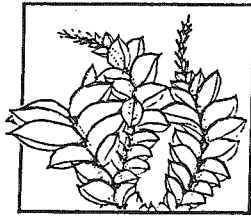


*Newsletter of the*

# FRIENDS OF THE FARLOW



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**Carolyn S. Hesterberg, Editor**

## **A Mossy Expedition to Brunei Darussalam**

**Benito C. Tan  
Farlow Herbarium**

Last December, I had the opportunity to visit the oil producing, Islamic sultanate, Negara Brunei Darussalam, in SE Asia. This small country is situated in the northern part of Borneo sandwiched between the Sabah and Sarawak states of Malaysia (see map). It has a total land area of



5,765 sq. km. and a population of about 300,000. Because of its large oil revenues and relatively low population, much of the country today (about 80%) is still under forest cover.

I was invited to spend a month travelling around the country documenting the richness of the local moss flora after attending a meeting on conservation in late November in Kuching, Sarawak. There I had presented a paper identifying the threatened hot spots of moss diversity in tropical SE Asia. It was both fortunate and unfortunate that heavy rain had resumed a few days after my arrival. The year 1995 ended with a record-breaking rainy season in SE Asia. Admittedly, this atypical downpouring of rain had made my field work uncomfortable, muddy and "leechy." The good side of it was the abundance of fruiting specimens of mosses that I collected.

Since my task was to survey and study Bruneian moss diversity, I immediately drew up a plan (with the help of the UBD Department of Biology and the Brunei Royal Forestry Ministry) to visit four recognizable forest types in the

country. They are the lowland and hill dipterocarp forests found inland, the peat swamp forest along the sea coast, and the kerangas forest or heath forest on sandy alluvial soils and sandstone ridges. This last type of forest is interesting to me because of its extensive development in Borneo. It is also a new field experience for me owing to its non-existence in the Philippine archipelago. To the native people, kerangas means "forested land not suitable for cultivation" owing to the nutrient-poor and high acid characteristics associated with leached white sands. The landscape represents ancient sea beaches left exposed by the rise of the land. The forest trees are of fewer species and shorter than those of the mixed dipterocarp forest. To my surprise, the dominant mosses inside the forest environ, both in terms of number of taxa and biomass quantity, belong to only three families, namely Calymperaceae, Leucobryaceae, and the Campylopodioideae of Dicranaceae. It appears that the sandy substrate can cause water stress for plant growth during dry days. Members of these three families of mosses have a leaf organization adapted to store extra water in their multi-layered and porous leaf cells. They thus have overcome this restriction and have resulted in a diversity of species and large biomass. Eventually, I collected two new species of mosses belonging to *Syrrhopodon* and *Octoblepharum* from this type of forest habitat. In contrast, the peat swamp forests are inhabited by characteristic plants tolerant of waterlogging and mineral poor conditions. The forest structure is rather uniform

and the species composition is relatively homogenous. Because of the thick accumulation of peats under submerged conditions, the surface water is dark owing to tannin contents. Both the kerangas and peat swamp forests in Brunei are home to large *Agathis* trees, Bornean red palms (*Cyrtostachys*), and many species of insectivorous plants (*Nepenthes*, *Drosera*), and ant plants (*Myrmecodia*). Yet, the species richness of mosses in these two types of forests is not greatly diverse when comparison is made with the moss diversity seen in mixed dipterocarp forests. However, it is here that several Bornean or Malesian endemics, such as *Papillidiopsis bruchii* and *Sclerohypnum littorale*, are found in many flooded sites. I believe that these rare Bornean/Malesian mosses will survive in the rain forests of Brunei long after their populations in other parts of Borneo and SE Asia have disappeared together with the rain forests.

My experience with the lowland mixed dipterocarp and hill dipterocarp forests in Brunei centered around the Kuala Belalong Forest Research Station located in the 50,000 hectare area of Batu Apoi Forest Reserve. The station is strategically constructed at the junction of two large rivers and surrounded by forests well within walking distance. It is fully managed by the UBD Department of Biology. To reach the station, one has to travel by motorized speed boat from the capital of Brunei, Bandar Seri Begawan, for nearly one hour across the sea to reach the remote town called Bangar. Here the visitors are picked up by the research station

vehicle by prior arrangement. This is followed by another 1-2 hour ride in an indigenous long boat up the Belalong River. The station has a fully equipped laboratory for systematic and ecophysiological studies, a functional dining hall and kitchen, and several chalets for visitors to stay overnight. All these facilities are opened to local and foreign scientists by applying to the University for a permit to visit or to conduct studies with a minimal charge for food and lodging.

Having been to many rain forests in SE Asia, I can vouch for the pristine nature of the dipterocarp forests in Batu Apoi Forest Reserve. Here one sees no sign of logging. The stately dipterocarp tree trunks on the ridges often reach more than 50 meters high and their crown-shaped canopy is festooned everywhere with woody vines and epiphytes, notably the staghorn fern (*Platyserium*). The forest floor is covered with humus several inches thick and is crisscrossed on a sunny day by battalions of giant Bornean ants. It is also here that I saw many kinds of bright orange, yellow and pink fruiting bodies of cup fungi, coral fungi, jelly fungi and polypores, in addition to macaque monkeys, Bornean gibbons, pygmy squirrels and myriad brilliantly colored butterflies. Two years before I visited, a giant python of several meters long was hit and killed accidentally by a speeding long boat going up the Belalong River at sunset. Unfortunately, the local Bruneian forestry office has recently developed a plan to attract tourists by constructing canopy and riverbank walkways at a stone throw's distance from the research

station. I am afraid that this will result in a sudden increase of human activities in the Batu Apoi Forest Reserve. The impact of tourism on the forest environment around the Kuala Belalong Forest Research Station needs monitoring.

In spite of the frequent rain which caused many rivers to overflow for days while I struggled to conduct field work across the country, my visit to Brunei can be considered a success. My only regret is that the trail condition and my short one week stay at Kuala Belalong field station had prevented me from reaching the mossy forests on the highest peak of Batu Apoi Forest Reserve at 1850 m elevation. As a result, my collections represent mainly the moss diversity at low elevations. Before this project, there were only eight species of moss reported in the literature for Brunei, mostly members of Calymperaceae. Now I have recorded more than 110 species of mosses in at least 50 genera. An exsiccatae set of 20 Bruneian mosses is being assembled and will be jointly distributed by the Farlow Herbarium of Harvard University and the herbarium of the University of Brunei Darussalam in early 1997.

I would like to express my appreciation to the Hong Kong and Shanghai Bank Research Bursary for funding this trip to Brunei.

### **Annual Meeting**

The Friends of the Farlow Annual Meeting will take place on Saturday, November 2nd. Our guest lecturer will be Prof. Robert K. Edgar, Chairman of the Dept. of

Biology at UMass, Dartmouth and Charter FoF Member. His talk, "Ecological Theater and Evolutionary Play: Diatoms and Hominid Evolution in East Africa" will cover its subject from the microscopic scale (scanning electron microscopy) to panoramas of the Kenya Rift Valley landscape. There will be a 3:30 business meeting in the H.U. Herbaria Seminar Room followed by Dr. Edgar's talk at 4:00. Afterwards (at 5:00) the Friends' reception will be held in the Farlow Library.

### **FoF Fellowship and WEB Page**

In April, Kathie Hodge, a graduate student in Plant Pathology at Cornell University, visited the Farlow Herbarium as an FoF Fellow to pursue her studies on the parasitic fungus genus *Hirsutella*. She found much to engage her in the collections, particularly Roland Thaxter's assemblage of worldwide monographs and specimens determined by Thomas Petch.

The FoF Fellowship is now on the World Wide Web, compliments of Bob Edgar. Its Internet address is:

<http://134.88.12.60/BioDept/resources/resources.html>

### **NHESP Research Grants**

Students in Sam Hammer's Biology Tutorial (99hf) John Blackmer (Harvard '98) and Jennifer Fraulo (Harvard '96) have received Natural Heritage and Endangered Species Program grants to continue their studies during the summer. John will be investigating the establishment of

the lichen *Cladonia grayi* by making use of both Farlow Herbarium and Library resources. He has also been awarded a Student Travel Grant to attend American Bryological and Lichenological Society meetings in Seattle, Aug. 4-8. Jennifer will be studying the soil binding biology of the lichen *Trapeliopsis*, a crustose lichen genus. In addition, she has completed her senior thesis with Donald Pfister on the same topic.

NHESP research grants have also been awarded to Sam Hammer, Elizabeth Kneiper, Martha Maxfield, and Benito Tan for work to be done at two Massachusetts sites owned by the U.S. Air Force. On the 120-acre site of the Cape Cod Air Station in Barnstable County, Sam will survey the lichens and study the establishment of *Cladina subtenuis*; Elizabeth will inventory and assess the status of the corticolous lichens to determine the impact, if any, of the Canal Electric Power Plant on the epiphytes; and Ben will do an inventory of the rare and endangered mosses on the Cape Cod Air Station. Ben also will do a similar inventory on the U.S. Air Force's Sagamore Hill Observatory in Essex County, Massachusetts, where Elizabeth and Martha will be working on an inventory of the lichens.

### **Thaxter Project Update**

Archivist Claire Goodwin has completed her finding aid for the Thaxter materials in the Farlow Library. Jean Cargill suggested that a possible project for the future could be the reformatting of Roland Thaxter's South American lantern slides for preservation

purposes and to provide access to the collections.

### **Clara Cummings Walk**

Clara Eaton Cummings (1855-1906), a professor at Wellesley College, was a tireless collector and student of lichens and bryophytes. Her first paper on mosses appeared in 1885. Her interests later, however, led her mainly to the study of lichens, and she issued many exsiccata, including "The Lichens of Alaska." She corresponded throughout her professional life with botanists in the U.S. and abroad and collected in New England, Florida, Colorado, California, Switzerland, and Italy.

The first of what (we hope) will be an annual walk named in honor of Dr. Cummings took place on Saturday, May 4th at the Hale Reservation in Westwood, Massachusetts. Boston Mycological Club and New England Wild Flower Society members in addition to FoF members attended and were led by Elizabeth Kneiper, Elisabeth Lay, Benito Tan, and Donald Pfister over an area, appropriately enough, known and collected in by Clara Cummings.

### **Library News**

In addition to her work on the Thaxter archives, Claire Goodwin has been supervising a Simmons College student, Michele Lee, working on Geneva Sayre's papers. Conservation work has also been planned for the Delise 1825 lichen atlas, part of the Ahmadjian gift to the Farlow Library.

More library renovations are also in the planning stages.

Librarian Judy Warnement has submitted to Facilities Maintenance plans "to increase the shelving in the Farlow Reading Room without sacrificing the aesthetics of the room."

Also on the subject of Library maintenance, this was found in the Farlow Library archives:

*February 1, 1939*

*Maintenance Dept.:*

*Please remove old chandeliers and install floor plugs for table lamps in the Farlow Library reading room. Replace old chandelier in lower and upper hall with more modern type of lamps.*

*Cost not to exceed: \$75.00*

### **Future Deliberations**

On February 23rd the Friends of the Farlow Executive Committee gathered for an informal "brainstorming" session on the subject of future plans, projects, and goals for the Friends. The meeting was suggested by Treasurer Harvey Pofcher who has guided the Friends financially since its inception. Under Harvey's careful management, FoF monies have created an endowed Farlow Herbarium account along with a healthy FoF operating budget.

Various ideas were submitted, from the *very* ambitious (an endowed chair ranging from a curatorship to a professorship--\$2-5 million) to the more manageable (computerization of the Farlow Herbarium or additional Library materials and acquisition). We would like to appeal to our members for any suggestions or ideas they may have.

FIRST CLASS

THE FARLOW REFERENCE LIBRARY AND HERBARIUM  
OF CRYPTOGAMIC BOTANY, HARVARD UNIVERSITY  
20 Divinity Avenue, Cambridge, Massachusetts 02138 U.S.A.

## FRIENDS of the FARLOW



**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, \$10-\$24; Full member, \$25-\$49; Sponsor, \$50-\$99; 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 the spring and fall. For more information, contact the Farlow Herbarium, 20 Divinity Avenue, Cambridge, MA 02138, USA (Tel. 617-495-2368; Fax. 617-495-9484).