

New England Botanical Club – Minutes of the 937th Meeting

3 April 1998 Prepared by Dr. Paul Somers, Recording Secretary

The 710th meeting of the New England Botanical Club, Inc., being the 937th since the original organization, met on Friday April 3, 1998 in the main lecture hall of the Biological Laboratories, Harvard University, with 73 members and guests present.

Following the reading of the minutes by Lisa Standley and introduction of guests new President Dave Conant discussed the Club's new parking permit arrangements with Harvard, announced the names of three new members, and then opened the floor for old and new business. Paul Somers announced the Club's purchase of the *Illustrated Companion to Gleason and Cronquist's Manual* by Holmgren & Collaborators. Leila Shultz, representing the Awards Committee, announced that Graduate Student Awards are being offered to Ms. Sonja Schmitz of the University of Vermont for a proposal entitled "Inferring evolutionary and biogeographic history from patterns of genetic variation in inland and coastal beachpea (*Lathyrus japonicus*) populations" and to Mr. David Moeller of Cornell University for a proposal entitled "The ecology and evolution of self-pollination in Blue Flag, *Iris versicolor*: an island-mainland comparison." Les Mehrhoff announced upcoming workshops at the University of Connecticut on two topics: *Dryopteris* and Invasive Plants. Les also announced a few new publications including a CD-ROM by Richard Mitchell on fern identification available through the New York State Museum. Under gossip Les mentioned receiving an eight-page paragraph from John Barrett giving his email address as "meranski@hotmail.com."

The honor of introducing the Club's Distinguished Speaker for 1998 went to Garrett Crow who expounded at length on the exploits and protégés of Dr. John Beaman. We learned that he was born in North Carolina and received a masters degree from Washington State University, where his developing interest in the rapidly evolving genus *Townsendia* (Asteraceae) led to Ph.D. research on the genus at Harvard under the guidance of Reed Rollins. Garrett then enlightened us on the many Michigan State students, now botanists, who with honor and respect have come to know Beaman as "Foddy," a name originated by his children as they were learning to talk, but which the students adopted, maybe because of his role in launching their botanical careers. Garrett himself had been one of these graduate students and recounted a field trip to an alpine area in the Pacific Northwest where, while in pursuit of *Erigeron*, he had the fortunate experience of grabbing his professor sliding past him on a slippery icy slope with a precipitous drop into a boulder-lined lake below. In 1983-84 he held a Fulbright Fellowship, which enabled him to initiate his study of the flora of Borneo's Mount Kinabalu, which he has continued to study ever since, but particularly from 1994 to 1996 during two years as founding director of the Institute of Biodiversity and Environmental Conservation of University Malaysia Sarawak, and since then as an Honorary Research Fellow at The Royal Botanic Gardens, Kew, England.

John Beaman began by acknowledging that he could not feel too smug in being the Distinguished Speaker, given that it had been 44 years since his first and only other presentation to the Club. He then launched into his slide-lecture entitled "The Systematics and Evolution of the Flora of Mt. Kinabalu (Borneo): An Example of Conservation Biology in Action." Via spectacular images, we were quickly taken to a lushly vegetated mountain with precipitous

slopes and waterfalls located a few degrees north of the equator in northern Borneo, where Beaman, his son Reed (named for Rollins), and about 40 other collaborators have been engaged in a number of projects aimed primarily at achieving a better understanding of the evolutionary and phytogeographic significance of the mountain and its flora. Part of Kinabalu's significance is that it is the highest mountain (c. 4100 m.) between the Himalayas and the mountains of New Guinea. We were given a quick tour up the mountain through five elevationally defined zones:

- 1) lowlands with rattans (viny, spiny palms) some over 150 ft. long;
- 2) hill forests with the world's largest orchid, *Grammatophyllum speciosum*, growing epiphytically;
- 3) lower montane forest--the zone with the most species-rich elevation on the mountain at about 1500 m. and taxa including *Viburnum* and many orchids;
- 4) upper montane forest--a zone with three species of gymnosperms belonging to the Phyllocladaceae and Podocarpaceae. The celery pine *Phyllocladus hypophyllus* has false leaves, actually flattened stem tissue anatomically. Isozyme studies of the genus *Leptospermum* from this elevation suggest that one of the species, now a dominant in an elfin forest community at 3000 m, has a post Pleistocene origin;
- 5) an open granitic summit with glacial scars from 9500 yrs. BP (before present) and interesting plants in its crevices and seeps. Interestingly, GIS studies relating floristic diversity to unit area revealed that species per 10 km² was actually greatest at 2500-3000 m, rather than at lower elevations.

Kinabalu is a batholith of granite formed in the Pliocene (c. 9-2 million yrs. BP) under water and then uplifted in the Pleistocene through sedimentary formations. Because the mountain is young geologically and has a history of glaciation, Beaman and colleagues found it to be an ideal outdoor lab for studying examples of rapidly evolving plant groups. Ultramafic areas of serpentine at mid and lower elevations have especially rich floras. Genetic studies of tree fern taxa on Kinabalu by Dave Conant, for instance, showed an endemic to the serpentine with likely derivation from a species in an adjacent geological formation. Studies of *Dendrochilum*, *Polyosma*, *Cyathea*, *Lithocarpus*, *Carex*, and *Rhododendron* are among those receiving the attention of collaborating systematists currently.

The flora of Mt. Kinabalu has proven to be one of the most diverse in the world. There are many genera rich in species, including the figs with about 100 taxa. One ultramafic serpentine area of hardly more than 100 hectares has over 300 species of orchids. One of Beaman's projects has involved the employment of local people in documenting the flora. This has been very successful and has significantly expanded the number of known species, especially in certain groups like the palms, where extra money was paid per specimen collected. The botanical inventory has resulted in two books thus far. One covers the pteridophyte flora with 620 species, 1/3 more taxa than on the entire African continent; the other enumerates 711 orchid taxa. His most recent and still unpublished work is an enumeration of the gymnosperms and non-orchid monocotyledons. Using the Cyperaceae as an exemplar group he illustrated that the closest floristic affinities are with continental Asia, but that other taxa are of Malesian and Australian affinity. The mountain has many neo-endemics, suggesting that a very rapid evolutionary process is happening on the mountain. Among the most interesting endemics are some of the pitcher plants, *Nepenthes*, with several species restricted to serpentine. He also showed a common lowland species with vestigial

pitcher lids. The endemic *Nepenthes rajah* has the largest pitchers in the genus and has even been known to trap mice.

Macrophotography through the base of the giant flowers of *Rafflesia pricei*, in the genus with the largest known flowers, illustrated what Beaman and his students have learned about its pollination ecology. The flowers are unisexual and pollinated by carrion flies, which are guided by the odor and appearance of rotting meat, to anthers on male flowers where they are precisely positioned by internal bristly ridges to pick up a load of pollen on their backs. When they go to a female flower the pollen load is rubbed off on the broad stigmatic surface of the female flowers. The Beaman team have hypothesized that the flies are deceived into visiting *Rafflesia* flowers as potential brood places. They receive no reward for their efforts, however. A slide was used to illustrate one site of this important study area that has since been lost to slash and burn practices.

Unfortunately, this area of Borneo, like so many other tropical areas, is under siege. Slash and burn agriculture, copper and gold mining, and illegal logging within park boundaries have had major impacts. Some areas once species rich have been cut and burned, and Beaman believes they will never recover lost species and ecosystem characteristics. Much responsibility rests on the shoulders of Malaysian botanists and naturalists who are studying and attempting to educate others about their rich and endangered flora. In response to questions after the talk, it was pointed out that the biologists and park managers are working very hard to preserve their precious natural resources.

For additional reading about Mount Kinabalu, Dr. Beaman recommends a book on the natural history of the mountain published in 1996, entitled "Kinabalu--Summit of Borneo," edited by K.M. Wong and A. Phillipps and published by the Sabah Society.

NOTE: A two-hour videotape of this meeting will be placed in the NEBC archives by Nancy Eyster-Smith. It includes Dr. Crow's notes for his introduction of Dr. Beaman.