THE CONDITION OF THE WORLD'S TROPICAL FORESTS, AND ITS IMPACT ON FURNITURE CONSERVATION

April, 1992

Abstract

Recent pressure on the world's tropical forests has resulted in some species being placed on the Endangered list. This report lists these species and others designated as threatened in all or part of their range. Also discussed will be the ethical dilemmas arising as tropical woods follow the fate of ivory and tortoise shell, further diminishing the conservator's palette. Alternative materials will be presented, as well as current information concerning voluntary boycotts and governmental restrictions.

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PREFACE

Since May of 1977, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, or CITES, has been enforced in the United States to regulate import and export of imperiled species. Over 100 nations agreed to classify these species by designation in Appendices I, II or III.

> *Appendix I* includes species presently threatened with extinction. Import and export of these species, primarily for commercial purposes, is prohibited and must be accompanied by permits.
>
> *Appendix II* includes species not presently threatened, but may become so unless trade is regulated.
>
> *Appendix III* is for any country desiring cooperation from other countries to control trade or restrict exploitation of certain species.

Species obtained prior to the convention are exempt. Scientific institutions are eligible for Certificates of Scientific Exemption.

Other organizations with endangered lists are The Food and Agriculture Organization of the United Nations, or FAO, and the International Board for Plant Genetic Resources, or IBPGR.

On July 1, 1975 CITES placed all sea turtles of the family *Cheloniidae* in Appendix I, presently threatened with extinction, and tortoise shell became unavailable as a material for replacement in furniture conservation.

On June 9, 1989 the United States, under the African Elephant Conservation Act of 1988, established a moratorium on all imports of African elephant ivory. The act exempts legally sports-hunted ivory. In October 1989, CITES listed the African elephant, *Loxodonta africana,* in Appendix I, and ivory became unavailable as a material for replacement in furniture conservation.

These dire circumstances prompted the following analysis on the status of Tropical Hardwood species around the world. All of the following species are on one or several compiled lists of endangered or threatened species. They are categorized by geographical area and chronology of exploitation.

THE CARIBBEAN

Spanish Mahogany, *Swietenia mahogani*

From the tip of Florida to Venezuela, the volcanic Caribbean islands were the sight of the first great tropical timber discovery by Europeans: Spanish Mahogany or *Swietenia mahogani,* of the family Meliaceae. The first recorded European use was in 1.514 in a cathedral in San Domingo, West Indies, which is still in splendid condition after more than 450 years. Most, if not all, of Thomas Chippendale's work of around 1750 was of this wood. Harvesting was first done on the accessible coasts of Jamaica and the Dominican Republic. Trees were up to 60´ tall and 12´ in diameter. This was the preferred source of the species and continued into the 1800's, when production was replaced by Cuban which did not become commercially extinct until around the 1900's. The species is almost exhausted in Cuba, Haiti and Domenica where log exports are banned.

CENTRAL AMERICA

Honduras Rosewood, *Dalbergia stevensonii*
Spanish Cedar, Cedrala, *Cederala fissilis*
Honduras Mahogany, *Swietenia macrophylla*
Granadillo, *Platymiscium pleiostachyum* *
Pacific Coast Mahogany, *Swietenia humilis*
Andiroba, *Carapa guianensis*
Lignum vitae, *Guiacum sanctum*
Piquia, *Caryocar costaricensis*
Spanish Oak, *Quercus copeyensis*

Honduras Mahogany, *Swietenia macrophylla,** was discovered in Central America and ranges from the Yucatan Peninsula through Central America into Columbia and Venezuela, and also into Peru and extreme western Brazil. As the Caribbean Spanish species declined, Honduras mahogany was heavily harvested throughout the twentieth century, and is now becoming inaccessible and scarce. Log exports have been banned in Brazil.

A third Swietenia, *Swietenia humilis,* called Pacific Coast Mahogany from southwestern Mexico to Costa Rica, was never in sufficient numbers for heavy commercial use. *Swietenia humilis* is listed under Appendix II. of CITES, and is uncommon in trade.

In Central America, the threatened rosewood is Honduras Rosewood, *Dalbergia stevensonii.* Shipments came from Honduras as early as 1841. Being harmonic, it was widely used in the U.S. for bars of percussion instruments like marimbas and xylophones. Now used only as veneers, it is not exported as lumber. Listed as endangered by Rainforest Alliance.

Andiroba, *Carapa guianensis;* Carapa or Crabwood: From Central America to Peru & Brazil, and also West Indies. Attains a height of 170´, and a diameter of 6´. Like mahogany, a Meliaceae. Felling of timber is prohibited in the state of Para, Brazil as the seeds produce an oil used in the manufacture of soap. It is legal timber in British Guiana. Proposed for inclusion in Appendix II. of CITES.

Spanish Cedar, Cedrala, *Cederala fissilis:* Another Meliaceae. Occurs in every country south of the United States, except Chile. Aromatic. The most important domestic timber in tropical America. Principal U.S. use was in cigar boxes, however now is minimal. *Cederala fissilis,* the principal species, is listed as "endangered" in FAO Panel on Forest Gene Resources, 1981.

Lignum Vitae, * *Guiacum sanctum:* Mexico, West Indies and Central America. Extremely dense. Useful for mallets, pulley blocks and textile shuttles. Became strategic in World War II as a self-lubricating bearing for ship propeller shafts. It is listed in Appendix II. of CITES.

Spanish Oak,* *Quercus species:* About 150 species of red and white oak, similar to American. *Quercus copeyensis* is listed in Appendix II. of CITES.

Piquia *Caryocar species:* Costa Rica, Brazil and Guianas. *Caryocar costaricensis* is listed in Appendix II. of CITES.

With human population doubling every 30 years, Central America has lost more than half of its forests since 1950. EI Salvador has virtually no primary forest left. Belize alone has kept a high percentage.

* See Addendum

ATLANTIC COAST OF BRAZIL

Brazilian Rosewood, *Dalbergia nigra* American Brazilwood, *Caesalpinia echinata*

The great Atlantic forests of Brazil used to cover almost 400,000 square miles, running from the state of Rio Grande do Norte at the eastern-most tip of South America; south along the coast to Rio Grande do Sul, the southern most state of Brazil, and extending inland from 1 to 100 miles.

First colonized in the early 1500s, it is now the most densely populated area in Brazil, with about 150 million people. The forests, some of the most diverse on earth, are now reduced to between 1% and 5% of their original area. In small pockets of forest in this area are the remaining Brazilian Rosewood, *Dalbergia nigra.* Heartwood of this tree is slow in forming and the rich color and fragrance come from old growth, often with defective stems. There are no rosewood plantations, as it is considered too slow growing for profitability. It was listed as "endangered" in the report of the fifth session of the FAO Panel of Experts on Forest Gene Resources, 1981.

American Brazilwood, *Caesalpinia echinata,* is the source for brazilwood extract, commonly used in 18th century Europe to dye furniture and textiles. The tree is now of little commercial importance and is difficult to find in its native habitat. Brazil was named for this tree.

WEST AFRICA

African Mahogany, *Khaya ivorensis*
Gabon Ebony, *Diospyros crassiflora*
Utile, *Entandrophragma utile*
Senegal Mahogany, *Khaya senegalensis*
Amazaque, *Guibourtia ehie*
Benin or Broad leaved Mahogany, *Khaya grandiflora*
African Padauk, *Pterocarpus soyauxii*
Afrormosia, *Pericopsis elata*[*]
Iroko, *Chlorophora excelsa*
Caboon, *Aucoumea klaineana*
Sapele, *Entandrophragma cylindricum*
Wenge, *Milletia laurenti*

Commercial logging started here in the 1880s. At this time, the area was a dense belt of closed-canopy forest, virtually uninhabited from Gabon west to Sierra Leone, occupying 5,000 miles of coast and up to 200 miles inland.

It was the Meliacae; the mahoganies, again, that first attracted loggers. Generally known as African Mahogany, the most important was *Khaya ivorensis.* (Ivory Coast, Gold Coast, Southern Nigeria) At 80´ - 90´, it is considered the best figured of these enormous buttressed trees. One of the most exploited trees in West Africa, it is not gregarious; therefore, unsuited for plantations. One known Khaya ivorensis was 121´ high & 18´ in diameter, providing 11,000 board feet of lumber.

Senegal Mahogany, *Khaya senegalensis:* Grows inland in the dry savannah regions of Senegal, Gold Coast and Nigeria.

Benin, or Broad leaved Mahogany, *Khaya grandiflora:* Sierra Leone, Gold Coast, Nigeria, Cameroons. It is known as broad-leaved mahogany for its 16″ leaves.

Sapele or *Entandrophragma cylindricum:* Ivory Coast, Gold Coast, Nigeria. Has been recorded 20´ in diameter at 15´ above the ground, and 193´ tall. The wood is fragrant like cedar. When cut on the quarter, it produces the distinctive stripe. Gregarious.

* See Addendum

Utile, *Entandrophragma utile:* Scented and banded as Sapeli. Also growing to huge proportions. listed by IBPGR as a priority for genetic resource conservation.

All of these species are high quality mahogany; almost indistinguishable from American. All Khayas and Entandrophragma are proposed for listing under Appendix II. of CITES. *Khaya ivorensis* has all but disappeared from West African forests. *Khaya senegalensis* is listed by FAO as "endangered". Log exports are now restricted in West Africa.

African Padauk, *Pterocarpus Soyauxii:* Southern Nigeria, Cameroons. Is endangered, while its relative in Southeast Asia, *Pterocarpus indicus,* is relatively plentiful. Its burl produces amboyna burl which is difficult to locate today; more from market disinterest, than availability. A dye is made from chips of heartwood. *Pterocarpus soyauxii* is listed as "endangered" by Rainforest Alliance.

Gabon Ebony, *Diospyros crassiflora:* Southern Nigeria, Cameroon and Gabon. A 50′ tree, up to 6′ girth. Black heartwood exists only in large specimens, with old trees usually hollow. Some veneer dealers are listing African ebony as "unavailable" due to irregular supply. Listed as "endangered" in the International Union for Conservation of Nature Red Data Book, 1978. This is the earliest listed endangered designation, and includes all of the Diospyros.

Iroko, *Chlorophora excelsa:* Considered the most valuable wood in local West Africa, as well as a sacred tree in Ghana. Sold as a teak substitute. Listed as "endangered" by FAO Panel on Forest Gene Resources, 1981.

Amazaque, *Guibourtia ehie:* Produces gum used in varnishes and pharmaceuticals. listed as "vulnerable" in FAO report, Conservation of Genetic Resources, Cameroon 1984.

Gaboon or Okoume, *Aucoumea klaineana:* West Africa. Up to 200′, with 8′ diameter. For plywood and furniture. "Vulnerable" in FAO report, Conservation of Genetic Resources, Cameroon 1984.

Wenge, *Milletia laurenti:* Zaire and Cameroon. Dark brown to almost black heartwood, alternating light layers. Common in contemporary art furniture. Listed as "vulnerable" in FAO report, Conservation of Genetic Resources, Cameroon 1984.

Of the original 160,000 square miles of West African forest, only about 60,000 square miles remain. The primary forests of Sierra Leone, Guinea, Cote D'lvoire, and Nigeria have all decreased to less than 10% of their original extent. Only Ghana retains a relatively healthy 22%.

MALESIA

White luan, *Pentacme contorta* Seraya, *Shorea curtisii*
Shorea platyclados

Formerly called the Malay Archipelago, and now known collectively as Malesia, consisting of ten distinct sub-regions; Sumatra, Malaya, Java, Lesser Sunda Islands, Borneo, the Philippines, Celebes, the Moluccas, New Guinea and the Soloman Islands. The most most important timber trees in this region come from the genus Dipterocarpacae, of the Meranti family, ranging from southern Thailand through Sumatra, West Malaysia, and Borneo to the Philippines. These ancient forests have been established

for 30 million years. The characteristic feature of this family is the fruit which typically resembles a shuttlecock with two to five vanes; the number of vanes designating the genera. The sepals are twisted causing the fruit to spin as it falls, thus aiding dispersion. They are the most abundant large tree in the lowland virgin forest, often exceeding 200´ in height.

By far the biggest genus of Dipterocarps and the most common species, are the genus Shorea. Of these, the most endangered is *Pentacme contorta* or white luan, from Burma, Siam, Malay Peninsula and the Philippines. Other endangered Shorea are *Shorea curtisii* or Seraya; and *Shorea platyclados* which, according to FAO report Malaysia 1984, is "requiring conservation action." Dipterocarp forests have become the most endangered in the world. Nearly all have been leased to lumber companies for exploitation. If none are reclaimed for conservation, these lowland forests will be gone by the year 2005.

Shorea are often highly resinous. "*Damar*" is a Malay word for resin. Agathis Dammara provides Manila Copal, and the Stryax genus provides us gum benzoin.

In Sabah, Borneo, the Dipterocarp forest has been severely reduced. In 1966, 17 million cubic meters (M^3) were removed. In 1970, $34M^3$ were removed; and in 1975, $51M^3$ were removed. A large portion of this went to Japan, the world's largest importer of raw timber.

In the past 20 years, U.S. lumber imports of southeast Asian plywood have increased forty times, equaling domestic production. Raw log imports have decreased from 100 million board feet to 30 million annually, as more developing nations convert these raw materials into products themselves.

Philippine forests are now below 25% of original range; and at present rate, 10 to 20 years will complete destruction of most forest resources.

Macassar Ebony, *Diospyros celebica:* The ebony of distinction in Malesia is from the Celebes. Its name comes from *"Makassar,"* the old name for Ujung Pandang, and the strait between Celebes and Borneo. It was not even identified until 1934. The dominant black and brown stripe is always apparent. It is the most available of the endangered Diospyros. *International Union for Conservation Red Data Book*, 1978.

INDIA AND CEYLON (Sri Lanka)

Ceylon Ebony, *Diospyros ebenum*
Calamander Wood, *Diospyros quaesita*
East Indian Rosewood, *Dalbergia latifolia*
Diospyros atrata

The last rain forests in peninsular India are found in the western Ghats, along the country's western edge. It is the origin of the famous East Indian Rosewood, *Dalbergia latifolia,* also known as Bombay Blackwood. The logs are larger and more free from defects than Brazilian. About 1/3 of this forest remains, with a conversion rate of about 580 square miles a year throughout India.

Sri Lanka, formerly Ceylon, the large island off the southern tip of India, is the main source for Ceylon Ebony, *Diospyros ebenum.* It was once common and gregarious in the dryer regions, producing a jet-black heartwood with no streaks. Unprofitable for silviculture because of slow growth. A 60 cm diameter tree is about 200 years old. Calamander wood, *Diospyros quaesita,* is almost extinct. *Diospyros atrata* is reduced to one known tree in a reserve.

MYANMA
(Burma)
Burma Teak, *Tectona grandis*

True rain forests once covered Burma, Thailand, Cambodia, Laos, Viet Nam and southern China. When disturbed, these all deteriorated into monsoon forests, and very little undisturbed forest remains as human population has been in these areas for up to a million years.

Logging of Burma teak, *Tectona grandis,* began in the 1850s for the British navy. Logs were extracted by elephants, causing relatively light impact. Burma contains 80% of the remaining teak production located high on the west-facing slopes of the great mountain ranges running north and south along the country's western and eastern frontiers.

The British Teak Program was a model of sustained yield production. Restricted to a 30-year felling cycle, only mature trees of 150 years and 7′ girth, were selectively removed. This policy was used until 1962, when a military coup acquired control and began deforestation to maximize profits.
Silviculture of *Tectona grandis* began in 1842 at Malabar in India, and by 1920, 70,000 acres were in production overall. Plantation grown teak is considered slightly inferior; however, operations are successful. Similar successful operations were begun 50 years ago in Trinidad and Tobago in the Caribbean.

Shifting cultivation by increasing indigenous "populations, and excessive damage by improper Jogging methods is reducing the teak forests in Burma by over 2% each year.

SUMMARY OF CURRENT SATELLITE ANALYSIS

The following is taken from a report by the Food & Agriculture Organization, FAO, of the United Nations after satellite photography analysis, 1991.

> "Recent studies covering several key countries suggest that deforestation in the tropics may be much worse than previously thought. Until recently, the most authoritative estimate of annual deforestation in the tropics was 11.4 million hectares, based on a 1980 FAO assessment of tropical forestry research, literature, and surveys. Several recent studies show that deforestation is much higher in Brazil, Costa Rica, India, Myanmar (formerly Burma), Philippines and Viet Nam. Forest clearing also increased sharply in Cameroon, Indonesia and Thailand…" "If these new studies are accurate, the world is losing up to 20.4 million hectares of tropical forest annually. 79% over FAO's 1980 estimate"

1980 figures show Brazil losing 1,480,000 hectares, whereas later figures reveal 8,000,000 hectares for 1987. India's rate increased from 147,000 hectares to 1.5 million hectares. Costa Rica had the highest percentage loss; 7.6 percent of closed-canopy forest in 1987, alone.

SUSTAINABLE YIELD

"Sustainable yield" is a term frequently used to describe ethical management of any forest. Basically, it is similar to our concept of reversibility. "Sustainable" timber production means doing nothing to irreversibly reduce the forest's potential to produce marketable timber. In 1988, the International Tropical

Timber Organization (ITTO) commissioned a survey of sustainably managed forests. Of the 828 million hectares of productive timber worldwide, only 4.4 million was so classified; or less than 1% of the total.

ALTERNATIVES

Bridge City Tool Works of Portland Oregon is now replacing rosewood in their precision brass instruments with 1/28 dyed birch veneers impregnated with phenolic resin. The laminating pressure heats the phenolic to a liquid state, creating an inert homogenous material with a hardwood matrix. It is dimensionally stable and esthetically pleasing. The process is twice the price of rosewood, but there is less waste and it allows greater consistency.

Another option is replacement of endangered species with a lesser-known wood of similar properties. A good reference for this search is *Tropical Timbers of the World*, M. Chudnoff, 1984, which lists 370 species of tropical trees; their characteristics and uses. It is available from the National Technical Information Service (NTIS), Order #PB85 - 156917, U.S. Dept. of Commerce (703) 487-4650. $50.00.

WOOD CERTIFICATION PROGRAMS

The Smart Wood Certification Program was developed by Rainforest Alliance *"to* identify and promote the use of tropical timber from well-managed sources whose harvesting does not contribute to the loss of forests." It certifies both sources in tropical forests, and distributors in North America.

Rainforest Alliance
270 Lafayette Street, Suite 512
New York, New York 10012
Telephone: (212) 941-1900 Fax: (212) 941-4986

The Green Cross Scientific Certification Program has two panels of scientist advisors: one for tropical forests; one for temperate forests. Inspection teams will audit every facet of logging operations, and designate a project's degree of sustainability.

Green Cross Certification Co.
1611 Telegraph Avenue, Suite 1111
Oakland, California 94612-2113
Telephone: (415) 832-1415 Fax: (415) 832-0359

Both organizations pay particular attention to land use rights of indigenous populations.

BOYCOTTS

The Rainforest Action Network,. has a campaign to boycott all tropical timber except certifiably sustainable operations.

The states of Arizona & New York, and the cities of San Francisco, Santa Monica, Baltimore and Bellingham have banned the use of tropical timber in public works, with many others in process.

European pressure is even greater. Over 450 town councils in Germany have banned tropical timber from public projects. There is growing public sentiment against all use of tropical hardwoods.

FUEL WOOD

Most of the wood harvested from tropical forests is not used for industrial purposes. Fuel wood, by far, has the greatest demand in Africa. Almost 90% of all felling is used for cooking and heating needs. In South America and Asia, fuel wood makes up approximately 70% of the round wood consumption.

LOGGING METHODS

In contrast to pre-World War II methods of hand logging, effects of mechanical logging are extreme. In an "average" Malaya forest when 10% of the trees are harvested, machinery damage and breakage accounted for an additional 55% of damage, leaving only 35%. In Sarawak, the results were only 21% undamaged forest to gain 6 - 8 trees per hectare (2.5 acres). Natural regeneration in such cases is then impossible. Undesirable species gain dominance over remaining trees, and it's been observed that in some cases, the entire residual stand may be killed by vines in three to five years after the logging operation. Heavy equipment churns and compacts the soil, making erosion inevitable. Rivers draining logging areas soon become highly polluted, and siltation is a common problem.

ETHICS

Woodworkers Alliance for Rainforest Protection, or WARP, states that less than 1/2 of 1% of all tropical timbers is used by woodworkers, and very small percentage of that is used for conservation of wooden objects. Our ethical dilemmas are many. Is conservation of important furniture a "higher order of ethics" and more important than new work? Is it ethical to stockpile endangered woods for conservation in anticipation of shortages? Can we refuse to use ebony or rosewood on grounds of ethics, and continue to use dipterocarp plywood?

A SCIENTIST'S VIEW [1]

The late Marius Jacobs, after a life of study of tropical forests, made these observations:

- A tropical forest should not be regarded as a source of timber. There are too many other values destroyed by logging.
- The forest is a renewable resource only when left alone. It does not regenerate quickly, and cannot compensate for loss of value.
- Methods of exploiting a forest so that all species may be protected does not exist.
- Selective cutting is harmful to the quality of remaining trees.
- Protection of single endangered species is ineffective.
- Important species cannot be preserved in botanical gardens or "seed banks." There are too many.
- Attempts to relieve exploitation pressure are laudable, but will not save any forests. Destruction is proceeding too fast.
- Reduction of tropical hardwood consumption will not save any rain forest.
- Only direct protection in nature reserves can be effective.

[1] Marius Jacobs, *The Tropical Rain Forest,* p. 12

CONCLUSION

Marius Jacobs, offered this sound advice.

> "It would be difficult, if not impossible, to ban the importation of tropical hardwood. It would be better to restrict its use. Western countries would do better to help tropical countries to manage their forests in a sustainable way; leaving substantial areas of primary forest undisturbed, as reserves. International aid should be directed to projects which benefit the forest not projects which tend to deplete them, and an economically harmful ban on tropical timber could thus be avoided."

ADDENDUM*

The 8th meeting of the Conference of the Parties (COP 8) to CITES was held in March, 1992 in Kyoto, Japan. The following changes were made.

Appendix I:
Brazilian rosewood, *Dalbergia nigra*, was moved-up to eminently threatened; the first tropical timbers to be so designated. It has already had far reaching impact.

Several more species were added to *Appendix II:*

Afrormosia, *Pericopsis elata:* West Africa, mainly Ghana and Ivory Coast. A 150´ gregarious tree, with a 3´ - 6´ diameter. Extremely decay-resistant, especially in water. Often used for the same applications as Teak.

Granadillo, *Platymiscium pleiostachyum:* Continental Tropical America, from Southern Mexico to the Brazilian Amazon region and Trinidad. Highly resistant to decay. Used in furniture, musical instruments (violin bows) and turnery .

Common Lignum vitae, *Guiacum officionale,* joins *Guiacum sanctum. Quercus copeyensis,* previously in Appendix II, was delisted.

Honduras Mahogany, *Swietenia macrophylla:* Once proposed for inclusion in Appendix II, was withdrawn.

The International Tropical Timber Organization (ITTO) and CITES were recognized as complimentary organizations in COP 8, and may become formally interactive when the ITTO meets in May, 1992 in Cameroon. A 1993 CITES meeting will be convened to re-evaluate the 1979 criteria for listing. COP 9 will convene in 1994 in the U.S.A.

COP 8 listings are in effect June 11, 1992.

* from a report dated March 30, 1992 by Bruce Mac Bryde, CITES Plants Committee Chairman, U.S. Fish & Wildlife Service

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