

INSTITUTE OF CURRENT WORLD AFFAIRS

GSH-6: Travels and Impressions  
of the Tropical Far East

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Dear Peter:

I recently returned from a lengthy trip to Indonesia, Malaysia and Singapore and want to convey to you my impressions from the trip. My primary purpose was to attend the Eighth World Forestry Congress in Jakarta. After the twelve-day congress, I went on an eight-day congress-organized tour to East Kalimantan (Indonesian Borneo), Bali and East and Central Java. From Indonesia, I then went to West Malaysia for nine days to visit the Forest Research Institute in Kepong (about 20 km north of the capital, Kuala Lumpur) and see some of the forests of Malaysia. I also spent two days in Singapore before leaving the tropical Far East.

Apart from the congress (on which I am writing a separate report), I was very interested in comparing the tropical forests of Indonesia and Malaysia with tropical American forests. On the dreadfully long flight over the Pacific, I reread Tim Whitmore's recent book, *The Tropical Rain Forests of the Far East*, to refresh my memory and help crystallize several questions that needed answering. My questions were mostly concerned with the reported differences between tropical forests of the Far East (tFFE) and tropical American forests (tAf). It is perhaps presumptuous to try to come up with reasons for these differences on such a short trip, but by focusing on certain questions I think it made my brief visit more productive.

Before discussing my impressions of tFFE, I would like to highlight my impressions of the places and peoples I visited in Indonesia, Malaysia and Singapore.

INDONESIA

Jakarta, capital of Indonesia and site of the Eighth World Forestry Congress, is a bustling and teeming city of more than five million people, with the characteristic daredevil drivers, traffic jams and air pollution of any big city in the tropics. It is also the most expensive city I've ever been in; some congress attendees said second only to Tokyo. (A 50% devaluation of the Indonesian rupiah occurred two weeks after the congress ended.) Many of the main streets and all of the boulevards are tree-lined, giving the city an aura of greenness that was enhanced by the start of the rainy season. Of course, the rains also increase the relative humidity, making it muggy as well as hot--very similar to Panama City during the wet season.

The Republic of Indonesia consists of 13,667 islands, only 600 of which are inhabited. Indonesia is the fifth most-populated country in the world with 135 million inhabitants, of which 80-90 million live on the island of Java. I travelled by bus over substantial parts of Java and it is quite obvious how an island that comprises only 6% of the Indonesian land mass (Java =  $131,563 \text{ km}^2 = 50,797 \text{ mi}^2$ ) supports such a huge population ( $600\text{-}700/\text{km}^2$  or about  $1600\text{-}1700/\text{mi}^2$ ). Most of Java is covered by very fertile soil derived from recent andesitic ash from the numerous active volcanoes on the island. The Javanese practice very intensive farming in both the lowlands (paddy rice) and on terraces in the low hills (mostly dry land rice), all fed by elaborate irrigation systems. Javanese farms make the extensive agriculture widely practiced in tropical America look primitive, careless and wasteful.

The Indonesian government has a very active and ambitious transmigration project to move people from the heavily populated islands of Java, Bali, and Madura to the less populated islands, especially Kalimantan. The new five-year government plan proposes to move 2.5 million people; although sounding impressive, the number represents less than the annual increase in population. Concomitantly, the government is actively promoting family planning and does report considerable success in reducing the rate of population growth. This may be true in Jakarta as well as in the countryside, but in travelling by bus around the country, I noticed that virtually every young woman was either pregnant or carrying a nursing child.

While in Jakarta, I read an editorial in the Indonesian Times quoting a transmigrant resettled to West Kalimantan that his former garden plot in Java was worth more than all the hectares he had been given in West Kalimantan. The basic problem disillusioning the quoted transmigrant is the low fertility of the sandy soils (ultisols) that predominate in Kalimantan. The rapid reduction in fertility of his land in West Kalimantan must have come as quite a shock to a Javanese farmer accustomed to the highly productive soils of Java. Apparently the Indonesian government has given little attention to the sustainable productivity of the soils on which they establish new colonies of transmigrants. Based on my ecological work in tropical America, I am sure that the soils we saw on the Weyerhaeuser concession at Kenangan, East Kalimantan, cannot sustain continual or even annual cropping. They are really only usable for crop production under shifting cultivation; otherwise they should be kept under forest or permanent tree crops. The transmigration program will not succeed unless the ecological constraints to settlement and agricultural productivity are actively incorporated into the planning of new colonies. An analysis of Indonesia's transmigration program requires a lot more time than I had, so I hope Bill Knowland (Forest & Man Fellow in the tropical Far East) will be writing to tell us more about transmigration.

Any meeting that exceeds five consecutive days has an increasingly difficult task of holding the participants' attention and interest, so you can imagine the problems of such a large twelve-day congress. Part of my solution was to make a day trip during the congress to the botanical gardens at Bogor and Cibodas. Bogor is one of the most famous of the world's

botanical gardens. It was started by the Dutch in 1817 on the grounds of the former palace of the ancient Hindu Kingdom of Pajajaran. The abundant collections of plants from the tropical world planted on the spacious grounds are really beautiful. Particularly striking is the very large size of many of the planted trees. Cibodas is a branch of Bogor Botanical Garden founded in 1862 at an elevation of 1400 meters. I was most impressed at Cibodas with the large collection of tropical conifers, especially in the genera *Agathis*, *Araucaria* and *Podocarpus*.

#### INDONESIAN TOUR

Post-congress tour "A" for 97 participants from 31 countries began with a flight from Jakarta to Balikpapan, the capital of East Kalimantan (Indonesian Borneo) for a visit the following day to the ITCI timber camp (a Weyerhaeuser joint venture) at Kenangan. After our late morning arrival in Balikpapan, we visited a local nursery that is trying to stimulate the planting of fruit trees and fast-growing trees by local farmers. The introductory speeches were very boring and verbose, so I soon wandered off through the nursery and small demonstration plantations. When I finally joined the guided tour, I was appalled to hear the technical tour leader (a forester from Jakarta) give wrong scientific names to some of the planted trees. I was afraid we were off to a bad start for factual scientific information that would only worsen as the tour progressed. Fortunately, I quickly learned that Mr. Wu of the Chinese delegation on our tour, is a very competent forest botanist. As the tour progressed, it became quite obvious that Mr. Wu knew more about the tree species we were seeing than did the several Indonesian technical tour leaders.

For our first evening in Balikpapan we were treated to an excellent Indonesian dinner, followed by a traditional Dayak dance. The Dayaks are a major tribe in East Kalimantan. Frankly, Peter, I don't remember much about the Dayak dance because I kept thinking about the dipterocarp forests I was finally going to see the next morning at the ITCI timber camp at Kenangan.

Upon arrival at Kenangan the next morning, what a surprise to find Bob Lowery, a former classmate of mine in the forest ecology and silviculture section from the University of Washington, welcoming us. I had last heard that Bob was at Weyerhaeuser research headquarters in Centralia, Washington. He has been at Kenangan almost two years as manager of research and of reforestation.

Our day-long tour of ITCI operations was very nice and well-organized. However, the only good forest we were able to walk into was ITCI's *Agathis* arboretum, a small patch (30 ha) of forest on white-sand soils at about 300 m elevation dominated by the conifer, *Agathis borneensis*, whose wood is second in value in Indonesia only to teak. The *Agathis* arboretum is within a 310 ha forest reserve, yet according to the map given us by ITCI, the tree chosen for the felling demonstration was inside the forest reserve. One wonders if the forest reserve and *Agathis* arboretum were set up just for the pre- and post-congress tours.

On tour day three we flew from Balikpapan to Bali, the popular resort island at the east end of Java. From the airport we went directly inland to see some mid-elevation forest reserves, but the weather didn't cooperate, so we came back down to the lowlands to visit the Holy Monkey Forest at Sangeh. The Holy Monkey Forest is a virtually pure stand of *Dipterocarpus hasseltii*, which, according to local tradition, is to be used only for the construction of the Hindu Bukit Sari Temple in the center of the small forest. I later learned that the wood of *D. hasseltii* is not resistant to termites, so it would not make much sense to use its wood for temple construction. Our technical tour leaders told me that *D. hasseltii* is not native to Bali or Java, but was probably brought from East Kalimantan. Suffice it to say that it seems to me somewhat improbable that a non-resistant wood (or even less likely seeds thereof) would be brought from such a distant source to build a temple in the middle of Bali some four or five centuries ago. Irregardless of these apparent inconsistencies, the Holy Monkey Forest is protected as a very nice patch of forest on a densely populated island.

For our first dinner in Bali, we had a sumptuous buffet by the ocean at Pertamina Cottages. I was amazed to find piles of mangosteens, the best fruit I had ever tasted, in the center of the copiously-laden dessert table. After having eaten too many to count, as well as convincing my table companions to try a mangosteen, I then visited several other tables proffering mangosteens to newly-made friends on the tour. Most who tried a mangosteen agreed that it is a truly delicious and exquisitely tasty fruit.

Our second day on Bali involved patronizing local artisanry shops and sightseeing. We did see what I considered to be the best local dance of the tour--called a Barong.

We flew from Bali to Surabaya, capital of East Java, to begin three very long days of busing over much of East and Central Java. Most of the tour stops were rather uninteresting and certainly non-memorable. I do recall being amused by the instant expertise of a Cypriot forester who occasionally sat next to me on the bus. He would often ask me what this or that was along the side of the road and surprisingly I could usually give him an answer. After my answer, he would lean across the aisle to ask a German the same question he had asked me. I presumed he was seeking corroboration of my answer, but no, he would matter-of-factly tell the German what he had just heard from me.

In Cepu, Central Java, we visited a State Forest Corporation teak forest, where we saw several aspects from plantation establishment through timber harvesting and sawmilling. One of the more interesting aspects of the whole operation is the deliberate shunning of most mechanization in favor of maximizing human labor. They put on quite a show for our tour, such as felling and bucking teak trees with 2-man crosscut saws, skidding a large teak log with eight pairs of cattle and even digging out stumps for the wood. I suspect most of it was just for show as I've seen one pair of large oxen skid out a similar-sized log. They also skidded the roundish log across a slope, a gross mistake, as the log rolled about five meters downslope and pulled the cattle with it!

On our next to last day we made a brief visit to a protected natural forest reserve at 1800 m elevation. I hustled about 200 m into the forest to take some pictures, quickly encountering an illegally-felled tree. I could not have been in the forest ten minutes when I heard the horns calling us to move on to the next site. Fortunately, I could look forward to seeing forests in Malaysia at my own pace.

#### MALAYSIA

What a pleasant change to leave over-crowded Java and the well-organized tour for eight full days in West Malaysia. Earlier in the year I had written my friend, Dr. F. S. P. Ng of the Malaysian Forest Research Institute (FRI), for suggestions of forests to visit. Francis (a name he selected to represent his F for westerners) and I met in 1976 at the Fourth Cabot Symposium in Harvard Forest, Petersham, Massachusetts; I later helped show Francis some Costa Rican forests. Francis prepared a detailed itinerary for me to visit Pasoh, Fraser's Hill, Genting Highland, Ulu Gombak, and the FRI. On the drive from the airport to Kuala Lumpur, Francis answered my many questions about Malaysia. When I asked how big is the city of Kepong (site of the FRI), he responded, "Oh, it's just like Turrialba" (small Costa Rican town and site of C.A.T.I.E., an international teaching and research center). When I saw Kepong the next day, I agreed with Francis' comparison to Turrialba.

The FRI is a beautiful place, with very spacious grounds, old colonial buildings, and extensive trial plantations of numerous tree species. Although the FRI staff is small, I was quite impressed by those I met, who, in addition to their scientific competence, were also most helpful and friendly. How often does one visitor get taken on field trips by four very knowledgeable local scientists?

Pasoh Forest Reserve is in the central part of the Malayan Peninsula in the northeastern part of Negri Sembilan. Pasoh recently came under the control of FRI as a lowland research reserve. Pasoh has a core area of about 650 ha (1606 acres) of undisturbed forest on low rolling hills between 75 and 150 m in elevation, surrounded by some 1500 ha of secondary forest. The area receives about 2000 mm of rain annually that is fairly well-distributed through the year (tropical moist forest in the Holdridge Life Zone Classification). Pasoh was the site of an intensive International Biological Program (IBP) study of forest structure and productivity conducted by a team of Malaysian and Japanese scientists. Not only is Pasoh one of the few remaining lowland dipterocarp forests in West Malaysia, it also has a 115 foot (35 m) tower as a major attraction.

The density of the forest understory (up to about 10 m) in Pasoh really surprised me. Even in good mature-phase forest in Pasoh, I found it impossible to walk through the understory without touching leaves in the 1-2 m tall range; it is quite easy to walk through mature-phase tropical American forest (tAf) without touching any leaves. Looking for explanations of such dense understory, I came up with two probable answers in Pasoh. One is that the Pasoh forest canopy is much more discontinuous than in climatically similar tAf, hence more light penetrates to lower

levels in the forest. Second, I noticed that all of the canopy dipterocarp species I saw in Pasoh plus those planted at FRI have monolayer crowns, i.e. each tree has one dense layer of leaves on the crown periphery, in contrast to multilayer crowns where a tree "stacks" one or more layers of leaves under the peripheral layer. One of the ecological consequences of this difference is that more light penetrates through a monolayer crown than through a multilayer crown. If the dipterocarps dominating the canopy of Malaysian lowland forests are all monolayers, then a lot more light reaches lower forest levels than in tAf where the majority of the canopy trees have multilayer crowns.

Even though my hosts cautioned me that Pasoh is not a good representative of the lowland dipterocarp forest in West Malaysia, I was surprised to find that the Pasoh forest was not nearly as tall as I had expected from reading Whitmore's book. Whitmore describes lowland dipterocarp forest as having a canopy between 50 and 60 m tall with occasional emergents exceeding 60 m. From the top of the Pasoh tower (35 m), I would describe a general canopy between 35 and 45 m, with very few trees exceeding 45 m and none more than 50 m tall. In the hill dipterocarp forest at Ulu Bombak, (tropical premontane wet (?) forest at about 600 m elevation) I doubt that any of the trees exceed 45 m in height.

In my visits to Pasoh and Ulu Gombak, I also learned what my Malaysian hosts called an emergent tree is quite different from my concept of an emergent. In Malaysia a tree with one-third or more of its crown above its neighbors tends to be called an emergent, whereas in tropical America I would call it a heterogeneous canopy. From the tower top in Pasoh, I didn't see a single tree I would call an emergent, that is, with its entire crown above the general canopy. Some of the *Shorea curtissii* characteristic of the hill dipterocarp forests do appear to be emergents, but the superior crown position is more likely due to its prevalence on ridges.

Having heard and read about the great richness of rattans (woody climbing palms) in the tropical forests of the Far East, I was very surprised at their rarity in Pasoh. Possible commercial exploitation of rattans in Pasoh prior to the IBP study may have greatly decimated the populations, but I also failed to find many juvenile rattans. I estimated that the biomass (weight of organisms per unit area) of lianas (woody climbers) in Pasoh is less than in comparable tAf. From the top of the tower you simply don't see any canopy crowns festooned or draped with lianas as you do in tAf.

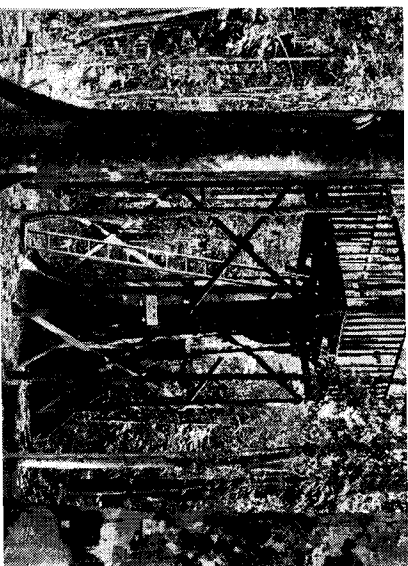
Not only are canopy lianas not abundant, but the virtually complete absence of epiphytes (plants deriving their nutrients from the air or debris they trap and physically growing on other plants) is really startling. There are some orchids and very infrequent aroids, but most tree branches appear aseptically clean. A fair bit has been published on the paucity of epiphytes in tFFE, attributing it primarily to chemical inhibitions to epiphytes by the host plants. When we visited higher elevations (1500-1800 m) at Fraser's Hill and at Genting Highland, we found abundant epiphytes, mostly mosses, but still not like the epiphyte abundance in comparable tAf.

The relative slowness of natural forest regeneration in the "Japanese clearcut" at Pasoh surprised me. Approximately seven years ago Dr. T. Kira's (Japanese plant ecologist) team removed all the above-ground biomass on a 20 x 100 m plot in virgin forest to obtain data for the IBP forest productivity study. The regeneration dominated by *Macaranga* spp. is now only 5-8 m tall. Second growth in comparable tAf would be at least twice that tall in seven years. No one could tell me how disruptive the IBP study was to the surface soil on the cleared plot; it is possible that the considerable human activity greatly altered soil physical structure thus retarding natural forest regeneration.

On my last day at FRI I was asked to meet with some of the FRI staff to review my impressions of Malaysian forests. In the hopes of stimulating discussion, I restricted my introductory remarks to about 15 minutes, which was followed by a lively and informative discussion in which I learned a lot. It is clear my "debriefing" was quite valuable for me as well as some of the FRI staffers: I was able to review my impressions and ideas with scientists knowledgeable about the Malaysian forests I visited and I offered some ideas that may lead to new research projects. A staff debriefing is also effective in minimizing "scientific imperialism" where a visitor comes in briefly and generates a few new ideas that are quickly published without review by local scientists.

During my first field trip in Malaysia I mentioned to my hosts my strong desire to taste a durian fruit, but they were unable to find any for sale along the roads because it was still early in the fruiting season. However, also on my last day at FRI after resigning myself to missing the durian, I was a guest at a fruit luncheon where there were 10 durian fruits on the table! Peter, I don't know if you have had any experience with durian fruit in Southeast Asia, so I will briefly try to tell a little about it. The olive-brown durian fruit, borne on the native tree *Durio zibethinus* (Bombacaceae), is about the size of a pineapple or cantelope, but densely covered with blunt spines. The fruit contains 10-25 egg-size seeds, each covered with a soft, white, edible pulp. It is this edible pulp surrounding each seed that evokes strong emotions in locals and foreigners. It appear to be the favorite fruit of local residents if my Malaysian hosts are not too strongly biased. However, many foreigners are repulsed by its strong smell. The famous British botanist, E. H. Corner, who spent much of his professional career in Malaya, likened it to eating ice cream in a water closet (or an outhouse in Americanese). As we toured Indonesia our local guides would parrot a remark reputedly made by an American: "It smells like hell, but tastes like heaven." The major hotels in Jakarta expressly prohibit bringing a durian fruit into the hotel.

I didn't find the smell of the durian overly repugnant or offensive; it certainly didn't inhibit me from eating the pulp of several seeds! I found the durian to be very rich--very close to an almost sickening sweet flavor, and certainly an acquired or cultivated taste. I still rank the mangosteen as the number one fruit in the world!



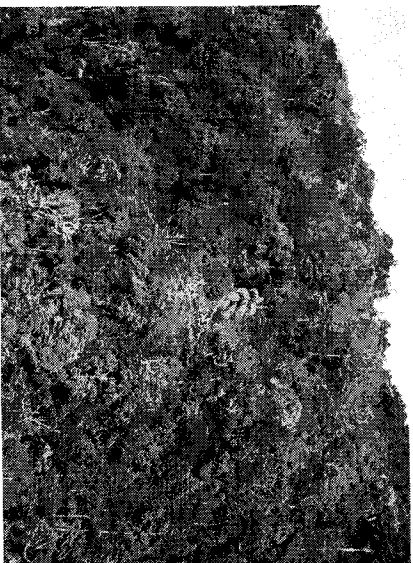
Base of 35 m tower built around  
*Shorea leprosula* in Pasoh Forest  
Reserve



View up the Pasoh tower with  
platforms at 5 m intervals



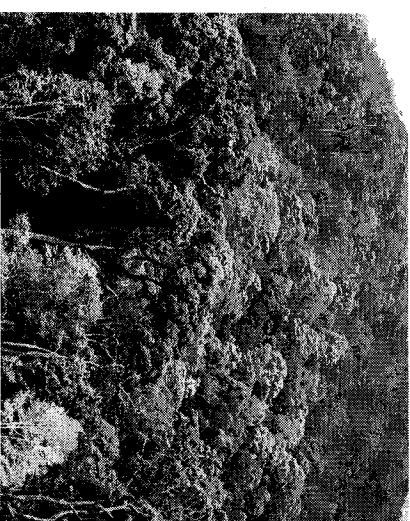
View of canopy from tower top. De-  
ciduous tree on right is *Alstonia*  
*angustiloba* (Note large epiphytic  
aroid in center)



Beautiful rattan, *Plectocomia grif-  
fithii*, center photo; Fraser's Hill  
(ca. 1100 m), Malaysia



My Malaysian hosts N. Manokaran,  
F.S.P. Ng, Tho Yow Pung and Yap Son  
Kheong of the Forest Research Inst.



Hill dipterocarp forest; gray  
crowns in background are *Shorea*  
*curtisii*; Ulu Gombak, 600 m



## SINGAPORE

At the suggestion of Dr. Gerardo Budowski (head of forest sciences department, C.A.T.I.E., Turrialba, and the only other person from Costa Rica at the forestry congress), I decided to spend one full day in Singapore in order to visit the botanical gardens in the city. The Singapore Botanical Gardens are also very beautiful, even though not as spacious or as old as Bogor. The Singapore Gardens even have a small patch of natural forest that is quite nice. While at the gardens, I had the very distinct pleasure of meeting Mr. Wong Yew Kwan (whose official title I did not get, but in effect is in charge of all the green spaces for the Parks and Recreation Department in the Republic of Singapore). Mr. Wong worked as a forest ecologist in Malaysia for many years, so we had a very good but brief discussion of Malaysian forests. Dr. Chang Kiaw Lan, a mycologist at the Singapore Botanical Gardens, took me to visit the Bukit Timah Nature Reserve on the edge of the city. Bukit Timah is a very nice protected example of hill dipterocarp forest, with several *Shorea curtissii* at only 100 m above sea level.

I would like to make one further observation on the preference of exotic trees for ornament and shade. In tropical America, most of the ornamental trees in city parks, along boulevards, etc., are native to the Old World Tropics. In Indonesia, Malaysia and Singapore the most popular ornamental trees are native to tropical America. Jakarta probably has more mahogany trees lining her boulevards than the number of mahogany trees that still remain in some of the Central American forests. The rain tree, *Pithecellobium* (or *Samanea*) *saman*, is very popular as a shade tree in all three countries. On the road from downtown Kepong to the FRI, there are two huge *Enterolobium cyclocarpum* (the national tree of Costa Rica) planted in 1953 in honor of the coronation of Queen Elizabeth. Not only is the grass greener on the other side of the world, but apparently exotic trees are also thought to be more beautiful.

In sum, Peter, my trip to the tropical Far East was outstanding, a truly valuable learning experience for me. I certainly didn't answer all of my questions about the tropical forests of the Far East, but I feel that my first visit to that region of the world was very productive and stimulating. I look forward to my next visit to the tropical Far East.

Sincerely,



Gary S. Hartshorn  
Forest & Man Fellow