

# CASE STUDY 6

## RUBBER AS (TOXIC) HERITAGE: AMAZONIAN KNOWLEDGE AND THE RUBBER INDUSTRY

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### **Introduction to natural rubber**

Natural rubber latex (hereafter NRL) is harvested from latex produced by rubber trees. Latex is an important tool for the plants' defences against herbivores, and the laticifers occur in many plants across different botanical families. Latex can be colourless, yellow, orange, red, and, most commonly, white. Sometimes it is a milky product, such as the latex from the botanical families Euphorbiaceae and Moraceae. Chemically, natural rubber latex consists of a complex mixture of polyisoprene, lipids, phospholipids, and proteins. As rubber production developed, a variety of chemicals were added to vulcanize rubber which makes it more rigid and durable (Table 1). Many of these materials present significant health hazards. Besides vulcanizing, chemicals were added as a "biological protector," and ammonia was standardized as a "universal protector" at least since 1853 (Blackley 1997).

### **Rubber heritage in the Amazon**

In the Brazilian Amazon, the only registered heritage related to rubber is the House of Chico Mendes (Xapuri, Acre) which was recognized due to its historical and social relevance as the home of the famous rubber tapper, environmentalist, and unionist. The stately home represents remembrance of a glorious and utopic past, while also connoting the sense of loss and the sense that those who continue to live and work in the area have been left behind. The toxic heritage of rubber is also represented at Fordlândia, the industrial property of the Ford Motor Company, which is currently being considered for designation. These properties are the visible remnants of the rubber industrial heritage, but they also encompass the often marginalized intangible heritage of Indigenous knowledge and the often invisible toxic consequences of working in the rubber industry.

**TABLE 1** Chronology of vulcanizing methods' discoveries. Adapted from: Hills (1971)

<i>Date</i>	<i>Inventor</i>	<i>Vulcanization agents</i>
1839	Goodyear	Sulfur
1842	Hancock	Sulfur
1846	Parkes	Sulfur chloride
1847	Burke	Antimony pentasulphide
1913	Klopstock	Halogens of Se and Te
1915	Ostromislensky	Polynitrobenzenes
1915	Ostromislensky	Benzoyl peroxide
1918	Peachey	SO <sub>2</sub> H <sub>2</sub> S
1918	Boggs	Selenium
1921	Buizov	Diazoaminobenzene and derivatives
1921	Romani	Disulfides of tetra-alkylthiurams
1925	Le Blanc and Kroger	Sulfur thiocyanates
1931	Fisher	Quinone halogens
1932	Edland	Tellurium
1933	Fisher	Phenols or amines + oxidizing agents
1934	Midgley, Henne, and Shepard	Organic metal compounds
1936	Fisher	Quinone amines
1939	Rubber-Stichting	Active phenol-formaldehyde resins
1940	Dufraise and Compagnon	Vulcanization by active resin formation

It is yet uncertain which or how many methods were used to vulcanize rubber in the Brazilian Amazon during the rubber boom (1850–1920), but the most known vulcanization system consisted of heating and smoking rubber until it coagulated. At the time there was little concern about the harmful effects of the process and workers had little protective equipment. Instead, they were exposed to the dangers of working with hot materials and to breathing the polymers emitted during the smoking process (Figure 1).

The short and long-term health impacts are difficult to document, particularly since life expectancy in Brazil in 1900 was just 33 years (Pontes 2009). In contrast, Indigenous rubber tappers used different types of coagulants, such as the rubber tree's own flower, lemon juice, tucupi (manioc bitter juice), and resins. These ingredients are now considered innovative techniques (Teixeira 2009), but the local knowledge, which would have been less harmful to workers, was not adopted by the industrial producers of NRL. The intangible heritage of Indigenous knowledge of working and shaping materials in many ways with forest products continues to be applied, but rubber tappers who once created non-hegemonic methods to vulcanize rubber now benefit from machinery that shapes NRL into rubber sheets and they use their own recipes to colour them and produce rubber bio-jewelries (Fig. 2).

Rubber is only one example of exploitation and coloniality worldwide (Muniz 2020). In the Amazon, Indigenous peoples were "recolonized" to tap rubber and,



**FIGURE 1** Latex smoking process and rubber balls solidification; highlights on unsanitary work with the aspiration of toxic gases. Photo rendered with MyHeritage app.

Source: Ule (1908–1909).



**FIGURE 2** Chemist showing natural rubber sheets drying after being coloured. Photo: Tiago Muniz.



**FIGURE 3** *Hevea brasiliensis* plantation at Fordlândia (Pará State, Brazil). Highlight: the small distance between the rubber seedlings plantation, which possibly made the growth of the trees unfeasible and contributed to the proliferation of the fungus (leaf-sickness).

Source: The Henry Ford Foundation.

while their labour was exploited, their knowledge system about tapping and growing rubber was not recognized. The consequences of this erasure can be seen in Fordlândia (Fig. 3).

When Henry Ford decided to establish rubber plantations in Brazil and build planned cities in his so-dreamed Amazonian Metropolis, plants were placed too close to each other spreading the growth of the leaf-blight fungus and in addition to tropical diseases., Ford's plans failed and the plantations were abandoned. Today Fordlândia is commonly described as a 'ghost town' (Reed 2016). Rarely, however, do the accounts mention the harms which haunt it – the fact that Amazonian rubber toxicity rests upon not only chemical residues in the environment but also on colonial extractivism and the legacy of exhausted soils and peoples.

## References

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