services to the scientific staff and to the community continued at a high rate: 7826 people visited the Library and more than 33,800 items were circulated. The Library answered nearly 10,000 reference questions, received 3750 interlibrary loan requests, xeroxed 10,352 pages for patrons, filled more than 7500 requests for photographic images and distributed more than 27,300 issues of Museum scientific publications.

A total of 1426 monographs and 35 new serial titles were added to the collection through purchase, exchange, review copy and gifts; 28,228 journal issues were added; 16 titles were transferred to the Rare Book Room; 1615 volumes were bound; 740 photographic images were cataloged and 2181 were preserved; 11,757 catalog cards were filed, and the papers of Joseph Asaph Allen, William J. Morden and Richard Archbold were processed and preserved. The review of the anthropology and the folio collections was completed. The Library continued to serve as a subject referral center for the New York State Inter-library Loan network and completed 20 bibliographic data base



Four books from the John C. Jay conchological library, an early donation to the Museum's Library. The open book in the foreground is a catalog of shells with notations by the donor. The books are part of the Museum's Rare Book and Manuscript Collection, which includes more than 8000 volumes. The Museum is currently expanding its in-house conservation work on rare volumes and now has a librarian specialist in charge of conservation. Rare books and manuscripts constitute an extremely important part of the 385,000-volume library that is considered the most valuable natural history reference resource on this continent.

searches via the NYSILL terminal for the scientific staff.

Finally, an enclosed bridge connecting the main Library with the Archives and the Photographic Collection was completed, providing much-needed office space for the reference librarians.

Exhibits, Gifts and Visitors Three exhibits were mounted in the Library Gallery: "Shakespearean Zoo" executed by Nina Root, Chairwoman; "Maria Sibylla Merian" executed by the reference services section and Kathy Keim, Research Assistant; and "Ernest Thompson Seton: Artist, Naturalist and Writer" mounted by Miriam Tam, Assistant Librarian for Technical Services.

Paintings, sculptures and photographs from the Library's collections were loaned to the Nassau Museum of Fine Art for the exhibition "Animals in American Art: 1880s-1980s"; paintings and manuscripts were loaned to The George Washington University for a "Peale Family" exhibition, and several uncolored Audubon prints were loaned to the New York University Grey Art Gallery for its "John James Audubon and His Sons'" exhibition.

The Centre National de la Recherche Scientifique office in New York gave 45 volumes to the Library and Mrs. Betty O'Neill donated some 700 volumes of anthropology books and journals. The Offices of the Director and the President continued to send gifts that they received to the Library, including a volume from the Queen of Thailand donated during her visit here this year. Others who contributed items to the collection included: Hamilton College, UNESCO, New York Botanical Garden, Queensboro Public Library, the Weyerhaeuser Co., George Miller, Bruce Einsohn, Avis Berman, Mrs. Nouvart Youssoufian, Edward F. McCartan, Fred Werner, Mrs. Constantine Sidamon-Eristoff,

Guillermo P. Bridges and Mrs. John Pilley, who donated a manuscript volume on Chinese butterflies executed by her father while on the Museum's Asiatic expedition (circa 1920). Mrs. William C. Trimble donated 210 black-and-white prints of Egyptian cruises and far eastern tours from the early 20th century. Richard Van Gelder, Curator in the Department of Mammalogy, contributed 1189 color slides of African mammals and scenes, and Mrs. Sophie Stone gave 4349 color slides taken by her husband of people throughout the world. They were obtained through the NYU Fine Arts Department Library.

Staff Activities Ms. Root organized and chaired the first North American meeting of the Society for the Bibliography of Natural History (SBNH), attended the SBNH Annual General Meeting in Norwich, England, planned cooperative programs with the librarians of the British Museum (Natural History) and attended the London Book Fair. She gave a lecture to an NYU Museums Program class on the role of libraries in museums and presented a slide talk on the history of the Museum's Library to the Archons of Colophon. She organized and chaired the Second Annual Preservation Conference and continued to chair the Administrative Services Committee of the New York Metropolitan Reference and Research Library Agency (METRO).

Ms. Tam attended a week-long seminar on collection development, served on the Technical Services Committee of METRO and attended the SBNH meetings in Philadelphia and Norwich, England.

Pamela Haas, Assistant Librarian for Archives and Photographic Collection, is the project manager for the U.S. Department of Education Title II-C grant. She is vice chairperson of the 1983 Program Committee of the Anthropology and Sociology Section of the Association of College and Research Libraries. Ms. Haas lectured on photographic preservation at a conservation workshop held at the C.W. Post Center of Long Island University.

Mary Genett edited "Recent Publications in Natural History" and served as Acquisitions Librarian. She presented a paper on the Library's preservation self-survey at the Second Preservation Conference, chaired METRO's Emergency Planning Task Force and served on the Binding Pre-Conference Planning Committee for the 1983 American Library Association (ALA) meeting.

Diana Shih, Cataloging Librarian, attended the SBNH Conference in Philadelphia and spent one semester attending the N.Y. Botanical Garden's Preservation Workshops. She attended the annual meeting of the American Society of Indexers and the Conference on Library of Congress Subject Headings.

Publications:

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1982. Conservation self-survey at the American Museum of Natural History Library. Paper presented at the Second Annual Preservation of Library Materials Conference, Arlington, Va., February 22-23.

Genett, Mary E., editor

1980. Recent publications in natural history. Curator, vol. 23, no. 3, pp. 209-224.

1981. Recent publications in natural history. Curator, vol. 24, no. 1, pp. 41-69.

1981. Recent publications in natural history. Curator, vol. 24, no. 2, pp. 117-141.

Root, Nina J.

1981. [Review of] Natural history manuscript resources in the British Isles. Curator, vol. 24, no. 2, pp. 121-122.

1982. The library of the American Museum of Natural History. The Bookmark, vol. 40, no. II, pp. 93-96.

1982. Role de la bibliotheque au musée. Actes du Congrès annual Mixte de l'American Association of Museums et de l'Association des Musées Canadiens. Boston, 1980, pp. 5-8. [Transl.]

Publications

Curator

Curator published six numbers this year (23/4 through 25/1) for a total of 450 pages. By January, 1983, publication should be on schedule for the first time in many years. The accelerated publishing program of the last two years was made possible by an increased flow of manuscripts, many of which were solicited by the Editor and Managing Editor. A major circulation promotion will be launched in 1983 to bring the journal to a wider audience and to increase subscription revenues.

Curator will mark its 25th year of service to the museum community with the publication of 25/4 (December, 1982). This special number will contain a cumulative index of the journal from its inception in 1958 to date. *Curator* intends to continue publishing the best in museological scholarship for years to come.

Special Publications

In October, 1981, the Office of Special Publications published "ASIA: Traditions and Treasures" by Walter A. Fairservis, Jr., with color photographs by Lee Boltin. The book, which was created in conjunction with the new Gardner D. Stout Hall of Asian Peoples, was an outstanding success both critically and financially. Time magazine chose the book as one of the Christmas gift books of 1981 and the entire first edition was sold out by December. A deluxe, limited edition of "ASIA," signed by Dr. Fairservis and Mr. Boltin, was also published, and volumes were sold to selected members and friends of the Museum. The Office plans to publish more books of the quality and significance of "ASIA."

Work has begun on the Museum Guide Series, and the first booklet will be an introduction to the Museum. It will be followed by a Guide to Dinosaurs and a Guide to Meteorites, Minerals, and Gems. Other guides will be produced on a regular basis. The Guide Series treats separate subjects in 32-page softcover booklets. When completed, the booklets may be combined into a single volume.

Scientific Publications

The Office of Scientific Publications brought to press a total of 37 articles from eight disciplines in the natural sciences. The articles ranged in subject matter from anthropology to vertebrate paleontology. A majority of the papers were written and illustrated by Museum scientists; a few, however, represented the work of researchers from other institutions. Ten of the 37 articles were printed in the *Bulletin of the American Museum*, 24 in *American Museum Novitates* and three in *Anthropological Papers*. A combined total of 2363 pages was printed during the fiscal year, and there are currently 1808 manuscript pages in press.

Administration

Plant Operations, Maintenance & Construction The Department attends to the operation of the Museum's electrical, heating and ventilating plant, as well as all mechanical and structural maintenance of machinery and buildings. In addition, a considerable amount of new construction is achieved every year by the Department's crews, with increasingly efficient use of manpower.

The new Naturemax Theater projection system and a giant collapsible screen were installed in the Auditorium. Two rooms housing the Museum's new computer, with terminals throughout the Museum, and complete with environmental control, were constructed.

Rooms with environmental control were also built to house the new Scanning Electron Microscope and related equipment.

Construction began this year for conversion of Education Hall into two theaters and expansion of the Museum Shop onto a new mezzanine floor.

Substantial construction in support of a variety of special exhibitions, such as "Aztec Mexico: Discovery of Templo Mayor," was rendered.

The City of New York funded the rehabilitation and conversion to automatic operation of four passenger elevators in the Roosevelt Memorial Building, and one combined passenger and freight elevator in the School Service Building. City-funded construction also progressed for the new Hall of South American Peoples and for mechanical and electrical work to increase energy conservation.

Museum Shop The Museum Shop offers unique items created especially for the Museum such as ties, tote bags, reproductions, and cards with motifs from the rare book room. Sales revenue increased substantially from last year and should continue to be bolstered by the expansion of hours and selling space.

With the opening of the Naturemax Theater, the shop extended its hours in keeping with the Museum's new expanded hours. This offers a greater opportunity for visitors to shop in the Museum.

Construction has begun on the new shop balcony which will greatly expand the shop's selection of books, posters, records, and stationery. The former book area is being renovated to provide increased space for clothing and accessories. The Gallery 3 Shop changed merchandise three times in order to offer items which specifically related to the special exhibitions held there.

Building Services The Department is responsible for the security and cleanliness of buildings and grounds of the Museum. It also operates visitor and employee parking facilities.

Communications equipment was upgraded, and administrative staff increased in a continuing effort to provide efficient security for Museum visitors and property. The Department also managed the Cash Control Office temporarily, while an administrative structure for the office was being established. The Cash Control Office oversees the cashiers who greet visitors to the Museum.

General Services The Department of General Services consists of five parts: Mail Room, Photography Studio, Print Shop, Switchboard, and Shipping and Receiving.

The Print Shop produced some 700 printing jobs for Museum departments. The Photography Studio completed approximately 800 projects, encompassing such diverse areas as scientific, promotional and exhibition photography. The Photography Studio also handled orders from the public for images from the Photographic Collection.

Attendance A total of 2,441,575 persons visited the American Museum and the Hayden Planetarium in 1981-82—1,979,544 the Museum itself and 462,031 the Planetarium.

Development And Communications

Development In light of the present economic picture, increasing levels of support are needed for the Museum to serve the public and continue its research activities. Thanks to the able stewardship of the Board of Trustees and the generosity of contributors, significant progress was made over the past year in achieving a sound financial base for the Museum's myriad acivities. Not only did Trustees increase their own giving, they generated special gifts which brought their total fiscal contributions to $1,745,492.

Trustee Plato Malozemoff continued his productive fund raising efforts for the Economic Mineralogy project which now stands pledged at 70 percent of the total goal of $500,000. Endowment support for a new curatorial position for research in the area of ore development and exploration is being provided by 22 mining companies.

The corporate campaign, under the skillful direction of Trustee and Chairman Donald Platten, generated contributions totaling $1.277 million. This year 270 corporations gave $884,000 in unrestricted support. Through our Employee Admissions Program, employees of 45 companies were granted free admission to the Museum because of significant contributions by their companies. Corporations also strongly supported the Museum's special projects with an additional $393,000 in restricted gifts.

A significant grant from Mobil enabled the Museum to remain open free to the public on Friday and Saturday evenings, giving numerous visitors an opportunity to become acquainted with the Museum's programs and exhibitions. The exhibition "Champions of American Sport" was a popular success at the Museum; Philip Morris, Inc., provided support for the creation of the exhibition and its tour.

Significant progress was made this year toward realizing the Museum's overall goals for the 1980s in expanding public sources of support for education, research and exhibition. Generous gifts from the Charles A. Dana Foundation, the Leonhardt Foundation and others totaled $1.3 million for the creation of a new Education Wing. The Leonhardt Foundation's gift endows the People Center, permitting the Museum to operate it 11 months a year. The Charles A. Dana Foundation's contribution, with gifts from the Edith C. Blum Foundation, the Henry Kaufmann Foundation and the Harold F. Linder Foundation, provides for two new theaters, a studio activities room and a lecture facility.

Other foundations provided important support for special projects. The grants funded such diverse projects as a new storage space for the Department of Anthropology and a new Museum-wide in-house computer system.

Funds were established in memory of James A. Oliver, former Museum Director, and Junius Bird, Curator Emeritus of Anthropology. It is gratifying that many others generously remembered the Museum in their wills.

Providing for the Museum's future security, President Robert G. Goelet and his wife, Alexandra Goelet, initiated a project to increase annual giving from individuals. The Goelets helped to establish a steering committee of Trustees and friends who aided in future developmental planning. In addition, a benefit dinner party was planned for early December, with Mrs. Goelet, Mrs. Charles A. Dana and Arthur Ross as co-chairpersons.

Natural History In addition to the usual outstanding articles and columns, *Natural History* featured three special supplements: "The Science and Art of Keeping Warm," "The Coming Solar Age," and "Human Wants and Misused Lands." Columnist Stephen J. Gould was featured in a cover story on evolution in *Newsweek.* Columnist Raymond Sokolov published a well-received collection of his writings from *Natural History* entitled "Fading Feast."

At the close of the year L. Thomas Kelly, who in March rejoined the staff as Associate Publisher, was named Publisher. He succeeded David D. Ryus, III, who continues as Vice-President of the Museum.

In addition to its reputation for editorial excellence, *Natural History* is known for its visual beauty. This year, three of the magazine's covers won awards of merit from the Society of Publication Designers.

The 1982 *Natural History* Photographic Contest attracted more than 2500 entrants from around the world. A new award—Cover Photograph—was featured as the cover of the July, 1982, issue.

Advertising sales for *Natural History*, as reported by industry sources, totaled 400 pages and generated $3.1 million in revenue. Sales were up slightly over last year despite the recession economy.

In addition to outside advertising, *Natural History* carried internal advertisements for other Museum departments. This contributed to the success of Museum programs such as Discovery Tours and the sale of the book, "ASIA, Traditions and Treasures," which commemorated the opening of the Gardner D. Stout Hall of Asian Peoples.

Net paid circulation for the year, as reported by industry sources, was approximately 464,000, composed primarily of subscriptions for associate members. Membership renewals have remained strong despite an increase in the annual associate membership rates to $15 from $10, which was implemented last fiscal year. Also, single copy sales and bulk sales to non-members increased from approximately 12,000 to 18,000 during the year.

In January, postage rates were significantly increased for non-profit organizations. In response to this major cost increase, *Natural History* has initiated new programs to generate additional revenue, as well as major cost reduction programs in manufacturing and other operational areas.

A total of 20,000 people attended members' programs during the year. Programs included two popular lectures by Stephen J. Gould entitled "The Facts of Evolution—The Politics of Creation," a preview of the television series "Life on Earth" and a lecture by pioneer researcher Roger Payne on "Whales: Their Behavior and Culture." A symposium entitled "Humans and Apes: Pathways in the Search for Human Origins" brought together three of the world's leading primatologists: Jane Goodall, Dian

Fossey and Biruté Galdikas. Donald C. Johanson, discoverer of the famed "Lucy" fossil, was the moderator.

To better serve all members, a demographic survey of participating and donor members was conducted. Funds to carry out the survey were contributed by the Bodman Foundation and the Union Pacific Foundation.

Naturemax Early in the fiscal year, the Museum began the installation of the new IMAX film system. Many IMAX films were previewed throughout the United States and Canada, and a decision was made for the Museum to present "To Fly." Through generous assistance from Johnson Wax, the Museum added the film, "Living Planet" to the schedule. In keeping with Museum themes, and the films' subjects, the new, permanent IMAX film theater was named Naturemax.

Through the summer and fall, construction crews worked to convert the Auditorium so that films could be shown in the IMAX format. A special booth was built in the balcony to house the 3300-pound projector. The Museum also accomplished what had never been done in other IMAX theaters and has yet to be duplicated—the installation of a retractable 40-foot by 66-foot screen. The largest indoor screen in New York, it can be raised or lowered and allows for versatile use of the Auditorium.

Ticketing systems were devised and an admissions process was implemented to handle 34 shows per week. Several previews were held in early February in anticipation of the opening.

Another first was made possible through a generous grant from Mobil —free admission to the Museum for Friday and Saturday "Naturemax Evenings at the Museum." Museum visitors were afforded the opportunity to tour the Museum and see a double feature of "To Fly" and "Living Planet" in the Naturemax Theater.

Naturemax opened on February 11, and was well received by both the media and the public. Long lines and sellouts resulted from booming attendance. Applause followed every screening, and by March 1, more than 43,850 Museum visitors had attended performances in the 600-seat Naturemax Theater.

Naturemax attendance dropped in March to approximately 40,000 visitors. With vigorous in-house promotion, increased advertising, the implementation of advance group reservations and area-wide distribution of a Naturemax brochure, attendance began to climb steadily and has continued to do so. By the end of the fiscal year, more than 200,000 Museum visitors had experienced Naturemax Theater presentations.

The close of the fiscal year saw Naturemax becoming even more varied. The IMAX film "Hail Columbia!", saluting the United States space shuttle program, opened on June 24. Naturemax ads appeared on television.

Naturemax is establishing itself as the unique educational and entertainment facility it was meant to be, making a significant impact on the Museum and its visitors. The Naturemax Theater represents another innovative step in the Museum's presentation of the natural world to its visitors in unique and arresting ways.

Public Affairs Public awareness and support of the Museum and its activities were heightened through the print and broadcast media, promotional events, informational materials and other channels.

Much of the attention of the office was focused on one of the most visible events to occur at the Museum during the past decade—the opening of the Naturemax Theater. A highly successful press preview and reception was held for the opening, generating coverage by news media outlets across the country. Additional awareness of Naturemax was developed through the production and distribution of a promotional brochure. The brochure was distributed to major public outlets, such as schools, tourist attractions, public transportation facilities and parks throughout the area.

Print and radio ads were produced for the opening of the Theater and later for a new film, "Hail Columbia!" An ad was also placed on WABC-Television.

During the year, several special exhibitions opened at the Museum and received considerable attention from the mass media. "Shakespeare: The Globe and the World" was covered in major metropolitan area print media as well as on NBC's "Today Show."

"Afro-American Arts from the Suriname Rain Forest" received coverage from a variety of publications. Advertising for "Suriname" included a radio commercial voiced by the distinguished actor Geoffrey Holder.

"Champions of American Sport," honoring 100 of America's sports heroes, became a popular exhibition and brought in a diversity of visitors. Philip Morris Incorporated was the sponsor for the exhibition, and its earlier national advertising campaign, together with local advertising and press coverage, helped bring about high attendance.

For the openings of both "Champions of America Sport" and the Naturemax Theater, Public Affairs coordinated preview receptions for Trustees and other friends of the Museum, in addition to press previews.

In addition to major Museum exhibitions, others received attention from the press. Smaller exhibitions such as "Scorpion," "A Wood Full of Birds," and "Evolution, Darwin and the Beagle" attracted media coverage. Special events, such as the appearance of the Khmer Classical Dancers from Cambodia, were also covered extensively, and Museum spokespeople were interviewed in both the print and broadcast media on the evolution/creation controversy and other topics. Museum scientific events, such as a high altitude dig made by Anthropology, received national media attention. On one day in the "Science Times" section of the *New York Times,* two Museum events—the in-house discovery of the world's smallest diatom and the upcoming exhibition "Aztec Mexico: Discovery of Templo Mayor"—received coverage.

Promotion of the 1981 Margaret Mead Film Festival helped to draw the largest weekend crowds to the Museum since the opening of the Festival in 1977, when Dr. Mead herself introduced the films. Information on individual films was targeted to ethnic press, and film directors and Museum representatives appeared on radio

and TV talk shows. Attendance for the two-day Festival was estimated at 11,000.

In an effort to help the Museum meet the needs and preferences of its visitors more effectively, Public Affairs updated the major Visitors Survey conducted in 1974-75. This year's effort included preparing questionnaires, supervising the volunteers' coding and tabulation and analyzing the survey data. The survey's results, when published in 1982, will help the Museum to know its visitor population and better serve its needs.

Again this year, the Museum's well-received national radio series was produced by this office. With Museum Director Thomas D. Nicholson as interviewer, Museum experts discussed scientific topics, with tapes being distributed to radio stations nationwide.

A new Museum information brochure was created for Guest Services to produce and distribute to outlets throughout the area. In all, more than 40 television stories, 40 radio interviews and hundreds of print media articles resulted from the more than 100 news releases issued.

Discovery Tours Discovery Tours is increasing its development of unique itineraries to remote areas which are rarely visited, yet familiar to Museum research, education and exhibition staff. An example is the Indonesian Odyssey, the first Museum cruise to Southeast Asia. It retraced the work of Margaret Mead as well as earlier research on the Komodo Dragon Lizard by the W. Douglas Burden Expedition. On this year's special voyage, Director Thomas D. Nicholson led a team of seven scientists to Java, Bali, Lombok, Flores, Butung, Komodo and Sulawesi.

The Museum's travel program conducted 585 participants on 11 trips to 17 countries. Indonesia, mainland China, Mexico, Ecuador, East Africa, Alaska, Morocco and Egypt were visited. Programs focused upon each region's anthropology, ecology, geology and zoology.

During the tours, lectures and informal discussions were given by 18 Museum staff members from the Departments of Anthropology, Education, Herpetology, Ichthyology, Mammalogy, Mineral Sciences, Ornithology and Vertebrate Paleontology.

Travel arrangements are contracted by the Museum with professional tour operators. More than 30 tour agencies submitted bids to operate Museum trips, of which six were chosen to operate the year's Discovery Tours.

Discovery Tours are promoted through Natural History Magazine advertising and direct mailings to selected readers.

Guest Services Opportunities to present the Museum to new audiences through special events continued to grow. In addition to regularly programmed lectures, meetings, classes and screenings, the Office of Guest Services planned, coordinated and executed numerous special events in connection with Museum-sponsored activities. Additional functions were scheduled by corporate supporters, scholarly institutions, and other organizations interested in the Museum and its work.

Included during the year were visits by Her Majesty the Queen of Thailand and Their Imperial Highnesses Prince and Princess Hitachi of Japan, Chemical Bank's Annual Stockholders' Meeting, the 15th Annual Meeting and Dinner of the Business Committee for the Arts, a reception for the newly appointed Consul General of Australia, the President's Awards Dinner of the Rhode Island School of Design, and the social functions associated with the openings of the Naturemax Theater and "Champions of American Sport."

A documentary on taxidermy for viewing in South Africa, filming for a TV pilot and a special HBO production were among the commercial filming/photography projects handled.

The Museum's floor plan, in English as well as in several other languages, was kept current, and 361,200 copies

Visitors to the Museum and passersby enjoy lunch at the Terrace Cafe on the steps of the Roosevelt Entrance on Central Park West. In 1981, the cafe was opened from April to October on a test basis. It met with such great acceptance that it was reopened last spring on a regular basis. Facilities like the Terrace Cafe and the Lion's Lair cocktail lounge, which opened in 1979 and continues to operate on Wednesdays, Saturdays and Sundays, are among the broad range of visitor services that generate additional revenue. The Terrace Cafe, the Lion's Lair, the Museum cafeteria, which is being expanded, and the school lunchroom program serve an average 850,000 persons a year.

helped guide visitors around the Museum. Some 119,000 brochure guides to the Hall of Asian Peoples were distributed.

Approximately 75,000 copies of the Museum's new general information brochure were distributed to visitor information centers, hotels, travel agencies and other tourist outlets. Translations of this new pamphlet have been completed in Spanish, German and Japanese and are also being disseminated. Italian, French and Chinese editions are in production.

The Office provided topical information for the closed-circuit television system, as well as for the general information telephone message. The latter reached approximately 202,000 prospective visitors. Construction work began on a new restaurant and an enlarged cafeteria, and the Office planned for the opening of these facilities. The existing cafeteria served more than 600,000 visitors and employees, and approximately 200,000 children made use of the Museum's school lunchroom.

Volunteer Office Volunteer employees contributed 96,898 hours of service during the year, working both behind the scenes and in the public areas. They led Museum Highlights Tours, staffed the information desks, sold memberships and gifts, worked in the scientific areas and provided invaluable assistance in many Museum departments.

The Museum Highlights Tours attracted 39,283 visitors in 2121 tours. The volunteer guides also led 144 VIP and special membership tours. VIP tours were arranged for special guests including the Queen of Thailand, the Soviet Mission to the United Nations, kings from Nigeria, the Saudi International Bank, employee groups from corporations that have made donations to the Museum, senior citizen groups and international exchange groups.

Orientation training prepares volunteers who are in contact with the public to represent the Museum with insight and authority. Special training was given to information services volunteers, Highlights Tour Guides and, for the first time, Planetarium docents. Classroom and other formalized orientation training totaled 4838 hours.

Juan C. Charlin, left, a volunteer employee, gives information to two visitors at the second floor information desk. Mr. Charlin speaks Portuguese, Spanish and English, and wears a badge which identifies him as a multilingual volunteer. Through its volunteer program the Museum provides informational services in a variety of languages. Highlights Tours with foreign language commentary are also available to the quarter of a million visitors from outside the United States who come to the Museum each year.

Sales of postcards, souvenir merchandise and memberships are significant revenue producers. Conducted by the volunteers at the information desks and the "Dino Cart," such sales produced $113,359 gross. Despite the cessation of sales activities at the 77th Street desk, the growth of the Dino Cart sales activity maintained volunteer revenue-producing activities at previous levels. The success of the original Dino Cart, improvised from a library pushcart and stocked with merchandise relating to prehistoric animals, resulted in the installation of a more permanent "Dino" sales area on the fourth floor.

The visitor survey was conducted during the July-December period. Volunteer teams were stationed at entrances on survey days to distribute questionnaires to visitors according to a daily formula. Volunteers also reviewed the completed questionnaires to code responses for the data processing operation. Volunteers gave 2094 hours to this survey activity.

A significant activity of volunteers was the development of the Archives Team—a specialized group organized early in the year for the Vertebrate Paleontology Department. The team consists of former professional archivists, writers and teachers. They reviewed the departmental archives dating from the 1880s to purge them of clips, acid papers, photo negatives and other materials that can cause deterioration, and cataloged the contents.

Special emphasis was placed on recruiting business corporation employees for weekends and evening events. For example, members of the Volunteer Office made a presentation at J. C. Penney Headquarters that resulted in the recruitment of 14 new volunteers. The Museum now is achieving a dependable and knowledgeable cadre of business employees and professionals who are available to act as hosts at afterwork events such as receptions, openings and lectures, and to staff information desks and other public contact points on weekends.

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To discuss opportunities for support of the Museum and its programs, contact Robert G. Goelet, President, or Kate Bennett-Mendez, Manager for Development, American Museum of Natural History, Central Park West at 79th Street, New York, N.Y. 10024. Telephone: (212) 873-5927.

NATUREMAX

AMERICAN MUSEUM OF NATURAL HISTORY

The space shuttle Columbia thunders away from its launch pad at the Kennedy Space Center toward its flight orbit. The scene is a frame from the super-screen motion picture, "Hail Columbia!," one of the three real-as-life features that were screened in the Naturemax Theater, the Museum's newest permanent addition. Also playing on New York's largest movie screen to awed audiences were "To Fly" and "Living Planet." Naturemax represents the American Museum's latest technological step to give its visitors new perspectives on the world around them.