

MCZ newsletter

MUSEUM OF COMPARATIVE ZOOLOGY

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ICHTHYOLOGY DEPARTMENT RECEIVES NSF GRANT FOR MUSEUM COLLECTIONS

The Ichthyology Department of the MCZ has received a major five year grant (\$195,000) from the National Science Foundation for the renovation, maintenance and improvement of the Museum's fish collection. The Department is headed by Karel F. Liem, Henry Bryant Bigelow Professor of Ichthyology and Curator of Ichthyology.

The NSF Grant will make possible a carefully planned program of limited and selective growth of the collections. The Department will be able to initiate an active national exchange and disposal program with other major institutions with the specific goal to furnish maximum use of national resources at minimal cost for research and education in organismic biology, ecology and fishery biology.

The project will begin in February of 1973. The fund will provide for appointments of technical staff and also for the renovation of Louis Agassiz's original physical plant, adding at least 1/3 more space to the facility. Among the many improvements, the original brick floors will be resurfaced, and the old wooden shelves and trays will be replaced with steel cabinets. The amount of shelf space will be doubled. The rearrangement of the collection according to a standardized family-group system will considerably aid utilization of the collection. In addition, relabeling and rebottling will be carried out as the collection is rearranged. Sixty new tanks will diminish the overcrowding of specimens and allow complete separation of fish groups. A type catalogue is being prepared.

The collection is historically the most important in the United States and ranks among the most important in the world. During Louis Agassiz's time the MCZ fish collection was the greatest in the world in terms of the numbers of specimens and of species. As long as Agassiz lived, merchants, Yankee skippers, missionaries, naturalists, and United States consuls sent fish specimens to the MCZ. The Thayer Expedition to Brazil and the Hassler Expedition which circumnavigated South America were two of the many expeditions launched to bring back fishes in order to build a comprehensive collection. During this period exchanges on an unprecedented scale were carried out with

virtually every museum in the world which had an important fish collection. One man worked full time just to unpack the material received.

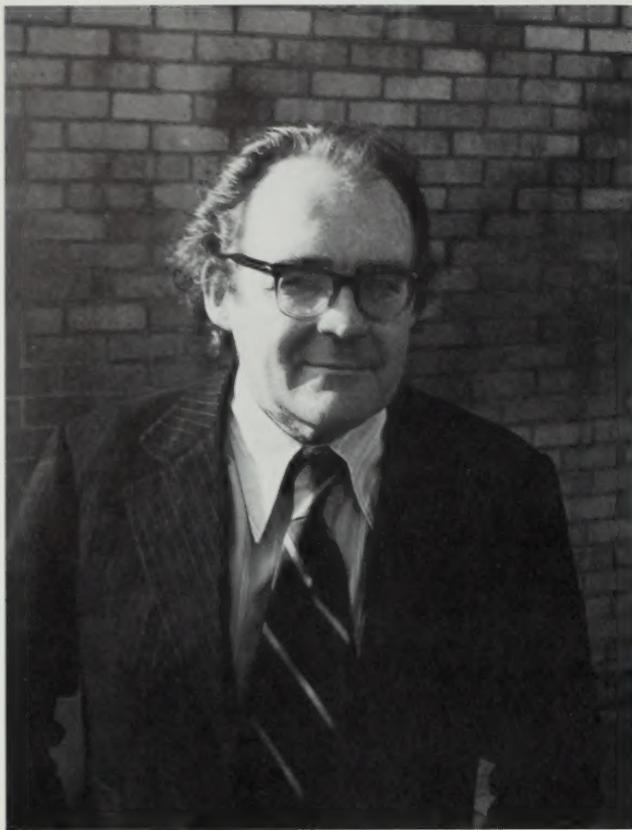
During the Agassiz period, much of the material accumulated was never properly curated and eventually dried up or rotted and was discarded. A great amount was sent on exchange to other museums, and the work of identifying, curating, finding and arranging space for the immense accumulation was beyond the Museum's resources. Those responsible for the collections found themselves devoting almost all of their time to curating, sending off specimens, or preparing anatomical preparations and exhibits. However, the staff members published extensively on the collections. Among the most important accessions to the collection during this time were Felipe Poey's types of Cuban fishes and the Indian fresh-water fishes of the Rev. M. M. Carleton and Sir Francis Day, fishes from the Thayer and Hassler Expeditions. The Thayer Expedition yielded what has been described as the greatest collection of Amazonian fishes ever assembled.

During the period in which Samuel Garman curated the collection, the rate of accumulation of new material gradually slowed. Exchanges continued to increase in number and many type specimens were acquired. Among the most important accessions were types of Chinese fishes from the Lyons Museum, deep-sea fishes including types from the "Talisman" and "Travailleur" expeditions, and British Guiana fishes including many types from Eigenmann.

Nicholas Borodin headed the Collection from 1928 through 1936. During his time he published a number of papers, describing new species from various parts of the world and attended to some of the curatorial work heretofore neglected.

It was not until the appointment of W. C. Schroeder (1936-1959) with the aid of Mrs. George Dick that major curatorial tasks were initiated (see: "Ichthyologist Appointed"). Since this time, many scientists have published extensively on these works. However, lack of funds did not allow for adequate care to be given to the collections.

The NSF Grant makes possible the realization of the maximum care and use of these valuable collections by the scientific community of the world.



John Maddox.

EDITOR OF NATURE TO DISCUSS "DOOMSDAY APPROACH" TO THE ENVIRONMENT

The Friends of the MCZ and the Harvard community will be treated to a very unusual lecture on April 10th when John Maddox, Editor of *Nature* since 1966, will speak on the prevalent "doomsday approach" to the problems of the environment put forth by many researchers. Dr. Maddox is the author of *The Doomsday Syndrome* (1972), *Revolution in Biology* (1964), and *The Spread of Nuclear Weapons* (with Leonard Beaton) (1962). The distinguished speaker was educated at Christ Church, Oxford; King's College, London. He was Assistant Lecturer, then Lecturer in Theoretical Physics at the University of Manchester from 1949-1955. He served as Science Correspondent for the *Guardian* from 1955-1964. He had served as an Affiliate of the Rockefeller Institute in New York and Assistant Director of the Nuffield Foundation and Coordinator of the Nuffield Foundation Science Teaching Project.

A THANKS TO RICHARD EATON

Richard Eaton, author of *A Vascular Flora of Concord*, recently examined all of the specimens collected by Harvard workers to determine the accuracy of taxonomic identifications. The material is representative of species in the area of the Concord Field Station.

PROFESSOR PATTERSON LEADS EXPEDITION TO SOUTH AMERICA

The first of two major expeditions to South America, headed by Professor Bryan Patterson (see *MCZ Newsletter*, Volume I, number 2) and supported by the National Science Foundation, yielded rich finds of fossil vertebrates from Pliocene deposits in northwestern Venezuela — nine thousand pounds of material has been shipped to the Museum. Included are at least five different types of crocodiles, some of them of gigantic size, various mammals, and six or seven types of turtles. Of particular interest was the discovery of two specimens of an enormous extinct pelomedusid turtle. Comparisons show that these are the largest fossil turtles ever discovered.

Accompanying Professor Patterson was a former student, Professor Roger C. Wood, presently of Stockton State College, Arnold D. Lewis, Chief Preparator of the Paleontological Laboratories of the Museum, and Ph.D. candidate Dan C. Fisher. Two Stockton students also participated in the expedition and two are currently assisting in preparation of the material.

A second expedition, to the Amazon Basin in Brazil, is planned in order to broaden knowledge of fossil vertebrate faunas from northern South America.

GREAT SLAVE LAKE IS SITE OF PRECAMBRIAN RESEARCH

Stanley Awramik, Ph.D. candidate in Invertebrate Paleontology, participated in a field trip to Great Slave Lake, Northwest Territories, Canada, organized by the XXIV International Geological Congress. Stan investigated Middle Precambrian (2 billion year old) stromatolites in terms of his research on biological-ecological interpretation of their morphology.

The formations of the Great Slave Supergroup may represent one of the most fossiliferous sequences known. Individual stromatolite columns approach 50 feet in height comprising mounds hundreds of feet thick and have been traced for more than 150 miles along almost continuous outcrop.

CHUCK SCHAFF CONDUCTS STUDIES IN BIG HORN BASIN

Chuck Schaff, Curatorial Associate in Vertebrate Paleontology, led a field expedition to the Big Horn Basin of Wyoming and Montana and explored new sites yielding Jurassic and Cretaceous vertebrates. Among the finds was a complete skeleton of a 15-foot long dinosaur *Tenontosaurus tilletti*, an Early Cretaceous herbivore. Collection of this specimen will be a major task, and plans for such an undertaking are currently being made. Funds for the collecting and preparation of the specimen are not as yet forthcoming.

Alfred S. Romer
"The vertebrate as a dual animal, somatic and visceral"
24 March 1971

RHYMES FOR ROMER

*To an osteoscholar like Romer
The word "ploughshare" is not a misnomer
For a bone by the naris
(That's the hole where the air is)
The dermal and palatal vomer.*

Bryan Patterson
"Something about aardvarks"
28 April 1971

DOGGEREL IS AARD VARK

*A remarkable beast is the aardvark.
It speaks softly and not with a hard bark.
Some think its song sweeter
But no it ant-eater
The sticky tongue makes it a marred lark.*

Robert L. Trivers
"Sexual selection in Jamaican *Anolis* lizards"
8 December 1971

TRIVIA FOR TRIVERS

*The male of an anole named garmani
Is subject to sexual selection.
He seeks an existence of harmony
And the chances to make a connection.

To do this he must defend holdings
(Which are plots for becoming attractive)
By resorting to dewlap unfoldings,
Being robust, and generally active.

He must be a competitive wizard,
Yet succeed in enticing a friend
Who will mate him. But being a lizard,
He does it by halves in the end.*

Guy L. Bush
"Sympatric host race formation in true fruit flies
(Tephritidae)"
16 February 1972

A NEO-DARWINIAN YELL

*Two, four, six, eight . . .
How do species speciate?
—patrically! —patrically!
Allo—! Para—. Sym—?*

Rolla M. Tryon, Jr.
"Geographic speciation in tropical American ferns"
12 January 1972

A FEW FIDDLEHEADED FACTS ABOUT FERNS

*A tree may be a prologue when it has a hyper bole.

The prothallia of ferns are always haploid.
They produce distinctive gametes, in their hearty sexual
role,
Which when wet can meet and fuse to form a diploid.

Up springs the frondly sporophyte, with rhizome, root, and
rachis
And a meristem that's apical and tight.
It uncoils; and on the leaves that are preparing for meiosis
Sporangia in clusters make a very sori sight.*

Stephen Jay Gould
"The relationship between ontogeny and phylogeny"
6 October 1971

ONTOGENY AND PHYLOGENY

*In the beginning is the end;
But ends unfold, becoming strange.
Lives — and generations — suffer change.
The tested metabolic paths will tend
To last and shape the range
Of future evolution from the past.*

In connection with the showing of a documentary film on continental drift, I unearthed the following piece (which dates from 1962); but it never got off the ground because of some problems in starting the film smoothly.

DESERT RANGE

*My faults are quiet now.
I rest in sprawling sunlight
And dusty devils try my dirty flanks
While I try to recollect the high bright
Spirits of my youth. How*

*If those angels saw my angles now
Bahada-bathed in soiled rock
Would they still sing? Could they
Do anything but mock?*

*For naturally I gave myself away
To fanfare, smiling at first as it caressed
My foot. But then*

*My fans arose and coalesced
To my own detriment. And still I must endure*

This wearing slow return to ancient orogen.

Ronald Munson
"Is biology a provincial science?"
6 December 1972

PROVINCE OF BIOLOGY

*The scientist and artist both create,
But the latter makes the better loner.
The fact that each is bound to be a goner
Is not a lively subject for debate.*

*Simpson said taxonomy is art as much as science.
Well, by most biologists, the systematics is eschewed
And rarely swallowed. For some, their thoughty food
Involves a mix of math and life in an ethereal alliance*

*About as holy as a sieve. If all of life without and in shall
Not be readily reducible to quantitative theory,
It may be fair that Ronald Munson, here, should query
"Is the science of biology provincial?"*

Joel E. Cohen and Thomas W. Schoener
"Species-area relations on archipelagoes: new findings and models"

10 January 1973

BIOMODELS

*A model in its elegance
Is better than reality
Its graphical simplicity
Denotes a rare intelligence.*

*The simple graph incites the wrath
Of field men who, half undressed,
Go rushing out to start a test
Which culminates in aftermath.*



Photo by Sarah N. Burns.

Professor Burns on a Roman cobblestone path in the mountains above Monaco.

NOTED INSECT PHYSIOLOGIST TO ADDRESS FRIENDS OF THE MCZ

A truly distinguished Harvard professor, Carroll Milton Williams, will present a lecture to the Friends of the MCZ and the Harvard community on February 13th, 1973. His discussion is entitled "Everything You Wanted to Know About Insect Hormones . . . but were Afraid to Ask."

During his career, Professor Williams has made several major contributions to the understanding of the endocrine control of insect development. He first defined the action of the prothoracicotrophic hormone from the brain of the cecropia pupa as a necessary component for postembryonic growth and development. In a series of experiments Professor Williams discovered the pupal diapause of cecropia could be broken by chilling the pupae for a certain period of time and then returning them to room temperature. Unchilled pupae were not able to terminate diapause and develop into adult moths. He then grafted together chilled and unchilled pupae and maturation of both insects occurred simultaneously. Williams then removed individual organs from previously chilled pupae and implanted them into unchilled pupae. Only the brain was active when tested in this manner. In further experiments he traced the source of the hormone to 26 secretory nerve cells embedded in the tiny mass of the pupal brain. Confirmation of the brain's endocrine function was made through the discovery that pupae deprived of brains were incapable of developing to the adult stage. Pupal diapause could be terminated only through reimplantation of a brain obtained from a previously chilled pupa.

In the course of his studies Williams developed several unique techniques for performing surgery on insects. Chief among these was his development of a method for the continuous carbon dioxide anesthesia of insects during surgery — a technique soon adopted the world over. In one such surgical maneuver Williams subdivided unchilled pupae into front and rear halves and implanted a chilled brain into both sections. The front end remained fully sensitive to the implantation and promptly developed into the anterior end of an adult moth. But the posterior end failed to respond, suggesting that another endocrine gland might be present in the front end to collaborate with the brain in controlling the development of the insect.

Further experiments involving implantation of organs into isolated posterior ends identified this second endocrine organ — a pair of prothoracic glands. The discovery indicated that insects are equipped with a miniature endocrine system in which the "brain hormone," or prothoracicotrophic hormone, acts on the prothoracic glands to provoke the secretion of a second hormone which then acts throughout the insect to cause the completion of metamorphosis.

In 1953 Dr. Williams collaborated with the German chemists, A. Butenandt and P. Karlson, in the isolation of 70 mg. of the prothoracic gland hormone from a half ton of silkworms — the first hormone to be isolated in pure form from any invertebrate. The hormone was named

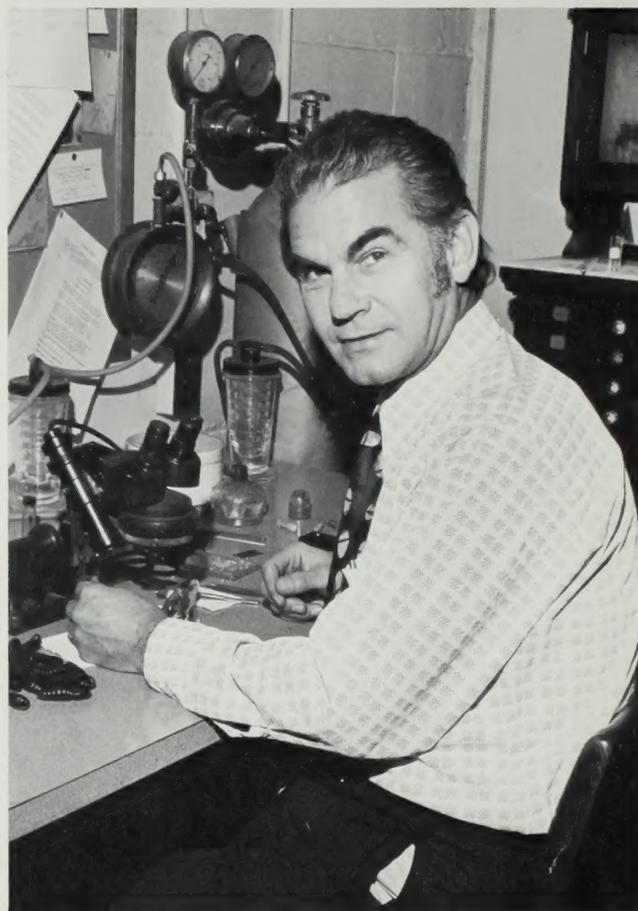


Photo by A. H. Coleman.

Professor Williams in his laboratory.

"ecdysone." After the chemistry of ecdysone was clarified and a chemical synthesis was achieved, a synthetic hormone was produced. Professor Williams performed the first biological tests of the synthetic hormone and found that it displayed the same high activity as the authentic ecdysone which Karlson had originally extracted from the silkworms thirteen years before.

After ecdysone is released from the prothoracic glands, it acts on the epidermis to cause its retraction from the old cuticle and the initiation of DNA synthesis and cell division in the epidermal cells, culminating in the synthesis of new cuticle. The type of cuticle produced is determined by the strength of concentration of a third hormone necessary for metamorphosis of insects. This hormone, which is secreted by the corpora allata, is called juvenile hormone (JH). When JH is present, the molt is to another larval instar. However, if no JH is present, an adult is formed. A low but finite amount of JH causes the formation of the pupa.

The next major discovery of Professor Williams was that the male cecropia moth contains a rich supply of juvenile hormone. He obtained the first active hormonal preparations through ether extractions of male abdomens. Juvenile hormone proved to be a neutral, water-soluble lipid which blocks metamorphosis when injected into immature insects. Further, he found that the oily extract, when placed on the unbroken skin, promptly penetrated it. Exposure to juvenile hormone had the net effect of preventing metamor-

phosis and causing death in all insects that came in contact with it. In 1956, Williams reported these findings and called attention to the promise of juvenile hormone as the first of a new generation of hormonally active insecticides — agents with selective lethal effects on insects but without any effects on other forms of plant and animal life.

In a recent work by Professor Williams, K. Slama and L. Riddiford, it was found that the juvenile hormone materials block the embryonic development of insect eggs. Therefore, it appears that materials with juvenile hormone activity constitute extremely effective ovicides.

Professor Williams received both his Ph.D. and M.D. degrees from Harvard and has been a member of the faculty since 1946. He was the first person named Benjamin Bussey Professor of Biology at Harvard (1966-). He was Chairman of the Department of Biology from 1959-1962 and has been Chairman of the Subdepartment of Cellular and Developmental Biology since 1972. He is Chairman of the Section of Zoology of the National Academy of Science, a member of the American Philosophical Society and a Fellow of the American Academy of Arts and Sciences. He won the Newcomb Cleveland Prize of the AAAS in 1950 and the George Ledlie Prize in 1967. The Prize is given every two years to the member of the faculty who has made "the most valuable contribution to science or in any way for the benefit of mankind." In 1969, he was awarded the Howard Taylor Ricketts Award of the University of Chicago.

ERNST MAYR CHAIRS SYMPOSIUM AT MONACO CONGRESS

Professor Ernst Mayr recently chaired one of seven symposia at the XVIIth International Congress of Zoology which met in Monaco. The symposium was entitled "The Characters of the Higher Taxa, Their Origin and Biological Significance."

Zoological Congresses are among the oldest of all international congresses, having first met in 1889 and have played a major role in preserving the unity of zoology. The first International Zoological Congress Prof. Mayr attended was held at Budapest in 1927. This is where he met Lord Rothschild and with him, arranged his first New Guinea expedition.

The symposia at the Monaco Congress dealt with currently active problems of science such as the "Biogeography of former connections between continents", "The biological effects of man-made interoceanic canals", and "The ecological aspects of behavior". In view of the difficulties in organizing such meetings it was feared that this might be the last international zoological congress. In order to prevent this, if possible, a committee of 12 was appointed, with Prof. Mayr one of the members, to examine the possibilities of organizing future interdisciplinary congresses under the auspices of the International Union of Biological Sciences.

ICHTHYOLOGIST APPOINTED

Mrs. George (Myvanwy) Dick has been appointed Ichthyologist in the Museum. In this position, Mrs. Dick will also serve as advisor to the care and utilization of the extensive collection of the Ichthyology Department. Her main area of concern, however, will be the preparation of a type catalogue of holdings, which will be published. Such a list should greatly increase the volume of requests for loan of type material in the Museum's possession. The project will include the completion of a thorough search for type specimens in the general collection, a check of all original descriptions against the type specimens and their labels, as well as an alphabetical listing of the families and the species under each family. Entries will include the name of the species as it was originally proposed, citation of the original literature, type locality, taxonomic status, and standard length of the specimens. An alphabetical index will complete the catalogue.

Mrs. Dick, who came to the Museum in 1941, is particularly qualified for this position. Under the direction of W. C. Schroeder, who headed the collections from 1936-1959, she contributed significantly to major curatorial tasks such as cataloguing, segregating the types, and arranging the collections. The card filing system now used to locate specimens was instituted by her.

The appointment of Mrs. Dick represents an important development in the effort to expand the knowledge and use of these collections to the scientific community.

Mrs. Dick resides with her husband in Harvard, Massachusetts.



Myvanwy Dick, Ichthyologist



Lack of transportation between the Concord Field Station (C.F.S.) and the MCZ is limiting student use of the Estabrook Woods and C.F.S. laboratories and classrooms. Funds are needed to acquire a vehicle so that a regular shuttle service can be established. Most of the costs of running such a vehicle could be covered by course budgets.

PROFESSOR EVANS RETURNS FROM THREE MONTH RESEARCH EXPEDITION TO AUSTRALIA

Alexander Agassiz Professor Howard Evans recently returned from a three month expedition to Australia where he continued his research on the comparative behavior of the Australian sand wasps. While in the country, he also delivered a paper at the XIV International Congress of Entomology. Professor Evans worked in three areas of the continent. In Northern Territory he was assisted by his former student, Dr. Robert Matthews. He then went with an expedition from the South Australian Museum into an extremely remote area, an Aboriginal preserve in the center of the continent, where few if any zoologists have previously studied. In the tropical parts of Queensland, Professor Evans worked with Professor O. W. Richards from Imperial College of London, a specialist on social wasps. Evans and Matthews worked primarily on the genus *Bembix*, of which there are about 80 species in Australia. One of their discoveries was that certain species are not as host-specific as had been supposed. These animals' behavior patterns were filmed by Professor Evans and will be shown at the Concord Field Station on February 7th, in a seminar entitled "Comparative Behavior of Australian Sand Wasps."

HERBARIUM DONATED TO THE CONCORD FIELD STATION

A Concord resident, Laurence Eaton Richardson, has donated a herbarium to the Concord Field Station. It will serve as the basic botanical reference collection for people using the Concord facility. The collection was begun around 15 years ago and contains about 1120 specimens. It also includes some collections of Horace Mann, Jr., dating from about 1862, miscellaneous specimens from Vermont, Maine, and New Hampshire, and a few exchanges made by Richardson over the years. Richardson has also donated a case in which to house the specimens. Of special significance to the Field Station is his collection of aquatic plants. Last summer a group of workers under the supervision of Ph.D. candidate, Warren Abrahamson, collected 400-500 species of plants in the Estabrook Woods. Because of this generous gift and the recent work of Harvard students, the field guides and scientific keys now present at the Field Station may receive maximum use.

FRIEND PUBLISHES ORNITHOLOGICAL WORK

Edward S. Gruson, Treasurer of the Friends of the MCZ, has just published *Words for Birds: A Lexicon of North American Birds with Biographical Notes* (1972).

The work has recently received favorable reviews from various media sources such as Station WCRB in Boston, the *Texas Ornithological Bulletin*, and the Massachusetts Audubon Society publication, *Man and Nature*.



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