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BOTANICAL MUSEUM LEAFLETS

HARVARD UNIVERSITY

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THE BOTANICAL MUSEUM OF HARVARD UNIVERSITY IN ITS 125th YEAR 1858-1983

The year 1983 marks the 125th anniversary of the founding of the Botanical Museum of Harvard University. It seems, therefore, appropriate to review the present state of the Museum from the point of view of its academic, research and public activities.

The Botanical Museum is one of five institutions at Harvard devoted to the plant sciences, its sister institutions being the Gray Herbarium, the Farlow Herbarium, the Arnold Arboretum and the Harvard Forest. Each is devoted to different aspects of botany. The Museum's fields of activity—economic botany (including several types of ethnobotany), paleobotany and orchidology—are diverse and, in scope, world-wide. They are likewise strongly interdisciplinary in character, basically biological but impinging upon other fields of science and the arts: anthropology and archaeology, chemistry and pharmacology, history, geology, horticulture, to mention only several.

Partly as a result of the wide orientation of the work of the Museum, research by members of its staff and students has attracted attention in fields other than the plant sciences, sometimes in fields distant from botany. It is particularly noteworthy

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MISSOURI BOTANICAL

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GARDEN LIBRARY

that all of the areas of teaching and research in the Museum are marked by this peculiarity of integrating material from and impinging upon several other disciplines.

The Botanical Museum dates from 1858, when Asa Gray wrote to Sir William Hooker, Director of the Royal Botanical Gardens at Kew: "I must tell you in humble imitation of Kew I am going to establish a Museum of vegetable products, etc., in our University." Hooker sent over duplicate economic botany materials from Kew, and these became the nucleus of a collection that grew in a somewhat desultory manner until 1878, when its care was added to the many other duties of Professor George Lincoln Goodale. Goodale saw this as the "germ of something large and fine"* and felt "...that such an assemblage, freed of casual elements and constructively developed along economic lines, might function both as illustrative material for the teacher and as a reference collection to which even the specialists might turn for much-needed information—a place where rare drugs could be identified or unusual fibres compared."*

The University named Goodale first director of the Botanical Museum in 1888, and the building of the Museum was completed under his direction in 1890. The period of active life of the Museum dates actually from the naming of its first director. Not the least unique aspect of this active life was the creation from 1887 through 1936 of the widely known Ware Collection of Blaschka Glass Models of Plants which constitutes today, in addition to its basic function as an adjunct in teaching botany, the major public attraction in the University.

Over its century and a quarter history, the Botanical Museum has grown into one of the world recognized centres of research in the plant sciences. Yet its reputation has developed differently from that enjoyed by many other outstanding botanical institutions, in part because the Museum's research, exploration and teaching, both university and public, are interdisciplinary in nature, transcending the usual strict boundaries of the plant sciences. During the past half century, these aspects of the Museum's activities have enjoyed an especially steady develop-

*Samuel Eliot Morison (Ed.) "The development of Harvard University, 1869-1929," Harvard University Press, Cambridge, Mass. (1930).

ment and expansion with the impetus given by the second and third directors of the Museum, Professor Oakes Ames and Professor Paul C. Mangelsdorf, respectively.

RESEARCH

Research is a major keynote of the Museum's philosophy. It is carried out not only in the laboratory, herbarium and library, but also in the field. Every aspect of the Museum's research involves field work or extensive exploration in a great variety of regions, including Mexico, the Andes and Amazonian parts of South America, Greenland, Canada, South Africa, Australia, Afghanistan, to name only a few of the areas where the staff and students have worked. It has also involved research in agricultural experimental fields. Lastly, certain aspects of its research have concerned historical and archaeological aspect of ethnobotany.

TEACHING

The Museum's teaching activities have materially enriched the course offerings in Harvard's Department of Biology on both the undergraduate and graduate levels. Recent courses by its staff have introduced students to the complexities of evolution of crop plants, paleobotany and the evolution of plant life through geological time. The country's oldest course in economic botany, currently known as "Plants and Human Affairs," has strongly influenced many of its students who have continued in academia, in science, in industry and in medicine. Numerous courses in various specialized phases of economic botany and the effect of plants on history have during the past twenty years been offered to the public in Harvard's Commission on Extension. The course "Plants and Human Affairs" has also been taught on several occasions in Harvard's Summer School program and advanced courses in medical botany have, until recently, been part of the offerings of the Department of Biology.

Graduate student doctoral research supervised by the Museum staff has encompassed a wide spectrum of topics in paleobotany (Precambrian evolution of life, Pleistocene vegetation patterns

in Eastern North America and Central America, the anatomy of Tertiary woods and fruits), economic botany (ethnoecology of Amazonian and Mexican tribes, generic monographic treatments of economic plants of tropical America, ethnobotany of Andean Indians, biological studies of maize and its relatives) and in orchidology.

EXHIBITS

One purpose of a museum is public service, providing a link between specialists and the public. In this activity, the Botanical Museum has excelled throughout most of its century and a quarter of existence. Although devoted primarily to university teaching, its exhibits have always been open to the public. Although now drastically limited, due to recent severe space restrictions, they still continue to draw more than 100,000 visitors a year from all parts of the world. Millions know the Museum as the home of the "Glass Flowers," officially called the Ware Collection of Blaschka Glass Models of Plants. Another exhibit presents pioneering research carried out by the Museum staff and students on Pre-Cambrian plants variously dated at from 3,000,000,000 to 3,400,000,000 years of age.

Until recently, two rooms housed extensive exhibits of economic plant products (including a large collection of ambers and Chinese laquer-ware), and an entrance hall presented displays of ongoing Museum research on the origin and biology of maize, on archaeoethnobotany and on narcotic and hallucinogenic plants of the New World. These widely acclaimed exhibits were unfortunately dismantled due to a reshuffling of space and its loss to the Botanical Museum.

ECONOMIC BOTANY: ETHNOBOTANY

The Museum's oldest field of interest, going back to the very founding of the Museum in 1858, is economic botany which is at present based on several unique collections, especially on the Laboratory of Economic Botany with its collection of economic plant products and herbarium of economic plants and on the

Economic Botany Library of Oakes Ames, comprising over 30,000 titles.

The term, economic botany, has always been broadly interpreted in the Botanical Museum to signify interdisciplinary studies on plants useful or harmful to man: consequently included are not only those plants of value to our modern agricultural and industrial civilization but also the often complex relation of primitive or pre-literate cultures to their ambient floras.

The introductory course in economic botany—"Plants and Human Affairs"—has been taught since 1876 and is now offered annually to graduate and undergraduate students of Harvard University and Radcliffe College. The most widely used textbook in this field—Hill's *Economic Botany*—was written at the Museum by a member of the staff and is based on the current Museum's collections and library. Throughout its history, various workshops, symposia and seminars in topics in economic botany have been held in the Museum and, under the sponsorship of the Museum, in South America.

Studies in economic botany in the American tropics have been extremely constant and productive. Of special and novel interest has been the ambitious search through the 4,500,000 specimens in the Harvard University herbaria for collector's notes on the native uses of foods and medicinal plants—research which has resulted in an extremely successful book.

Investigations into the economic botany of numerous commercially important groups of plants have characterized much of the Museum's recent effort: Hevea and other rubber-producing plants; Brugmansia, Erythroxylon, Theobroma, Cannabis, to name only several.

One major aspect of economic botany has been the extensive archaeological, morphological, taxonomic and genetic research on the origin of cultivated plants, especially maize, in the studies of which a unique group of scientists spent over a quarter of a century investigating the origin, evolution, structure, history and other aspects of this major cereal, including research on remains of primitive maize from Mexico and South America. Furthermore, advanced courses have been offered on the origin of other cultivated plants.

Ethnobotany, or the study of the relationship of plants and primitive societies, has played a significant role in the Museum's economic botany programme. During the past fifty years, intensive ethnobotanical studies have been carried forth, especially in tropical America. These have encompassed field and laboratory investigations in ethnopharmacology, ethnoecology, ethnomycology and archaeoethnobotany, concentrating particularly in the study of medicinal, narcotic and toxic plants. The investigations have been carried out primarily in Mexico, Colombia, Ecuador, Brazil and Peru, although the research in ethnomycology has been much wider.

Since the 1930's, one of the specialized branches of ethnobotany that has been seriously pursued is ethnomycology—the relationship of fungi and human affairs. Research in this field has been carried out in the United States, Mexico, Japan, India, and Europe.

The Museum's facilities in archaeoethnobotany—the study of archaeological plant remains and their significance to both plant evolution and man's social and cultural evolution—have attracted scholars from far and wide. The research in archaeoethnobotany has been especially focused on Peru and Mexico, particularly on specific crop plants such as maize, including the origins of agriculture in these countries. This effort has led to the creation of an extensive study collection of archaeological plant remains, one of the few in the United States, and to the publication of significant books and articles in this neglected field. Recent research on vegetal remains in Egyptian, Peruvian and Aleutian mummies has been a novel undertaking of the Ethnobotanical Laboratory.

The most recent development has been the initiation of active effort in conservation in cooperation with the World Wildlife Fund. An Ethnobotany Specialist Group has been set up to bring together ethnobotanists from around the world in the realization that folklore concerning plants and their uses is fast disappearing with the encroachment of civilization. This programme is a logical extension of the Museum's longstanding ethnobotanical activities.

PALEOBOTANY

Another long established part of the Museum is the Laboratory of Paleobotany. The collection of fossil plants, constituting one of the most valuable of the world because of its wealth of type specimens, has been the basis of research in plant evolution for nearly a century. Linking botany and geology, Harvard's paleobotanical research has in recent years studied the oldest forms of life yet discovered, some specimens dated at more than three billion years of age.

The staff and students of the Laboratory of Paleobotany have been active in field work in sundry parts of the world: North America, Greenland, South Africa, Australia.

THE BAILEY-WETMORE LABORATORY OF PLANT ANATOMY AND MORPHOLOGY

Although the Wood Collection, basis of the Bailey-Wetmore Laboratory of Plant Morphology and Anatomy, is not exclusively a part of the Botanical Museum, it is housed in the museum. This facility represents the union of wood samples from the Biological Laboratories, the Gray Herbarium, the Arnold Arboretum, the Harvard Forest and the Botanical Museum—the second largest scientific wood collection in the United States. It is under the direction of a committee of representatives of the several institutions.

ORCHIDOLOGY

The Orchid Herbarium and Library of Oakes Ames, comprising a collection of more than 100,000 herbarium specimens and many thousands of spirit collections of orchids from every continent and an associated library of some 5,000 titles, represents the world's largest herbarium devoted to a single plant family. Originally dedicated mainly to purely taxonomic and floristic research, its importance to wider fields of research has recently been established in such disciplines as cytology, genetics, phytochemistry, phytogeography and horticulture. Members of the staff of the Orchid Herbarium have, during the past half century

or more, carried out exploration in many parts of both hemispheres, especially in the tropics.

Although the staff of the Orchid Herbarium is concerned primarily with taxonomic and floristic investigation, it offers valuable consultative services to orchidological horticulture.

THE ECONOMIC BOTANY LIBRARY OF OAKES AMES

This unique library of some 30,000 titles is topically indexed to uses of plants as well as to names of plants. Basic to the teaching of various aspects of economic botany, it is organized especially for student use. It is, however, a research tool of extreme importance, consulted by students and scholars from many fields at Harvard and by researchers from other universities in the greater Boston area. It is completely interdisciplinary in scope, organization and aims.

THE TINA AND GORDON WASSON ETHNOMYCOLOGICAL COLLECTION

Given to the Botanical Museum by Dr. R. Gordon Wasson and dedicated in February, 1983, this collection represents the only facility in the world set up specifically for research in the history and influence of fungi in human affairs. It is basically an interdisciplinary library of approximately 8000 titles, including sundry items in foreign languages that are not often found in this country and numerous valuable rare herbals and other volumes published in medieval Europe.

Associated with the library is a collection of art and archaeological artifacts: carvings of mushrooms in jade, ivory, bone and wood from Asia; stone "mushroom gods" from Guatemala, some dated approximately 600 B.C.; a 2000-year-old Mexican shaman communing, with her hand on a large mushroom; Japanese and Chinese paintings; posters; drawings; American Indian documents; and other objects.

This collection is available to research scholars whose interests lie in studies of the role that fungi have played in civilization.

PUBLICATIONS

The BOTANICAL MUSEUM LEAFLETS OF HARVARD UNIVERSITY, now in its 29th volume, has been a major outlet for the scientific papers of its staff and students. Printed until recently on our own press, it has published papers of worldwide interest with many novelties and discoveries in orchid taxonomy, new genera and species of tropical America, origin of cultivated plants, economic botany, Amazonian ethnopharmacology, ethnobotany, ethnomycology, phytochemistry and paleobotany. The staff has likewise published over the years a large number of books in these fields, a number out of all proportion to its small size. Especially notable is the production of books in orchidology, for the orchid floras of a large percentage of New World countries have been the products of the Botanical Museum: North America, Trinidad and Tobago, Mexico, Guatemala, Venezuela, Ecuador, Peru, lesser Antilles and Okinawa.

COMMEMORATIVE EVENTS DURING 1983

During this 125th year of the Botanical Museum, several events in recognition of the anniversary have been planned and carried out. In February, the Tina and Gordon Wasson Ethnomycological Collection was dedicated. The halls and cases where the Glass Flowers are exhibited were air-conditioned for control of humidity to safeguard the models, some of which are nearly a century old, from dust and deterioration. The first extensive book on the Glass Flowers, illustrated with 85 colour photographs of the models and published in December 1982, was made available to the public at the sales desk of the Museum.

The Botanical Museum is a small institution, yet its influence has spread far and has been felt in many circles, primarily because of the interdisciplinary character of all of its teaching and research. It proudly takes its place among the institutions dedicated to the advancement of botany around the world.

THE STAFF OF THE BOTANICAL MUSEUM IN 1983

- Richard Evans Schultes**, Ph.D., M.H.(hon.), Jeffrey Professor of Biology; Director; Curator of Economic Botany.
Paul C. Mangelsdorf, Ph.D., Fisher Professor of Biology Emeritus; Director Emeritus.
Elso S. Barghoorn, Ph.D., Fisher Professor of Biology, Curator of Paleobotanical Collections.
Leslie A. Garay, Ph.D., Curator, Orchid Herbarium of Oakes Ames.
Andrew H. Knoll, Ph.D., Associate Professor of Biology.
Howard J. Allgaier, Printer.
William A. Davis, M.A., Keeper of Scientific Exhibits.
Mary R. Gaudet, Staff Assistant.
Katheryn M. Harrow, Staff Assistant.
Scott E. Wilder, B.A., Curatorial Assistant.
Doris E. Ward, Typist - Secretary.
Wesley Y.Y. Wong, M.A., Library Assistant.

ADJUNCT APPOINTEES

- Loran C. Anderson**, Ph.D., Associate in Economic Plants.
Michael J. Balick, Ph.D., Associate in Plant Domestication.
Umesh C. Banerjee, Ph.D., Associate in Palynology of Cultivated Plants.
Elizabeth A. Coughlin, M.L.A., Associate of Botanical Museum.
G.C.K. Dunsterville, B.S., Associate in Orchidology.
William A. Emboden, B.S., Associate in Ethnobotany.
Norman F. Farnsworth, Ph.D., Associate in Ethnomedicine.
Alvaro Fernández-Pérez, Quim. Farm., Associate in Medical Botany.
Thomas T. Furst, Ph.D., Associate in Ethnobotany.
Francis W. Hankins, M.E., Associate in Paleobotany.
Fritz H.P. Hamer, Associate in Orchidology.
Bo Holmstedt, Docent M.D., Associate in Medical Botany.
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Gunnar Seidenfaden, D. Phil., Associate in Orchidology.
Emly Steffan Siegerist, B.A., Associate in Orchidology.
John E. Stacy, M.A., Associate in Orchidology.
Tony Swain, Ph.D., D. Sci., Associate in Phytochemistry.
**Herman R. Sweet, Ph.D., Honorary Curator of the Oakes Ames
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**Margaret A. Towle, Ph.D., Associate Curator of Ethnobotanical
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R. Gordon Wasson, B. Litt., Associate in Ethnopharmacology.
Andrew T. Weil, M.D., Associate in Ethnopharmacology.
**Johannes Wilbert, Ph.D., Associate in Latin American Amerindian
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