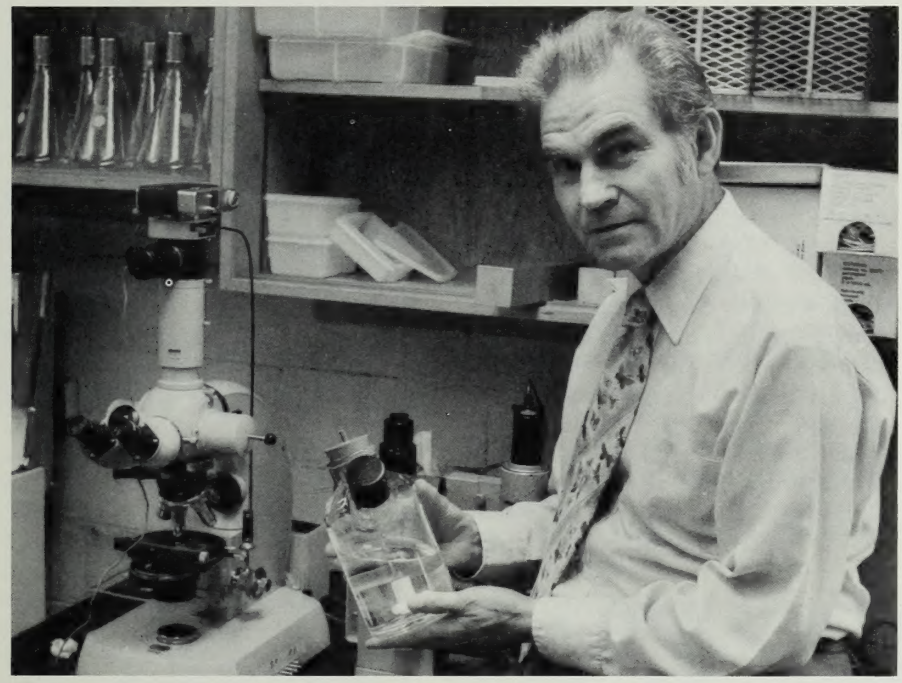
MCZ newsletter
MUSEUM OF COMPARATIVE ZOOLOGY

Harvard University
Cambridge, Massachusetts
Volume 8, Number 2
Winter, 1979

SPRING INSECT ACTIVITIES PLANNED

In 1977, March was "Fossil Month"; in 1978, "Copan: A City Uncovered" laid the foundation for "Maya Month"; this year, "An Insect Spring" will be the focus of the special activities for the MCZ's Friends, visiting school groups, and the general public.



Professor Carroll M. Williams, sporting one of his collection of over 200 entomological ties, holds a spinner-flask culture of insect cells in his lab. He will talk to the Friends on April 3.

Photo by Rick Stafford

After DDT, What?

Professor Carroll M. Williams will discuss biorational approaches to insect control on Tuesday, April 3, 1979 at 5:30 PM (Geological Lecture Hall). Professor Williams' work on juvenile hormone as a means to control insect populations is well-known.

Spring Insect Programs

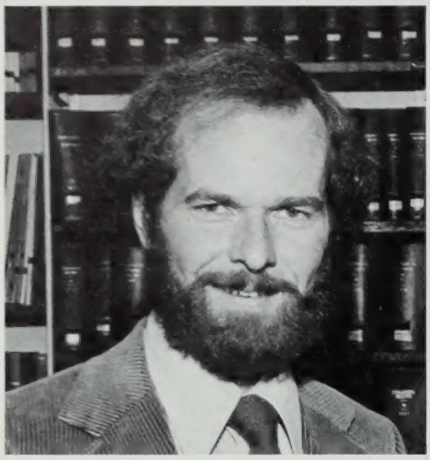
The Museum Guides have developed special one-hour programs for school and community groups throughout April, May, and June. Participants will be encouraged to look at insects in new ways, to explore the role insects play in our immediate environment, and learn how scientists collect insects in various habitats. A live insect colony will be on display. Call Karen Duffy (495-2341) for reservations.

An Eye on Insects

A new Spring exhibit will include striking research photographs of ant behavior by Professor Bert Holldobler, Muriel Williams' exquisite photographs of insect metamorphosis, and a presentation of Professor Frank Carpenter's fossil insect research. There will be a special preview of this exhibit following Professor Williams' talk on April 3. The exhibit will open to the public on April 4.

A robber fly photographed by Muriel V. Williams whose work will be featured in a new insect exhibit to open to the public on April 4.

WARM CORE RINGS IN THE NORTH ATLANTIC PROVIDE NATURAL LABORATORY FOR OCEANIC STUDY GROUP



Associate Professor James J. McCarthy, a biological oceanographer who studies the ecology of oceanic plant and animal life, is currently part of a multidisciplinary team which has proposed a new project to the National Science Foundation to be considered by the International Decade of Ocean Exploration. Known as the "Warm Core Rings Study Group Interim Steering Committee", the group (which includes other oceanographers from MIT, Woods Hole, and University of Rhode Island) proposes to study the "warm core rings" (or anticyclonic eddies) created by the meandering Gulf Stream in the water region adjacent to the northeast United States and Canada. At any time several such "rings" or pools of warm Sargasso Sea water can be observed in southwest flowing waters which overlie the continental margin between northeast United States and the Gulf Stream. They are typically 100 km. in diameter and 1 km. deep, and they can be tracked in the coastal waters for a few to several months before being swept back into the Gulf Stream.

According to their preliminary proposal: "The region is one of intense commercial fishing and also potentially intense mineral and petroleum utilization. The ability to predict major changes in these resources and in the physical environment could have a significant impact on these segments of the economy." For Dr. McCarthy the study also provides a tailor-made opportunity to increase his understanding of the fluctuations in animal and plant abundance in shallow waters and the open ocean.

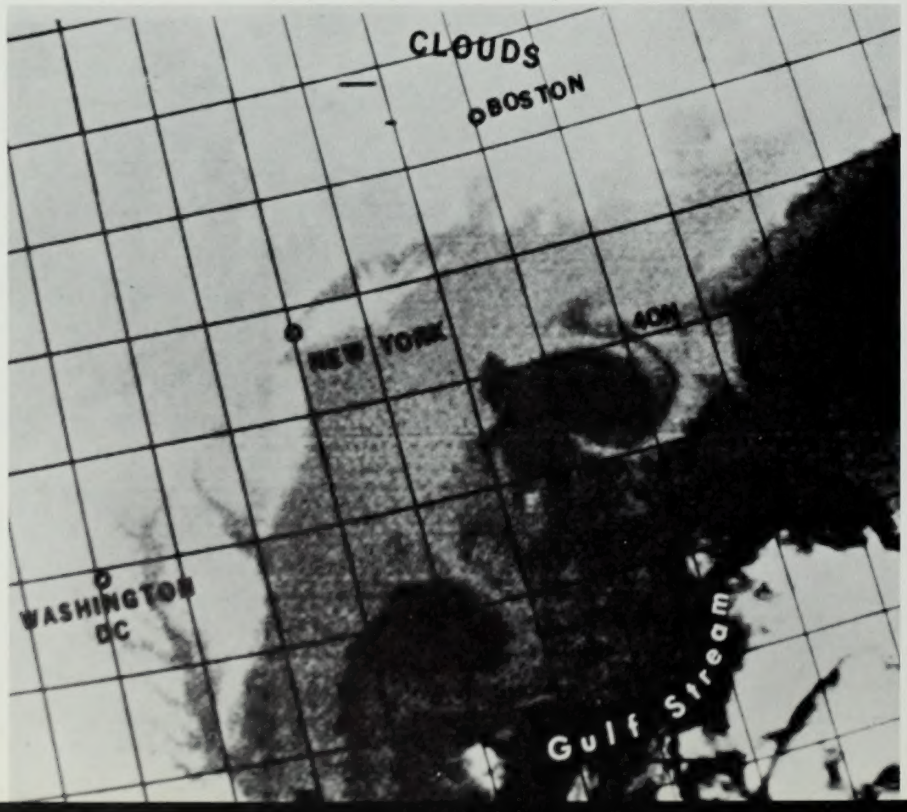
As background to this study, Dr. McCarthy explains: "Casual observation reveals that shallow coastal waters tend to appear green while those in the open ocean are blue. This is caused primarily by the greater abundance of plankton near the surface in coastal waters. The vertical density structure of the water, which is largely regulated by temperature, determines the depth to which near surface plankton can survive. As on land, plants are the base of the marine food chain, and in the ocean the dominant plants are microscopic single-cell phytoplankton. The plants must live near the surface in order to receive light for photosynthesis, and correspondingly herbivorous zooplankton are abundant in near surface waters whereas carnivores and scavengers dominate in deeper waters.

In the open ocean the density structure of the water permits light-requiring plankton to live at depths which are up to ten times as great as those in coastal waters. So, although coastal waters have more plankton near the surface, the total plankton in the sunlit layer is not as different between coastal and open ocean waters as the color of the water might suggest. The coastal waters also have greater seasonality in production cycles, and averaged over a year, these waters are probably only about three times more productive than open ocean waters per unit area of surface."

Biological oceanographers see warm core rings as providing a unique opportunity to investigate several important phenomena. Since major currents transport plankton and planktonic larvae of larger vertebrates and invertebrates downstream from a fixed point, it is possible that the long-lived rings are important in restocking the headwaters of the currents.

Movement of the Sargasso Sea organisms into the coastal water (and the converse in cold core rings) provides an opportunity to

This enhanced satellite photograph of the coastal region of northeast United States taken by the Defense Meteorological Satellite in November 1975 (with infrared or temperature-sensitive film) clearly shows two warm core rings. Satellite pictures provide constant accurate information on the current position and size of the rings.



WHO'S NEW AT THE ZOO?

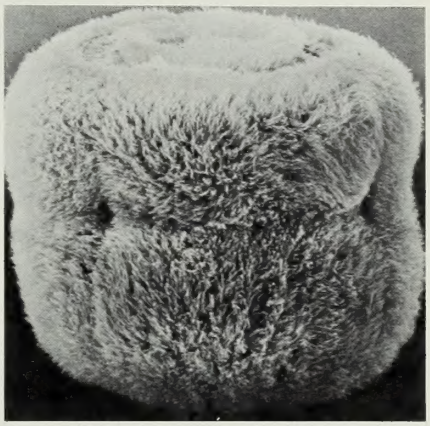
As the MCZ grows in popularity as a good place to visit (and even to live in) the problem of recognizing faces in the corridors increases too. Here is an introduction to four researchers currently on the premises.

Dr. Roy L. Hughes, Jr.

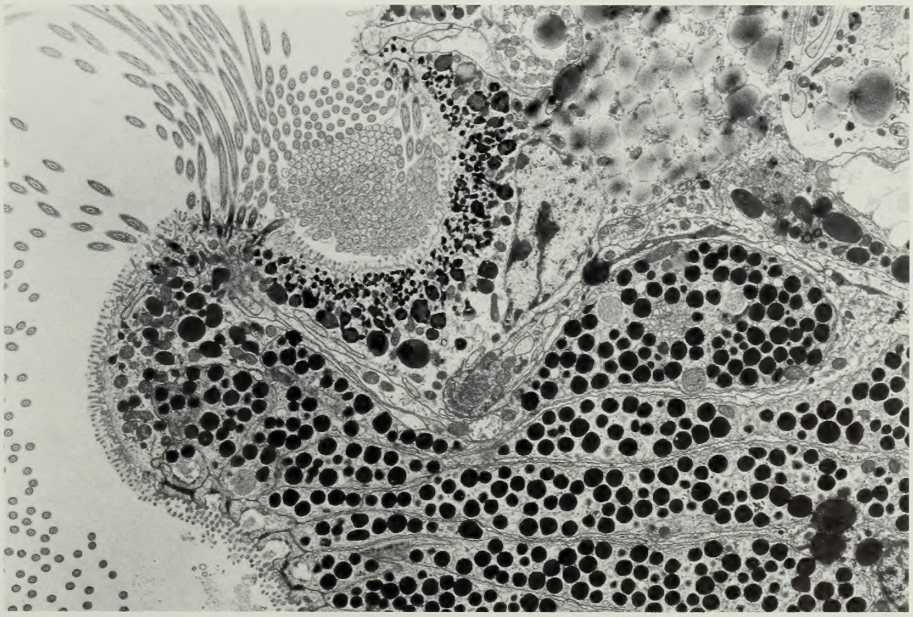
Dr. Roy L. Hughes, Jr., who received his Ph.D. at Northeastern University and completed a postdoctoral at the Harbor Branch Foundation, came to the MCZ last year to pursue studies with Associate Professor Robert M. Woollacott. His work focuses on bryozoans (moss-animals), a group of sedentary colonial marine invertebrates. With the aid of the transmission electron microscope, which transmits a beam of electrons through a thin-section of tissue revealing the internal cellular features (thus differing from a scanning electron microscope which scans the surface), Dr. Hughes is compiling new systematic data on these organisms based on their larval anatomy. Simultaneously, he is investigating the basic biology of larval settlement and metamorphosis.

Dr. Hughes' research has important practical implications. Funded by the Office of Naval Research, he is investigating the major role bryozoans play in marine fouling, as can be seen by the encrusted bottle held by Dr. Hughes in the photograph. Marine fouling is a pervasive problem; for example, a newly-painted ship, after being in tropical waters for three months, will be encrusted by bryozoans to such a degree that maintaining a constant traveling speed will require a 50% increase in fuel consumption; in temperate waters, the same degree of encrustation is reached in six months.

The bryozoan's activity during the larval stage determines its physical location for the rest of its life. It is during this short period, ranging between two to twelve hours, that the organism is mobile. Influenced by its sensitivity to light, it swims around until finding a suitable place to settle, after which it undergoes a radical metamorphosis into the stationary adult. Its photoreceptive qualities facilitate laboratory study. Dr. Hughes keeps the adult colonies in the dark until he is ready for an experiment. Return to light activates release and swimming of larvae. Dr. Hughes can then follow their movements until the settling stage is reached.



Scanning electron micrograph of a bryozoan larva. The photoreceptors are located at the two points of indentation. (Enlarged 1,000X)



Transmission electron micrograph of a vertical section through a photoreceptor; a bundle of cilia (left), functions as the light-sensitive surface. (Enlarged 4,200X)

Photos by Roy Hughes

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observe the interactions between the two communities across the ring boundary. The significance of this phenomenon in the biological oceanography off northeast United States is not known. Another problem of interest is the manner in which biological productivity is ultimately regulated in the two types of waters. Dr. McCarthy and coworkers are proposing research which will address this fundamental issue more effectively than is possible using existing techniques in oceanic waters.

Dr. J. Perran Ross

Dr. J. Perran Ross, an ecologist employed by the World Wildlife Fund to study sea turtles, is currently a visitor in the Herpetology Department. He is writing up the results of his recent two-year project in the Sultanate of Oman (an independent state of one million inhabitants near Saudi Arabia).

Oman has large nesting populations of the green turtle, *Chelonia mydas* and the loggerhead turtle, *Caretta caretta*. Two other species, the hawksbill, *Eretmocholys imbricata* and the Olive Ridley *Lepidochelys olivacea* are found nesting in smaller numbers. Dr. Ross, who received his Ph.D. from the University of Florida but whose accent reveals Australian origin, set out to survey the turtle populations, collect basic biological data, train local residents to carry on the study in his absence, and advise the governing officials on conservation of the turtles.

Local turtle workers measure a loggerhead turtle in the Sultanate of Oman.

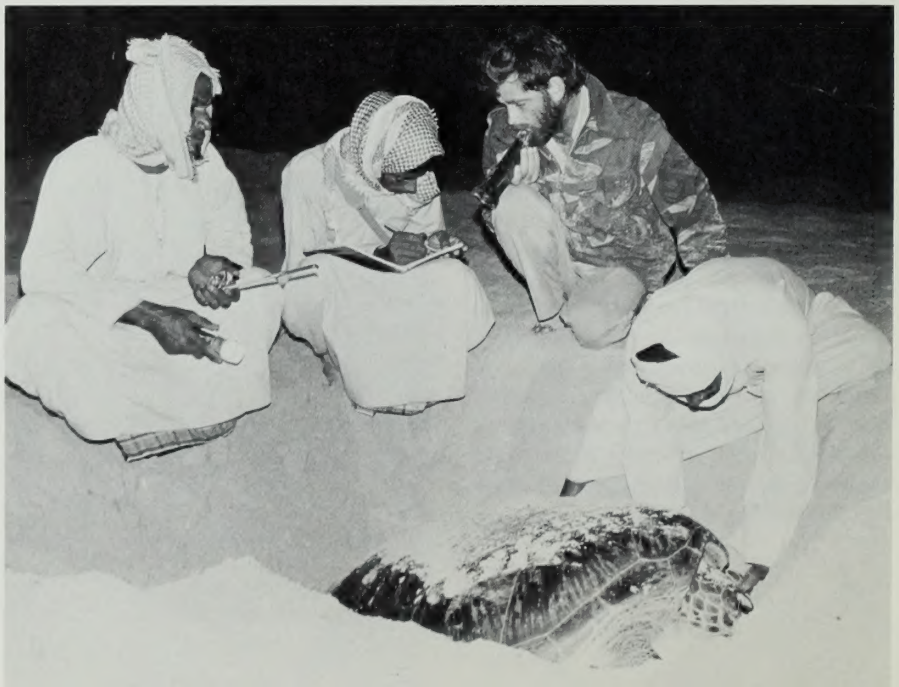
Photo by J. Perran Ross. Courtesy of World Wildlife Fund.

Dr. Ross met with excellent cooperation. Although his salary comes from the World Wildlife Fund, the local government provided more than $80,000 in research support. He was able to recruit and train 12 local men to catch, tag, and measure a sample of the turtles; he hopes that these tagged turtles will reappear so that more data on their movements and life histories can be compiled. Two of his trainees are now holding government-supported positions to continue the work. Hopeful that his apprentices are following his instructions, Dr. Ross plans to return to Oman in May to review recent results. Through Dr. Ross' efforts, the local government has been made aware of the importance of protecting the turtle population. This was not an easy task. As Dr. Ross points out: "In underdeveloped countries, the officials in charge don't respond automatically to a plea for conservation. They want to know *why* they should not exploit a natural population. The only way to approach them is to appeal to a concrete immediate need of the local community." Dr. Ross stressed the importance of the turtles as a rich source of protein for the local inhabitant's diet. In order to protect this resource, the local government passed two laws: one prohibits the killing of nesting turtles; the other prohibits fishing trawlers from fishing off the nesting beaches, a measure vital to their preservation. The result is that the taking of enough sea turtles to feed the local community will continue at a rate that does not seem to endanger the species; widespread commercial exploitation has been averted for the time being.

Dr. Ross also promoted local sea turtle awareness through an extensive public relations and education campaign. He disseminated information to the press, helped produce a television documentary, and visited the local schools. Dr. Ross is presently writing up the scientific results of the survey for publication.

The turtle-tagging team of (l. to r.) Jimah Salim, Mohammed Hamed, Dr. Ross (holding flashlight in his mouth), and Robya Salim work at night. This sea turtle has just laid her eggs.

Photo by Mark Boulton. Courtesy of World Wildlife Fund.



Katherine Muzik

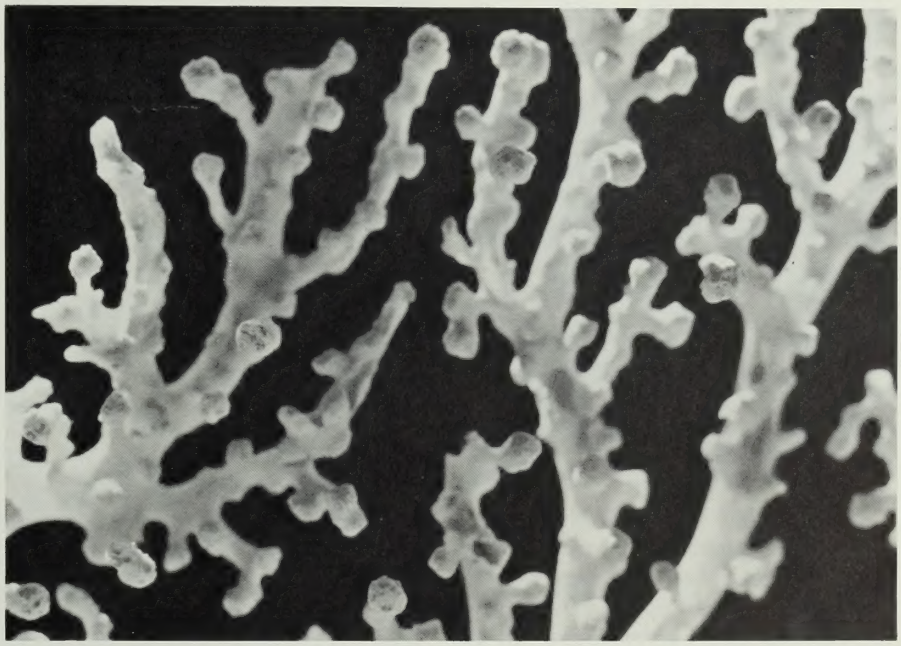
As anyone who has ever donned a face mask and snorkelled over a tropical reef knows, the shallow waters abound with numerous varieties of colorful corals. Corals are living colonies of individual animals called polyps, which together secrete massive stony skeletons to form reefs. The MCZ has an extensive coral collection, including corals collected by the U.S. Exploring Expedition in the Pacific and the Atlantic during the 1800's and early 1900's, and additional specimens newly contributed by the University of Hawaii and the National Marine Fisheries Service from expeditions in the 1970's.

Katherine Muzik, who is spending the year in the MCZ Invertebrate Department, is concentrating on more elusive corals found in very deep water off Hawaii. Unlike the reef corals which have polyps with tentacles arranged in patterns of six, the polyps of these corals each have eight tentacles, and hence are known as octocorals. Ms. Muzik, who will receive her Ph.D. from the University of Miami, has just completed two years studying the Hawaiian octocoral collection at the Smithsonian Institution in Washington, D.C. While writing up her doctoral thesis ("Systematics and Zoogeography of Hawaiian Octocorallia"), she is utilizing the coral collections and scanning electron microscope facilities here at the MCZ. (Scanning microscopy accurately portrays the minute calcareous sclerites in the surface tissue of octocorals, which are the most important identifying character.) The coral fauna she is describing includes over 100 species, many of which are new to science.

Ms. Muzik has added to already existing museum collections by collecting her own research specimens last year, descending 1400 feet to the ocean floor off Makapuu Point, Oahu, in a two-man submarine owned by Maui Divers. Maui Divers, a commercial coral jewelry company in Honolulu, is the sole collector of the Hawaiian pink coral, which they then cut, polish, and fashion into much sought-after jewelry. Working together with a State-Federal fishery council, the company is helping to develop management plans to protect pink, gold and black corals. Annual weight quotas and size limits have been set to prevent destruction of these species. Aside from their aesthetic and commercial value, corals serve as useful biological indicators of pollution.

Katherine Muzik returns from a dive in Maui Divers' submarine, STAR II, during which she made observations on living corals and collected specimens for later study.

Photo by Terry Irwin



The pink calcareous skeleton of a colony of Corrallium, *the octocoral from which jewelry is made.*

Photo by Katherine Muzik

Dr. William L. Hylander

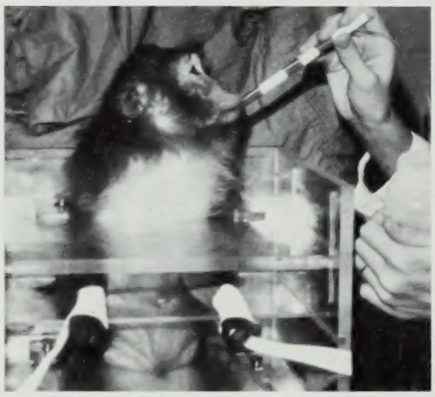
When Professor William L. Hylander arrived at the MCZ this January, he did not come empty-handed. His baggage included an impressive array of video tape and strain gauge equipment. These research tools are used in his long-term study of, as he puts it, "why primate faces are shaped the way they are." To find out, Dr. Hylander is analyzing patterns of stress and strain in the facial bones of primates, due to muscle action and bite.

Dr. Hylander, Associate Professor of Anatomy and Anthropology at Duke University, is the recipient of a National Institutes of Health Career Development Award which funds his salary and, consequently, is in the enviable position of being able to devote five years purely to research, which is mainly supported by the Institute of Dental Research of N.I.H.

No one fully understands how facial bones are stressed naturally; patterns of stress and strain influence how the jaws grow. For orthodontists, who apply artificial stress, it would be extremely helpful to acquire an understanding of the natural stress process.

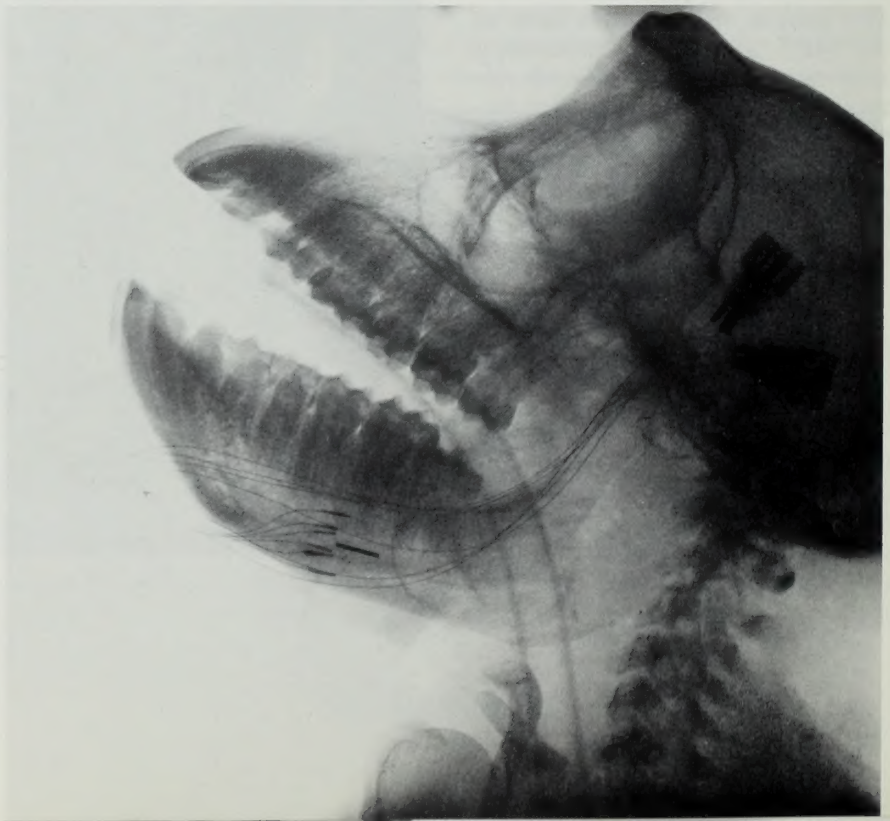
By using two video cameras simultaneously, Dr. Hylander is able to record both the animal's chewing action, the signals emitted electromyographically, and signals from the strain gauge. He then analyzes each "frame" individually. Dr. Hylander, who is working jointly with Dr. A. W. Crompton, finds the MCZ an ideal environment for this work. He is learning the techniques of electromyography here as well as sharing his expertise—and equipment—with MCZ staff and students. Graduate students Herschel Franks and Kathleen Smith are both currently working on projects with Dr. Hylander.

Professor Hylander with video equipment.



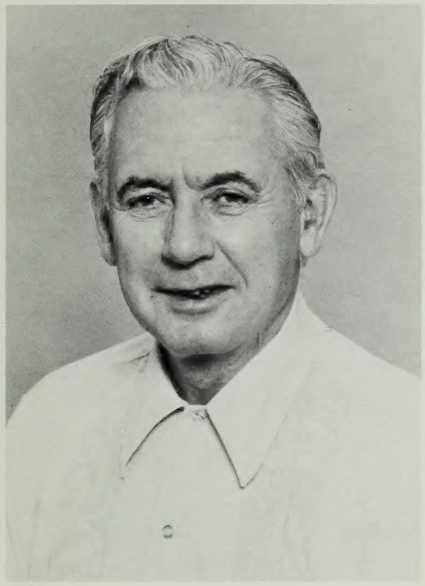
"Senator Dole", one of Dr. Hylander's four research monkeys (a crab-eating macaque from South East Asia) enjoys a diet of apples and other fruit in the lab. In the wild these animals feed on a variety of fruits and leaves, plus the crustaceans they find in tide pools.

X-ray of "Senator Dole" (one of a sequence) allows researcher to analyze the natural strain patterns caused by chewing.



STAFF NOTICES

Michael J. Regan



Michael J. Regan, who was in charge of the Museum's Mail Department since November 1961, died suddenly on November 5, 1978. His warm, humorous presence and slightly unintelligible Irish brogue were a constant part of daily life at the MCZ. Happily, during the summer of 1978, he realized his long-cherished dream of returning to visit his native Ireland. He leaves his wife, Helena, and six children. He also leaves everyone who knew him at the MCZ deeply saddened.

The MCZ Can Be Habit-forming

Four long-term staff members were recently officially recognized for their 15 or more years of continuous MCZ service. Together, Charles Atlas (Building Superintendent), Victoria Kohler (Research Assistant in Invertebrate Paleontology), Catherine McGeary (Herpetology Secretary), and Marjorie Sturm (Administrative Officer) have served the MCZ for 75 years!

Additional vacation time, a special ID card entitling the bearer to discounts for certain University facilities and activities, and the opportunity to take certain courses free of charge is Harvard's way of saying "Thank you!"

Susan N. Brewster

Susan N. Brewster, who became Manager of the MCZ Shop in March 1972, left in October to become a mother. Among her many contributions to the MCZ's sales effort was last year's successful mail order program through *Harvard Magazine*. Sue and her husband are active outdoor recreationists and son, Tom, at age two months, has already taken part in a downhill ski weekend. He will also be joining his parents on a trip to Hawaii this Spring. He will however sit out next Summer's white-water canoe adventures.

Jean S. Webster

Jean S. Webster joined the staff in October as the new Manager of the MCZ Shop. Lively and energetic, Jean relishes the challenge of expanding the Shop's market. As the mother of two sons of prime "Shop age," she brings an intimate knowledge of her major market to her new position.

Susan and Tom Brewster and Jean Webster in the Shop. Symbolically, Sue is passing on the peacock feather (the Shop's perennial best-seller) to Jean.

Curatorial Associates Share Concerns

The MCZ's Curatorial Associates, who are the primary managers of their departments' collections, have begun meeting to discuss mutual concerns. The group includes Karsten Hartel (Fish), Alfred Newton and Margaret Thayer (Insects), José Rosado (Reptiles and Amphibians), Edi Rutzmoser (Mammals), and Charles Schaff (Vertebrate Paleontology).

These meetings, which, according to Mr. Hartel, "are held irregularly, but at least once a month," are providing an opportunity to share technical information and resources, and to explore mutual concerns. Partly because of these meetings, the Curatorial Associates will now attend Scientific Staff meetings where the collections are discussed and the Associates will be able to attend professional curation-related meetings or workshops. The group is also coordinating the purchasing of supplies. But perhaps the most significant achievement of these meetings is the open communication and cooperation between members of hitherto isolated departments.

Brazilian Celebrity

Professor Ernst Mayr has been awarded Brazil's equivalent of the Pulitzer Prize "for the best translation in the science category in the year 1978." The book, *Populations, Species and Evolution,* was translated into Portuguese by Dr. Hans Reichardt, a Harvard Ph.D. who studied with Professor Frank M. Carpenter.

The trophy itself is a bronze casting of a "jabuti" (the Indian word for "turtle") with the alphabet inscribed on its shell. In Brazil, the turtle is the symbol of wisdom.

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Editor: Gabrielle Dundon
Photographers: A. H. Coleman
Paula Chandoha

Ronald J. McGinley to Join Entomology Department

Ronald J. McGinley has been appointed Assistant Professor of Biology and Assistant Curator of Hymenoptera in the MCZ. He will be arriving in the Fall and will be contributing lectures to *Biology 48: Systematic Biology,* teaching his own course on the natural history and classification of insects, working with the MCZ's vast hymenoptera collections (which include ants, bees, and wasps), as well as continuing his own research on solitary bees. Currently completing a postdoctoral study at the University of Kansas with Professor Charles D. Michener on aspects of the higher classification of bees, Mr. McGinley (who will officially become "Dr." McGinley within the next few weeks) plans to pursue his strong interest in systematics at the MCZ.

When asked about his research activities, Mr. McGinley explained: "I spend a lot of time in desert areas looking for holes in the ground where the solitary bees nest." He plans to add to the MCZ's collections of solitary bees (which comprise the large majority of the approximately 20,000 different species of bees—there are only four species of honey bees and a few hundred species of bumblebees). He will also set up experimental bee cages in Professor E. O. Wilson's environmentally-controlled facilities in the MCZ Labs.

PUBLIC PROGRAMS

Who says times change?

Cambridge.

—The course of free lectures to the teachers of the public schools in the Museum of Comparative Zoölogy will be given on Saturdays, at ten A. M., and on Wednesdays at 3 P. M.

Front page item from the Boston Daily Advertiser of Friday morning, November 17, 1865 (spotted by Bernard Brown, amateur local historian and husband of Public Programs Secretary Jean Brown). The lecturer was probably Louis Agassiz himself.

Open House Fan Mail

November 6, 1978

"Your Open House the other Tuesday was a great success. I'm sure that many of the faculty must have shuddered as our children climbed on cabinets in order to see some exhibits better (cases of insects), but they were so good natured about it (especially Annette Aiello). The children were dazzled by many of the insects.

The live exhibits were very popular, but we loved the riddles in the mammal department together with narwhal spike, elephant tooth, etc. It was a very special afternoon, and please thank all your professional staff for sharing their precious time, knowledge and exhibits, with us, not forgetting those wonderful volunteers who are such a great part of the MCZ.

Sincerely,

Pam Pettengill, Mark and Becky
Concord, Massachusetts"

After School Programs for Cambridge Children Started in January

As a direct result of last Fall's Open House, which inspired Eva and George Sommaripa, Cambridge parents, to organize a group of local youngsters and their parents, the MCZ is offering a new series of after-school natural and cultural history sessions for local children. The first series of six classes will be taught by Museum Guide Louis Tripoli, who is a Harvard undergraduate with considerable experience with teaching in the early grades, and will focus on his speciality, insects—the topic chosen by the children themselves. Future series are planned to cover such subjects as marine mammals, North American Indian cultures, and fossils.

Victoria Kohler of the Invertebrate Paleontology Department demonstrates the removal of fossils from rock matrix to a group of third-grade students from the Winship School in Brighton. The children are part of a career awareness program currently being conducted by Elizabeth Cori-Jones, Museum Education Coordinator, and Museum Teachers Susan Patz and Steven Katz. Photo by Susan Patz