FMF-6
Amazônia: The Hylean Forest

Belém, Pará
Brazil
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Mr. Richard H. Nolte
Institute of Current World Affairs
366 Madison Avenue
New York, New York 10017

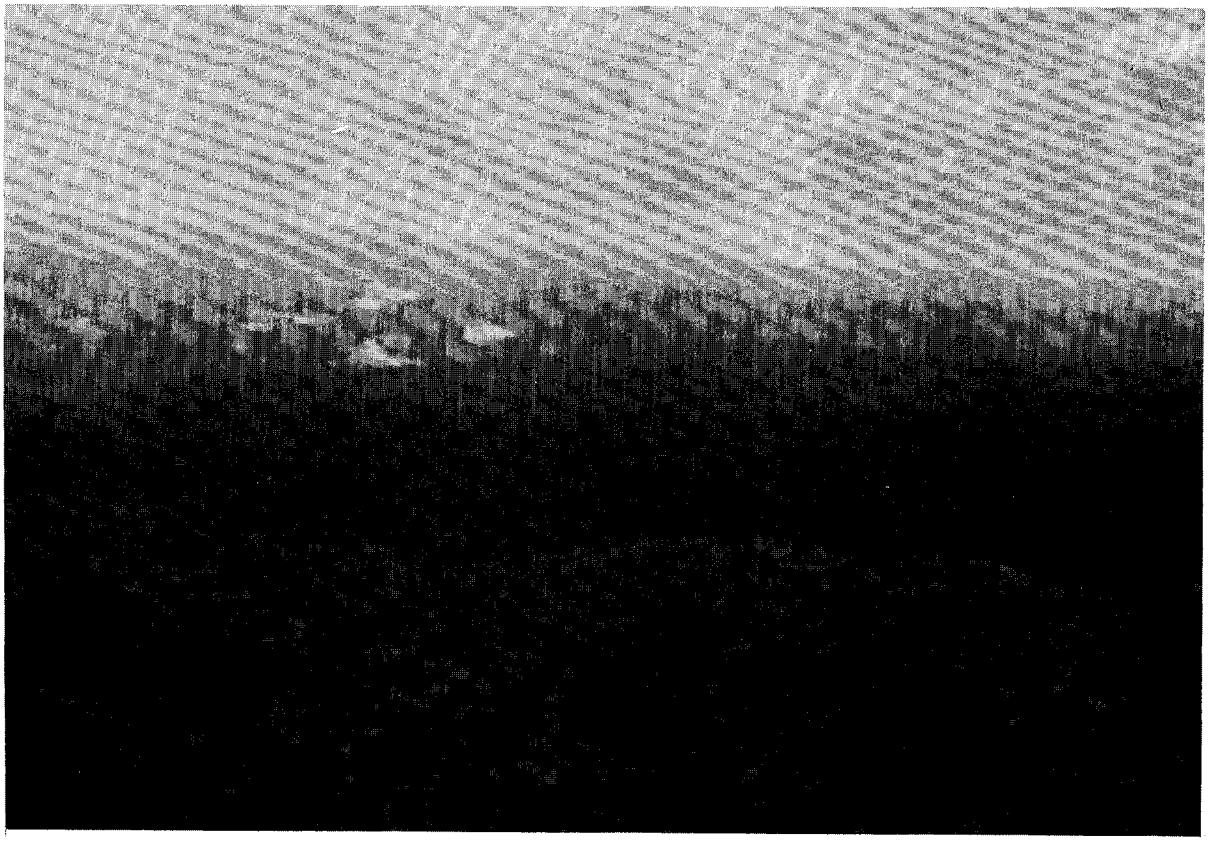
Dear Mr. Nolte:

They are clearing the forests of Amazônia in order to plant trees. "Trees are a crop" is the ascendant slogan.

Climax forest, dense and evergreen, represents the growth of a millennium over a vast area of 3,620,000 square kilometers. Whether one is amid it, alongside of it on a river, or over it in a plane, its vastness amazes. From horizon to horizon this equatorial forest, called "Hylea", mantles the earth with its several layers of growth. It is water-loving, deriving its nutrients from the torrential rains and inundated rivers and from the decaying litter layer at the surface.

On the lowlands the softwoods dominate---the sumaúma (Ceiba

BELOW. The Amazon hylean forest. In the background, the Jarí River.



pentandra), ucuuba (Virola sp.), andiroba (Carapa guianensis). On the highlands stands the most abundant growth of hardwoods in the world---mahogany, acapú (Vouacapoua americana), angelim (Hymenolobium excelsum), massaranduba (Manilkara huberi), and castanheira (Bertholletia excelsa). In all, over 4000 species abound with more being discovered all the time---a heterogeneous scattering which defies foresters accustomed to pure stands.

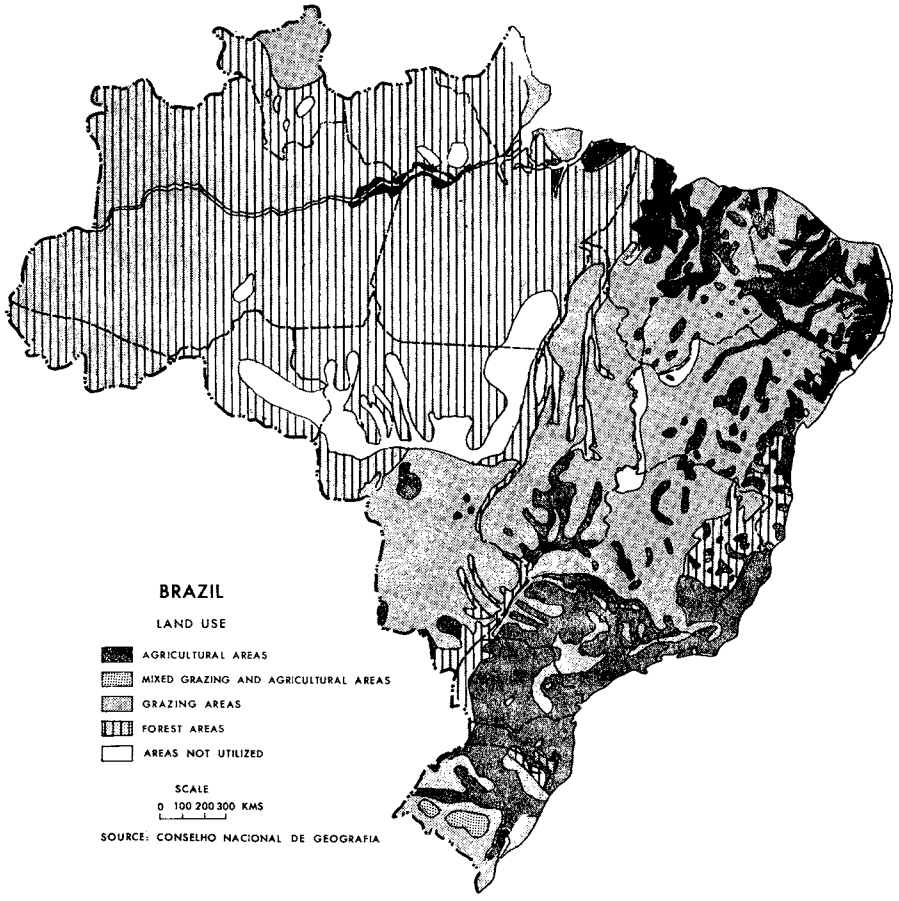
From the beginning the forest has been the keystone of Amazônia's economy. During the three centuries after Brazil's discovery in 1500, Portuguese, Dutch, English and French competed for the valuable spices, the "drugs of the interior", extracted by the natives. Rubber held sway for nearly a century, and now Brazil nuts are the major extractive product. But there are many more: vegetable and medicinal oils, aromatic essences, tallow, gums, resins, fruits, fibers and charcoal.

Effect on the inhabitants has been negative. Dependent upon the forest for their living, they must penetrate it and live in it, victims of an isolation imposing a low cultural level. Due to the season or the search for larger harvests, the man of the Amazon is a nomad, living in a temporary hut on the river's edge, traveling by canoe.

An extractive economy tied to nature has been carried out by means of primitive methods and high-cost operations. Lumbering in Amazônia fits this description. Because the human muscle is the sole force employed, the industry is limited to that which is possible for this energy source. Thus, the highlands have been little exploited, concentration being on the more accessible softwoods along the floodplains. Since the river is the road, the pattern of exploitation is linear, extending along the banks hundreds of miles from the sawmill, necessitating weeks for the logs to reach their destination.

Felled by ax, the trunks are cut into lengths of about four meters and then rolled manually to the river's edge. To execute this transport it is necessary to open trails through the forest, six meters wide and as straight as terrain allows. At the river's edge another crew takes over to bind the logs together as rafts, called jangadas. Sometimes these floats are merely the logs joined parallel with vines. Other times, more professionally or for longer trips, the jangadas are formed as a "V"---one end of two logs tied together, the other ends spread to insert another two, etc., until the raft takes on the appearance of a great chevron.

The hardwoods of Amazônia have such high density that they often do not float. It is estimated that some 90% of the species are "sinkers". Therefore, a makeshift operation without tugs and and barges must suffice to transport these logs to the sawmill. This is usually done by attaching the heavy logs to highly floatable



TIMBER REGIONS OF BRAZIL

trunks, such as palms.

The whole process is laborious and time-consuming---felling the tree, clearing the trail, rolling the log, securing the raft. As can be imagined, salaries are low but, even so, inefficiencies result in high costs. In addition, there are often intermediaries ---brokers, contractors or what have you---between the caboclo cutting the tree and the saw mill. And each must have his profit.

The mill may be located much closer to civilization than the logging camp, but still it is likely to suffer from isolation. If

equipment breaks down, days and even weeks may be lost while the part is repaired or replaced. The super-hardwoods demand special saws which as yet must be imported and this fact further complicates the maintenance problem.

Operators are ill-trained, if at all. Logs are mishandled, splintered and badly cut. Rot and insects take their toll, and the drying process is haphazard, dependent upon the elements.

Since Amazon port facilities are adequate only in Manáus and Belém, and also to avoid port fees, the logs or boards are often loaded at the mills. Once more the lumber is interlaced as rafts and pushed to the ship moored in the middle of the river. With great effort and sometimes with accidents, the heavy cargo is then lifted from the water into the holds by means of the ship's crane.

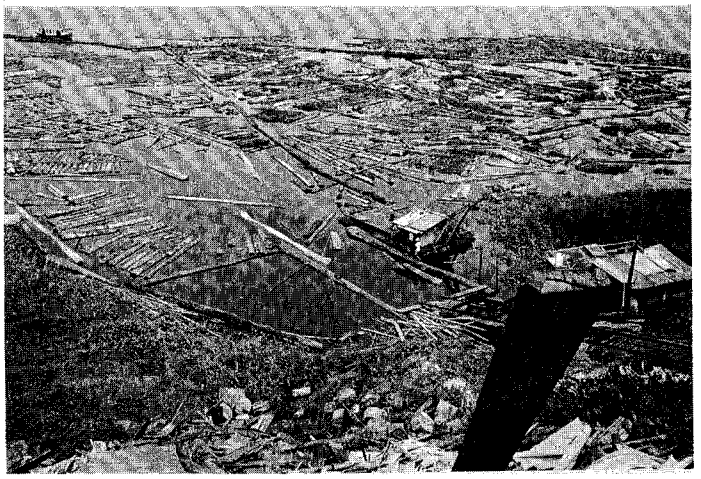
Taxes both on import of machinery and supplies and on export of the lumber are burdensome and usurious. A Dutch expert's report on the industry, done for the Brazilian government in 1963, states:

"It is very likely that taxes and charges on Amazonian woods are among the highest in the world, as well as the most numerous and complicated. The formalities for filling out the forms and the receipts associated with these imposts, as well as the procurement of the export licenses, demand the service and time of people specialized in the procedure. It hampers and limits the expansion of commerce."

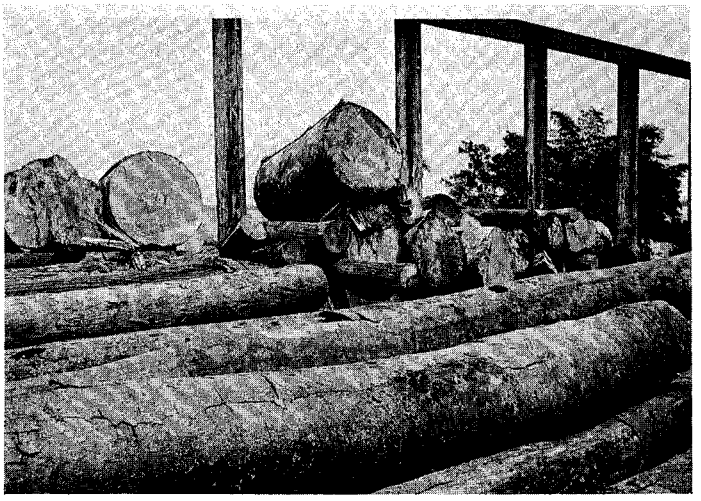
Although some concession may be obtained, the going tax rate is as high as 30% ad valorem. Other lumber-exporting nations seldom exact more than 6-8%. In addition, there are a number of flat charges per shipment: despatch agent, U.S.$30; 10% extra on above, U.S.$3; customs fees, U.S.$29; rural economy inspection, U.S.$15; inspectors fees, U.S.$10---ad infinitum. Payment of certain other "under-the-table fees" is also prevalent in order to expedite the workings of an onerous bureaucracy.

To cope with the primitive lumbering industry, in 1952 Brazil contracted the Food and Agriculture Organization to determine the extent of the forest reserves, and later to administer a training school in Santarém. The survey covered 40 million acres on the south side of the Amazon River, from Belém to Manáus. Finding the richest clustering of species with the best possibility of transport between the Xingú and the Tapajós, the FAO operation established its own reserve at Curuá from which it supplies its training mill in Santarém. At the mill it conducts three-month courses for 18 or 20 men who are already experienced in mill work but need more technical know-how.

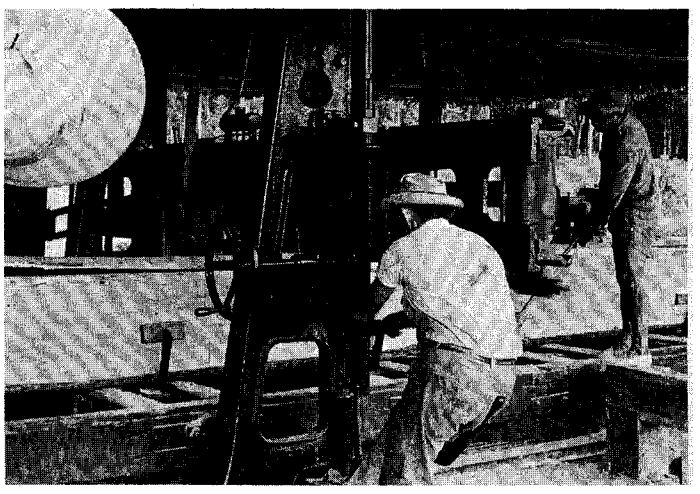
The mill is under the supervision of Pieter H. Hallewas, a



The logyard at COMPENSA, a Brazilian plywood factory in Manáus. It holds a reserve of 60,000 logs, some still tied together as jangadas, others sunk to the bottom, usable only when the water recedes.



Ucuuba (Virola sp.) of a deep red color, ready to be peeled for veneers. For the Manáus factory, the sources are the distant Juruá and Purus Rivers.



The sawmill at Santa Barbara, Rondônia--- functional only part of the time due to breakdowns and supply shortages.

FAO forestry expert from Holland, who has many years experience in Indonesia. According to him, commercial operations in Amazônia are so far based largely on only seven species: cedar, mahogany, acapú (Brazilian teak), pau-amarelho (Boxwood), sumaúma (Ceiba pentandra), louro (Lauraceae) and ucuuba (Virola, related to the nutmeg family). However, FAO has found 75 species with commercial value; the problem is that they do not float and require heavy equipment to work them. At the Curuá reserve, 60-80% of the trees cut do not float and are brought to Santarém by tugboat and barge.

Hallewas agreed that, due to a tax incentive law of October 1966, there was a "rush in the lumbering industry. He named six big operations which are now getting underway: 1)Georgia-Pacific (U.S.) at Portel, south of the Marajó Island; 2) Brumasa (the Dutch firm Bruyznell from Surinam) in Amapá; 3) Inasa (Brazilian) in Corcovado near Breves on the Marajó; 4) Sabim (Brazilian) with headquarters in Belém; 5) Jarí (U.S.) along the river of that name in Pará; and, 6) a group of U.S. missionaries in the Tocantins-Araguaia area. Most of these six are capable of modern, highly-capitalized operations which, for the first time in Amazônia, will open up the highlands and allow large-scale production.

Hallewas estimated that in the next few years, Amazônia will lose 12 to 20 million acres of forest due to commercial exploitation. He commented, "It is a price it must pay for development." By law, every tree cut must be replaced by four saplings, but since there is no forestry service for enforcement, the law is ignored.

Georgia-Pacific, the world's largest producer of plywood, bought 600,000 Amazonian acres from an American resident of Belém and began operation late in 1965. So far it has concentrated on veneers, using ucuuba and sumaúma, which are shipped to their main plant in Savannah, Georgia. To transport the woods, the company early found it could not rely upon commercial shipping lines and so constructed two special heavy-duty barges which shuttle back and forth, taking 15 or 16 days for a one-way trip.

By the end of this year, it expects to have two lines going to peel the trunks at the Portel headquarters, turning out two million board feet. The executive with whom I talked estimated there were at least five billion board feet available just along the Amazon River, but part of the task before exploiting this resource is to create a demand for exotic woods on the world market. The Georgia-Pacific Sales Dept. in the U.S. has undertaken a promotional campaign to arouse interest in such woods as the beautifully-grained, red-toned andiroba.

The other U.S. company, Jarí, is just getting set up, having completed the purchase of three million acres, encompassing the valley of the Jarí River from its mouth northward to Surinam, eastward to Amapá and westward to the Paru River. The power behind

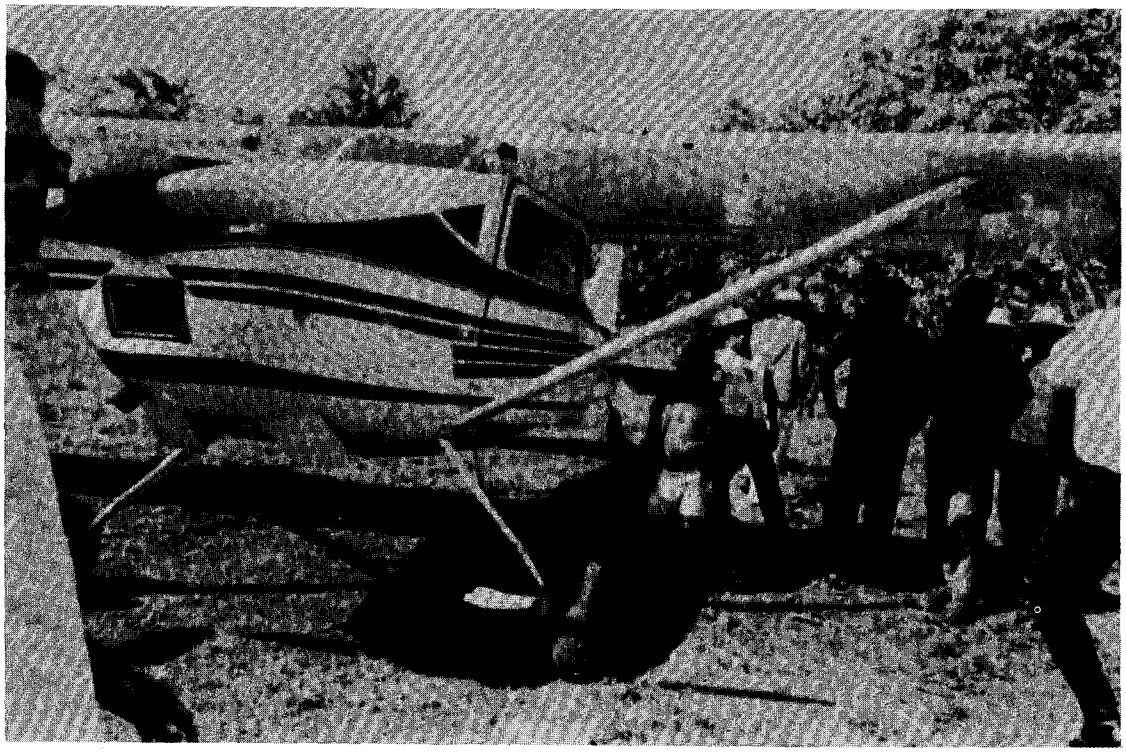
the operation is D.K. Ludwig of National Bulk Carriers.

Eventually land use will include a herd of 200,000 cattle, mineral exploration, a plywood industry, and exploitation of babaçu palm groves for the oil. First priority, however, goes to the development of a pulp industry with the Latin American, and especially the Brazilian, markets in mind. Right now the area is importing paper and cellulose valued at U.S.$300 million. Being a region of rapid development, FAO estimates consumption will increase geometrically, reaching a value of U.S.$1 billion by 1975.

Looking to this market, the company is now clearing 100,000 acres of Amazonia forest. Tom Bunger, forester in charge of this operation, has marked certain of the better trees---angelim, castanheiras, etc.---to be spared, but thousands of other trees are going down before bulldozers. In their stead will come an imported tree, the fast-growing gmelina, native of the Bay of Bengal area, now cultivated on plantations in Nigeria.

At the time I was in Belém, two U.S. technicians had just arrived to supervise the mechanical aspects of the clearing operation. One, from Oregon, was a specialist in chain-saw work. The

BELOW. Our transportation to reach the camp on the Jarí River. When we were ready to leave in late afternoon, dozens of the local residents hiked up the steep slope to see the plane and the take-off.



other came in from one of Ludwig's other big operations in Venezuela where he was in charge of the bulldozers clearing thousands of acres for cattle-grazing purposes.

Together with the forester, we flew up to the main camp. Unlike Georgia-Pacific which has been operating a little longer, Jarí does not yet have their own two-engine plane and so must rely upon the local air taxi service. This means of transportation is comparable to the bus system in our country, connecting smaller outposts which in Amazônia would otherwise be isolated, having no roads or railroads to reach them. For instance, the Kovacs Taxí Aéreo, with six Cessnas, has daily or weekly connections to towns within a three-hundred-mile radius: Tomé-Açu, Abaetetuba, Muaná, São Sebastião da Boa Vista, Portel, Gurupá, Porto de Moz, and Almeirim.

Chartered for the day, our Cessna 185 took off across the Marajó, over the Amazon River and up the sinuous valley of the Jarí, a flight of about two and a half hours. We landed in a small clearing on the top of a hill overlooking the widespread cataracts of the first falls of the Jarí. Since it had rained that morning, the truck could not negotiate the slope to pick us up, so we walked the muddy, steep path to the settlement, a half an hour below. The head man of the village was having a malaria attack and apologized for not arriving at the airstrip to meet us.

We got into a boat and went down the river another half an hour to the camp. The Jarí, some 500 feet wide, turgid with eddies and counter-eddies from the falls above, gave a sense of the tremendous force of the water. Along its overgrown banks were occasional isolated huts; caboclos continue the original extractive activities of the area---skins, Brazil nuts, and gums and rubbers such as sorva, massaranduba and balata.

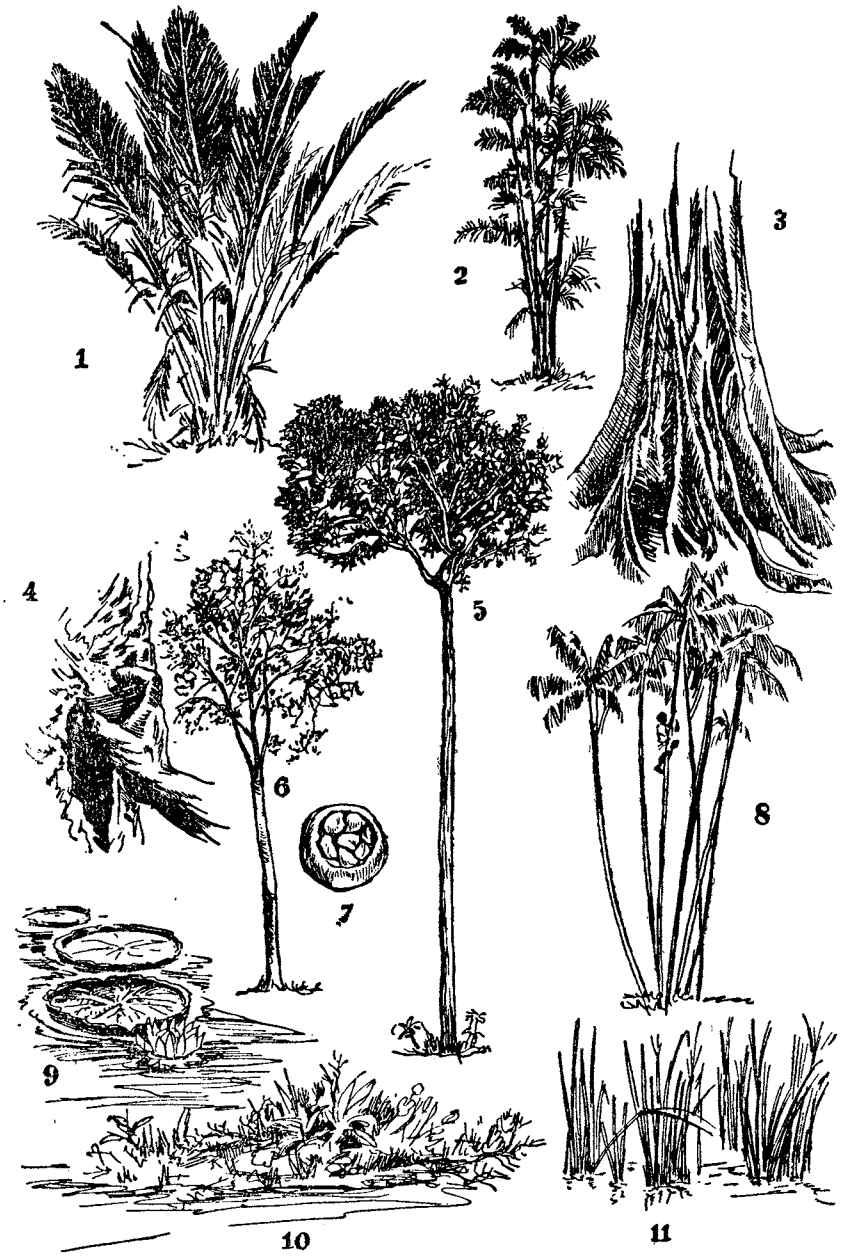
The camp is spanking new, the well-constructed frame buildings painted stark white and some thought already given to landscaping. Only a few weeks before, a tractor cleared the hilltop, routing and crushing three bushmasters in the process.

We tramped the forest for a couple of hours to let the two technicians see the trees and the terrain. They were pleased. The bulldozer specialist felt there were few trees that would cause problems, nor would the terrain. That meant less work for the chain saws which follow behind to cut down those trees which the bulldozer cannot or should not attack.

At that very time, the bulldozers were on their way, coming from Belém by barge, a trip of seven to ten days. It was important to get them in now as the waters would be receding soon, and the camp would no longer be accessible by boat.

The tractors are D-9's, the largest manufactured by Cater-

FLORA AMAZÔNICA



1) Buçu (Manicaria saccifera). 2) Paxiúba palm (Iriartes exorrhiza). 3) Sumaúma (Ceiba pentandra). 4) Collecting latex from the rubber tree. 5) Castanheiro, Brazil nut (Bertholletia excelsa). 6) Seringueira, rubber tree (Hevea brasiliensis). 7) The Brazil nut. 8) Acaí palm (Euterpe oleracia). 9) Vitoria-régia, water lily. 10) Balsa reeds. 11) Canarana aquatic grass.

pillar, weighing 35 tons each and standing more than twice the height of a man. Six will work in front, felling trees; three will pile the debris behind. Because the top soil is so thin and so precious, they would not use chains as they were in Venezuela. There, because less care was necessary and because the rubbish could be left, the cost was but $5 per acre to clear.

At Jarí, Rome KG blades would be used. This massive cutting instrument protrudes on one side with a stinger which is used to gouge and push the tree. Then it curves back with a sharp edge which slices into the trunk. The tree, therefore, falls because it is cut rather than pushed, and the root system has not been ripped out to leave great pits in the ground. With this blade the D-9 can clear an average of an acre per hour.

A "clean-up squad" will finish the clearing with some care. Costs, therefore, will be much higher than in Venezuela. The bulldozer technician estimated $80 per acre; the forester, $100 or more per acre. With 100,000 acres to clear, this represents an initial expenditure of $800,000 to $1,000,000.

The U.S. technician would spend one to three months at the camp to train local men in the use of the D-9. Not one trained operator was available. Forest men throughout the world have high respect for this craft and appreciate its dangers. The angelim and sumaúma, for instance, have great buttresses which must be trimmed with the blade before reaching the core of the trunk. The trees, some of them 150 to 200 ft. high, must be handled with great care to direct the fall. Once the cut has weakened the trunk sufficiently, the operator eases it over by a well-calculated pressure. Should he misjudge and apply too much, he can run through the tree, causing it to fall backward, crushing him, the tractor, and all that follows. The U.S. technician said, "Yes, we'll probably lose a man or two."

The 25 acres for the nursery has already been selected on the basis of its sandy, clay loam soil and its good drainage. Artificial overhead irrigation will be installed, utilizing the waters of the Jarí down the hill.

A rotary tiller will be brought in to prepare for the seed beds, 4' X 150', to be laid out on contour. Pre-emergence chemicals, fertilizers and lime will be applied.

The seeds are already at hand---seven and a half tons of them, approximately 15 million, imported from Nigeria. After germination, six to eight weeks will suffice before lifting and outplanting the seedlings.

After seven years, the trees will be ready for the pulp mill. That is, if they are not attacked by fungus, bacteria, parasites, nematodes, erosion, etc. This will be the first experience with the gmelina in Amazônia, although some young plantations in Central America are doing well.

In the meantime, much infrastructure will be laid down. The first, yet this year, will be a deep-water port down river at the terminal point for year-round navigation, to be supplemented by a road of eight to ten miles through the jungle to the camp. Logistics are always a prime consideration. A D-9 uses about 120 gallons of diesel fuel in a ten-hour day. With nine going, that's over 1000 gallons per day. But the nine will not be going all the time---there will be break-downs, and spare parts must be on hand, or quickly available. When it reaches capacity, the camp will have over one hundred workers, who must be fed with food brought in from Belém. Etc.

Besides the port and the road, the company will build its own hydroelectric plant to supply the pulp factory it will also build. Aware of their responsibility for the workers' health, a hospital will be among the first structures to go up; arrangements have already been made to bring in a doctor to give everyone yellow fever shots. Anti-malaria pills will be distributed, but the problem may be similar to Georgia-Pacific's at Portel: to keep the workmen from hoarding the pills and then selling them at a considerable gain. Georgia-Pacific now demands that the workman swallow it upon receipt, not just put it in his pocket.

The Amazon forest has never faced such an attack as is now being readied. "Primitive", "handicraft", "extractive" have been the adjectives to describe the previous incursions, with the exception of Henry Ford's adventure at Fordlândia and Belterra. Now, one vital ingredient spells the difference: money. The foreign and Brazilian enterprises now entering Amazônia have, perhaps, as many dollars as the forest has trees. But, Amazônia has its own weapons, as Ford found out, and the contest may be between capital and nature.

The greatest extent of hylean forest in the world is in Amazônia, rivaled only the the African Congo. Other patches mat the tropics of Panama, East Indies and Hindustan. Variously dubbed "Reign of the Naiads", "Vegetal Museum", "Last Chapter of Genesis", "Green Hell", "Granary of the World"---this equatorial forest has so far withstood man's attempt to rule it. With the gargantuan forces---the interplay of water and vegetation---which dominate the area, it will be interesting to observe the course of the assault.

Sincerely yours,

Frances M. Foland

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Illustration, p. 9: Raymundo Moraes, Na Planície Amazônica, Rio, 1960.
Photos: FMF

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