

PALAWAN ISLAND
A MOSS REFUGIUM IN THE PHILIPPINES?

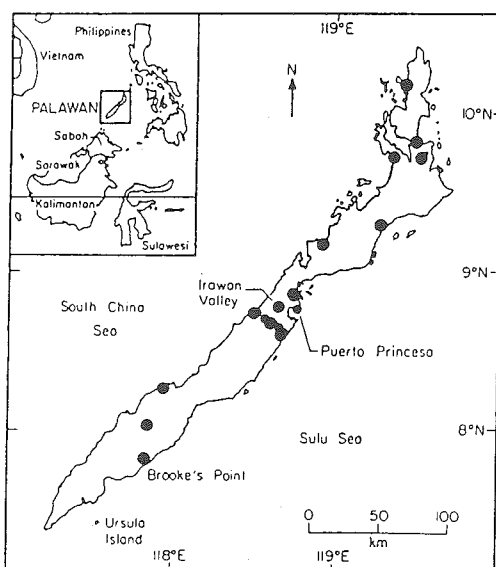
BENITO C. TAN

Palawan is the last forested frontier of the Philippines, an archipelago consisting of 7,100 islands. Botanically, it is also one of the least collected islands in the country. The elongate island is located at the edge of the SE Asiatic Sunda Shelf and is a mix of limestone and volcanic rocks. Its biogeographical interest lies in its proposed role as a land bridge during the Pleistocene permitting the exchange of both flora and fauna between Borneo and the Philippine islands proper (see map).

Palawan is also the island in the Philippines where several rare mammals, e. g., the mouse deer, the Calamian hog deer, the leopard cat, the binturong civet cat, the Malayan pangolin and the oriental small-clawed otter, survive today. These animals had their origin from Borneo and western Malesia.

The phanerogamic flora of Palawan is equally fascinating and understudied. In a three month survey conducted in 1984, a total of 151 species of seed plants were recorded as additions to the island. More than 15% of the island's flowering plant species are locally endemic. Its overall floristic affinity has been reported to be closer to Borneo than to the Philippine islands proper. In spite of the presence of such a unique and noteworthy biota, the island today suffers from a rapid rate of deforestation brought about by logging and slash-and-burn agricultural practices.

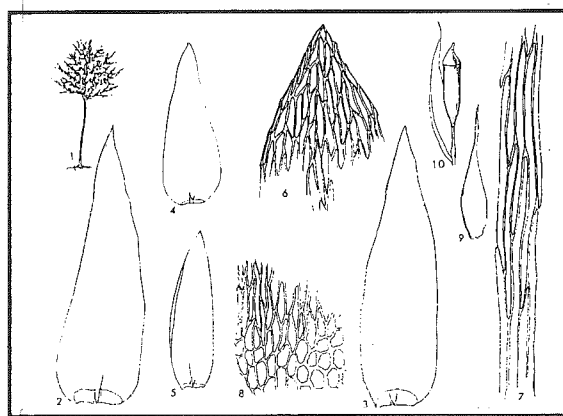
Two years ago I obtained a research grant from the National Geographic Society to survey the moss flora of Palawan with the aim of understanding its moss diversity and to test the hypothetical role of the island as a land bridge in the regional moss migration during the Pleistocene.



Location of Palawan Island in the Philippines.
Solid dots represent collection sites.

For a period of two summers, and with the help of former colleagues of the Department of Botany of the University of the Philippines, I travelled and collected bryophytes from the Brooke's Point area at the southern part of the island to the Calamian island group north of Palawan. Because of the construction of a road around the island funded by the World Bank, in recent years there has been an influx of landless peasants from adjacent islands. Within the short period of two years, I watched with an intense feeling of helplessness as a vast portion of the pristine, semi-deciduous lowland rain forest was burnt and cleared for crop planting by the new immigrants. At no time during my 10 years of field work in the country have I felt so strongly the threat of a large scale biological extinction. Frequently, my plan to survey a selected site, determined the previous year, had to be abandoned upon returning to the locality because the original forest cover had been turned into a large tract of smoking ashes.

In spite of all these difficulties, my collecting efforts have yielded substantial results. Thus far, I have recorded 65 species new to the island flora. I discovered eight species representing new records for the country and one species of *Horikawaea* new to science. The genus *Horikawaea* has a localized disjunctive distribution in Vietnam and the islands of Hainan and Taiwan, and is new to the Philippine flora. My joyful consolation is in finding living populations of six rare species of Philippine mosses, including *Euptychium setigerum*, *Symphysodontella obtusa* (see figure) and *Desmotheca apiculata*. The first two species are known in the Philippines from Palawan. The much expected Bornean elements in the island proved to be a disappointment. There are no endemic Palawan mosses since the new species that I found includes a collection from Hainan. The overall pattern of Palawan moss distribution is, I think, a good reflection of the greater dispersibility for long distance colonization of moss propagules over the seeds of angiosperms.



Symphysodontella obtusa Tix. The species is known from Vietnam, Sumatra, Borneo and Palawan (new to the island and the Philippines). From Magill, 1980, J. Hattori Bot. Lab. 48, fig. 9.

One surprising outcome, though, is the finding of several widely disjunctive Southeast Asiatic mosses present on the island. Examples are *Acorporium malayanum*, *Homalia arcuata* and *Rhapidostichum bunodicarpum*. These are the same xerophytic and calciphilous mosses reported from Indochina, the Malay Peninsula and South Malesia. Currently, they are not known from Borneo, Taiwan, or other parts of the Philippine archipelago. Their presence on Palawan island would seem to indicate either the successful occurrence of several long distance dispersal events or the existence of a much drier environment on the island during the geologic past. This pattern of distinction is paralleled by a few seed plants. The best example is the palm genus *Veitchia* with 18 species known mainly from New Caledonian, Vanuatu (New Hebrides) and Fiji, and one species, *V. merrillii*, endemic to the dry karst forest of northern Palawan.

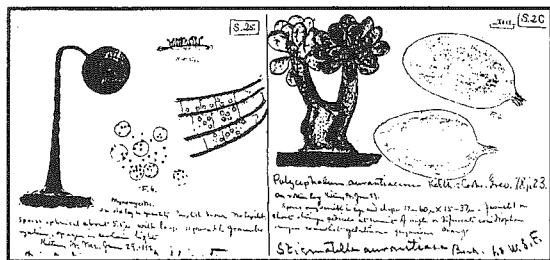
At the moment, I am more inclined to accept the existence of a drier Palawan island in the geologic past as a plausible explanation. There is palynological evidence which indicates that the whole SE Asia was drier during the Pleistocene glaciation than today. The high mountains of Borneo, in fact, had an extensive cover of pine forests which no longer exist because of a much wetter climate with higher rainfall today. In fact, the whole of Philippines today, except Palawan,

is well within the monsoon and typhoon belt. It is likely that these mosses in question had a broad range in the past and that the Palawan populations represent the surviving "relicts" in a few, xeric refugia scattered amidst the continuous, wet, evergreen rainforest in the region today.

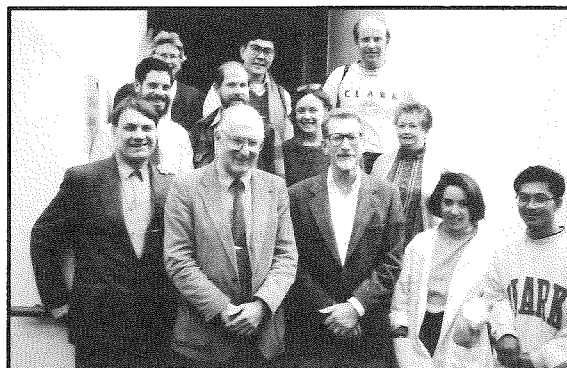
Benito C. Tan is a Research Associate at the Farlow Herbarium.

THAXTER PILGRIMAGE

An international group of researchers studying the Myxobacteria met in Rhode Island in early August and visited the Farlow Library and Herbarium on 3 August. The Myxobacteria are true bacteria that go through a phase of communal movement and fruiting body formation. The visit to the Farlow was in recognition of the description, 100 years ago, of the family Myxobacteriaceae by Roland Thaxter. Thaxter, a student of Farlow and later Professor of Cryptogamic Botany at Harvard, described the family in 1892 and provided the first detailed information on the life cycle and natural history of the the family. Don Pfister was asked by the group's organizers to prepare a talk on Thaxter and his work on the Myxobacteria and to show them Thaxter's collections and related materials. About 60 people attended. We had on display several specimens for microscopic examination, Thaxter's sketchbook in which he first illustrated a myxobacterium, a selection of Thaxter's original illustrations, copies of some amusing letters, and a collection of Thaxter's publications. Don's talk will be included in a forthcoming book on the Myxobacteria.



Myxobacterial fruiting bodies sketched by Thaxter.



FOF lichen lunch at Vernon Ahmadjian's lab in April 1992. Front row (left to right): Teuvo Ahti, Vernon Ahmadjian, Harvey Pofcher, Megan Perusse, Steven Goldsmith. Second row: Samuel Hammer, Philip May, Elizabeth Kneiper, Anna Reid. Third row: Elizabeth Lay, Benito Tan, Lars Froberg.

FOF FINANCIAL REPORT

Balance on hand 7/1/91		\$ 21,241.78
Income		
	Members & Donations	3,738.73
	Book Sales	3,659.46
	TOTAL	\$ 7,398.19
Expenses		
	Postage	430.37
	Farlow Fellowship	650.57
	Annual Meeting	404.07
	Bookbinding	180.00
	Supplies	102.73
	Publishing	660.00
	TOTAL	\$ 2,427.74
Balance on hand 6/30/92		\$ 26,212.23

FARLOW VISITORS

(April - September 1992)

Excluding members of the Harvard University community

A. Abdullah (Petronas, Kuala Lumpur), A. S. Ahmad (Petronas, Kuala Lumpur), J. Beck (Boston), C. C. Bratt (Santa Barbara), S. Dayanandan (Boston), N. & S. Ginatilleke (Peradiniya, Sri Lanka), J. C. Hare (Amherst), B. Ismail (Petronas, Kuala Lumpur), H. Konstantinova (Kirovsk, Murmansk), L. Kroos (East Lansing), M. P. Leape (Cambridge), R. Libet (San Francisco), D. L. Miller (Davis), R. Pursell (University Park, Pennsylvania), C. Wesner (Norman, Oklahoma), W. Zimmerman (Cambridge).

NEWS

Sam Hammer presented a paper on *Cladonia* morphogenesis at an August symposium of the American Bryological and Lichenological Society in Hawaii. The presentation, dedicated to the memory of Mason Hale, won the A. J. Sharp Award as the best student paper at the symposium. Aside from the positive responses to his work from his colleagues, attending the conference provided the opportunity for Sam to hear many interesting papers and to forge vital professional ties with other lichenologists and botanists from a number of institutions. Partial support for Sam's travel was provided by FOF.

Teuvo Ahti of the University of Helsinki visited the Farlow in April and checked type specimens of *Cladonia* and *Cladina* for his compilation of names in current usage. He accompanied fellow lichenologists **Elizabeth Kneiper** and **Sam Hammer** on an excursion to Mount Monadnock in southwestern New Hampshire and uncovered several lichens species new to North America.

Ronald Pursell, a bryologist at Pennsylvania State University, worked at the Farlow for a week in September, primarily in the Bartram Collection, on preparation of a monograph on the neotropical species of *Fissidens*.

Deborah Miller, a senior in zoology at the University of California Davis, is spending this year in Professor **Naomi Pierce's** lab at the Museum of Comparative Zoology, studying the functional nature of the symbiosis between scale insects and *Septobasidium*, a resupinate basiomycete epiphytic on tree bark.

Charis Bratt, curator of the Bratt Lichen Herbarium at the Santa Barbara Museum of Natural History recently searched the Farlow collections for lichens from the Channel Islands along the California coast.

A "testimony of the rocks" - Miocene/Pliocene/Pleistocene rocks from Kenya's Baringo Basin containing freshwater fossil diatoms - is the focus of **Robert Edgar**, currently on sabbati-

cal leave at the Farlow from the University of Massachusetts Dartmouth. With **John Kingston**, a recent Harvard Ph. D. in anthropology specializing in paleo geochemistry, Bob is immersed in the systematics of a few diatom genera as prerequisite to a diatom-based reconstruction of local environments at Baringo accompanying hominid evolution in the region over the past 8 million years.

Six friends of the Farlow from the Boston area - **Jerry Cacavio**, **Elizabeth Kneiper**, **Philip May**, **Sharon Gowan**, **Benito Tan** and **Elizabeth Lay** - attended this September the Seventeenth Andrews Foray organized by **Eric Karlin** in Sussex and Warren Counties, New Jersey. Sites visited included quartzite outcrops and the Kuser cedar swamp near High Point. At the Tillman Ravine in Stokes State Forest **Richard Harris** found his newly described *Cladonia petrophila* growing on the sandstone walls of a stream. The fens and the calcareous cliffs in Johnsonburg were particularly rich collecting sites. The mix of enthusiastic amateurs and friendly professionals made a special weekend.

1992 ANNUAL MEETING

The Friends of the Farlow 1992 Annual Meeting will be held on Saturday, **November 7th**. A business meeting will commence at 3:30 pm at the Farlow, followed by a talk by Dr. **Roy Halling**, a specialist on Agraricales at the New York Botanical Garden. He will speak on "Mycological Observations in South America." Dr. Halling will be available for an informal meeting or bag lunch between 12:30 and 2 pm. The Farlow Library will open for reference work at 10 am, and displays will be on exhibit both in the Farlow and Cabot Libraries. A reception in the Farlow Library for Friends and their guests will begin about 5 pm.

Geneva Sayre

(1911-1992)

Dr. Geneva Sayre, retired Professor of Biology at Russell Sage College and Research Associate in the Farlow Library and Herbarium, died on May 26th after a long illness. The daughter of a country banker, Geneva was born on June 12, 1911 in Guthrie, Iowa. She attended Grinnell College (1929-1933) where she was introduced to mosses by her teacher, Henry Conard. He later arranged for her to spend the summer of 1934 with A. J. Grout in Newfane, Vermont. Her work that summer on the Splachnaceae, Timmiaceae and Aulacomniaceae for the *Moss Flora of North America* became the basis for her Master's thesis at the University of Wyoming, and she was awarded the M.S. in 1935. When she received her Ph.D. at the University of Colorado in 1938, her family attended the ceremony, and, according to one story, her grandmother remarked, "Isn't it grand that we have a doctor in the family. We've always had so much sickness."

Following a brief instructorship at Colorado, Geneva joined the faculty of Russell Sage College in 1940 and remained there until 1972, most of those years serving as chairman of the biology department. She was known by both fellow faculty and students as a dedicated and rigorous teacher (current Friends of the Farlow President, Elizabeth Kneiper, was a student of Geneva's at Russell Sage and also attests to this!).

Her early retirement in 1972 freed Geneva to do the research which is always neglected in an academic's life. She became a Research Associate at the Farlow Herbarium at a critical time in that institution's history. Under her supervision, young curatorial assistants hired under an NSF grant processed hundreds of thousands of specimens. She oversaw a library renovation program and cleared up much of the confusion in the collections of Sullivant and James. Her own research progressed, and she finished her series on Cryptogamae Exsiccatae as well as pursued her historical interests in important past bryologists



such as Thomas Taylor, Thomas Potts James, and Coe Finch Austin.

Her professional activities included the American Bryological Society (president 1951-53), International Botanical Congresses, and the American Association of University Women. In 1983 she was awarded the Hedwig Medal by the International Association of Bryologists in recognition of her "outstanding contribution to the development of Bryology."

In 1981, a festschrift in honor of Geneva's 70th birthday was published at the Farlow (in an atmosphere, it might be added, of great secrecy and intrigue!). The surprise birthday celebration during which it was unveiled also saw the establishment of the Geneva Sayre Fund which she elected to have used to support visitors to the Farlow who normally would not have the opportunity to use the collections. Longtime members of the Friends will remember at one point being given the option of making their annual dues a donation to the Fund in order to bring it up to its endowment minimum, a successful effort which caused it to become available for use.

Geneva's last years were burdened with ill health but she continued to pursue her bryological interests as long as she could. Some of what she considered to be her best work, that on Thomas Taylor, was done during this difficult time. Her determined spirit and uncompromising scholarship continue to live on at the Farlow in everything she touched and for those of us who had the privilege of knowing her.

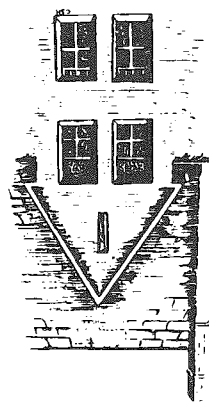
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Friends of the Farlow is an international group of amateur and professional botanists concerned with supporting the programs and resources of the Farlow Reference Library and Herbarium of Cryptogamic Botany of Harvard University. Membership categories are: Associate member, \$5-25; Full member, \$25; Sponsor, \$50-100; Benefactor, \$1000 or more. To join please make your check payable to the **Friends of the Farlow** and send to the address below. The membership year runs from January 1st to December 31st. Members receive a discount on Farlow publications and services, participate in book sales, annual meetings and other events, and receive a special welcome at the Farlow. This newsletter is published twice a year, in April and October. For more information, contact the Farlow Reference Library, 20 Divinity Avenue, Cambridge, MA 02138 USA (Tel. 617-495-2369; FAX 617-495-9484).