

or to a great extent based on the resources of this herbarium and library. It can be said safely, if not boastingly, that with a very few exceptions, all orchid floristic studies, especially those of the New World, were prepared either at the Ames Orchid Herbarium, or were mostly based on the holdings of this institution.

The Ames Orchid Herbarium has, indeed, become a haven for those who seek critical information about the unique Orchid Family. Being at the cross roads of scientific and horticultural endeavors, the facilities of the Ames Orchid Herbarium are continually used by a large number of visitors, especially those from foreign countries. Among the holdings of the Herbarium, the Philippine and Mexican collections are the most extensive in the world. This truth is so aptly expressed by Dr. Valmayor in the preface written in August 1983, to her two-volume "Orchidiana Philippiana", after having spent a considerable time in the herbarium for the preparation of these books:

"The Ames Orchid Herbarium of Harvard University . . . is considered the mecca for Philippine Orchidologists, and this is because almost all the type specimens of Philippine orchids are represented in its collection. . . . Moreover, the Orchid Library of Harvard University is so extensive that almost all valuable early taxonomic books on orchids are to be found there."

May these kind words not only sum up the treasured history of this herbarium, but also keep on echoing it in every concerned heart for an unending and promising future.

Leslie A. Garay
Curator of the Herbarium

THE ECONOMIC HERBARIUM OF OAKES AMES AND THE TEACHING COLLECTION OF USEFUL PLANT PRODUCTS

One of the specialties of the Harvard Botanical Museum has long been the study of economic botany which includes ethnobotanical research. Extensive teaching and research in this inter-

disciplinary field have been carried on by the Museum staff for over a century. The course in economic botany, now entitled "Plants and Human Affairs", has been taught for 107 consecutive years by five educators; it represents the oldest course in the sciences at Harvard University and the oldest course on this subject possibly in the world.

Among the numerous facilities at the Museum which support teaching and research in economic botany, one of the most important is the Economic Herbarium of Oakes Ames. There are actually two separate Ames herbaria at Harvard: the Economic Herbarium located in the Botanical Museum, and the Ames Orchid Herbarium, now housed in the University Herbaria building.

The Economic Herbarium was presented to the University by Professor Oakes Ames early in 1940. Although a small herbarium of useful plants had existed previously from the collections of Professor Asa Gray and Professor George Goodale, it was Ames' efforts from the early 1900's to 1940 that assembled the beginnings of a significant and very specialized collection of herbarium specimens. The purposes of this herbarium were primarily for teaching and secondarily for scholarly research in economic botany and the ethnobotanical uses of plants. The species in this herbarium are designed to supplement, not duplicate, the extensive floristic collections of the Gray Herbarium and Arnold Arboretum; and with the Economic and Orchid Herbaria, Harvard's herbarium facilities total some 4,500,000 specimens.

The 125th anniversary of the Botanical Museum dates from 1858, when Asa Gray, Professor of Natural History at Harvard, received from Sir William Hooker, Director of the Royal Botanic Gardens at Kew, an acquisition of undetermined size of wood samples, pods, cones, nuts, witches' broom, palm trunks, monkey pots and other vegetable products of economic value for teaching purposes. During the following eighty years, the Botanical Museum grew to become an international centre where plant origins could be studied, drug plants identified and fibres compared. Under the ambitious guidance of Professors

George Goodale and Oakes Ames, the Museum's economic herbarium and products collection grew to nearly 10,000 pressed plants and 7000 vegetal products. Forty-three years ago, a description of the Economic Herbarium was published by Professor Richard Evans Schultes in *Chronica Botanica* v.6 (1940) pt. 4, p.90-91. The Herbarium's growth in scope and size during the ensuing years suggests the advisability of an updated account, and the 125th anniversary of the founding of the Botanical Museum provides an appropriate opportunity for such a review.

With the exception of ornamentals, the Economic Herbarium contains plants which are or have been useful or harmful to man, comprising both cultivated and wild algae, fungi, lichens, pteridophytes and spermatophytes. These general classes of economic plants are included: 1) plants of importance in agriculture (including the principal forage crops), industry and the arts; 2) plants used in primitive societies; 3) plants connected with superstition and religious rites; 4) plants of interest because of former uses or because of association with the old herbals; 5) wild species of significance because of their known or presumed association with the origin of cultivated plants and 6) voucher specimens of phytochemical analyses.

The Economic Herbarium which now numbers 41,000 sheets, has experienced a more than 200% increase in accessions since 1940. Arranged in accordance with the Engler and Prantl system, it comprises material of more than 500 families, 3300 genera and well over 11,000 species and varieties. Included in the Herbarium, as a supplement to the specimens, is a collection of 600 original drawings, watercolors and handcolored prints of economic plants. Another unique aspect of the Herbarium is the inclusion of over 300 photographs of the economically useful species from Harvard's Ware Collection of Glass Models of Plants. This superb public exhibit which is housed in the Botanical Museum and is used extensively for teaching botany by the various botanical institutions of the University, may be viewed as an adjunct herbarium in glass; it provides the scholar with 847 accurate three-dimensional species, including more than 2000 enlarged flower parts and cross sections.



The Herbarium contains material of value to monographers and general taxonomists, including a few types, numerous duplicate types, and drawings of types. There are extensive unique or rare collections which may be of critical or historical importance to students of taxonomy and floristics. *Ilex Warburgianum*, the Faurie, the Kunstler, the *Species Blacoanae* and other rare collections are among those of special interest. A complete herbarium of Maiden's *Useful Plants of Australia*, only a few sets of which are known, is preserved in the Economic Herbarium. Ruiz and Pavón's collection of *Cinchona* barks, a gift from the British Museum (Natural History), and other special generic collections have very significant historical value to students of economic botany.

The Herbarium was initially very rich in Asiatic material. During the past forty years, however, research programs and field work in tropical America have added ample collections from this new world region. The extensive collections of Schultes in Southern Mexico and South America, especially in the Amazon; and the ethnobotanical specimens basic to the studies among the Kamsá and Kofán Indians of South America by Dr. Melvin Bristol and Dr. Homer Pinkley respectively, have enriched the Economic Herbarium. Dr. Tommie Lockwood's collection of *Brugmansia* primarily from the Andes, and Dr. Timothy Plowman's extensive collections of *Erythroxylon* and *Brunfelsia* as well as many other general ethnobotanical species from Colombia and Peru have been added as valuable resource material to the Herbarium. The *Theobroma* specimens basic to the thesis of Dr. Wertit Soegang are available, and the material on oil palms, especially of the *Jessenia-Oenocarpus* complex, by Dr. Michael Balick, are included as well. Representative material of Dr. Doel Soejarto's extensive collection of South America *Saurauia* have been deposited in the Economic Herbarium; and among additional noteworthy collections from other areas are Vestal's ethnobotanical specimens from the Navajo Indians; Schultes' useful plants of the Kiowa of Oklahoma; and Miss Marjorie Whiting's plants of the Kung Bushmen of Botswana, Africa.

Numerous ethnobotanically important plants of the north-west Amazon, especially of the Apocynaceae, collected by Dr. James Zarucchi, have been added to the Economic Herbarium; and an ethnobotanical collection of the useful plants of the Ecuadorian Jivaro Indians made by Mr. Melvin Shemluck, and extensive ethnobotanical plant collections made by Mr. E. Wade Davis in South America, especially in Amazonian Peru and Ecuador, help to enrich the facility. Professor Robert Bye's research on the ethno-ecology of the Tarahumare Indians of Mexico, and Mr. Richard Martin's studies of medicinally promising plants of the Peruvian Amazon, both represent unique additions. More recently, collections of *Hevea*, *Micrandra*, and wood samples for anatomical analyses were made by Miss Kristine Forsgard in Brazil along the Amazon inland to the Rio Negro area; and Miss Lynn Bohs' collection of *Cyphomandra* throughout the Andes, basic to her research in that economic genus of fruits, have also recently been added.

Several specialized collections of voucher herbarium collections have been set up in the Botanical Museum for reference use by scholars—extensive collections devoted to a single genus or species which are or will be valuable to future monographic or analytic studies. Among these are Professor Paul Manglesdorf's extensive maize herbarium, Dr. Walter Hodge's collection of *Cinchona*, mainly from Peru, and several thousand specimens of *Hevea* and its relatives made by Professor Schultes in the Amazon Valley. Also available is a *Cannabis* collection of several hundred specimens from many different areas of North America, Europe and Asia, many collected from the National Institute of Health-sponsored cannabis plantation in Mississippi. The collection is comprised of material introduced and planted from more than 300 localities around the world; their classification basic to a modern interpretation of the genus *Cannabis*.

There are five other herbaria at Harvard University, and every attempt is made to avoid duplication in the Economic Herbarium of material available in other institutions. The specimens at the Botanical Museum are, however, equally available to both

monographers and specialists; and efforts are currently being made to send out material for annotation, citation in publications, and to fill in gaps in our representation of economic plants of the world. We believe that this specialized herbarium is and will remain basic to contemporary growth and interest in the teaching of and interest in economic botany.

The Economic Herbarium is catalogued under the Dalla Torre and Harms' genus number. It is closely integrated with an extensive collection of economic and ethnobotanical plant parts, including seeds, fruits, flowers, roots, woods, barks, oils, resins, rubbers and other vegetal products. This teaching collection of useful plant products numbers well over 14,000 entries and has had a 100% increase in accessions since 1940. Likewise available is a collection of 4000 habit photographs of economic plants, 300 related charts and graphics and a clipping file assembled over the past fifty years. All of these facilities are reinforced for teaching and research by the topically indexed interdisciplinary Economic Library of Oakes Ames with well over 35,000 titles.

A recent addition from the New York Botanical Garden is the collection of economic plants of Dr. Henry Rusby, dating from the early 1900's. Representing only a portion of Rusby's collected material, the 4000 specimens, stored in antique apothecary jars, is a unique part of a massive accumulation of medicinal and general economic flora from Arizona, New Mexico, Colombia, Brazil and the Lower Orinoco area. A preliminary examination of this outstanding collection by Miss Susan Rossi has already produced a long-lost type specimen of *Erythroxylon truxillense* and promises to yield other critical specimens.

The Curator of the Economic Herbarium from 1954 to the present is Professor Schultes. Since 1976, Mr. Scott Wilder has acted as Assistant to the Curator and Manager of Economic Botany Collections. He has revitalized the Museum's botanical holdings, has organized a separate and more effective collection of herbarium specimens for laboratory use in teaching, and rehabilitated exhibits in the Nash Lecture Hall where economic botany courses are taught. Graduate students, as part of their

training within the department, have undertaken to assist the Curator and Mr. Wilder in day-to-day management of the Herbarium.

The value of the Economic Herbarium of Oakes Ames and the teaching collection of Useful Plant Products lies in their importance as tools of instruction and research in ethnobotany and economic botany as well as being a repository for voucher specimens of chemical analyses of plants by schools of pharmacy and chemistry and pharmaceutical establishments. The Botanical Museum has provided 125 years of accessibility to students of botanical science, and the Museum's specialized collections offer a facility for research which might be difficult or impossible to satisfy in the larger and more generalized herbaria dedicated to a study of the floras of the world.

Scott E. Wilder
Curatorial Assistant

THE WARE COLLECTION OF BLASCHKA GLASS MODELS OF PLANTS

Millions of persons who have visited the Boston area remember Harvard University as the home of the "Glass Flowers." Exhibited on the third floor of the Botanical Museum are 18 glass models of orchids which are now almost 100 years old. They arrived from Germany in April of 1887 as part of the initial shipment of glass models of plants created in the studio of Leopold and, later his son, Rudolph Blaschka in the small town of Hosterwitz-bei-Dresden, the first of 850 models produced by these artists between 1886 and 1936 and sent to Harvard in 23 shipments.

The first few shipments of models numbered in the twenties because of part-time production. Later, when the Blaschkas worked on plant models full time, 50 to 60 were sent at one time. After Leopold's death in 1895, Rudolph working alone sent fewer models in each shipment, usually in the twenties and none in some years due to World War I and other interruptions.