

Rubber



Hevea brasiliensis.
Euphorbaceae

Up to 40 m tall.

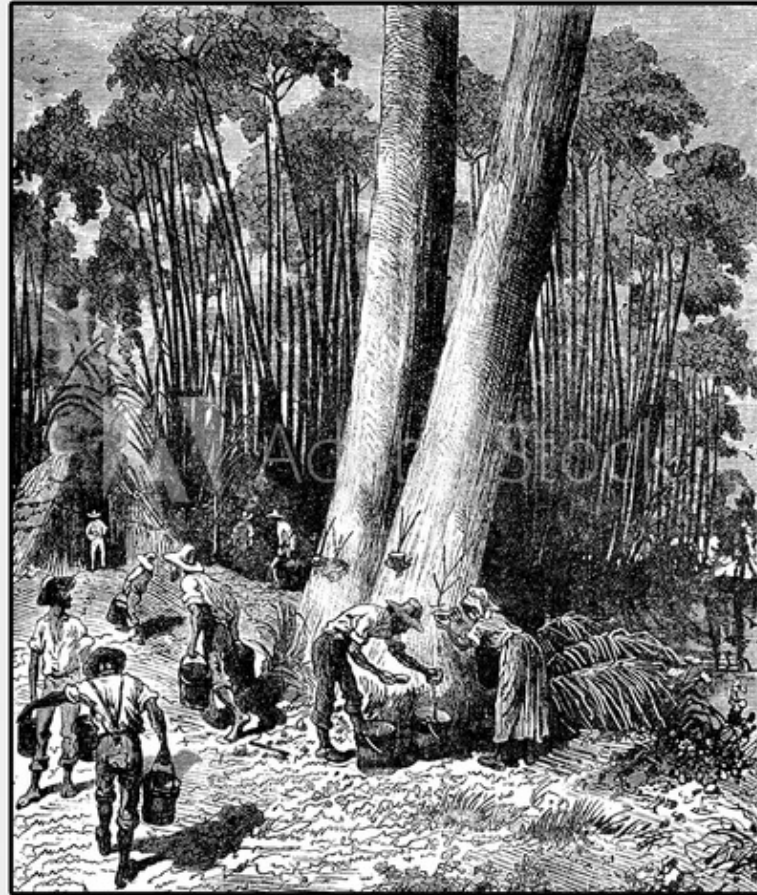
R strategy plant (latex)

Can be tapped for up to 25
years.

Well-drained soils

Native to Brazil.

Hevea from the Quechua
word hyeve for the rubber
tree.



#178337722



Aztec – Olmec – Maya Technology

3,000 years ago



Aztec – Olmec – Maya Technology

Mixed rubber with
morning glory juice



Aztec – Olmec – Maya Technology

Mixed rubber with
morning glory juice

Castilla elastica, not
Hevea brasiliensis



Aztec – Olmec – Maya Technology

Mixed rubber with
morning glory juice

Castilla elastica, not
Hevea brasiliensis

River Ulapa means “River of
Rubber Trees”



Aztec – Olmec – Maya Technology

Mixed rubber with morning glory juice

50:50 rubber:morning glory = bounce = balls



Aztec – Olmec – Maya Technology

Mixed rubber with morning glory juice

50:50 rubber:morning glory = bounce = balls

75:25 rubber:morning glory = durable = sandals



Aztec – Olmec – Maya Culture

Mixed in with many other plants to make an incense.



The Amazon as a backwater.

Jesuit missionaries

The “black robes”

Expelled, control by Portugal.

Anthony Vieira,
17th century.



Vulcanization – 1839 – Charles Goodyear

Chemical process by which the physical properties of natural and synthetic rubber are improved; finished rubber has higher tensile strength and resistance to swelling and abrasion, and is elastic over a greater range of temperatures. In its simplest form, vulcanization is brought about by heating rubber with sulfur.



Vulcanization – 1839 – Charles Goodyear

This triggered the Amazon Rubber Boom.



The Amazon Rubber Boom

1850.

Transportation is the first problem.

River transport

think Mesopotamia and Cahokia

Compania de Navegação do Amazonas

12% subsidy



The Amazon Rubber Boom

Compania de Navegação do Amazonas purchased by British firm, Amazon Steam Navigation Company in 1874.



The Amazon Rubber Boom

Labor is the second problem.

One person can handle 400 to 600 trees depending upon how they are distributed in the forest.



The Amazon Rubber Boom

Labor is the second problem.



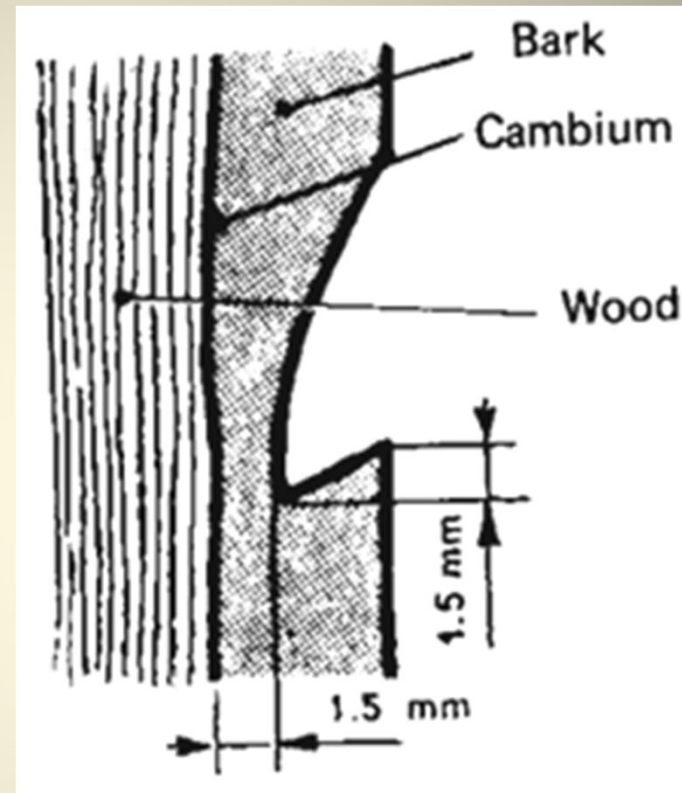
The Amazon Rubber Boom

Labor is the second problem.

The cut is in the bark and away from the cambium.

The slope allows the latex to flow to the bucket.

Skilled work.



The Amazon Rubber Boom

Labor is the second problem.

Collection cup.
Metal spout?



The Amazon Rubber Boom

Labor is the second problem.

Cups are collected about every three days to prevent coagulation.



The Amazon Rubber Boom

Labor is the second problem.



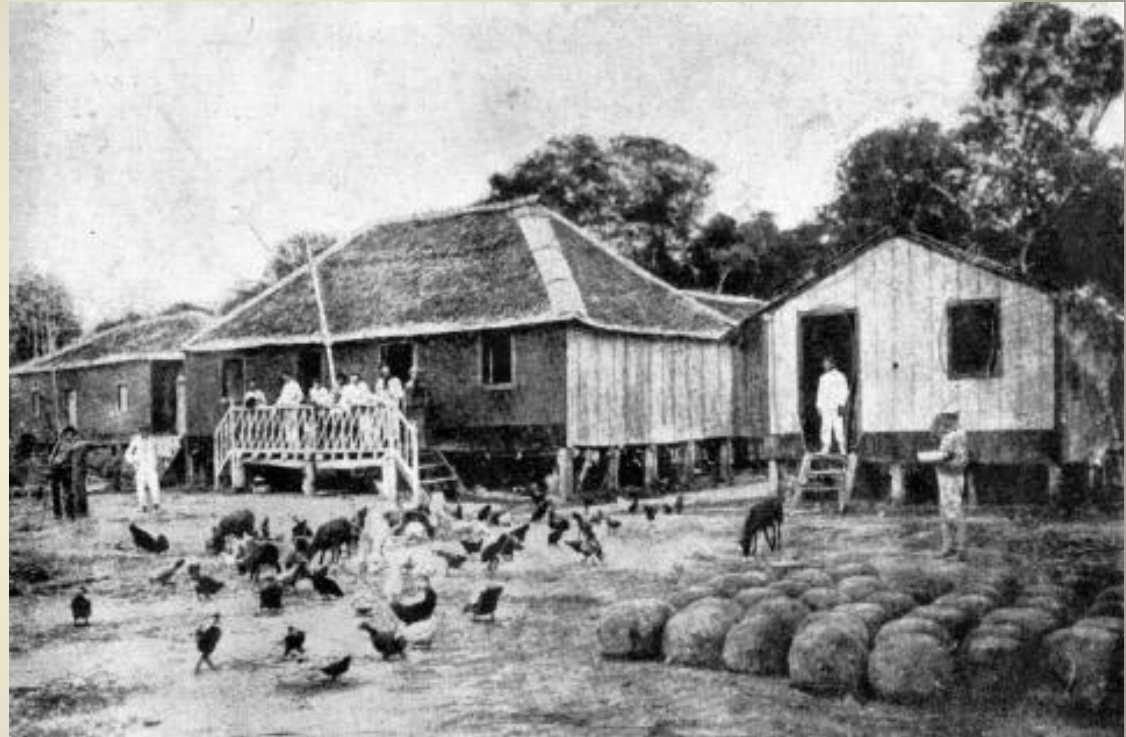
Smoking rubber: 5 to 6 pounds on a spoon = a biscuit. Dip and smoke, dip and smoke, Eventually larger “biscuits” on a pole. This picture shows the pole process, pouring latex over the ball as it grows.



The Amazon Rubber Boom

Labor is the second problem.

Sold at trading posts.



The Amazon Rubber Boom

Labor is the second problem.

Japan?

Southerners fleeing reconstruction?

Indigenous people?



The Amazon Rubber Boom

Enslavement of indigenous peoples of the Amazon.



The Amazon Rubber Boom

Roubichon. Casement investigation of atrocities (1905-1911).



The Amazon Rubber Boom

The drought of 1879 in NE Brazil.



Image from page 438 of "Brazil, the Amazons and the coast" (1879)



The Amazon Rubber Boom

The heart of the boom was 1890-1910.



1888 Starley Rover



The Amazon Rubber Boom

Manaus – where the Amazon and Rio Negro meet.



The Amazon Rubber Boom

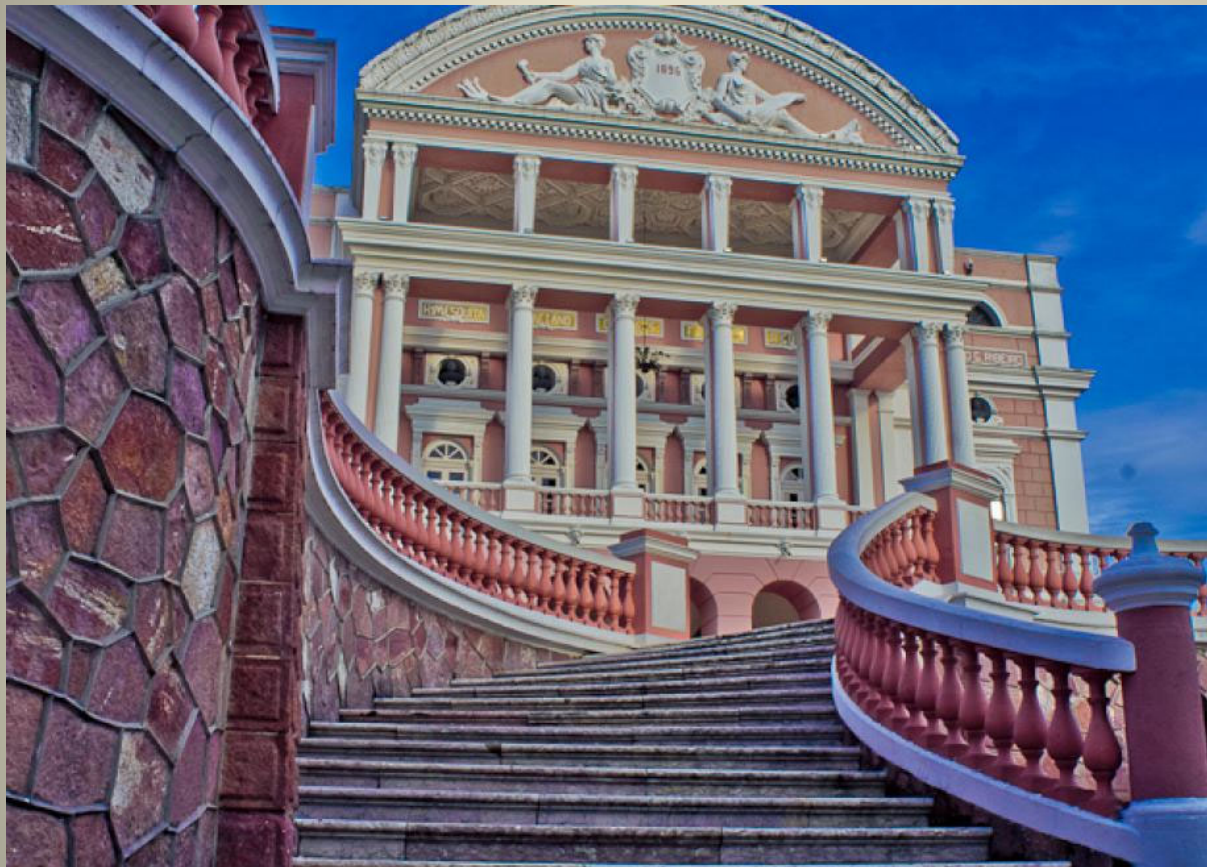


Manaus Opera house

<https://www.atlasobscura.com/places/teatro-amazonas-manaus/>



The Amazon Rubber Boom



Manaus Opera house

http://www.slate.com/blogs/atlas_obscura/2014/01/14/teatro_amazonas_the_unlikely_opera_house_in_manaus_brazil.html/



The Amazon Rubber Boom



Manaus Opera house

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The Amazon Rubber Boom



Manaus Opera house



The Amazon Rubber Boom (tangent)



Calumet opera house

<https://www.michiganhauntedhouses.com/real-haunt/calumet-theatre.html>



The Amazon Rubber Boom



Manaus today

<https://theculturetrip.com/south-america/brazil/articles/the-top-10-things-to-do-and-see-in-manaus/#>



The Amazon Rubber Boom



Manaus today: \$300 million World Cup stadium.



The Amazon Rubber Boom



Manaus today: medicinal herbs in the market.



The Amazon Rubber Boom – Side note

When the boom collapsed people still needed to make a living.
Estimated that 23,000,000 animal hides were legally exported from the Amazon when the rubber boom collapsed.



The Amazon Rubber Boom

Meanwhile in Asia.



The Amazon Rubber Boom

Meanwhile in Asia.

1876 – Harry Wickam smuggles several thousand rubber seeds to Kew Gardens in England. Seedlings from Kew are planted in Sri Lanka.



The Amazon Rubber Boom

Meanwhile in Asia.

At first there is little interest in Asian rubber plantations.

Tea markets change.



The Amazon Rubber Boom – SE Asia



PL. 177 — PLANTATIONS DES TERRES ROUGES, PLANTATION DE QUAN-LOI
Un village tonkinois



The Amazon Rubber Boom – SE Asia



178 — PLANTATIONS DES TERRES ROUGES, PLANTATION DE QUAN-LOI — Hévéas de 9 ans



The Amazon Rubber Boom – SE Asia



The Amazon Rubber Boom – SE Asia



The Amazon Rubber Boom – SE Asia



The Amazon Rubber Boom – SE Asia



The Amazon Rubber Boom – SE Asia

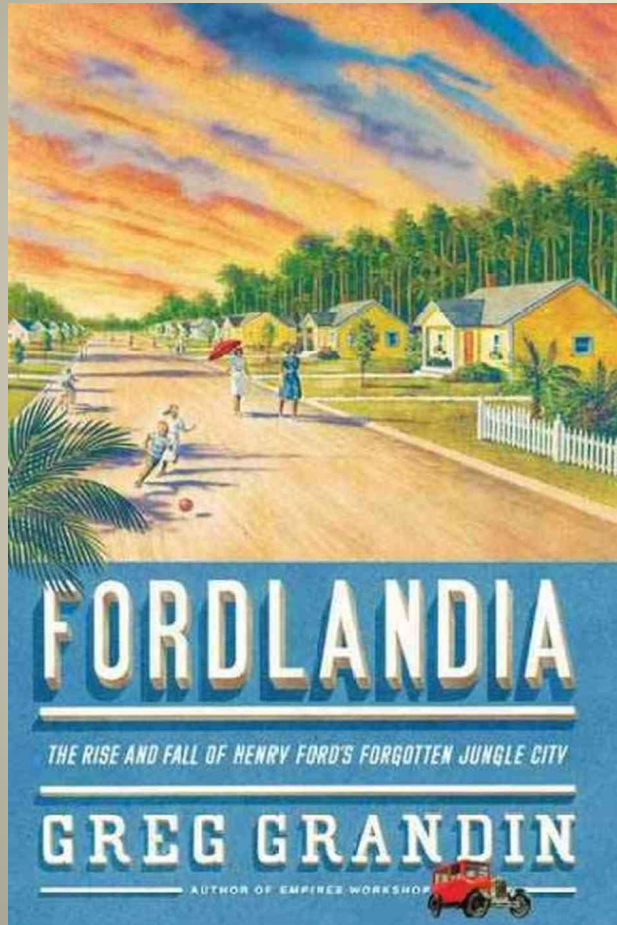


1932 film, love triangle on Vietnamese rubber plantation.

Now on the national film registry as "culturally, historically, or aesthetically significant"



The Amazon Rubber Boom – Fordlandia



An attempt to grow rubber to vertically integrate the Ford Motor Company and protect the company from consolidation in the rubber industry.



The Amazon Rubber Boom – Fordlandia



What went wrong here?



The Amazon Rubber Boom – Fordlandia

Ford purchased 2.5 million acres of land in Brazil. In order to make the deal work Ford agreed to pay the government of Brazil 9% of the profits.

but



The Amazon Rubber Boom – Fordlandia

The land was rocky and nutrient poor and



The Amazon Rubber Boom – Fordlandia

the seller was the Brazilian official assigned to work with Ford.



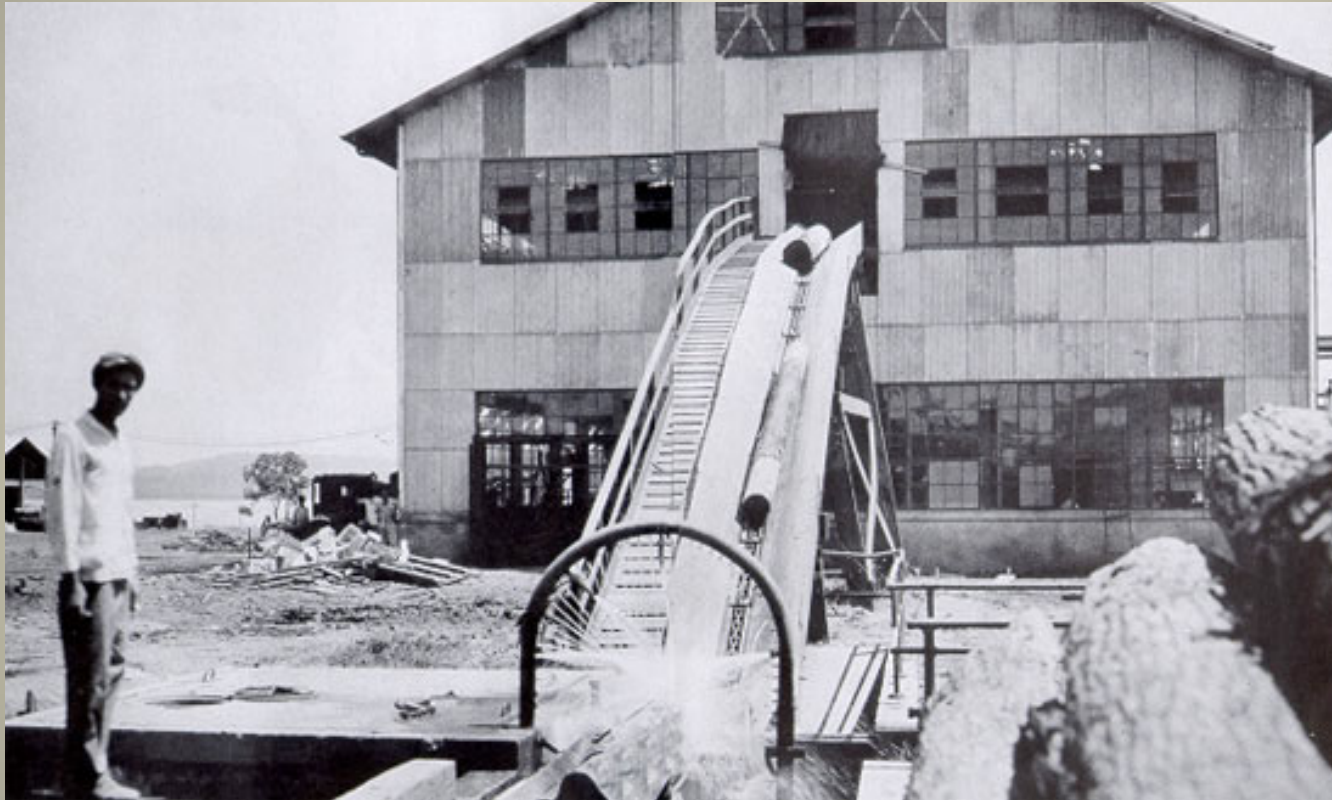
The town in the 1930s



The Amazon Rubber Boom – Fordlandia



The Amazon Rubber Boom – Fordlandia



The Amazon Rubber Boom – Fordlandia



The Amazon Rubber Boom – Fordlandia



The Amazon Rubber Boom – Fordlandia



After blight and insects



The Amazon Rubber Boom – Fordlandia



You can only grow rubber in plantations if diseases and insects are not present.



The Amazon Rubber Boom – Fordlandia



The hospital ward.



The Amazon Rubber Boom – Fordlandia



The water tower then.



The Amazon Rubber Boom – Fordlandia



The town now. At its peak there were 10,000 residents.



The Amazon Rubber Boom – Fordlandia



“Residents were forced to live a mandatory ‘healthy American’ lifestyle to include attending poetry readings, square dances, and English-only sing alongs. Workers were required to wear identification badges at all times.”

Source: <http://sometimes-interesting.com/2011/08/30/henry-ford%E2%80%99s-failed-town-fordlandia/>



The Amazon Rubber Boom – Fordlandia



American schooling.



The Amazon Rubber Boom – Fordlandia



American foods were served: hamburgers, hot dogs, ...

If a worker was caught with native food, their pay was docked or they were fired.



The Amazon Rubber Boom – Fordlandia



Pay 37 cents per day, twice the Brazilian average.
9 to 5 work day.



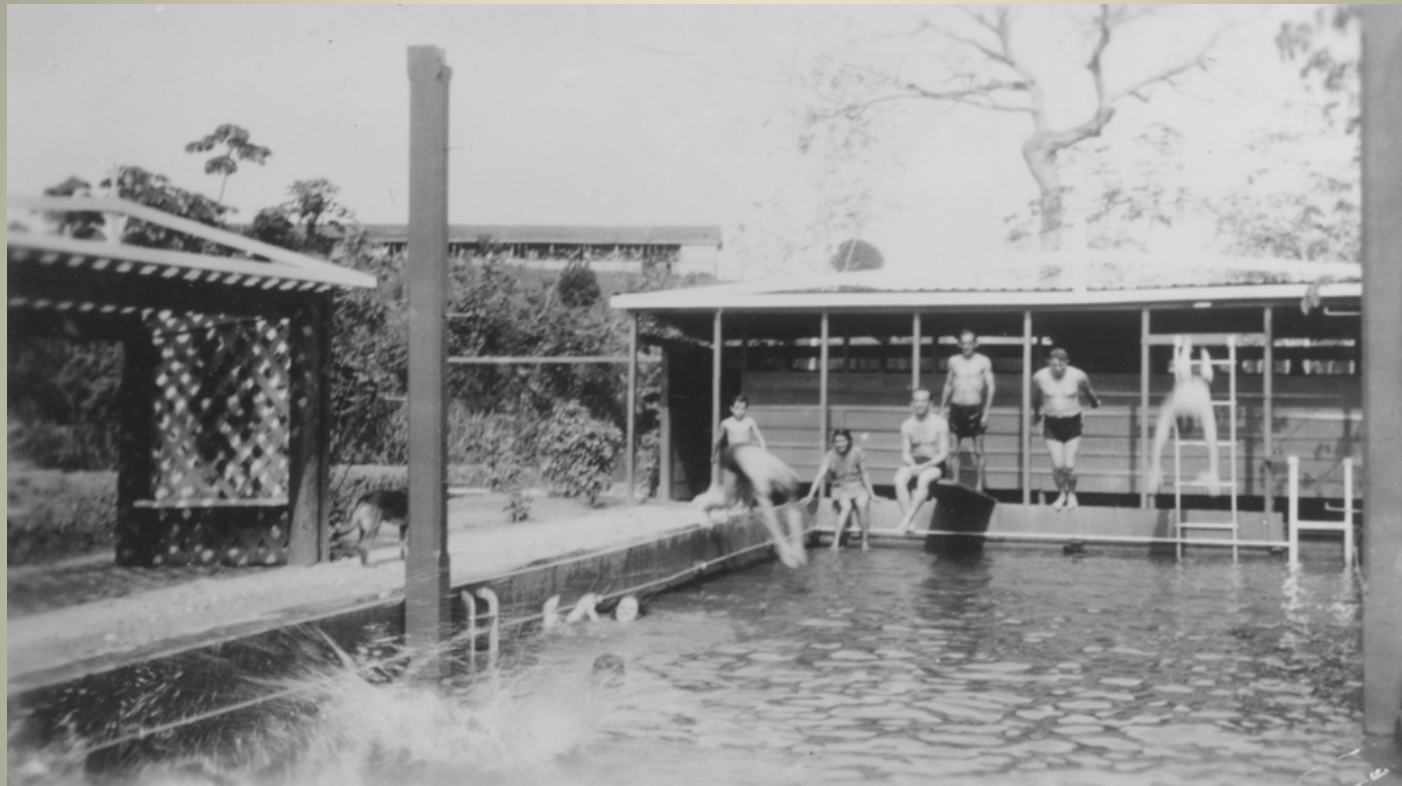
The Amazon Rubber Boom – Fordlandia



Brazilian troops called in.



The Amazon Rubber Boom – Fordlandia



Swimming pool then.



The Amazon Rubber Boom – Fordlandia



Swimming pool now.



The Amazon Rubber Boom – Fordlandia



Town administration now.



The Amazon Rubber Boom – Fordlandia



Better housing now.



The Amazon Rubber Boom – War strikes

Allied concern about rubber supplies as Japan takes over SE rubber plantations.



The Amazon Rubber Boom – War strikes

Richard Evans Schultes.



The rubber soldiers of Brazil

Allies turn to native rubber supplies in Brazil.



The rubber soldiers of Brazil

Allies turn to native rubber supplies in Brazil.

- Estimate 100,000 tons/year
- Actual maximum in 1944 was 14,000 tons



The rubber soldiers of Brazil

Allies turn to native rubber supplies in Brazil.

Brazil drafts 55,000 to 60,000 rubber soldiers from NE Brazil

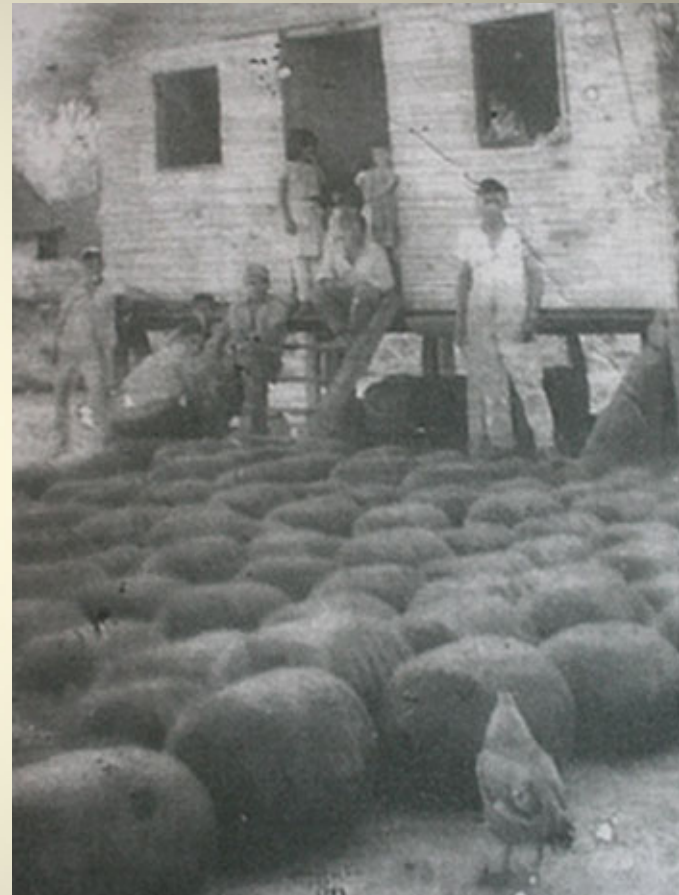


The rubber soldiers of Brazil

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Latex processing and blindness



The rubber soldiers of Brazil: compensation

1988 Constitution

- Fraction of payments to other draftees
- Most rubber soldiers do not have documentation



The rubber soldiers of Brazil: compensation

1991 estimate, 300 of 5,000 eligible
rubber soldiers were receiving
compensation



Post WWII.

Synthetic Rubber developed by Fritz Hofman in 1909. An inferior product.



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For tires, especially airplane tires and radial tires, natural rubber is a better product.



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After WWII tapping continued in Brazilian forests and SE Asian plantations



Show that again.

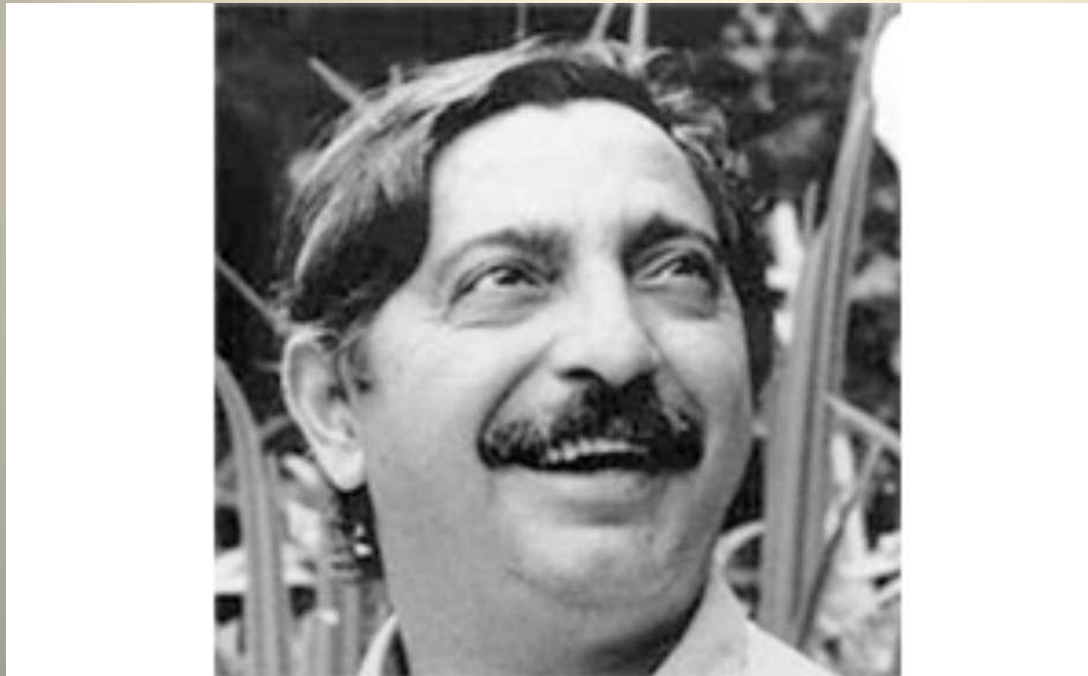


Chico Mendes

Born Dec 15, 1944.

Rubber tapping family.

Started tapping trees as a child.



Chico Mendes

Age 20 met Euclides Fernandes
Tavora, a communist on the run.

Motivated to learn to read and write.



Chico Mendes

By the late 60s deforestation was increasing in the Amazon. 1970s increased migration into the Amazon.



Chico Mendes

By the mid-80s Mendes was actively organizing rubber tappers and forest workers to protect forests.



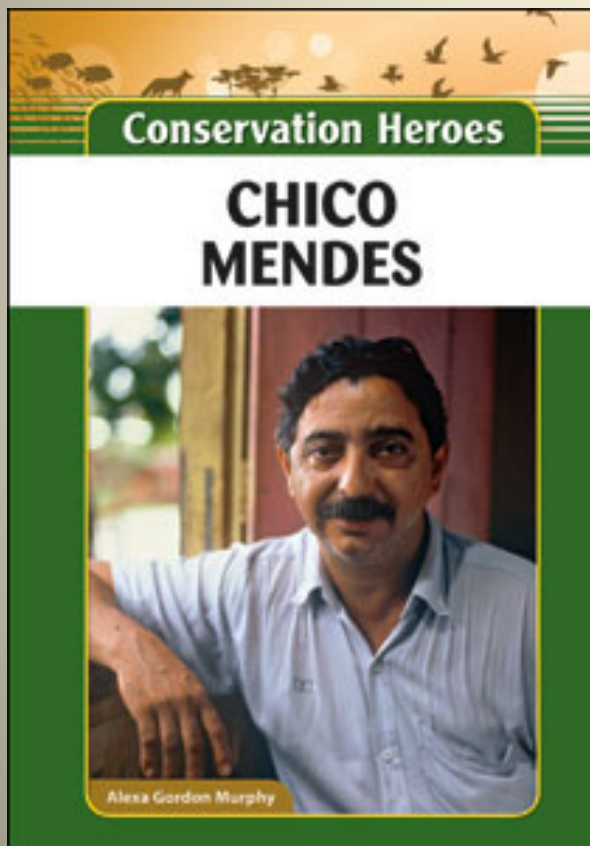
Chico Mendes

19th rainforest activist murdered in
1988. December 22, 1988.



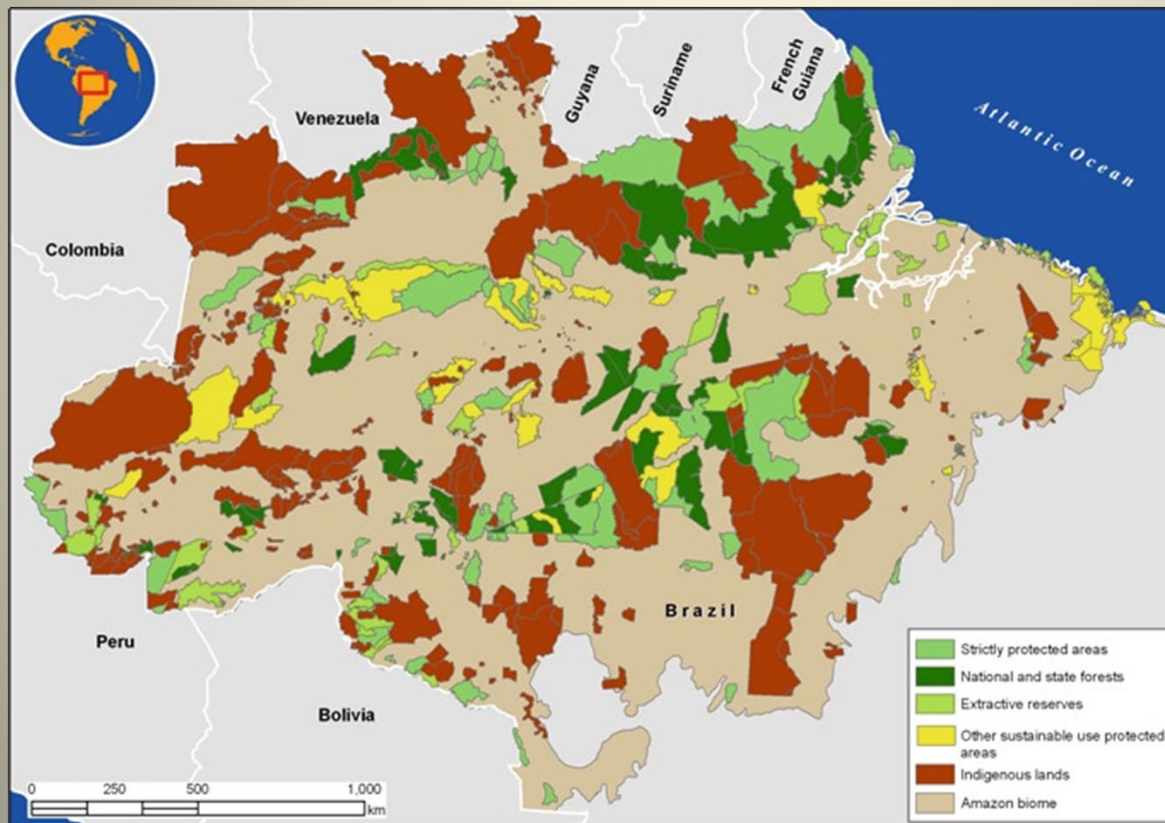
Chico Mendes

Unlike others, he was known internationally for his work on extractive reserves.



Extractive reserves.

Land is set aside for “local citizens” to extract non-timber forest products. In some cases sustainable extraction of timber is also allowed.



Extractive reserves.

Rural to urban migration of rubber tappers. Change to more intensive land use in the extractive reserves.

- * Cattle farming
- * More intensive agriculture
- * Not as severe as other areas

Source: Jacqueline Michelle Vadjunec , Carlos Valerio A. Gomes & Thomas Ludewigs (2009) Land-use/land-cover change among rubber tappers in the Chico Mendes Extractive Reserve, Acre, Brazil, Journal of Land Use Science, 4:4, 249-274, DOI: 10.1080/17474230903222499



Extractive reserves.

In many areas illegal logging continues.



Extractive reserves.

Burning an illegal logging camp.



Extractive reserves.



"To cut down a tree is like cutting out a piece of us. No one does anything to save us," she says. "We people of the forest are peaceful. We don't want this war."



Plantations in SE Asia.

Not just rubber plantations. This is oil palm.



Carbon credits?

<https://wrm.org.uy/all-campaigns/world-bank-no-more-funding-for-oil-palm-plantations/>



Plantations in SE Asia.

Rubberwood furniture.

