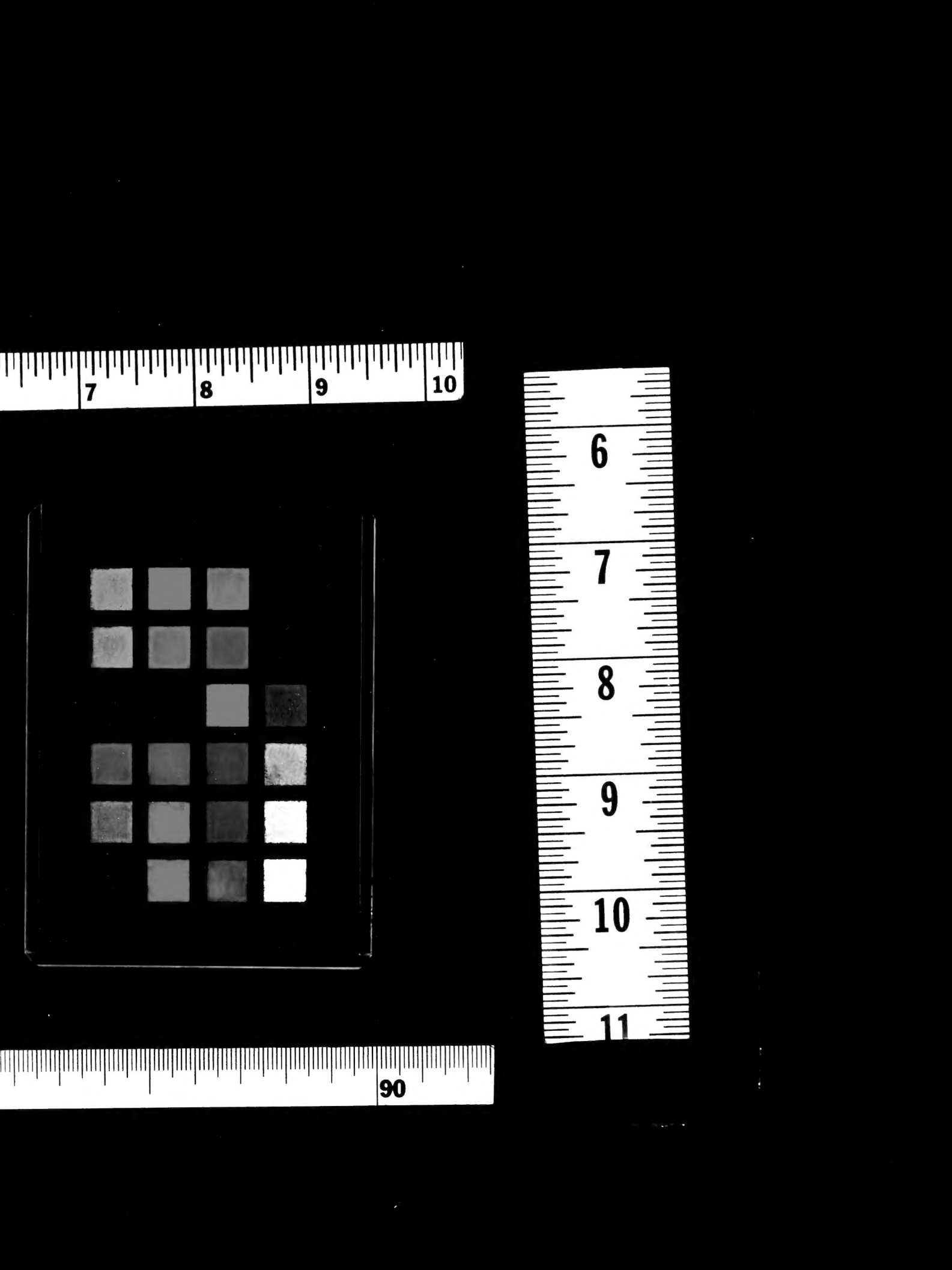
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Harvard University
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Fall, 1986

MCZ newsletter

MUSEUM OF COMPARATIVE ZOOLOGY

Songs of the Spring Warblers

A new exhibit will open on March 24, 1987 which will provide an opportunity for new birders to learn, and seasoned birders to brush up on, the distinguishing songs of the warblers that arrive in New England in the spring. The exhibit will feature plates of the warblers in breeding plumage by Allan Brooks and will have a computerized recording system which will allow the visitor to hear the desired song.

Five warbler species drawn by Allan Brooks from Portraits of New England Birds, *published by the Commonwealth of Massachusetts, 1932.*

The exhibit will also include panels describing various aspects of the annual warbler phenomenon, such as: an introduction to the history of Mt. Auburn Cemetery, the local haven for the spring migrants; current theories on the mysterious mechanisms of migration; and the status of the southern end of the migratory route, the endangered rain forests of South America.

Special evening programs are planned in April and May for the Friends of the MCZ, the Friends of Mt. Auburn Cemetery, and various local bird organizations to coincide with the annual local bird-watching bonanza.

Invertebrate Department Hosts First Open House

A series of twice-a-year behind-the-scenes evenings hosted by the various MCZ departments was launched on October 28 with talks by Professor Herbert W. Levi and graduate students Leticia Aviles, Wayne Maddison, and Jackie Palmer and tours of the invertebrate collections by members of the department. Friends of the MCZ joined MCZ staff and students for the occasion.

Coral Reef Hall Next-in-Line for Renovation

The MCZ's public exhibits are undergoing a transformation. Now that the main entrance hall, which housed the spectacular *Birds-in-Art* exhibit to celebrate Harvard's 350th anniversary, has been renovated, the next major effort will focus on the Coral Reef Hall. Most of the exhibits in that hall date from Alexander Agassiz' time and show the effects of age. Some excellent temporary exhibits were mounted by the Malacological Society last year to coincide with the First Day of Issue of a series of stamps featuring shells. While the model of the coral island of Bora Bora will remain the central focus of the room, new exhibits will include panels on current ecological studies on coral reef communities, a section on SCUBA and snorkeling with world maps pinpointing the coral reef areas, an underwater slide show, and spectacular specimens from the collections.

Birds-in-Art, *September 4-26, was the first exhibit in the renovated main entrance hall to the MCZ.*

Patterns of a Life in Science: Frank M. Carpenter

by Hilary Hopkins

Frank M. Carpenter, Professor Emeritus of Zoology and Natural History, and Honorary Curator of Fossil Insects at the Museum of Comparative Zoology, has been what he himself describes as "one of the lucky ones," to have found a topic of deep interest early, and to have been able to follow this in work.

As we sat in his quiet office at the MCZ, Professor Carpenter described to me a remarkable series of experiences in collegiality which he has had during his 84 years. He is especially clear on one point: his father, who was his first colleague, was probably also the most important.

"I was fortunate in having as a father someone who was strongly interested in natural history, in all forms. My earliest recollection, in 4th or 5th grade, is of being with him in the fields collecting butterflies. He was not scientific, he just enjoyed collecting these things, and rearing them. My interest in insects very much began with my father's interests. I might mention that I had a brother who got very much interested in the stars when he was in grammar school, and my father used to take him out at night. He helped him make a little telescope, helping him grind the lenses and so forth. My brother became an astronomer and director of one of the observatories in the West."

A second significant colleague came into Professor Carpenter's life at about this time, albeit a silent one who spoke to his imagination through the printed word and through one special picture. He explained, "One of the things I read was a book by Samuel Scudder. Scudder was a student of Louis Agassiz, and he was one of the founders of the Cambridge Entomological Society. He wrote a book for youngsters. I think that people who go into natural science have an obligation to write at least one book that is aimed at the young people."

Professor Carpenter continued, "The book was called *Frail Children of the Air*. I devoured that book! The thing that startled me most was a short section with some woodcuts on fossil butterflies. The idea of a fossil insect, to say nothing of fossil butterflies! There was a woodcut of this thing, showing the wings spread out, markings on them—it affected me so much that I decided to myself that I'd work on fossil insects."

"All through school I was a loner," Carpenter recalled. "I liked to go out after school and collect butterflies and my schoolmates thought I was crazy." But during his freshman year in high school, a remarkable meeting with a new colleague occurred. "One day the mailman came to the door and asked my mother who it was that got the mail on insects, so my mother brought me to the door, and he said, 'I'm Waldo Dodge and I collect beetles. Would you like to go collecting with me on the weekends?' So from that time on we would meet and go out to collect."

Several years later the young Carpenter's colleague Mr. Dodge invited him to a meeting of the Cambridge Entomological Club. "I was astounded that there was any such thing going on! At the end of the meeting Mr. Dodge brought me up to meet someone, and that was Professor W.M. Wheeler, who was professor of entomology at Harvard."

"Professor Wheeler said to me, 'What insects are you interested in?' And I said, 'Fossil insects.' He said, 'Did you ever see any?' When I said no, he took me downstairs to his office, and there were stacks of trays, and in them were 6000 fossil ants, and these were the first fossil insects I ever saw." As it turned out, these same fossil ants became the subject of Professor Carpenter's doctoral thesis.

From this wonderful moment on, Carpenter determined to attend Harvard and to work with Professor Wheeler. This powerful dream came true: within a few years, after a stint working as a drugstore clerk to earn tuition, he did indeed find himself at Harvard.

Enter—miraculously—the fossil butterfly again. "I learned that Mr. Scudder had left his collection of fossil insects to Harvard. I went to the director of the Museum and asked if I could see some of the specimens." Professor Carpenter shook his head in amazement over his youthful bravery as he explained how he convinced the director to let him see the collection. "He brought me to the collection, and he opened up a cabinet—"

At this point Professor Carpenter asked me to wait a second, and he went off around the corner of one of the tall cabinets lining the walls of his office. Upon returning, he said, "The Museum director took out a little brown box and he said, 'How about this one?'"

Professor Carpenter opened the sliding cover of a little wooden box and there lay on the cotton within a perfect image of that frail child of the air of distant times, an elegant revelation of forces guiding the shape of life then as now. "As you might surmise," he said with feeling, "this was the original specimen that Scudder had shown in the book I read as a child. I never expected to work within 20 feet of that thing for the rest of my life."

(Continued on p.7)

Hilary Hopkins, a Friend of the MCZ since 1981, is a science enthusiast and educational consultant specializing in gifted children. This article is the second of two she has prepared for the MCZ Newsletter.

Visitors

Itzhak Choshniak

Itzhak Choshniak, Professor of Biology at the University of Tel-Aviv, is spending his sabbatical year here working with Professor C. Richard Taylor on several research projects. A specialist in comparative and environmental physiology, Choshniak is studying the effects of high altitude on the blood flow to certain muscles during exercise in llamas. At the Concord Field Station he and Taylor run llamas on a treadmill, and also measure oxygen consumption during exercise.

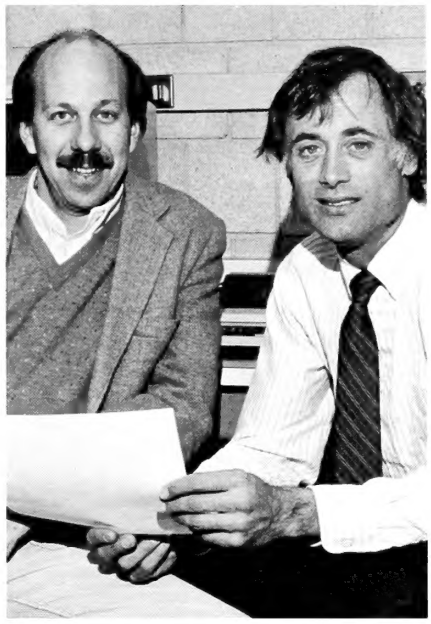
Choshniak's most recent work in Israel has focussed on desert adaptations in black Bedouin goats who can survive for several days without water and then restore their required water intake in one drinking session. Choshniak studied the kidney response to such rapid water loading which can equal as much as 30-40% of the animal's body weight. His investigations showed that the water is temporarily stored in a holding chamber, the rumen, which is one of the four chambers of the stomach, and is then gradually released into the more permeable parts of the digestive tract and absorbed into the body.

During his year here Choshniak is also conducting the laboratory sessions for *Biology 21: The Structure and Function of Vertebrates*. Living at the Concord Field Station apartment with his wife and three children, all the family members are enjoying their first visit to the United States.

Two Visitors from Flagstaff

Dr. G.E. (Ted) Goslow, Jr., Professor of Biology and Northern Arizona University (Flagstaff) is spending his sabbatical year at the MCZ together with Post-doctoral Fellow Kenneth P. Dial.

The visiting researchers are investigating the mechanics of bird flight with Professor Farish A. Jenkins, Jr. The year's project is now getting underway. By training a pair of cooperative starlings to fly through a wind-tunnel and filming their movements using cine-x-ray, the trio propose to analyze the movements of the wing during flight and monitor the activity of the muscles that control the wing. Visitors to next Spring's Open House will have an opportunity to see demonstrations of this research.



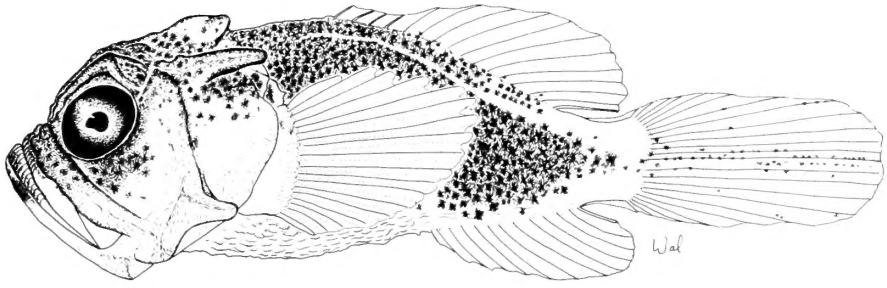
Kenneth P. Dial (L) and G.E. (Ted) Goslow, Jr.

Goslow and Dial are also assisting Jenkins with the teaching of human functional anatomy course at Harvard Medical School.

Eel Expert Joins Fish Department

Dr. David G. Smith arrived at the MCZ in September to continue the work on the larval fish collection, which includes an extensive collection of eels, started under a grant from the National Science Foundation by the late Dr. Sally Richardson. According to Karel Liem, Curator of Ichthyology, "we are extremely lucky to have Dave here since he is the world's leading expert on adult and larval eels." Smith, who received his Ph.D. at the University of Miami and previously worked at the University of Texas Medical Branch in Galveston, is slightly more modest about his standing. Smith's assessment: "There are two of us eel experts in the world and the other one is in New Zealand."

The total project is expected to take two-and-a-half years to complete.



A larval fish, Southern Stargazer, Astroscopus y-graecum

Ecologist Steve Austad Joins Teaching Staff

An undergraduate degree in English literature, with a special emphasis on the Victorian novel, and proficiency in lion-taming are not the among usual prerequisites for teaching ecology at Harvard. In newly-appointed Assistant Professor of Biology Steve Austad's case, the progression from magazine writer to Hollywood lion-tamer/stunt-man to teaching at Harvard was based on a series of logical decisions.

After graduating in English from UCLA, aspiring writer Austad moved to Oregon to work on a magazine. Austad's good friend and karate instructor in the area had two pet lions and Austad, who had always been an animal lover, spent much of his spare time in the lions' company. When a movie producer friend hired the lions for stunt work, Austad accompanied them to Hollywood and ended up performing stunts in a number of movies. His last role was as a stand-in for the "Bionic Woman" in a mauling scene. "I had to shave my moustache for the role," Austad recalls. Although the salary was extremely attractive, Austad reckoned his life would be short if he continued in this line of work. He suffered common minor injuries, was seriously injured once, and on one occasion only escaped death because the attacking lion flung him just beyond the length of his tether. As Austad tells it: "I found myself lying there, surprised to be alive, with the lion straining at his leash a foot away from me."

His experience with the lions inspired Austad to study biology with the ultimate aim of conducting research on lions in East Africa. Having no previous science background, he enrolled in a few courses at a California State University and went on to enroll in a Ph.D. program at Purdue. During the course of his work he switched from lions to smaller, more tractable research animals including spiders, tropical wrens, and opossums. He held postdoctoral fellowships both at Purdue and the University of New Mexico prior to his present appointment.

Austad chooses research animals that will most conveniently answer the questions that interest him. He favors setting up experimental conditions in the field rather than in the laboratory whenever possible. For example, American opossums are ideal subjects for his current research on how animals age since they only live for one year while housecats, of comparable size, live for an average of 12 years. In testing current theories, which mostly correlate aging rate to reproductive effort, opossums are especially convenient since, being marsupials, the young develop in an accessible pouch, providing an ideal experimental opportunity to manipulate reproductive effort. To investigate the role of reproductive investment favoring male versus female offspring, he has found that altering the physical condition of opossum mothers alters the sex ratio of their young. By radio-collaring his subjects, following them to their lairs, and leaving food outside, Austad is able to correlate the rate of offspring growth with food supply.

Married to a veterinarian, Austad's private life also includes a heavy emphasis on animals. The current population at the Austad home includes four dogs, two cats, several parrots, and a nine-foot python.

Austad will start teaching *Biology 19: Principles of Ecology* next year. He is enthusiastic about the "aura of academic seriousness" he detects in Harvard students and is recruiting undergraduates to assist him in his local field work.

Education Programs Mark Tenth Anniversary

In September, 1976 the MCZ launched a formal education program for the Boston elementary school students, funded by a grant made available as part of the effort to desegregate the city's public schools. The program continued successfully for four years, entirely funded by outside monies. As Boston programs started to dwindle, the MCZ's public education efforts were redirected to concentrate on the needs of our immediate neighbors in the Cambridge public schools. The present phase of the program, started under the direction of Museum Education Director Arlene Nichols in 1982 and partially funded by Harvard's Office of Government and Community Affairs, is now supported by the Massachusetts Council on the Arts and Humanities, the Cambridge Public Schools, local corporations and individual benefactors.

Utilizing the exhibits and specimens from the collections, the programs emphasize the development of science thinking skills and the process of science. A multidisciplinary approach stresses the role of science in all activities.

A recent development has been the MCZ's involvement in MITS (the Massachusetts Institute for the Teaching of Science) in collaboration with six other Boston area science institutions. At the first two-week session for teachers in July, MCZ ichthyologist Dr. Melanie L. J. Stiassny discussed her research with elementary school teachers. She has subsequently been requested to speak to classes at nine schools in neighboring Arlington to help inspire elementary school students to pursue studies in the sciences.

Now generally recognized as one of Harvard's most valuable outreach programs and enthusiastically received by students, parents, teachers, and administrators, the continuation of these programs still depends entirely upon the generosity and commitment of loyal Friends and supporters.

New Honorary Curator Appointed by MCZ Library

G. William Cottrell was appointed Honorary Curator of the Ornithological Collections in the MCZ Library as of July 1, 1986. A reception in his honor was held on July 22. Cottrell's relationship with MCZ began in 1960 when he became an Associate in Ornithology. He served as one of the editors of the recently completed 15-volume *Checklist of the Birds of the World*. According to MCZ Librarian Eva Jonas, Cottrell has been a "great friend and regular user of the MCZ Library," whose suggestions initiating transfers from other Harvard library collections and whose frequent gifts have greatly strengthened the Library's collections.

At the reception on July 22 in the MCZ Library were (l. to r.) MCZ Director James J. McCarthy, G. William Cottrell, University Librarian Sidney Verba, and Mrs. Cottrell.

Informal Seminars at the MCZ

The need for an exchange of ideas between researchers is met in a variety of seminars that are held throughout the MCZ on more or less regular schedules during the academic year. Attendance is open and visitors often join faculty and students at these informal sessions. Following is a round-up of some of the seminars currently being conducted. Call the Public Programs Office at 495-2463 for more detailed information on any of the seminars.

The Systematics and Biogeography Discussion group meets every Wednesday at 4:00 PM in MCZ 202. Currently organized by graduate students Robert J. O'Hara and Jeffrey Jensen, the format alternates between prepared talks by members of the MCZ community and beyond and informal coffee hours. Botanists from the Arnold Arboretum and the Harvard University Herbaria are frequent attendees at these sessions. Speakers scheduled for this fall include: R. J. O'Hara, *Systematics as the chronicle of evolution;* P. F. Stevens, *Why characters, hence cladistics, aren't/isn't for real;* M. L. J. Stiassny, *Atavisms and evolution;* R. D. Turner, *Systematic problems in shipworms;* F. M. Carpenter, *Geological record of insects;* W. Allmon, *Litter frogs.*

The Population Genetics group holds lunchtime meetings every Monday around the large table in the department on the third floor of the MCZ Labs. Organized this year by graduate student Peg Reilly, topics are not restricted to population genetics but range widely over the entire field. A random sampling of the subjects of recent talks include functional morphology, DNA sequencing, biochemistry, function of proteins, philosophical issues of genetic engineering, mathematical modeling, and topics in the history of science.

The Fish Group meets every Friday at 10:00 in MCZ 101 to discuss topics in ichthyology. Staff members and students are often joined by visitors from other departments and from outside of the museum.

Arachnology Seminars are conducted on an occasional basis in the Invertebrate Department on the first floor of the MCZ. Typical speakers include Professor Herbert W. Levi's frequent visitors to the department. Dr. Steven Austad, newly-arrived faculty member in ecology, gave this fall's first seminar on his work on the natural history of a group of European spiders. Visitors to other departments of the MCZ often present departmental seminars during the course of their visit.

The OEB seminar, a more formal departmental seminar currently chaired by Professor P. B. Stevens, is held across the courtyard in the Biological Laboratories (Main Lecture Room) on Thursdays at 4:00 PM. This is the forum for the presentation of seminars by graduate students on their thesis work, and invited scientists from institutions throughout the United States and beyond.

The MCZ Newsletter is published two or three times a year by the Museum of Comparative Zoology, Harvard University, Oxford Street, Cambridge, Massachusetts 02138; James J. McCarthy, Director.

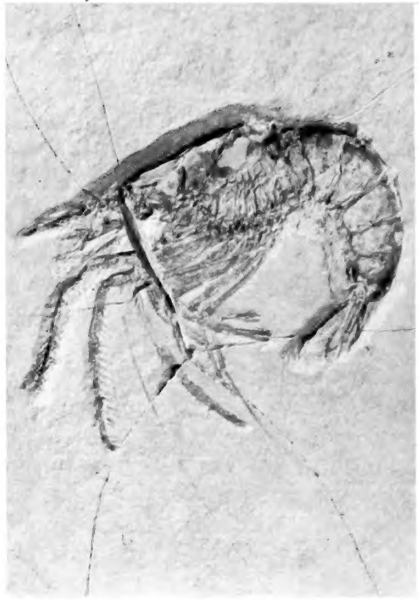
Editor: Gabrielle Dundon
Photographer: A. H. Coleman

Grant Received by Invertebrate Paleontology Department

The MCZ's collections of invertebrate fossils, which consist of 250,000 lots of specimens including 10,000 type specimens, have been rated as the fourth most significant in North America in both size and number of primary type specimens, according to the 1977 Report of the Paleontological Society Ad Hoc Committee on North American Resources in Invertebrate Paleontology. The collections are also the largest repository of European material in this hemisphere due to Louis Agassiz' aggressive acquisition of European collections in the late 1800's.

According to Dr. Peter Williamson, Assistant Professor of Geology and Assistant Curator in Invertebrate Paleontology, the collections, many of which were prepared in the late 1800's, would be impossible to replicate at today's labor costs.

Thanks to a three-year grant from the National Science Foundation, the collections, which are housed in 15,000 drawers, will receive their first thorough reorganization since the 1940's. In the intervening period, researchers reorganized the collections of their specialty, including the trilobites (H. B. Whittington) and the cephalopods (Bernhard Kummel). The first task to be completed by Curatorial Associate Ron Eng, assisted by Curatorial Assistant Felicita d'Escrivan, is to produce a catalog of the type specimens. The eventual goal is to computerize the entire collection, making specimens readily accessible to researchers.



One of the more spectacular specimens in the collections, a shrimp Aeger tipularius *(Schlotheim), from the Solenhofen Limestone, Bavaria, W. Germany (Jurassic, ca. 150 million years old)*

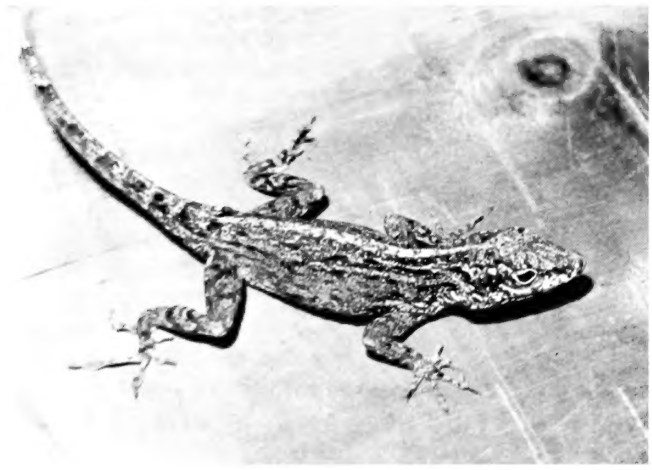
What's in a Name?

The naming of species hitherto unknown to science provides an opportunity to honor one's senior professor and ensure that his or her name will be perpetually associated with a group of organisms. Several species carry the names of members of the MCZ faculty.

When James D. Lazell, Jr., a former student and now head of The Conservation Agency, decided to honor his former professor Ernest Williams in naming the lizard he discovered on a collecting expedition in 1980 in the British Virgin Islands, he could not call it *Anolis williamsi* since this name already existed, named after another Williams. So he named it *Anolis ernestwilliamsi.* According to graduate student Gregory Mayer, who took part in the expedition, "Carrot Rock, home of *Anolis ernestwilliamsi,* is a tiny island, only about 3.2 acres in size. *Anolis ernestwilliamsi* is only found here even though the island is separated from its much larger neighboring island by only a few hundred yards of shallow water. This anole is much larger than its nearest relatives across the water."

Prior to the advent of *Anolis ernestwilliamsi,* Professor Ernest E. Williams actually had another species of Anolis named after him. This was *Anolis eewi* from Venezuela but Williams himself eventually showed that this was not a new species but one that had been previously described.

A female Anolis ernestwilliamsi



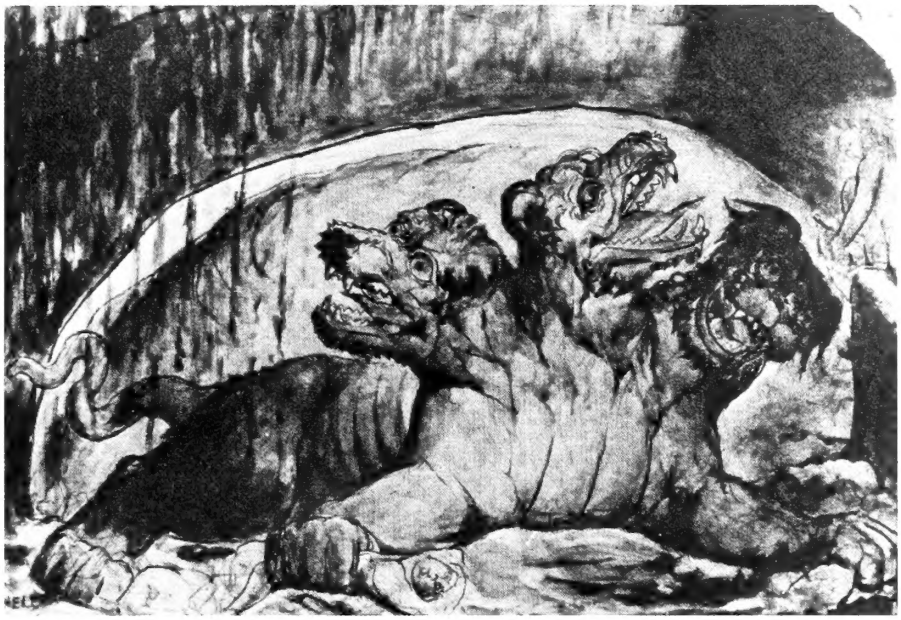
Carrot Rock in the British Virgin Islands, home of Anolis ernestwilliamsi

Photos by Gregory Mayer

Pere Alberch Receives Guggenheim to Study "The Logic of Monsters"

As one of 272 artists, scholars, and scientists chosen from among 3,717 applicants in the 62nd annual competition for fellowship awards from the John Simon Guggenheim Foundation, Pere Alberch, Associate Professor of Zoology and Associate Curator of Herpetology, is among those who have been recognized "on the basis of unusually distinguished achievement in the past and exceptional promise for future accomplishment."

Alberch plans to continue his research on the general properties of developmental systems and the genesis of morphological diversity. During the tenure of the Fellowship he will focus on teratology—the study of malformations—which appear with specific relative frequencies in populations. Since monstrous forms are maladaptive and do not survive, their regular occurrence and organization stems not from external functional demands but from internal rules of generation. An understanding of such developmental rules allows a definition of the realm of "possible monsters." For example, organisms with two heads appear at low frequencies in most species of vertebrates; developmental rules, however, seem to preclude the appearance of three-headed organisms, "impossible monsters," of which there are no well-documented cases, to Alberch's knowledge.



Three-headed Cerberus the Hellhound is an example of a biologically "impossible monster." (1826 watercolor by William Blake, an illustration for Dante's Inferno)

For his admittedly ambitious project, which will result in a book on a general theory of form, Alberch plans to collaborate with various colleagues in the areas of developmental biology, comparative morphology, mathematical modeling, and evolutionary theory. He also plans to investigate the intriguing parallel between monsters that appear in nature and those created by the human imagination. Does the human mind also have an internal system of generation? Alberch will concentrate on mythological forms, such as centaurs and mermaids, as well as some aspects of artistic form. In particular, Alberch plans to study the rules of construction used in the work of several surrealist painters, such as Miró, who have become well known for the richness of their biomorphic forms.

Frank M. Carpenter

(Continued from p.2)

Later in our conversation Professor Carpenter spoke to me about some important mentors in his life in science, especially Professor of English Bliss Perry, whom he feels was second only to Wheeler in his effect on the course of his life. Perry taught a course on the essays of Emerson. "It met in Harvard Hall," Carpenter said, "with about 50 students, with of course 49 of them being concentrators in English and me the only concentrator in science."

He went into the first lecture with notebook at the ready. "It ended up that my notebook was blank at the end of the lecture. I was so absolutely spellbound by what he said and the way he said it that I couldn't take my eyes off him! And when he left the room after the last lecture of the course, we all stood and applauded for 10 minutes, and he left the building and we were still applauding. And I decided I wanted to teach."

And teach he has, having had 34 graduate students taking their Ph.D.'s with him over the years. But these formal colleagues are only a few among countless others whom he has encouraged during his long career, encouraged to follow their love of entomology even if their work lay elsewhere. I thought of him as a link in a long chain of colleagues in science, of how early he received and welcomed the gift of collegiality, and of how generously he has passed it on.

IMS Grant Funded

The Department of Public Programs has received a $75,000 federal grant for general operating support from the Institute of Museum Services. This is the second time since the first annual application was submitted in 1979 that the grant has been funded. The last time was in 1983 for the amount of $50,000.

The grant is providing support for development and planning throughout the department with a particular emphasis on the public exhibit program.

Birds-in-Art Attracts Record Crowd

The opening of the *Birds-in-Art* exhibit on September 4 was one of the highlights of the three-day round of festivities in honor of Harvard's 350th. Over 400 MCZ Friends and their guests made this a most successful MCZ celebration.

Dr. John D. Constable, Mrs. Harold J. Coolidge and Roberta Zinman, Museum Guide (background, right) . . .

Mrs. Anita Ruthling Klaussen, Dr. James W. Wallace, and Mrs. Dorothy Wallace at the opening of Birds-in-Art.

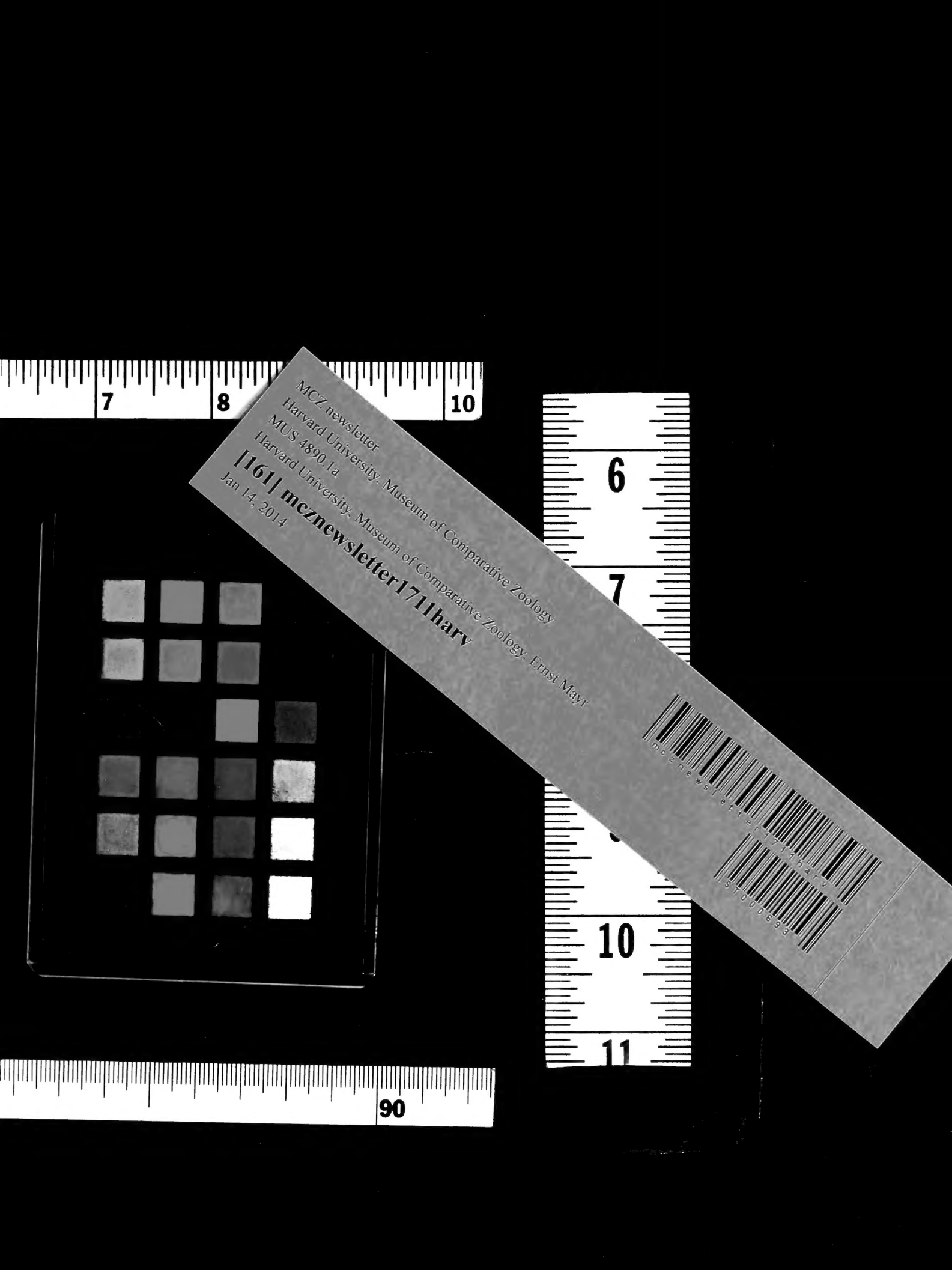
Travel Program

1987

Next January's voyage to **Antarctica,** accompanied by MCZ Director James J. McCarthy, is proving so popular that the trip will be offered again in January 1988. Members of this year's waiting list are already signing up and anyone interested in joining this spectacular cruise to see penguins, elephant seals, glaciers, and icebergs at the bottom of the world should contact the Public Programs office for details. There is also a waiting list for our **Kenya** safari, February 25—March 13, accompanied by graduate student Mark Skinner and Public Programs Director Gabrielle Dundon, and a second departure for July is being considered as of this writing. Our Africa programs are becoming so popular that we have been approached by two private family groups to plan their safaris. Drs. Rob Dorit and Gillian Kendall will accompany these groups. Our first joint venture with the Arnold Arboretum, with whom we have formed the "Harvard Biological Expeditions", will be to **Borneo** in August. Arboretum Director Peter Ashton and Faculty of the MCZ member John Constable will co-lead this expedition which includes two options: to visit Mark Leighton's orangutan study site in Kalimantan; or to journey deep into the interior of Sarawak by native canoe. A final eight days in Bali and Java can be added to the trip. A proposal to cruise the upper **Amazon** aboard the *Society Explorer* in October is being discussed by the Trip Committee. Dr. Melanie L. J. Stiassny, Assistant Professor of Biology and Assistant Curator of Ichthyology, would lead this adventure.

1988

Aside from the previously-mentioned January **Antarctica** trip and a repeat of the popular **Kenya** safari, new trips are planned to **Australia** in February and **Papua New Guinea** in July. The Trip Committee is also considering a natural history trip to **Yugoslavia** in April and a March cruise to the **Lost Islands of the Pacific** from Easter Island to Tahiti aboard the *Society Explorer.*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