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21 June 2010

Online at <https://mpra.ub.uni-muenchen.de/23415/>

MPRA Paper No. 23415, posted 22 Jun 2010 08:35 UTC

“RUBBER WILL NOT KEEP IN THIS COUNTRY”: FAILED DEVELOPMENT IN BENIN, 1897-1921

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ABSTRACT. Nigeria’s Benin region was a major rubber producer in 1960. In 1921, however, the government abandoned the industry as a failure. I explain why rubber did not take hold before 1921. British conquest was motivated in part by the region’s wild rubber resources. The government was unable to protect Benin’s rubber forests from over-exploitation. Expatriate firms were reticent to invest in plantations, and private African plantations remained small. The colonial government promoted the development of “communal” plantations, but these suffered from labor scarcity, a weak state, limited information, and global competition.

1. INTRODUCTION

In 1961, Nigeria was the Africa’s largest (and the world’s 6th largest) producer of natural rubber (faostat.fao.org). Rubber production underwent a substantial boom during the Second World War; Nigerian exports rose from 3,135 tons in 1938 to 10,518 tons in 1945, and continued to grow afterwards, reaching 57,167 tons on independence in 1960 (Anschel, 1965). The bulk of this production was centered on mid-Western Nigeria, in areas formerly under the control or influence of the Benin Kingdom. After the conquest of Benin in 1897, however, the rubber industry was slow to develop. In 1921, Nigeria exported only 85 tons of rubber, and the colonial government officially abandoned its support of the industry. Motivated by low producer prices and Britain’s global policy of reducing rubber acreage, the incoming Director of Agriculture wrote that his department would cease distributing seeds to “ordinary farmers,” since it was “not desirable that we should appear to in any way be advocating the planting of this product” (Anschel, 1965, p. 51).

Several recent studies in economics have argued that the geographic endowments are powerful determinants of economic outcomes. Rubber’s slow development then comes as a surprise. In particular, suitability for specific crops has been shown to predict what is cultivated, and what institutions are adopted. Nunn and Qian (2009) show that suitability for potato cultivation predicts both population and urbanization in the Old World after 1700, and argue that this is evidence

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Date: June 21, 2010.

I would like to thank my advisors Timothy Guinnane, Benjamin Polak, and Christopher Udry for their guidance. I am also grateful to Dickson Oriakhi, Benson Osadolor, Uyilawa Usuanlele, Pauline von Hellermann, and to the participants of the Yale Economic History lunch for their comments and advice. Archival research for this project was made possible with support from the Coca Cola World Fund at Yale, the Georg W. Leitner Program, the John F. Enders Fund, and the Economic Growth Center at Yale. I would also like to thank Joseph Ayodokun (victoria005@yahoo.co.uk, <http://www.toperesearchnigeria.com/>), Monday Egharevba, and Amen Uyigüe for their valuable research assistance. In addition, I owe many thanks to Isiaka Bakare and the staff of the Rubber Research Institute of Nigeria for their considerable logistical support in collecting oral histories that are part of my larger project on rubber in Benin.

that this crop provided the calories and vitamins needed to spur these demographic changes. Bubb (2009) demonstrates that suitability for cocoa cultivation in Ghana is correlated with land alienability, and takes this to imply that cocoa was adopted where it could be planted and that, as a permanent crop, it drove changes in the country's land tenure system. Engerman and Sokoloff (1997) have suggested that regions of the Americas that were suitable for sugarcane adopted slavery, and became unequal societies that failed to develop public education on the same scale as those that cultivated wheat.

Brazilian *Para* rubber thrives best with 1900-2000 mm of rainfall per year, temperatures between 24 °C and 32 °C, deep fertile soil, and altitudes below 300 m (Okpeke, 1992). Mid-Western Nigeria fits these conditions closely. In present-day Edo state, rainfall averages 1,500-2,500 mm annually, and the typical diurnal temperature range is from 22 °C to 36 °C. Benin City is at an altitude of 79 meters. The Acting Colonial Secretary reported in 1907 that "there are large tracts of country admirably suited for growing rubber."¹ As opposed to the rapid expansion of cocoa cultivation in Ghana and southwestern Nigeria, however, rubber was slow to take off in this favorable climate.

Similarly, a major theme in African history is the capacity of African cultivators to rapidly adopt new crops and technologies – their agency. Berry (1975) and Austin (2005) have outlined the brisk spread of cocoa in southwestern Nigeria and Ghana, respectively. Conversely, writers such as Brett (1973) and Mackenzie (1998) have stressed that in East Africa, African cultivation of cash crops had to be actively suppressed where it competed with the interests of white settlers. This is not a colonial phenomenon; Africans responded to the Columbian exchange by cultivating new crops, such as maize (McCann, 2005) and cassava (Jones, 1959). In contemporary Africa, writers such as Amanor (1994) have shown that Africans readily apply their specific ecological knowledge to changing economic circumstances and opportunities.

If these themes of suitability and agency are general, the delay of Nigerian rubber is a paradox. Prices alone cannot explain this; while these were roughly 17% higher during the post-war rubber boom (1946-1960) than from 1900 to 1921,² annual physical output was more than 35 times greater during the later period.³ Further, production steadily rose from 1932 to 1939, when prices averaged a meagre £37 per ton. This was also not due to a failure of government interest in the early period and encouragement later on. During the Second World War, colonial officials worried that excessive rubber planting would leave producers poor, since prices would surely crash once peace came. In 1943, the District Officer for Benin Division sent a missive to all the Native Councils to tap "all the rubber you can now, and save some of the money to make palm plantations after the war."⁴ Before 1921 the government had encouraged collection of wild rubber, private African plantations, communal African plantations, and European plantations. So, what went wrong?

In this paper, I focus on institutions, information, and inequality as explanations for the problems faced by Benin's rubber industry. Several recent studies in economics have shown that both

¹Southern Nigeria Annual Report for 1907.

²Anscher (1965) gives price figures that average £153 per ton from 1900 to 1921, and £179 per ton from 1945 to 1960.

³25,884 tons versus 701, on average (*ibid.*).

⁴National Archives, Ibadan (NAI): BP 1470 Vol 2: Permanent Crops in the Benin Division. 16 Oct, 1943: District Officer to All Councils Benin Division.

imperfect information and poor institutions impede the adoption of new technologies. In particular, learning about a new crop takes time, and this slows its spread (Foster and Rosenzweig, 2010). Conley and Udry (2010) demonstrate that pineapple farmers in Ghana learn about proper fertilizer use by observing their neighbors' choices and outcomes. Bandiera and Rasul (2006), similarly, find that social networks are important for learning about sunflower in Mozambique. Critically, Besley and Case (1994) and Foster and Rosenzweig (2001) stress that this learning is non-cooperative; individuals can free-ride on the costly experimentation of their neighbors, and will adopt a "wait and see" approach that, while individually rational, is socially sub-optimal. As for poor institutions, there exists a substantial literature demonstrating that secure property rights in land encourage agricultural investment; in West Africa this is particularly true for the adoption of tree crops (Besley, 1995).

In the African history literature, it has similarly been established that planners' access to information matters for the success of projects and industries. Many colonial projects failed because they were based on misinformed prejudices of European officials. Beusekom (2002) describes how French planners in charge of the Office du Niger were confronted with the reality that intensive plough agriculture could not be easily introduced to effect agrarian and social change in Mali. Fairhead and Leach (1996), similarly, show that forest preservation in Guinea was based on the incorrect premise that local people were, though their farming practices, destroying the region's forest cover. In the area under study here, von Hellermann (2007) has highlighted colonial foresters' "profound unease at the seeming chaos of shifting cultivation" as a motivation for the introduction of *Taungya* planting as a system of forest conservation. Planners' lack of local knowledge similarly contributed to the failures of the East African Groundnuts Scheme (Bromund, 1997), terracing programs in East Africa (Maack, 1996; Mackenzie, 1998), and the Thaba-Tseka Project in Lesotho (Ferguson, 1990).

Scholarship on Africa has also highlighted the importance of inequality in the success or failure of projects and industries. In fact, African participation in many "successful" industries had to be compelled, because only certain groups benefitted from them. In much of the continent, poll taxes were necessary to create a supply of migrant laborers (Arrighi, 1970). In colonial Mozambique, peasants who refused to produce their quota of cotton were forced to work in labor gangs, on plantations, or were deported to São Tome (Isaacman, 1996). In the early years of coal mining under colonial rule at Enugu, many of the workers were slaves whose masters were able to appropriate a share of their wages (Brown, 2003).

These themes help explain why rubber failed to take off in mid-Western Nigeria before 1921. In this paper, I use primary and secondary sources to outline the problems facing rubber in Benin during this period. I argue that wild rubber failed because, after undermining the indigenous state, the colonial government could not create property rights institutions to adequately manage exploitation of Benin's wild rubber resources. What could have been a regulated common property resource degenerated into open access, and the region's endowment of *Funtumia elastica* was over-exploited. I further argue that private plantations of *Funtumia* and *Para* rubber, whether owned by Europeans or Africans, failed to take off because potential planters lacked the information needed to give them confidence in their future profits. In addition, officials were wary of promoting European

cultivation of products they believed were within the capacity of West Africans to produce. Finally, I argue that British encouragement of “communal” plantations suffered due to labor scarcity, limited state resources, difficulties in transmitting skills and information, and low returns. Further, the benefits of these plantations did not accrue those whose labor was necessary for their success.

I proceed as follows. In Section 2, I provide background on the world rubber trade to 1921, on Benin, and on the primary and secondary sources used for this study. In Section 3, I show how Benin’s untapped forests of wild rubber helped motivate British conquest, I describe the regulations created by the colonial state to protect these, and I outline the reasons why the British failed to successfully police their exploitation. In Section 4, I discuss the failures of plantation rubber, and deal with European, African, and communal plantations in turn. I show that Europeans largely refrained from production. I argue that African plantations were few in number. I provide evidence of the challenges faced by the communal plantations. I then use a simulation exercise to show that the communal plantations were a risky undertaking from the start. In Section 5, I conclude.

2. BACKGROUND AND SOURCES

2.1. Rubber in Africa, 1890-1921. In 1735, the French explorer Charles Marie de La Condamine joined a French expedition sent to South America, and became the first European to encounter natural rubber. Initially the substance was treated as a curiosity, with only limited commercial applications, such as the production of waterproof fabrics. On November 21, 1843, Thomas Hancock patented the vulcanization of rubber in the UK. Eight weeks later, Charles Goodyear patented the same process in the US. Adding sulphur to rubber removed its stickiness, allowed it to regain its shape when deformed, and improved its durability in cold temperatures. Rubber then became useful for hoses, tubing, springs, washers, diaphragms, and other industrial uses, spurring demand (Harms, 1975). This was accelerated by John Dunlop’s patenting of a pneumatic tyre for bicycles in 1888⁵ and the later diffusion of the automobile. UK rubber consumption rose from 608 tons in 1851 to 10,983 in 1900 (Woodruff, 1955); by 1921, the country’s imports had risen to 42,100 tons (Rae, 1938).

Global supply came initially from South America. From 1860 to 1910, the Amazon basin accounted for some 60% of world rubber output (Barham and Coomes, 1994, p. 80). Amazonian production came mostly from wild rubber collected by tappers outfitted by river traders or *patrões* who acquired land by “purchase, squatters’ rights, or force” and hired *matteiros* to carve paths through the forest that connected the rubber trees (Resor, 1977). The *patrões* in turn received credit from export houses. This organization built on relationships that had already existed during the Portuguese colonial period (Weinstein, 1983, p. 16). Contemporary writers worried, then, that the supply of rubber was inelastic (Coomes and Barham, 1994). Critics of this system pointed to the systematic indebtedness of the illiterate tappers to the *patrões*, who paid them largely in trade goods. A Parliamentary commission found that one firm operating in Peru had resorted to mutilation, torture, and murder to coerce the local population into rubber production (Weinstein, 1983, p. 26). Bolivian rubber production took off after Heath’s exploration of the Beni river in

⁵His patent was later declared invalid, since Robert Thompson had patented the same invention in 1846.

1880; by 1890 the country's rubber production was so concentrated in the house of Suárez that contemporaries referred to his organization as an 'empire' (Fifer, 1970).

High quality Amazonian Pará received a premium up to 50% above the price obtained by rubber from Central America and Africa (Coomes and Barham, 1994, p. 241). In 1872, Henry Wickham succeeded in smuggling 70,000 rubber seeds out of Brazil with the help of the British consul; these went via Kew to Ceylon, and on to the rest of Southeast Asia. Asian rubber was first exported from Ceylon in 1898, where it had been planted on land cleared for coffee before blight struck that crop (Resor, 1977). Beginning in 1910, rubber exports began to take off in Asia. This new supply depressed world prices. In Brazil, traders and export houses were driven to bankruptcy, real estate markets collapsed, and incomes fell back to their pre-boom levels. In 1910, Southeast Asia exported 9,544 tons of rubber; in 1921, this figure was 238,040 tons (Voon, 1976).

During the boom period, many African states also exported wild rubber. From 1890 to 1905, the Gold Coast was the largest rubber producer in the British empire (Dumett, 1971). In the early 1880s, African merchants such as Francis Chapman Grant and John Sarbah instructed their agents to buy rubber from the inhabitants of the forests north of Cape Coast, which they collected from the local *Funtumia* trees and *Landolphia* vines. Middlemen brought the rubber trade further into the interior than had been done with palm produce. Migrants came south from Gurunshi and Gyaman to serve as porters. In Upper Guinée, the rubber trade went through two historical phases (Osborn, 2004). From 1880 to 1901, local collectors and Muslim traders exported their product through British-controlled Freetown, while after 1901 European merchants entered and redirected the trade to Conakry. African producers and commercial traders remained important throughout, thwarting colonial control; in particular, the state was unable to overcome problems of adulteration.

Twenty-six companies were floated in Britain to invest in (mostly wild) rubber production in West Africa between 1905 and 1914, but Munro (1981) argues that they had no lasting impact. The colonial office was hostile towards creating monopolies for the collection of wild rubber, while expatriate firms suffered from an "inadequate financial and managerial structure," with fraudulent or near-fraudulent concerns emerging as a result. In East Africa, 22 companies were floated (Munro, 1983). These, by contrast, invested largely in planted *Ceara* rubber in Kenya and Tanganyika, and *Para* in Uganda. These suffered from high labor costs and low yields, and it was clear that investors did not fully anticipate the negative effects of Asian production on world prices. By 1914, the rubber boom in East Africa was largely over.

The most infamous example of African rubber production during these years was the "red rubber" period in the Congo Free State. Hochschild (1998) has outlined many of the worst abuses, including hostage taking to ensure rubber quotas were met and cutting off of hands by company agents to account for cartridges used. By his own estimates, murder, starvation, exhaustion, exposure, disease, and a plummeting birth rate during this period left the Congo with a population half of what it would have been otherwise. While Hochschild (1998) suggests that the end of red rubber was due to the humanitarian campaign of figures such as E.D. Morel, Roger Casement and William Sheppard, Harms (1975) looks more specifically at the internal correspondence of Abir, a concessionary company. He argues that the reform campaigns were far less important than the physical reality that, by 1905, the rubber supplies were largely exhausted.

Within Nigeria, the mid-West was not the only region that participated in the boom. During the 1880s, the governor of Lagos promoted rubber as part of his strategy of diversifying the colony's exports (Omosini, 1979). Governor Carter brought Fanti tappers into Ibadan to teach the locals their trade, but they kept their skills to themselves and were expelled at the behest of the Ibadan authorities in 1895. The colonial government granted a monopoly over the rubber trade in Ibadan to F. & A. Swanzy in 1895, but due to local protests at the firm's dishonest practices, this was revoked the same year. Production declined from 1896 onwards. British officials such as Denton and Punch blamed overtapping and cutting down of trees, some 75% of which had died by 1899. Omosini (1979) pins the pervasiveness of slaughter-tapping in part on the example left behind by the Fantis and the failure of the colonial office to instruct Yoruba tappers about the dangers of improper tapping.

2.2. The Benin Kingdom region of Nigeria. In this paper, I focus on rubber production on the area once under control of the Kingdom of Benin. This coincides roughly with the Benin District depicted in Figure 1. The Edo language of the region's inhabitants diverged from Igbo and Yoruba some 3,000 to 6,000 years ago (Ryder, 1969). The dynasty of Obas (kings) that ruled Benin until the British conquest in 1897 traces its origins to Eweka I, the son of a Yoruba prince, who rose to power c. 1200 (Egharevba, 1936). Under Ewuare, c. 1440, Benin became known as a military power, subjugating towns in Ekiti, Ikare, Afenmai, and among the western Igbo. It was during his reign that the first European visited the area in 1472 (*ibid*). Benin sold slaves, stone beads and pepper to the Portuguese from c. 1480. Pepper, cotton cloths and ivory figured in Bini trade with the English from c. 1550 and the Dutch from roughly 1600 (Ryder, 1969). Slaves were important in Benin's 18th century trade, but the state became isolated from the coast during the palm oil trade of the nineteenth century. In 1897, following the massacre of an expeditionary party led by Consul-General Phillips, the British sacked Benin City. Benin was part of the Niger Coast Protectorate until 1900, Southern Nigeria until 1914, and Nigeria thereafter.

Rubber production in Benin is worthy of study. Mid-Western Nigeria was one of the world's major rubber producers after the Second World War, and in 1961 rubber was Nigeria's 6th largest export by value (faostat.fao.org). Several works in African history have used the lens of one commodity to study economic and social change, including cotton in Mozambique (Isaacman, 1996), tobacco in Zimbabwe (Rubert, 1998), or cotton in Côte d'Ivoire (Bassett, 2001). In addition, the problems in Nigerian rubber to 1921 were mirrored in the difficulties faced by other African and South American producers. In spite of the centrality of rubber to Benin's economy, the industry has received little academic notice. Anschel (1965) and Blanckenburg (1965), in a dissertation and in a short report respectively, describe the industry as it was in 1965. Egboh (1985) briefly outlines the history of rubber in Nigeria as a whole, within a larger work on Nigerian forestry. Afigbo (1970) describes the regulations on rubber tapping as part of Ralph Moor's policies for the development of Southern Nigeria. Igbafe (1979) gives a few pages to the early industry in his discussion of Benin's colonial history, but he relies heavily on colonial annual reports that paint an excessively rosy picture of both the success of tapping regulations and the health of the communal plantations. The best

(2009), and Usuanlele (nd) are invaluable. For primary sources, I have relied on colonial annual reports, and on archival correspondence taken from the National Archives of the United Kingdom (NAUK) in Kew and the National Archives of Nigeria in Ibadan (NAI).

3. WILD RUBBER

In 1838, two surgeons from the schooner “Warree” visited Benin City with a view to opening trade through Gwato (Ughoton). At one of the market squares, “they were shocked by the sight of what may be termed a ‘Golgotha,’ a place where human skulls were heaped up and bleaching in the sun” (Becroft, 1841). Visiting in 1862, Burton (1863, p. 286) wrote that “nothing can be said in favour of Benin; the place has a fume of blood, it stinks of death.” While Europeans stressed humanitarian motives and removing the tyranny of the Oba as motives for conquest in 1897, Igbafe (1970) has shown that economic motives played a far more important role in the fall of Benin.

Little can be added to his argument here, except to note that the untapped rubber resources of Benin were among the major produce that caught the eye of traders and officials prior to 1897. In an 1892 report, Claude MacDonald, Commissioner of the Niger Coast Protectorate, wrote to the Foreign Secretary that “[t]here is plenty of rubber in the country, but the natives have a great disinclination to start working a new commodity. They are very conservative in their ideas, and prefer to follow in the footsteps of their forefathers rather than striking out in a line of their own.”⁶ One trader in 1896 reported to the Liverpool chamber of commerce that the Oba would not allow own people to crack kernels, sell gum, or collect rubber, and turned back British traders who endeavored to open up the trade (Ofonagoro, 1979, p. 149). Similarly, Miller’s agent at Ughoton informed Acting consul Phillips in 1896 that, while there was “plenty” of rubber produced in the country, he was unable to get a “rubber man” from Cape Coast to collect it in any quantity, since he would not go far from Ughoton, having been twice “maltreated while away in the bush” (Ryder, 1969, p. 277). In the same letter, he hinted to Phillips that if “Benin was under proper Government and the resources of the country properly developed, [he was] firmly of the opinion that the exports would be very great.”⁷

In 1896, a man from Lagos went to see the King of Benin on the advice of Ralph Moor, the new Commissioner, “chiefly with a view to asking the King to start the ‘rubber’ industry, the country abounding in that product.” Phillips reported that the man “made presents to the King to the value of over £30, but the results of his mission have been nil.” Later in the same letter, he warned the Under-Secretary of State for the Colonies that his instructions “to deal with this matter by pacific means have been literally obeyed and have failed to produce the results desired.”⁸ In November 1897, soon after the fall of Benin, Moor reported the 25% increase in rubber exports to be “satisfactory,” adding “and I anticipate considerable increase in the future as much trouble has been taken to open up rubber production...A rich country has been opened up to the influence of civilization and trade, containing extensive rubber forests, valuable gums, the usual products of palm oil and kernels, and possibly many other valuable economic products.”⁹

⁶NAUK, FO 2/51. Enc. in Jan 12, 1893: Macdonald to Rosebery.

⁷NAUK, FO 2/102: 24 Nov, 1896: Phillips to Under-Secretary of State; Enc: 9 Nov, 1896: Brownridge to Phillips.

⁸NAUK, FO 2/102. 16 Nov, 1896: Phillips to Under-Secretary of State.

⁹Niger Coast Protectorate, Annual Report for 1896-7.

Benin had been opened for trade in general, and rubber exports in particular. In this section, I outline the early trade in wild rubber, collected largely from the local *Funtumia* trees. I argue that the new government was unable to police over-exploitation of Benin's rubber resources. First, the government lacked the resources to adequately police rubber tapping. Second, they undermined the existing systems of property rights, and were unable to replace them with foreign regulation.

The immediate aftermath of the fall of Benin was one of drastic change, described by Igbafe (1975). Much of the city had been burned down and many of the inhabitants had fled. In order to encourage resettlement, Turner, the new Resident, declared that any slave who returned to the city before his master would be free. Thus, moves against slavery were more rapid in Benin than in much of colonial Africa (c.f. Roberts and Miers (1988)). This pattern was reinforced by the Slave Dealing Proclamation (1901), Slave Dealing Ordinance (1908), and Slavery Proclamation (1916), though it was partly counteracted by the Native House Rule Ordinance and use of forced labor by the colonial government in portage and road maintenance. Further, British officials were quite willing to uphold the rights of slave owners. In an 1899, case¹⁰ Fosbery (Turner's successor) sentenced a disobedient slave of the King of Ewu (in Esan territory) to six months imprisonment and forfeiture of his property to the King of Ewu, when the Obaseki testified that he had been disobedient. According to Bradbury (1973), Benin was under more or less direct rule until 1914. Though a Native Council was established in 1897, it did not have many functions; instead Administrative Officers relied largely on the Obaseki and a handful of chiefs for advice. With the unification of Northern and Southern Nigeria in 1914, indirect rule was introduced; Eweka II was made Oba, while Obaseki became the Iyase.

After the capture of Benin in February 1897, Yoruba and Fante tapping gangs moved in to tap rubber almost immediately. This was part of a larger move of Hausas and Yorubas into the Anambara valley and Cross River territories, backed by the armed forces of the Royal Niger Company (RNC) and over local opposition (Ofonagoro, 1979, p. 89, 122). On February 24, Moor reported that six "Accra men, captured in the Mahin country rubber collecting during the last few months, came in from the bush heavily ironed," meaning that some of these incursions had begun even before the city's fall.¹¹ The British believed these outsiders were aiding the fugitive chiefs Ologboshi and Abohun. Fosbery reported that "it would be most difficult to place a limit as to those assisting, for undoubtedly all the rubber cutters in that part of the country were in his favour, and on the day of the first engagement our men were cursed from the bush by Yorubas."¹² Later on, he met a man called Deji, living at Isua. "This man's residence," he noted, "was undoubtedly the head centre of all the Yoruba rubber cutters in that part of the district; both these men were arrested, with several of their followers" (*ibid*). He expressed concern that the Yorubas had killed many of the local *Funtumia*, but also described his hope that the recently enacted rubber regulations (described below) would improve the situation:

The bush passed through between Iho and Isure, Isua and Ihuekpe has been a very rich rubber country, but I regret to say is now full of dead rubber trees. ... Close

¹⁰NAI, Ben. Prof. 8/2/1, Case Book 1898-1899: Regina v. Ugiemi.

¹¹NAUK, FO 881/7002: Feb 24, 1897: Moor to Salisbury.

¹²Benin Territories Expedition Correspondence 1899: Enc 4: Report on Expedition against Ologboshi and Abohun by Fosbery.

to Deji's house at Isua there were steps down an incline made of a dead rubber tree. The natives stated they never worked rubber, that it was done entirely by the Yorubas. I expounded the rubber regulations [described below] on every available opportunity, and urged the people to protect the riches of their country. ... This rubber has of course been a great source of revenue to Ologboshi, and I am certain a good deal of it found its way to Benin City (*ibid*).

Most of the wild rubber collected came from *Funtumia*, though *Landolphia* vines, *Clitandra*, and various root rubbers were also exported. Collectors would "grub the plant up root and step then pound these to pieces for the purpose of separating the latex from the crushed tissues, which [was] usually done by means of boiling water."¹³

Early on, British firms applied for concessions to work Benin's rubber. In May 1898, Gallwey reported that he had received a telegram from Bleasby, asking for a concession of fifty square miles to work both rubber and timber. Moor, who was on leave, replied that he was "opposed to the granting of such Concessions as they savoured somewhat of monopoly also they milk the country too heavily without supplying commensurate feeding." He was, in fact, "inclined to object to the applicants rather more than the concessions for they put little or nothing into the country and want the concessions merely to draw all they can out." He believed that that there were few concessionaires "who want really to do anything for Africa but many who want poor Africa to do much for them."¹⁴ Gallwey agreed, stating that he did not yet consider the time "ripe" for concessions. In his view, applicants typically had "no intention of investing capital in the country. What they would probably do would be to work their concessions with great energy so as to get as much out of it in the shortest possible time," leaving the local peoples worse off. He favored instead "development by the natives themselves," a view that would later be integral to the "West African policy" described by Phillips (1989). Finally, he noted that Chamberlain had recently pointed out to the House of Commons that it was difficult to assess whether chiefs had the authority to make concessions for their own benefit, and that concessions were therefore often brought to the local government for approval that "eventually prove to be signed by men who had no title to the land."¹⁵

The Royal Niger Company took advantage of the removal of the Oba to expand into Benin territory. RNC agents moved into subject towns, encouraging them to ignore the British officers in Benin City, in order to divert trade. Moor reported that, during the expedition against Ologboshi, arms and ammunition had "found their way into the disaffected area from the territories of the Royal Niger Company, and were no doubt exchanged for the rubber, to obtain which valuable rubber forests have been most seriously damaged by the tapping of trees by reckless and inexperienced workers."¹⁶ It was his belief that there had been a "a general league between the rebels, the local inhabitants, and the Yorubas who were in the territories as traders in rubber" (*ibid*). While some of the rubber trade had managed to find its way into Benin City, the majority he believed had been

¹³Report on the Forest Administration of Southern Nigeria for 1906.

¹⁴NAUK, FO 2/179: 13 May, 1898: Gallwey to Under-Secretary of State.

¹⁵NAUK, FO 2/179: 28 July, 1898: Gallwey to Under-Secretary of State.

¹⁶Benin Territories Expedition Correspondence 1899: #1: May 27, 1899: Moor to Chamberlain.

pushed into the territories of the RNC, whose mark had been found on kegs of powder held by the guerrillas. Rubber continued to bleed into RNC territory after this; the defendants in *Regina v. Akonweli, Odutala, and Ola*¹⁷ claimed to be employed by a man named Omoli, living in RNC territory, who had sent them to Ipoki to work rubber. They had been working there five days without a license when they were arrested. Fosbery sentenced them to three months imprisonment with hard labor.

Quickly, the British concluded that these tappers were killing the trees. “Makeshift” regulations were imposed in 1897 “to stop foreigners entering the Benin country for the purpose of working the economic products therein.”¹⁸ These have been outlined by Afigbo (1970). Foreigners, defined as those not speaking Edo as their mother tongue, were required to obtain licenses from the Resident every 6 months for a fee of 10s. Further, the regulations prohibited all persons from “tapping rubber trees in such a manner as to permanently damage them or to interfere with their future yield.” The “Chiefs of the districts” were made responsible for supervising adherence to this rule, and were to be awarded half penalties in all cases of conviction. The colonial office was unsure whether these regulations were legal; one margin note (signed HBL on April 10, 1899) read, “I do not quite see how these regulations have the force of law. They appear to be Queen’s Regulations made without the Queen’s consent.” Another note (signed by RW, on May 6) pointed out that it was unclear if Queen’s Regulations made under the Africa Order in Council 1889 could be enforced against Lagos persons. These legal niceties did not prevent Fosbery from promoting the regulations during his operations against Ologboshi.

According to Igbafe (1979, p. 340-342), rubber inspectors were sent out to explain these regulations. Forestry Inspectors trained local boys in tapping, who were given licenses and would then pass their knowledge onto others. Local men with influence were appointed to assist the village chiefs in policing violations. Later, a tax of 20% was imposed on rubber worked by foreigners in Benin, split evenly between the “owners of the land” and the colonial government. License holders were required to plant rubber seeds where they worked.

The prosecutions under these regulations¹⁹ tell us about the foreign tappers who moved into Benin, and how the rules were enforced. In *Regina v. Gbeson and Aburonke*, *Regina v. Adeanju*, and *Regina v. Lawojo and Omoleye*, the defendants were each sentenced to six months or one year each for “illicit rubber working” or “working rubber without a license.” The defendant in *Regina v. Olowo* had been trained by the Government rubber inspector to work rubber; he and four others had been sent out six months earlier and not seen since. He was arrested along with three others in Owedou, and three of his other accomplices had escaped. He and his brother had worked together, the defendant selling his product “for a piece of cloth,” and his brother for 7/6. He was sentenced to one month of hard labor.

In *Regina v. Ipapa, Ehenua, Obasuye, Asaota, and Jegede*, the defendants were described as “a portion of a gang of 150 who were surprised by the Yorubas of the town working rubber near Okiewo.” They were found with rubber just collected in a calabash and rubber gouges, and were

¹⁷NAI, Ben. Prof. 8/2/1, Case Book 1898-1899.

¹⁸NAUK, CO 444/1, 5 March, 1899: Moor to Under-Secretary of State.

¹⁹All of the cases cited here are from NAI, Ben. Prof. 8/2/1, Case Book 1898-1899.

sentenced to 1 year hard labor each. The defendant in *Regina v. Jagbohun* was charged with not leaving Benin territory, after the court had found him guilty of “complicity with illicit rubber workers,” and ordered him to vacate the area within three days or face imprisonment. Ten days later, he was brought down from Isua, pleading that he was in fact trying to catch some illicit rubber workers. The incredulous Acting Resident (he or Fosbery serve as judge in all these cases) sentenced him to six months hard labor.

The defendant in *Regina v. Thomas Ouami* was charged with being the headman of a gang of illicit rubber workers. The chief prosecution witness, T.A. Moses, a rubber inspector, told the court that he found the prisoner in the act of working rubber with a large gang of men under him. On recognizing Moses, Ouami ordered his men to escape at once, begged Moses not to report him to the Consul, and offered him a bribe. He later sent three men who lived in the same house in Benin City to “beg” Moses not to report him. The three men, all with Christian names, confirmed that the defendant had asked them to beg Moses not to inform the consul, but claimed that he had not told them what crime he had committed. Ouami, in his defense, told the court that Doctor Howe had advised him to “collect some native medicine” for his hand, which he had been pursuing when Moses surprised him. Moses replied that he had served as an interpreter between Ouami and Howe, but that Howe had never given any such advice. Ouami’s undoing was his claim that he had asked the three men to ask Moses to serve as an interpreter for him in an upcoming debt case, and had not asked them to beg Moses not to report him; this contradicted their testimony. The acting resident also considered a prior record against the defendant for obtaining money by false pretences as evidence of his bad character (for which he had received 6 months hard labor and a dozen lashes), and sentenced him to 9 months of hard labor.

Adulteration was a worry even in this early stage. Regulations passed over the objections of the European trading firms in 1897 allowed for confiscation of adulterated rubber, with fines of up to £50 with six months imprisonment for violation (Igbafe, 1979). In *Regina v. Osufu Jebu, Sumola, and Bakari*, the prosecution witness (a Captain) stated that he found Osufu Jebu at Udo, carrying adulterated rubber towards Lagos – this was produced in court and “found to be adulterated and very offensive.” The prisoners claimed they had bought the rubber in Benin City and did not know it was adulterated. They were imprisoned with hard labor for six months, and the rubber was destroyed. The same Captain told the court in *Regina v. Jegidi and Agbi* that, while in the same area, the residents of Obahon informed him that the defendants were cutting rubber. They claimed to be from Umapa, but “the natives of that village,” told him that they had never seen the men before. They carried articles of trade with them. Though they claimed to be traders, and not rubber cutters, they were sentenced to six months imprisonment and hard labor. The Captain was also the prosecution witness in *Regina v. Ground Nut, Jack, and Josiah*. The defendants in that case had been arrested by the headman of Rejain with “a lot of tools etc. used for working rubber.” The Captain told the court that he had previously instructed the headman to arrest all those cutting rubber without a license. Their sentence was two years imprisonment with hard labor. In addition, the court noted that Ground Nut was a Mendi (likely Mende, from Sierra Leone) who had deserted government service and was charged with raping a small child.

What do these cases teach us? First, it is clear that enforcement required active policing by colonial staff such as the forest guards and the captain mentioned above, who apprehended violators. Second, the work of these officials required the active cooperation of local communities. Third, tappers often operated in large gangs, even if a few violators could be apprehended, many would escape into the bush. Together, these suggest that policing rubber tapping was difficult. Finally, the court was quite eager to use punitive sanctions to prohibit unlawful exploitation of forest products. Notably, there is only one rubber case in this record book in which the defendant is acquitted.²⁰

Almost immediately, these regulations were seen to be inadequate (Afigbo, 1970). In October of 1898, Gallwey reported that the Benin country was “full of rubber,” but that the Acting Resident, Benin City, had “continually been complaining” over the past year of the destruction of rubber trees, which he attributed to “the manner in which the natives tapped them.” The number of trees killed, he suggested, “amount to no small figure.” He recommended that a rubber inspector and two workers be sanctioned to prevent those without licenses from tapping the trees.²¹ In February 1899, Moor similarly stated that he found it “utterly impracticable to preserve the rubber forests in the Benin City District unless there be a special European officer detailed for the work as the natives in collecting will cut and damage the trees, and also tap them in the wrong season.” Since the capture of Benin City, officers had tried to deal with it but due to their “enormous amount of other work” it was impossible to supervise the Native Inspectors. In his opinion, the matter was a “pressing” one, and “of great importance for the rubber forests in question are of very considerable extent and of great value and if properly preserved now and dealt with on proper forestry lines they will in future be exceedingly valuable.”²²

In 1899, the rubber regulations were amended. The maximum imprisonment was extended to two years, and violators were required to forfeit any illicit produce. In addition, a closed season was imposed from December to June, and tapping that caused damage to the trees was prohibited (Afigbo, 1970). Prosecutions made under these regulations are also preserved in the Case Book for 1898-1899. In *Regina v. Akinbo*, the defendant, charged with “illicit rubber working,” pleaded guilty to “working rubber during the close time,” and was sentenced to 6 months of hard labor. The defendant in *Regina v. Aluko* was a “foreigner” caught by the above-mentioned Captain working rubber unlawfully at Udo, and found with a large quantity of rubber in his house covered over with cinders; he pleaded that he was a trader, but was sentenced to two years imprisonment with hard labor.

In *Regina v. Oje and Ayeyi*, Oje pleaded guilty to working rubber during the close season (the prosecution witness Gbadamosi told the court that both were “constantly employed in this way”). Ayeyi initially denied the charges before later admitting them. Oje was sentenced to 4 months hard labor, Ayeyi 5. *Regina v. Ejei et al*, similarly, saw six men out of a larger group arrested. Ejei, their leader, had formerly worked under a Fanti headman who had been expelled from the country by the acting Resident. The defendants claimed to be traders who had ceased working rubber since the new regulations were made, but were sentenced to two years imprisonment with hard labor.

²⁰*Regina v. Osun and Abiomo*; no reason is given for why charges are dismissed.

²¹NAUK, FO 2/185; Oct 26, 1898: Gallwey to Salisbury.

²²NAUK, FO 2/185; 17 Feb, 1899: Moor to Under-Secretary of State.

The court also noted that the headman of Uhen, who apprehended the prisoners, was to receive the reward laid down by the regulations.

The Forestry Department was created in 1900; according to Gallwey the “first matter that required dealing with by this department was the preservation of the extensive rubber forests in the Benin territories.”²³ In his annual report, he gave great credit to Hitchens, the Forestry Inspector, for the “very energetic manner in which he carried out this work, and for the successful efforts he made to educate the Binis to safeguard the rubber trees. The wholesale destruction of yielding trees and vines in both the Lagos and Gold Coast Colonies pointed to the necessity there was for immediately framing regulations laying down the manner in which the rubber should be worked, and the seasons when it was permitted to work it” (*ibid*). Moor drew up regulations that were made law in the Benin territories, and which Gallwey believed were effective.

Hitchens reported that he had personally inspected and assessed the value of the rubber forests belonging to nearly 100 Bini towns and villages, and created “staffs of ex-officio rubber inspectors” in each of them, proportionate with the size of the forest (*ibid*). He instructed locals in tapping, explained the regulations, and “constitute[ed] every Bini an ex-officio policeman to bring to justice any rubber gatherer infringing on the regulations.” In his view, the Bini “responded with alacrity,” exercising “such restraining influence on prohibited rubber-tapping and adulterated rubber-producing that not a single rubber gatherer is free from close ‘shadowing,’ and not a single ball of rubber and prohibited root rubber could work its undetected way to Lagos or our own trading factories.” He did not believe it was possible for rubber to leave any portion of the Benin territories, even in the newly acquired Eastern districts.

Moor’s regulations were initially only in force in the Benin territories; the other rubber forests of Southern Nigeria were in areas where Native Councils had not yet been established, so that similar laws could be made there. Gallwey felt, however, that it would “probably be found advisable to issue a Proclamation dealing with rubber forests throughout the Protectorate.” In 1900, the Forestry Proclamation was issued; this required licenses be acquired from the District Commissioner to tap rubber, provided details on the permitted methods of tapping, and were applied to all persons, not just foreigners (Afigbo, 1970, p. 390). The Government wished to use this proclamation to begin the forced creation of forest reserves, but due to fierce opposition, this could not be implemented (von Hellermann and Usuanlele, 2009). These regulations did lead to some conflicts over jurisdiction. In 1901, Moor, now the High Commissioner of Southern Nigeria, noted that the Resident of Benin City had seized rubber that had been collected during the closed season, believing that he had the authority to do so; Moor did not believe that he did, and so issued an additional regulation to make this possible.²⁴

At first, the restrictions on rubber collection appeared to be working. More than £700 was collected as license fees from the Benin territories in 1900.²⁵ Probyn, the Acting High Commissioner, noted a fall off in rubber exports in 1902, arguing that timber has attracted “many who formerly collected rubber, and the legislation which has stopped the destruction of rubber trees is

²³Southern Nigeria Annual Report 1899/00.

²⁴NAUK, CO 520/9. 17 Oct, 1901: Acting High Commissioner to Secretary of State.

²⁵Southern Nigeria Annual Report for 1900.

probably a second cause which accounts for the decline.”²⁶ In 1904, Egerton suggested that the Forestry Department was then “fully organized and capable of exercising an efficient control over timber cutting and, in a lesser degree, over the proper tapping of rubber-bearing plants.”²⁷ At the beginning of that year, H.N. Thompson, the Conservator of Forests, advised ending the December-May close season, and rubber exports rose. Rule 7 of 1905 amended the rubber regulations, and the Forestry Department brought in £653 10s revenue from rubber in Southern Nigeria.²⁸ In 1906, £368 was collected for 645 rubber licenses (Igbafe, 1979).

In the Report on the Forest Administration of Southern Nigeria for 1906, Thompson wrote in particularly glowing terms about the license system, which he believed had

worked very satisfactorily in the Benin Districts of the Central Province where the native communities take a lively interest in forestry matters and are fully alive to the importance of preserving the plants – an annual source of revenue to themselves. No doubt in time the inhabitants of the other districts in the Protectorate will adopt the same attitude towards the license system.

He felt that the rubber and timber rules were working “very smoothly” in the Central Province, where the chiefs had taken “and active interest in protecting their forests, and the inhabitants are becoming very law-abiding in this respect.” 1114 licenses were issued, resulting in £671 10s paid, £557 of which went to the Government. 645 of these were given in Benin City. He did, however, add a word of caution about the “natives”; “as long as they are encouraged by the trade to ruthlessly destroy the rubber-yielding plants by getting as much as possible out of them in the shortest possible time and then to leave the rest to chance, I am afraid but little attention will be paid by them to more prudent advice.” 1541 licenses were given out in the Central Province in 1910, and 1756 in 1911, and in that year the Government began dividing revenues equally with “the chiefs and villagers.”²⁹

The regulations were ultimately unsuccessful, however. Trees were still being destroyed in large numbers. In 1901, the Resident reported that it was “deplorable to see what destruction was wrought by the foreign element some years ago around Ibewhe. Dead rubber trees can be counted by the hundred.”³⁰ In 1906, F.S. James, the Colonial Secretary, suggested that the work of rubber preservation was not completed, but rather in progress:

There has been no systematic cultivation or preparation of the rubber, and the forest trees have been destroyed through want of knowledge and practically uncontrolled collection, except that during the last four years when a serious attempt has been made by the Forestry Department in the Eastern and Central Provinces to arrest the evil.³¹

In the hinterland of Lagos, by contrast, the efforts of the Forestry Department were “restricted to advice” as rubber rules under the Forestry Proclamation were not in force. Though the close season

²⁶Southern Nigeria Annual Report for 1902.

²⁷Southern Nigeria Annual Report for 1904.

²⁸Southern Nigeria Annual Report for 1905.

²⁹Southern Nigeria Annual Reports for 1911 and 1912.

³⁰NAUK, CO 520/7, 26/2/1901: Resident Benin City to Moor.

³¹Southern Nigeria Annual Report for 1906.

had been done away with in 1906, it was re-imposed in 1907, and exports fell.³² The Annual Report for 1908 was yet more gloomy, stating that “[r]ubber appears to be a rapidly decaying business ... the Southern production in 1908 was 713,000 lbs. only, as compared with 1,656,000 lbs. in 1907. Some portion of the shortage may be attributed to the prohibition of tapping in certain districts, but the reckless destruction of trees by excessive bleeding is largely responsible for the drooping business.” In spite of this, there were only 12 prosecutions and 10 convictions under the rubber rules. In 1913, the annual report for Benin Province commented on a marked falling off in the amount of rubber exported, blaming this partly on the drop in price “and also to the fact that the wild rubber is much scarcer than formerly.”³³

Why did the regulations fail? First, it was physically difficult to police violations. The rubber regulations diverted some of the rubber trade from Benin to Lagos, as the Acting High Commissioner recognized in 1901.³⁴ Similarly, because Northern Nigeria had no similar regulations on rubber collection, rubber was smuggled from the South to the North (Egboh, 1985, p. 57). In 1901, the representative of Miller Brothers wrote to Moor, informing him of the difficulties involved. “Few of those who bring down rubber,” he argued, were “able to give a detailed account of its history from the time of manufacture, as it may have passed through many hands before reaching theirs.” Rubber was sold in many markets on its way to the coast, and “many of the rubber traders here are preparing to leave the district as they profess themselves unable any longer to conduct business here under the vexatious conditions in force.” He felt that, though under the law every Bini was made a “rubber detective” and was eligible for a reward of £2 for any conviction, the people had not looked after their own interests; “they show themselves in that respect unworthy to benefit by the rubber regulations as they have already proved themselves in other respects, through not yet devoting the slightest attention to the manufacture of rubber.”³⁵

1905, the Governor recognized that the prohibitions on root rubber were no longer being enforced.³⁶ Christy (1911) pointed out that, while 221,566 lbs were exported from Southern Nigeria in 1907, only £53/10 was collected in license fees.³⁷ It was impossible that 107 license holders could be responsible for this quantity of rubber, so the bulk must have been illicit. Even if the forestry staff were to be increased fifty times, he thought it would be impossible to police the area needed:

So long as the native can sell his ‘lump’ rubber at an enormous profit, so long will he continue his destructive methods of tapping, and his dirty, primitive system of preparation, despite voluminous rules and regulations, which he could not understand, even supposing them ever to reach himself or his chief (Christy, 1911, p. 13).

Second, the British undermined the systems of property rights that existed before the fall of Benin, and lacked the public trust necessary to replace them with effective colonial regulation.

³²Southern Nigeria Annual Report for 1907.

³³NAI, BP 138 1914: Annual Reports Benin Province.

³⁴NAUK, CO 520/9. 17 Oct, 1901: Acting High Commissioner to Secretary of State

³⁵NAUK, CO 520/9, 13 July, 1901: McLucas and Schaumburg (for Miller Bros and Bey & Zimmer) to Moor

³⁶NAUK, CO 520/30, 5 March, 1905: Egerton to Lyttelton.

³⁷Though this contradicts the figure in the Annual Report, the figure in that report is larger, making the argument stronger.

Ostrom (1991) has argued that regulation of common property resources by local communities, as opposed to privatization or state intervention, will be preferable under certain circumstances. There must be defined boundaries to the resource, and those with rights of use must be identifiable. Rules must be appropriate to local conditions. Individuals affected by the rules must be able to participate in modifying them. Monitors must be accountable to users. Sanctions should be graduated by the seriousness of the offense, and applied by officials accountable to the appropriators. Conflict resolution must be low cost and rapid. The rights of users to devise their own institutions must be recognized by wider authorities. In Benin, the *de facto* boundaries of Benin territory were altered by British conquest, rules were imposed by an external authority with no local participation, colonial agents lacked accountability, and the courts in Benin City have been shown above to have been eager to impose the maximum penalties stipulated under the regulations.

Before 1897, Edo villages could control access to their forest resources. In principle, land in Benin was “considered as belonging to the people as a whole,” with the Oba as trustee (Egharevba, 1949, p. 77). In each town, village or clan, the Enogie or Odionwere was trustee, under the Oba’s authority. The village was the effective landowning unit, with no smaller group holding any recognized permanent interest in land (Bradbury, 1957, p. 45). Any Bini could farm in any part of Benin territory (Egharevba, 1949, p. 79), though outside of his own village he would need to obtain permission from (and give annual gifts to) the local Enogie or Odionwere, until he settled permanently (Bradbury, 1957, p. 45). Hunters in the forests of Benin, “native and non-native” were required to turn the hand of any animal killed to the Enogie of the local town, and the Oba was owed a leg and tusk of any elephant killed (Egharevba, 1949, p. 43-44). Critically, the only non-Edo who, before 1897, could exploit local resources were those who settled and assimilated in Bini villages (Bradbury, 1957, p. 45). After 1897, outsiders came in seeking rights to farm, fish, and reap palm fruits, and effective regulations were established only slowly throughout the colonial period to control these demands. Immediately after 1897, many Yoruba settlers succeeded in gaining land without holding title through the Oba; these were not regularized until 1914 (Rowling (1948, p. 11)).

An 1896 editorial in the Lagos Weekly Record put the Oba’s power to police outsiders’ use of Bini resources in stark terms, wishing that those who damaged trees in the hinterland of Lagos could be sent to Benin:

Every traveler in the hinterland complains of the devastation wrought by the greedy rubber hunters. It is complained that the rubber forests are destroyed, the elephants driven back, and general desolation produced. The King of Benin, it is said, makes short work of the intruders, and an enraged and disgusted traveler suggests as a remedy for the injurious results which he saw around him that the greedy rubber hunters should one and all be dispatched to the domains of the expeditious King of Benin (quoted by Ofonagoro (1979, p. 120)).

The 1908 trade report for Southern Nigeria reached a similar conclusion; the *de facto* situation with regards to property rights was not adequate to protect rubber trees from destruction (though the writer believed that private property in plantation rubber was the answer):

The planting of rubber by natives has all along been encouraged and assisted by the Forestry Department, and in some parts of the Central Province the plantations are doing very well, and give good promise for the future. It is generally realized that not until rubber trees are owned by individuals, who will see that they are duly protected, can this industry be looked upon as a permanent one in Nigeria. Thousands of trees in the forests, which are practically a 'no man's land,' are destroyed each year by over-tapping, and although every effort is made by the Forestry Department, with the staff at its command, to regulate the gathering and to prevent indiscriminate bleeding, the task in so large a country and amidst dense forests is, it must be admitted, and extremely difficult one.³⁸

The Forest Guards, installed to replace these systems, were either inadequate, corrupt, or both. In 1899, the defendant in *Regina v. Amidu*³⁹ was charged with seizing a government rubber inspector. The inspector came across a "large gang of Lagos rubber cutters," headed by a man named Gbadamosi. The prisoner seized the inspector along with his two carriers, tied them up, and gave the inspector a "severe flogging." They were then handed to a Lagos Hausa, who took the inspector and his carriers to Igbo-Bini. The Traveling Commissioner sent them to Lagos. When he returned, the inspector saw the prisoner and arrested him. While the defendant claimed he was a trader who had never seen the men before, Fosbery sentenced him to six months imprisonment with hard labor.

The Resident of Benin City complained in 1901 that the "ignorance of some of the native rubber Inspectors may also have had something to do with the failure of last year's sowing... Three of these men have lately brought into Benin City seed in a green and half grown condition, absolutely useless and of course wasted. One would-be Rubber Inspector, was a small boy about 14 who would be of about much use as a process server in Ireland of the same age."⁴⁰ In 1907, Egerton noted their frequent abuses of power (unfortunately, not mentioning what these were), stating that "there are the strongest objections to the multiplication of native Forest guards with semi police powers carrying on their work in places far away from European supervision."⁴¹ Though it is outside the time period of this study, the accusation made against one guard in 1940 is an illustrative example of the corruption available to these officials.⁴² Oronsaye, a timber contractor, complained to the District Officer that S.A. Ovbiogbe, a Forest Guard, had aided one Ulitsemitsede to escape to Benin City when he was accused of illegally farming in the Oghosa Reserve. Oronsaye further charged that a clerk in the Forest Office was attempting to secure an agreement between the Ranger, Oronsaye, and the Forest Guard that would allow Ulitsemitsede to escape prosecution. Because of Thompson's strong pro-regulation views, Egerton did not press his point.

It was becoming clear that the future of rubber was in plantations. The 1904 Annual Report for Southern Nigeria stated that experiments were in progress to improve the tapping of trees, "the present method pursued by natives being most injurious and in fact responsible for the death of

³⁸Quoted in Southern Nigeria Annual Report for 1908.

³⁹NAI, Ben. Prof. 8/2/1, Case Book 1898-1899.

⁴⁰NAUK, CO 520/7, 26/2/1901: Resident Benin City to Moor

⁴¹NAUK, CO 520/45: Minute Dated 12 April, 1907 by Egerton.

⁴²NAI, Ben Dist 6 BD 142 Usen Native Court and District Affairs; 2 Feb, 1940: Oronsaye to District Officer.

numbers of trees.” Notably, there was “little doubt that the future supply of rubber largely depends on the cultivation carried on during the year by the natives in the Western and Central Divisions, 214 plantations having been laid down containing a total of 227,155 young trees.” Similarly, Egerton wrote in 1907 year that, after three years in West Africa, he did not “consider it feasible to efficiently supervise the collection of latex from rubber bearing plants in the West African forests.”⁴³ Rather, he felt that the colonial office should “recognize that the future of rubber is in the cultivated article and that all that is necessary as regards the forest produce is to spread the knowledge of the best methods of extracting the latex and the folly of improper tapping.”

The failures of wild rubber production in Benin are of broader relevance. Exhaustion of natural rubber supplies was repeated throughout Africa, in Guinée (Osborn, 2004), in Ghana (Dumett, 1971), and in the Congo (Harms, 1975). In none of these scenarios could colonial officials or concessionary companies establish institutions that created effective incentives to extract rubber at a sustainable rate, or restrict tapping to methods that did not injure the trees. Resor (1977) suggests several weaknesses of the Brazilian wild rubber industry, including high levies, the loss of prime territory to Bolivia, poor port and transport infrastructure that was expensive to build and maintain, and overall high costs of collection. Clearly high transportation costs apply to Benin, where head porterage remained the norm.

4. PLANTATION RUBBER

By 1907, it was obvious that wild rubber offered little future for rubber in Benin. The local *Funtumia* could be used to create plantations, and Brazilian *Hevea* had been introduced to the country in 1895 (Anschel, 1965, p. 49). By 1921, however, plantations had not transformed Nigeria into the major rubber producer that it would become after the Second World War. In this section, I outline the difficulties faced by the three types of plantation in Benin. *European plantations* were few in number, because of their own challenges, government hostility to creating concessions, and the general preference of European firms for horizontal over vertical integration. *African plantations* are of only limited visibility in the archival record, but these too appear to have been few in number and faced challenges in securing labor. African *communal plantations* were established with the support of the colonial government, but these suffered from labor scarcity, limited state resources, difficulty in transferring information, and low returns.

4.1. European plantations. The only serious attempt by a European firm to create a rubber plantation in Benin was that of Miller Brothers. The firm acquired roughly five hundred acres at Sapele in 1905, and acquired another 560 in 1911 on the condition that it would be planted by 1916.⁴⁴ The 1905 Annual Report for Southern Nigeria claimed that they had been “induced by His Excellency the Governor” to start this *Para* plantation with 10,000 seeds imported from the East. In the first year, 6,800 germinated successfully. Fosbery hoped that the other large firms on the coast [would] follow this lead and go in for *Para* cultivation on an extensive scale.”⁴⁵

⁴³NAUK, CO 520/45, Enc. 14 April, 1907: Egerton to Elgin.

⁴⁴NAI, BP 311/1914: Rubber Plantation on the Ologbo Road, 18 March, 1911: Provincial Commissioner Warri to Provincial Commissioner Calabar.

⁴⁵Southern Nigeria Annual Report for 1905.

In 1906, they imported 30,000 more seeds, more than 16,000 of which had germinated by year's end. Thompson felt that they had "gone whole-heartedly into the work."⁴⁶ They experimented with different approaches, clearing 30 acres of all roots and planting seedlings 3 ft apart in one section, while leaving the roots in and planting seedlings 15 ft apart on another 60 acres. In 1906, the plantation was said to be "now in very fine condition," with the plants showing "excellent growth."⁴⁷ In 1908, it was "doing very well" and showing "good growth"; 8,000 plants were 33 months old, and 22,000 plants were 18 months old, with average girths of 9.33 in and 3.69 in, respectively.⁴⁸ Cowan, the director, testified to the West African Lands Committee (WALC) in 1913 that the plantation was paying rent to 5 or 6 different local communities. At that time, 800 acres were under cultivation and the bulk of the 400 laborers did not come either from Benin or from Sapele, but rather from the Opobo, Kwa, and Ibibio territories (WALC, 1916, p. 468-475).

Others were less successful. In 1915, a return of agricultural plantations in Benin province listed five – J.G.M Cranstoun and Company's at Sapoba, Messrs. MacIver's at Sapoba, I.T. Palmer's at Sapoba and Abraka, and the Nigerian Mahogany and Trading Company's at Unutu.⁴⁹ MacIver and Palmer (an African) were both said to have rubber in good condition at this time. Egboh (1985, p. 159) states that Cranstoun had two plantations in 1908, totalling 1,280 acres. MacIver reported in 1917 that they were doing no business in rubber, though by 1927 their holdings had expanded to 2021 acres.⁵⁰ This (and possibly Cranstoun's as well) was later taken over by the United Africa Company, becoming the Jamieson Estate Plantation (Usuanlele, nd). A German firm, possibly Bey and Zimmer, planted ten acres that were handed over to the Native Authority during the First World War (Usuanlele, nd). The African Association made an attempt in 1906 to start an experimental *Para* plantation at Warri, but James believed that they "[did] not seem to have pushed the matter further."⁵¹ In 1908, they were reported to have an "excellent small *Para* rubber plantation at Eket."⁵² The British Cotton Growing Association started a plantation in Benin territory in 1909, but in 1917 it was "neglected," containing only 228 trees.⁵³

One of the difficulties faced by these plantations was difficulty in securing access to labor. Cowan told the WALC that his company did not use Bini laborers because, even though they were able to make arrangements with the headmen, the people were unwilling. Laborers would come to work for at maximum six months. His view was that this was "no doubt" because the authority of the Benin chiefs had declined – a development that also made it difficult to secure labor for the communal plantations, described below.

In addition, the British were reticent to grant concessions to Europeans for working produce that Africans were capable of exploiting on their own, and so their policy for rubber and palm

⁴⁶Report on the Forest Administration of Southern Nigeria for 1906.

⁴⁷Southern Nigeria Annual Report for 1906.

⁴⁸Southern Nigeria Annual Report for 1908.

⁴⁹NAI, BP 603 1915 Agricultural Plantations Benin Province. Two lists are given in this file; the first omits Cranstoun, the second MacIver.

⁵⁰NAI, Ben Prof 2/4 BP 262 1917: Para Rubber, Benin Division, 16 Nov, 1917: Howe (for MacIver and Co) to Acting District Officer. NAI, CSO 26 09125 Assessment Report on Benin Division.

⁵¹Southern Nigeria Annual Report for 1906, Report on the Forest Administration of Southern Nigeria for 1906.

⁵²Southern Nigeria Annual Report for 1908.

⁵³NAI, BP 175/1917, Para Rubber Plantations, 19 June, 1917: D.O. Ubiaja to Resident.

oil concessions differed from policies towards timber. The African Association and Miller Brothers were both rejected for concessions in the Benin City area in 1898 (Afigbo, 1970, p. 392). Evans' application to rent communal plantations was turned down in 1911 (Egboh, 1985, p. 158). This was general policy throughout West Africa. As Phillips (1989) has described it, the British came to favor "peasants" over "plantations" because of opposition from local chiefs, lawyers and concessionary companies to the 1897 Gold Coast Lands Bill, pressure from the so-called "Third Party" of reformers that included individuals such as Mary Kingsley and E.D. Morel, their persistent inability to create a market for wage labor, resistance from the Aborigines' Rights Protection Society, negative experiences with spurious concessions that were given early on in the Gold Coast, the rise of "mercantile" manufacturers such as the British Cotton Growing Association and Cadbury who seemed capable of healthy profits without engaging directly in production, and a general desire to limit both litigation and migration.

It was a widespread feature of West Africa that expatriate firms remained horizontally, as opposed to vertically integrated. Usuanlele (nd) has described this as a preference for this as a "commerce" over "production" in the case of Benin. This was a general response to a situation where, barred from directly engaging in agriculture and faced with a market in which export crops were produced by thousands of small, dispersed farmers, the large trading firms chose to operate in many products and colonies, but to refrain from production (Hopkins, 1976).

4.2. African plantations. Less is knowable about private plantations owned by Africans. Both the Annual Reports and Igbafe (1979) take an upbeat view of their progress. In 1903, forestry officers were said to have extended "very considerable" areas of rubber plantations, while "some of the more intelligent chiefs" had started operations on their own account.⁵⁴ In 1906, the Provincial Forest Officer stated that the "feature of the year ... [had] been the number of small private plantations made by individual natives, although it [was] difficult to say exactly how many [had] been made." He believed there was no doubt that "the natives of the Benin Districts of this Province are, with a few exceptions, now thoroughly alive to the value of looking after their rubber trees."⁵⁵ Igbafe (1979, p. 343-348) notes that 126 villages had been convinced to start plantations by the end of 1903, there were 369 private plantations by 1906, and that some 3,000 acres were owned by eleven private individuals or companies by 1925. The largest of these belonged to Palmer, reported to have 1500 acres at Abraka, employing 900 laborers who were paid the same wages as in the timber industry (WALC, 1916, p. 468-475). The Obaseki had two *Para* plantations, of 10,000 and 12,000 trees, 4 to 6 years old in 1919.⁵⁶ In the late 1920s, it was reported that, in addition to Palmer's plantation, MacIver had 2021 acres at Sapoba.⁵⁷

Before 1921, however, the scale of these plantations must have been small. Chief Ugo had a single acre at Benin (Egboh, 1985, p. 159). Thompson described those planted in the Benin City District in 1906 as "small private plantations."⁵⁸ In 1909, it was estimated that private individuals owned

⁵⁴Southern Nigeria Annual Report for 1903.

⁵⁵Report on the Forest Administration of Southern Nigeria for 1906.

⁵⁶NAI, Ben Prof 2/6 BP 480 19: Agricultural Department Report.

⁵⁷NAI, CSO 26 09125 Assessment Report on Benin Division.

⁵⁸Report on the Forest Administration of Southern Nigeria for 1906.

166,820 *Para* trees or seedlings in Southern Nigeria, “and a great development [was] expected in this direction.”⁵⁹ It was reported in 1911 that, in addition to government plantations “and numerous small plantations owned by natives” there were 241,250 *Para* rubber trees in large plantations and 164,350 seedlings in nurseries in Southern Nigeria.⁶⁰ A 1917 return of *Para* plantations in Benin forwarded a list of plantations excluding those with less than 20 trees, and “small private plantations of which there is no record”. It listed 270 *para* plantations in Benin District, started in 1914 or 1915, with 57 seedlings planted on average. By contrast, (Christy, 1911, p. 14) estimated that there were 2,250 “communal” plantations in the Benin City area by 1911.

These too faced their own difficulties. Cowan told the WALC that there were six African-owned plantations of 10,000 to 30,000 trees in the Sapele district. These were of *Para* rubber. They had been paying for labor by allowing their workers to plant “catch crops” among the trees, and as a result, the rubber had suffered. In his view, they had “tried to make the thing pay as they went along, and they have been pennywise and pound foolish” (WALC, 1916, p 468-475).

4.3. African communal plantations. During this period, the colonial government also sought to establish thousands of small plantations of mostly *Funtumia* rubber throughout Benin territory, which were to be owned by the communities on whose land they were planted. The explicit term used by the government was “communal.” At first these were lauded as a successful and promising enterprise, but before the outbreak of the First World War, it was clear that they were in trouble. They suffered from labor scarcity, a lack of state resources, colonial difficulties in transferring skills and information, and low prices once Asian plantations began to export in large quantities.

4.3.1. Initial promise. The communal plantations were started early on. In 1899, nurseries were established in a few district centers, in order that plantations could be made close to the villages for seed-producing purposes. These in turn would be used to collect seed to sow in the bush at the beginning of the rainy season.⁶¹ Out of 450 miles of road existing in the Benin territories, the Forestry Inspector planted 250 miles with rubber seed, four deep on each side of the main roads and bush paths (*ibid*). In 1900, twenty large nurseries for young rubber were established in the Benin territories using seed collected in 1899; the object of this was “supplying rubber seedlings for transplantation into the forest lands between villages.”⁶² It was presumed that the labor required for transplanting and caring for the young rubber would be performed “subject to the supervision of the Forestry Inspectors, by the inhabitants of those villages which [would] ultimately be enriched by the matured rubber” (*ibid*). All villages receiving timber royalties were required to establish nurseries from 1901 (Igbafe, 1979).

Undergirding these efforts was a paternalistic racism, made clear by Bedwell, the Acting Colonial Secretary, in 1903:

It is not in the nature of the average West African to lay out capital for which there is no immediate return. He can understand the yam growing at his door; he can understand the cask of oil to be filled before his “boys” can return with the required

⁵⁹Southern Nigeria Annual Report for 1909.

⁶⁰Southern Nigeria Annual Report for 1911.

⁶¹Southern Nigeria Annual Report for 1899-1900.

⁶²Southern Nigeria Annual Report for 1900.

cloth, pipe or frock-coat, but he will not sew for his son to reap; nor will a village work, of its own initiative, for the benefit of the next generation that is to occupy it. It is this difficulty that has rendered so great the task of encouraging the rubber industry.⁶³

In the villages, the government distributed seeds and seedlings and oversaw tapping. These plantations were mostly of *Funtumia*, but contained some *Para*. By 1903, 15,694 plants had been established in 33 plantations along the major roads; this had reached 126 villages and 145,000 plants by the end of the year (Igbafe, 1979, p.343). There were 1,050 communal plantations in the Province in 1906, 1629 in 1907, and 2251 in 1908 (Egboh, 1985, p. 159).

Plantations of this sort were encouraged throughout other parts of Southern Nigeria, though Benin was the model case. In 1904, it was reported that a “quantity” of *Funtumia* seed was being collected for planting nurseries in the Eastern and Cross River Divisions. The *Para* trees that had been planted “some years ago” in the botanical gardens were “progressing favourably,” having reached 30 feet in height.⁶⁴ In 1904, 227,155 *Funtumia* seedlings were transplanted from nurseries in the Eastern Division; in 1905, this number was 119,800, the difference being due to “defective seed.”⁶⁵ Ten acres were planted in the Mamu reserve (in present day Anambara State) in 1906.⁶⁶ The same year, James reported that in the Eastern Provinces, “little [had] been done in the way of making plantations of rubber.” A few European firms had planted *Funtumia* but he felt that there had been “no active interest taken in the matter by the natives, who as a rule appear[ed] to be fully engaged in the palm oil trade” (*ibid*).

In 1908, Thorburn, the Colonial Secretary, wrote that small plantations of both *Para* and *Funtumia* had been made at the district headquarters in the Eastern Provinces.⁶⁷ The same year, the sixteen-year old *Para* trees in the Ebute-Metta Gardens were tapped for the first time and gave rubber “very favourably reported on by the Imperial Institute.” The curator of the botanical gardens at Calabar similarly reported that the *Para* plantation there showed “magnificent growth” (*ibid*). By 1909, it was calculated that there were 30,000 *Para* plants in the Eastern Provinces, in addition to 10,000 seedlings sold to individuals. That year, 1,232 *Para* plants were added to the Mamu reserve, 6 more acres were put to *Para* at Ilaro, and 1,200 *Para* trees were planted in the Oshun reserve.⁶⁸ These were extended again in 1910 and 1911.⁶⁹ In 1910, 12 new plantations were created with 22,000 seedlings in the Niger division.⁷⁰ In addition, in 1911, 155 “native communal rubber plantations,” were created in the Western Province, and communal *Ceara* plantations were started in the drier areas of the Central Province, though it was recognized that at that time there no known “satisfactory and remunerative” method of extracting the latex.⁷¹

⁶³Southern Nigeria Annual Report for 1903.

⁶⁴Southern Nigeria Annual Report for 1904.

⁶⁵Southern Nigeria Annual Report for 1905.

⁶⁶Southern Nigeria Annual Report for 1906.

⁶⁷Southern Nigeria Annual Report for 1908.

⁶⁸Southern Nigeria Annual Report for 1909.

⁶⁹Southern Nigeria Annual Reports for 1910 and 1911.

⁷⁰Southern Nigeria Annual Report for 1910.

⁷¹Southern Nigeria Annual Report for 1911.

The communal plantations in Benin were initially seen as promising, and were strongly encouraged by colonial officials. Since Igbafe (1979) relied on the colony's annual reports as his primary sources, this is the positive picture he leaves with his readers. In 1904, Egerton saw the boom in the rubber market and the development of trade as "gratifying." While he felt it would be long before the prices paid for Nigerian rubber were at all close to those paid for rubber from the Straits and Ceylon, "as the cultivation is extended improved methods of preparation will undoubtedly be introduced with beneficial results."⁷² He noted that experiments were in progress to improve tapping, since the existing method used by Africans was seen as "most injurious and in fact responsible for the death of numbers of trees." He had little doubt that the future of rubber depended on the cultivation of rubber in the Western and Central Provinces, 214 plantations having been made that year, containing 227,155 trees.⁷³ In 1905, Fosbery reported that rubber continued to show a "considerable increase," predicting that "with systematic cultivation and collection it will become a valuable addition to the exports of the country."⁷⁴ The same year, *Para* seeds were imported from the Cameroons and the Straits; only the latter germinated, but produced 120 plants from 140 seeds (*ibid*). In 1906, two pupils had just returned from the French School of Forestry in Sudan.⁷⁵

In 1906, existing plantations of *Funtumia* were extended in reserves in the Central Province; that year, 368 plantations with 167,135 plants were made in the Benin Districts.⁷⁶ Thompson pointed out that, at that time, 916 plantations with 678,000 plants existed in the Central Province, in addition to 134 plantations with 80,000 plants in what had earlier been the Central Division.⁷⁷ These were laid out in rows 3 to 7 feet apart or closer.⁷⁸ A large number of seeds were sown that year in Benin City, with the expectation that the young plants would be later distributed to the various district headquarters. The plants in the Forest Office compound had, by then, reached 12 to 15 feet (*ibid*). In 1908, there were 2,251 *Funtumia* plantations in the Central Province, containing 1,125,972 trees, many of which were old enough to be tapped.⁷⁹ In the Benin City district that year 154,000 trees were added to the communal plantations.⁸⁰

In 1910, the success of the communal plantations in Benin inspired 24 villages in the Ilesha District as well as some additional communities in the Ijebu-Ode and Epe Districts to start plantations of their own.⁸¹ The same year, 60,000 new *Funtumia* seedlings were added to existing plantations in the Central Province (*ibid*). In 1911, 224 new villages were planted out in 63,753 *Funtumia* seedlings, and 4,133 *Para* plants were put out under the same scheme. 68,000 *Para* seeds were distributed in the Central Province; 11,000 were sold, 18,000 distributed to the village communal plantations, 28,200 to the Benin City Chiefs' plantation, and 10,400 to the Forestry compound in Benin City. In 1912, "numerous communal rubber plantations were examined" in the Central

⁷²Southern Nigeria Annual Report for 1904.

⁷³Southern Nigeria Annual Report for 1904.

⁷⁴Southern Nigeria Annual Report for 1905.

⁷⁵Report on the Forest Administration of Southern Nigeria for 1906.

⁷⁶Southern Nigeria Annual Report for 1906.

⁷⁷Report on the Forest Administration of Southern Nigeria for 1906.

⁷⁸NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

⁷⁹Southern Nigeria Annual Report for 1908.

⁸⁰Southern Nigeria Annual Report for 1909.

⁸¹Southern Nigeria Annual Report for 1910.

Province, with arrangements made for extending them.⁸² In 1914, the plantations in Asaba Division planted between 1906 and 1912 were reported to be between 1/3 and 3.5 acres.⁸³

In 1910, the several thousand *Funtumia* communal plantations had become large enough to tap.⁸⁴ Tapping and rubber preparation were done under the supervision of the Forest Department, and in the presence of the owners. To coagulate the latex, the rubber was boiled, and then rolled into thin biscuits using a wooden roller on a table. The rubber was washed throughout with hot water. These biscuits were then hung for drying and smoked in a long drying shed. The amber-colored biscuits were reported to be of “the first quality,” produced “by means of simple appliances that can easily be procured by the natives,” and were sold for 6s 6d per lb despite a falling market on which only the best *Para* could fetch more than 6s per lb.⁸⁵ This was seen as a “very great improvement on the usual quality of rubber exported from Southern Nigeria.” In 1911, the Chief Conservator of Forests inspected several of the communal rubber plantations in which tapping and rubber preparation were underway. His impression was that some of these were “very fine examples of their kind and should eventually form valuable native estates.”⁸⁶

4706 trees from 84 communal plantations were tapped in the Benin City district in 1910, 20,210 trees from 300 plantations in 1911, and 386 plantations were tapped in 1913.⁸⁷ The yield for 1911 was 1,885 lbs and 11 oz of dry rubber.⁸⁸ In 1912, the tapping of the communal plantations ran from May to October, and the rubber was sold locally the following March. 2,988 lbs of “good rubber” were sold at 3s 4d per lb, and 43 lbs of “tackey rubber” was sold for 2s 10d. Two thirds of these revenues were paid to the communities and chiefs.⁸⁹ In 1913, 5,612 lbs of rubber were exported from the communal plantations.⁹⁰ Tapping during 1913 was done between May and November, overseen by “native staff” of the Forest Department, along with Ogas (headmen), who supervised groups of ten to twenty villagers using *Para* knives.⁹¹ The staff encompassed the Assistant Conservator of Forests, an interpreter, a forester, ten Forest Guards, five pupils, and five Ogas.⁹² In 1914, certificates were issued so that each village had one certified headman, “responsible for the upkeep and cleaning of his plantation” (*ibid*).

4.3.2. *Problems.* Outside observers were impressed with these plantations; Christy (1911) reported that “[t]he system of native communal plantations so successful in Southern Nigeria is admirable, and should be adopted by all the west African colonies.” In reality, however, several problems were already apparent. One of the most notable difficulties they faced was labor scarcity. Usuanlele (nd) has made this argument, interpreting Benin as a “land abundant” region; this mode of analysis for

⁸²Southern Nigeria Annual Report for 1912.

⁸³BP 294 1914 Communal Rubber Plantations - Asaba.

⁸⁴Southern Nigeria Annual Report for 1910.

⁸⁵*Ibid.* The report states that only the best para could fetch 6d per lb, but this is clearly a typographical error.

⁸⁶Southern Nigeria Annual Report for 1911.

⁸⁷Southern Nigeria Annual Report for 1911, NAI Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

⁸⁸Southern Nigeria Annual Report for 1911.

⁸⁹Southern Nigeria Annual Report for 1912.

⁹⁰NAI, BP 5 1915: Report on the Tapping Operations on the Communal Rubber Plantations for 1914.

⁹¹NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

⁹²NAI, BP 5 1915: Report on the Tapping Operations on the Communal Rubber Plantations for 1914.

Africa as a whole has been recently revitalized by Austin (2008). The population density of Benin was estimated at only 25 per sqm in 1927.⁹³ I begin my discussion of the problems faced by the communal plantations by adding more evidence in favor of this view.

The problem of labor scarcity in the Benin territories was apparent as early as 1901. That year, the Annual Report for Southern Nigeria noted that recent “changes in the social conditions of the natives of these territories, particularly with regard to slavery, render it certain that the capacity of these native carriers for their transport work is not likely to increase, at all events for some years to come, until a good native labour market is established.”⁹⁴ The colonial response was to enact the House Rule Ordinance. This was initially intended to maintain the reciprocal obligations between House heads and members in the Niger Delta; in its actual application, however, the Ordinance made it easier for the state to rely on Benin chiefs to requisition labor, since the law enabled them to bring those who refused work before the Native Court (Igbafe, 1975). In 1906, similarly, the Provincial Forest Officer reported that the Sobos⁹⁵ were too involved in road-making to devote much time to plantations; where rubber had been taken up, palm oil had been abandoned.⁹⁶

Like other colonial projects in Benin (and indeed, throughout Africa), it was expected that the communal plantations would be worked with unpaid labor (Usuanlele, nd). Without pay, it became difficult to recruit workers. The 1913 Report on the Communal Rubber Plantations detailed five major problems that were causing them to fail: first, the weakened authority of the local chiefs; second, competing labor demand from other sectors, such as timber areas, government works, road construction, and portorage; third, insufficient incentives for the local communities, even when the government waived its one third claim to the plantations’ revenue in that year; fourth, villagers’ lack of experience with the product, which was made worse by deferred payoff of rubber as a tree crop, and; fifth, sharp labor demands that conflicted with seasonal festivals and funerals.⁹⁷ Results on the model plantations, similarly, could only be achieved by “constantly worrying” the Obaseki and Edosomah for labor (*ibid*). In 1915, the government punished the Ero, Oshodi, and Obaseki for not weeding their plantations by withholding royalties (Usuanlele, nd). While initially proposed as a year-to-year arrangement, the waiving of the government’s share of the revenues soon became permanent.⁹⁸

The next year, the a report on the communal plantations noted that it was difficult getting upkeep work done:

The village people have shown very plainly that they do not care for the plantations. The Forest guards report that they have the greatest difficulty in getting any cleaning or clearing done. At Uburu Uku the forest Guards had been driven away when they attempted to get the plantations cleaned. ... At Ogwashi Uku and Abah

⁹³NAI, CSO 26 09125 Assessment Report on Benin Division.

⁹⁴Southern Nigeria Annual Report for 1901.

⁹⁵A colonial term that erroneously joined the Isoko and Urhobo together.

⁹⁶Report on the Forest Administration of Southern Nigeria for 1906.

⁹⁷NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

⁹⁸NAI, BP 76 1914: Communal Plantations Central Province; 16 Dec, 1913: Colonial Secretary to Conservator of Forests.

very few men would be persuaded to do the work which was done almost entirely by the Forest Guards.⁹⁹

Similarly, in Ishan, the people were disinclined to do the work requested, and officials felt they had been wasting their time. Especially in Asaba, Ifon and Ishan, officials had difficulty getting men to work rubber. Many chiefs complained that, “as their power had been broken, it was hardly fair to make them responsible for the boys not working...they consider it very unfair to be held responsible for the work when the Government has taken away their power.” (*ibid*). In addition to the work of tapping and upkeep, processing was labor intensive. Latex had to be cooked at central cooking camps and let stand for eighteen hours or more before it was ready to cook. For people from outlying villages, this was not worth the time involved, and they would not stay behind to learn how to properly cook the rubber (*ibid*). Officials recognized that their own labor requisitioning contributed to this scarcity of labor – the same report noted that the question of carriers “has been a difficult one. The Assistant Conservator of Forests is obliged to find his own carriers, except on leaving a station, to take him from village to village. These carriers are not paid and this does not help to make the rubber business any more popular.” In 1916, the Resident pointed out that it was not worthwhile for villages to send small quantities of rubber to Benin, and that they did not do so voluntarily.¹⁰⁰

This was not the only difficulty faced by the plantations. While the proceeds of the plantations were supposedly to be split between the government and the local communities, it appears that their benefits went largely to the chiefs. This was true also of the model *Para* plantation on the road between Benin City and Sapele, which was owned by eighteen Benin City chiefs who had “provided the labour for it free.”¹⁰¹ Lugard, similarly, believed that “communal” labor generally meant “forced” labor, and opposed the communal plantations on these grounds (Egboh, 1985, p. 160). In 1924, the Resident chastised the Oba for hiring practices on his *Para* plantation, requesting the District Officer to inform him that if his workers were “called upon to work for nothing, it simply means that they will leave their villages, and either seek employment with the timber concessionaires or elsewhere outside the division.”¹⁰² Bradbury (1973) notes that chiefs received one third of the wages paid for laborers they requisitioned, and received a share of the profits from rubber. Some were still profiting from these plantations as late as 1960, though he noted that this hurt their political legitimacy.

A plantation established by the Forestry Department near Usonigbe had been turned over to the local villages around 1910, but in 1914 was appropriated by the Oba. His successor was leasing it to Palmer for tapping in 1937.¹⁰³ A *Para* plantation on Sapele Road that had been damaged by fire was turned over to the Iyashere in 1916, since he was the only chief who had shown interest

⁹⁹NAI, BP 5 1915: Report on the Tapping Operations on the Communal Rubber Plantations for 1914.

¹⁰⁰NAI, Ben Prof 2/3 BP 523 1916: Proceeds from Rubber Sales; no date given, letter to Secretary, Southern Provinces.

¹⁰¹NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

¹⁰²NAI, Ben Prof 2/4 BP 262 1917: Para Rubber, Benin Division. 18 Feb, 1924: Resident to District Officer.

¹⁰³NAI, Ben Dist 1 BD 84 Vol 2: Usonigbe Native Court and District Affairs: 16 March, 1937: Palmer to DO; handwritten note by Jull.

in it and it was through the disinterest of other chiefs that it had come to be damaged.¹⁰⁴ One official remarked that “looking at it from a business profit and loss point of view the communal plantations have so far been a failure, except to the chiefs.”¹⁰⁵ Usuanlele (nd), similarly, observes that Benin chiefs were also able to turn timber royalties, intended to benefit the whole community, into personal incomes. Not all revenues failed to produce public benefits, however; Dennett told the WALC that the Native Council in Benin used some of its share of rubber revenues to finance the city’s waterworks (WALC, 1916, p. 393).

In addition, the colonial state was short on staff and equipment, to the detriment of the plantations. The supply of seed was not always reliable; seeds imported from Cameroon failed to germinate, while in it was reported that poor germination had lowered the number of *Funtumia* planted in Southern Nigeria from 234,878 in 1907 to 133,094 in 1908. Of the 622 plantations formed during that year, most were extensions to existing ones.¹⁰⁶ This plagued other experiments with rubber. Experiments with rubber tapping in the Ibadan State Reserve in 1906 failed due “to the want of sufficient European supervision.”¹⁰⁷ In the Ibadan and Mamu reserves, the small staff made it impossible to tap all the trees even once, “let alone a second and third time, during the season as was originally contemplated.”¹⁰⁸ In 1910, the Agricultural and Forestry departments were separated, and von Hellermann (2005, p. 112) argues that the Forestry Department quickly lost interest in agricultural pursuits such as these plantations. Before 1911, thinning had been neglected, and the trees needed each other’s support to stand.¹⁰⁹ At Agbor and Adaba, while thinning was desperately needed, there was no staff to do the work. The report for 1913 on the communal plantations in Benin admitted neglect by the government, stating that “it is a breach of good faith and fair dealing to have started these rubber plantations as a native industry and leave them, now when maturing and needing thinning, tapping etc under European supervision” (*ibid*).

The District Officer worried that the villages were “disappointed with the results of their labor.”¹¹⁰ In Ishan in 1913, the Forestry Department was “unable” to tap the 93 communal plantations.¹¹¹ At times, one Forest Guard and one pupil had to supervise as many as twenty men.¹¹² That year, the senior Conservator of Forests decided to suspend tapping on the plantations, “on the ground that the trees need rest, and the Forestry Department is short of officers” (*ibid*). In 1917, there were no funds available to supervise preparation and assist in the sale of rubber at Ubiaja; the District Officer proposed turning the village plantations over to their respective chiefs.¹¹³

¹⁰⁴NAI, Ben Prof 2/5 BP 173/1916 Communal Rubber Plantation Management of. 9 Nov, 1916: Conservator of Forests Benin Circle to Resident Benin Province.

¹⁰⁵NAI, BP 5 1915: Report on the Tapping Operations on the Communal Rubber Plantations for 1914.

¹⁰⁶Southern Nigeria Annual Report for 1908.

¹⁰⁷Southern Nigeria Annual Report for 1906.

¹⁰⁸Southern Nigeria Annual Report for 1912.

¹⁰⁹NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

¹¹⁰NAI, BP 138 1914: Annual Reports Benin Province.

¹¹¹NAI, BP 138 1914: Annual Reports Benin Province.

¹¹²NAI, BP 5 1915: Report on the Tapping Operations on the Communal Rubber Plantations for 1914.

¹¹³NAI, Ben Prof 2/4: BP 403 17: Village Rubber Plantation, 3 July, 1917: District Officer Ubiaja to Resident, Benin and 9 Aug, 1917: Resident to District Officer Ubiaja.

In 1917, the government had to borrow pans, metal spoons, tapping knives, rollers, cog wheels, fittings, and bottles of acetic acid from Miller Brothers.¹¹⁴ Local tapping knives were described as “slow and bad,” though by 1914 a local “native imitation” of *Para* knives had been devised.¹¹⁵ Smoking facilities too were inadequate, and could not prevent the cured rubber from becoming moldy.¹¹⁶ The two smoking sheds at Benin City were poorly built, lacked proper heating and drying facilities, and were in constant danger of catching fire.¹¹⁷

It was also difficult for the colonial government to transmit new knowledge and skills to Nigerians. The government needed to transmit new ideas of plantation management, instructions on better tapping methods, and inducements to produce higher quality output. Much of the plant distribution had to be done from the Onisha Gardens. As early as 1906, it was recognized that this was a poor location relative to the Central Province. It was too dry and too far from the centers in which cocoa and *Para* rubber could be successfully cultivated.¹¹⁸ *Para* yields were estimated to be five times greater than those for *Funtumia* per acre, but there were only 6,000 acres in Southern Nigeria by 1922 (Egboh, 1985, p. 162). One officer reported in 1913 that the “native idea of a clean plantation is often opposed to all Forest ideas of soil protection and the arrival of a Forest Officer often leads to the plantation being swept and scraped bare of all needful and protecting surface soil and humus.”¹¹⁹ Individual rubber samples mentioned in colonial correspondence were often poor – in 1918 samples of locally grown rubber were reported to be “anything but good, and it is evident if the best results are to be obtained, that the Beni ‘Planter’ requires both advice and supervision.”¹²⁰

The quality of Nigerian rubber, among the worst in the world after the Second World War (Anschel, 1965), was an issue throughout both the wild and plantation rubber periods. In 1906, it was reported that “up to the present practically the whole of the rubber exported is forest produce, rudely prepared by the native with little or no intelligent control of the collection.”¹²¹ Thomson added that improving the quality of rubber had encountered difficulty, though some progress had been made.¹²² At that time, most *Funtumia* was shipped as either “Lagos lump” or “Benin lump,” containing a very large percentage of water and impurities” (*ibid*). Efforts were being made to replace these lumps with biscuits, which were easier to dry and better resisted rotting. Generally, heat, lime juice, or an infusion of *costus lucanusianus* was used as a coagulant. *Funtumia* would spontaneously coagulate in three days to a week if exposed to air in a shallow vessel. He suggested that alcohol, acetic acid, and boiled *Bauhinia* leaves would accelerate the process, improve quality,

¹¹⁴NAI, Ben Prof 2/4 BP 262 1917: Para Rubber, Benin Division.

¹¹⁵NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

¹¹⁶NAI, Ben Prof 2/4 BP 270 1917: Sale of Village Rubber Plantation, 28 March, 1917: District Officer to Resident.

¹¹⁷NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

¹¹⁸Southern Nigeria Annual Report for 1906.

¹¹⁹NAI, Ben Prof 2/1 BP 364 1914: Report on the Communal Rubber Plantations for 1914 (1913).

¹²⁰NAI, Ben Prof 2/4 BP 262 1917: Para Rubber, Benin Division. 12 Dec, 1917: Herald to Watt.

¹²¹Southern Nigeria Annual Report for 1906.

¹²²Report on the Forest Administration of Southern Nigeria for 1906.

and lead to higher prices. In addition, inferior latex from a variety of other plants was used to adulterate the latex.¹²³

For producers, there was little incentive to improve quality; this was also an issue for wild rubber as well. Egboh (1985, p. 166) describes similar quality problems in the Lagos hinterland. While rubber produced in French West Africa using chemicals available from local plants fetched 54d per lb in Europe, “Lagos lump” could be only valued at 18d to 24d per lb. In 1907, Thompson reported that “with one exception, the European firms trading in this produce have not encouraged the movement to the extent they might have done by paying substantially better prices for the improved article.”¹²⁴ Similarly, in 1909, another official complained that, while all licensees and Ogas were instructed in the “proper method” of making rubber, the Yorubas “simply refuse to do it, as they can sell bad rubber near Illushi even if not at Siluko or Benin City.”¹²⁵ Though an ordinance to control the adulteration of produce had been passed the previous year, Miller Brothers complained that the amount of rubber then fell; Unwin’s view was that “the natives, especially Yorubas just tried to see how long the firms would hold out before giving way, after two months the whole thing was reversed and they were told that they could make lump rubber.” A “vacillating policy” from Miller Brothers and indifference from the other European firms made it difficult to convince Africans that quality biscuits, as opposed to lumps, were actually wanted.

The Imperial Institute analysed several Nigerian rubber samples in 1908.¹²⁶ While comparable fine hard *Para* was selling for 3s 5½d per lb, Benin lump was valued between 1s 6d and 1s 11d. Three specimens of *Funtumia* from Benin City “were of rough appearance but of satisfactory composition,” valued from 2s 8d to 3s 8d per lb, with comparable fine hard *Para* selling at 4s 6d per lb and Benin lump at 2s 0d.

The same year, experiments were conducted to improve the quality of Nigerian rubber.¹²⁷ Straining the latex for impurities, washing it once it was freshly coagulated, and cutting it into thin strips that could be more easily dried in wood smoke created a product that could be sold in England for between 4s 6d and 4s 8d a lb, when Brazilian *Para* could fetch a price of 5s 2d (*ibid*). This was achieved using simple articles that it was hoped could be obtained by Africans – demijohns, earthen pots, a sieve, empty bottles, and the like. These were demonstrated to the rangers, forester, forest guards and pupils in the hope that they would pass these methods onto others. James, optimistically, assumed the price of Nigerian rubber could be doubled by such efforts, so long as these higher prices could be passed onto producers and adulteration policed (*ibid*).

Two African Rangers were sent to French West Africa, and returned in 1907 on a lecture tour that did encourage some quality biscuit production in Benin, but only 35.5 lbs were actually offered for sale (Egboh, 1985, p. 166-7). Biscuits took twice as long to produce and lost weight more rapidly than lump rubber; one official estimated that it would require 4s per lb to induce producers to switch (*ibid*). The Adulteration of Produce Ordinance of 1897 was used between

¹²³Thompson listed *carpodinus hirsuta* and *carpodinius fulvis* (*funtumia africana*, *hoarrhena wulfsbergii*, *alstonia confensis*, *omphalocarpum elatum*, *couonopharyngia pachysiphon*, *omphalogramum calophyllum*) as adulterants.

¹²⁴NAUK, CO520/50:30 Nov, 1907: Rubber Collection (Egerton to Elgin).

¹²⁵NAUK, CO 520/83, Enc. 25 Sept, 1909: Unwin to Thompson.

¹²⁶Southern Nigeria Annual Report for 1908.

¹²⁷Southern Nigeria Annual Report for 1906.

1907 to 1909 to prevent producers from producing lump rubber, but this was quickly withdrawn due to protests from European firms who faced declining supplies. Egerton's similar proposal to forbid lump exports in 1910 was opposed by the colonial office (*ibid.*). In 1908 it was reported that attempts to improve the quality of rubber had been "rendered futile, owing, principally, to the unwillingness of the merchants to pay for the inspection and supervision of the rubber tappers and to the reluctance of the Government to follow the lead of neighbouring Governments and prohibit the sale or export of lump rubber."¹²⁸ In 1910, the quality of lump rubber was improved, and this was sustained through 1911, the product receiving a price of 1s 6d per lb.¹²⁹ In 1909, the government proposed charging local firms a fee of 1 or 2d per lb to mount an instruction campaign, but this was withdrawn following on opposition from the Liverpool Chamber of Commerce (Egboh, 1985, p. 168). In 1913, however, there was a falling off in exports "owing to the very poor prices offered for the low grade of rubber shipped".¹³⁰ That year, prices for Ishan rubber were said to be low due to "its inferior quality and large percentage of impurities; also owing to the large quantities of good plantation rubber now on the market."¹³¹ The quality of Nigerian rubber did not improve – one 1918 textbook described "Benin ball" as "generally dirty," having "rotten, woody smell" (Pearson, 1918).

Finally, the return to rubber fell sharply once Asian production began to increase. Some inklings of these were felt even before 1910; in 1908, it was reported that there was a "marked falling off" in rubber exports was "mainly due to the poor prices offered for the produce owing to the general trade depression prevailing in the home markets."¹³² In 1912, both cocoa and rubber were said to have suffered from the shortest rainfall in many years. The First World War did not help prices either. Officials realized that the failure to anticipate the collapse of the world market has a major oversight on their part; the 1914 report on the communal plantations noted that:

The possibility, in fact probability of a fall in the price of rubber was evidently not taken into consideration when these operations were started...A second and very important point is that the natives have not taken up the plantations with much enthusiasm. Every year the returns have been smaller and, most important of all, the natives have been kept waiting many months before receiving payment.¹³³

Eventually, the government admitted its failure. The same report recommended turning the plantations over to the local villages, noting that it would not be remunerative to work them with paid labor. In 1916, the Forestry Department ceased to exercise any control over the communal plantations, and the commissioner of the Benin Province requested the District Officer to inform the "native owners" that, since the government "has given them practical instruction in the method of planting, tapping, and preparing the rubber in those plantations, it is now their duty to carry on

¹²⁸Southern Nigeria Annual Report for 1909.

¹²⁹Southern Nigeria Annual Report for 1911.

¹³⁰Southern Nigeria Annual Report for 1913.

¹³¹NAI, BP 138 1914: Annual Reports Benin Province.

¹³²Southern Nigeria Annual Report for 1908.

¹³³NAI, BP 5 1915: Report on the Tapping Operations on the Communal Rubber Plantations for 1914.

the work themselves without regular supervision and assistance.”¹³⁴ Proceeds were then divided between the Native Authority and the villages.¹³⁵ In 1918, the District Officer for Benin asked the Resident about his meeting with the local agent for Miller Brothers, concerning the continued purchase of rubber. “If there is no market for the Native Administration Rubber,” he warned “tapping should cease temporarily and the trees be allowed to rest.”¹³⁶ The export market had collapsed. It was then “impossible to import rubber into the United Kingdom.” Miller Bros were unable to ship rubber from Sapele to Great Britain. He sighed:

It appears that rubber will not keep in this country, and unless a market can be found for the rubber products of the communal rubber plantations and the para plantations, it would appear to be a waste of both time and money to continue tapping and preparing rubber, as is now being done by the Native Administration (*ibid*).

In 1921, the Director of Agriculture wrote his above-quoted memorandum making the abandonment of rubber official government policy.

4.3.3. *Cost benefit analysis.* Were the communal plantations a worthwhile endeavor? One approach to answering this is to use cost-benefit analysis to piece together a reasonable distribution for the rate of return that colonial officials should have expected at the outset. Ansel (1965) uses a budget study of 22 *Para* farms to ask whether year-to-year profits in rubber are greater than those for a palm plantation, and to show how sensitive the answer is to 10% and 20% changes in the price of rubber and to overall costs. There are two major shortcomings of this approach. First, because year-to-year profits are delayed relative to the costs of establishing a plantation, this method does nothing to discount these future returns. Second, the sensitivity analysis only allows for very crude shifts in profits and costs, giving little sense of the riskiness of rubber as an investment.

The approach I take is to calculate a plausible distribution for the internal rate of return (IRR). Suppose that the fixed cost of establishing a one-acre *Funtumia* plantation in the first year is F ; I assume constant returns to scale and calculate all figures in per-acre values. Suppose further that, from the plantation’s maturity in year M until the end of its lifespan L , it yields a year-to-year operating profit of π . The plantation’s net present value (NPV) will then be given by:

$$(1) \quad NPV = -F + \sum_{t=M}^L \left(\frac{1}{1+r}\right)^t \pi.$$

The IRR will be the value of r such that the NPV is zero. In order to find a reasonable *a priori* distribution on r , I break F and π into their components, and represent these as functions of unknown parameters. I assume distributions on these parameters, and simulate 3000 draws of them, producing this many draws of the IRR. I begin by assuming that, while land for planting is free, establishment costs come from the labor required to clear and plant it:

¹³⁴NAI, Ben Prof 2/5 BP 173/1916 Communal Rubber Plantation Management of, 2 March, 1916: Commissioner Benin Province to District Officer.

¹³⁵See, e.g. NAI, Ben Prof 2/3 BP 523 1916: Proceeds from Rubber Sales.

¹³⁶NAI, Ben Prof 2/4 BP 262 1917: Para Rubber, Benin Division; 4 July, 1918: DO to Resident.

$$\begin{aligned}
(2) \quad F &= \text{Cost of labor in clearing} + \text{Cost of labor in planting} \\
&= \text{Man-days clearing per acre} \times \text{Wage} + \text{Man-days planting per acre} \times \text{Wage} \\
&= c1 \times w + c2 \times w.
\end{aligned}$$

Operating profits, by contrast, are revenues minus the annual cost of tapping, plantation maintenance or upkeep, and processing:

$$\begin{aligned}
(3) \quad \pi &= \text{Revenue} - \text{Cost of Tapping} - \text{Cost of Upkeep} - \text{Cost of Processing} \\
&= \text{Producer price} \times \text{Trees per acre} \times \text{Yield per tree} \\
&\quad - \frac{\text{Trees per acre} \times \text{Man-days per tapper} \times \text{Wage}}{\text{Trees per tapper}} \\
&\quad - \text{Man-days upkeep per acre} \times \text{Wage} \\
&\quad - (1 + \text{Equipment multiplier}) \times \\
&\quad \quad (\text{Trees per acre} \times \text{Yield per tree} \times \text{Man-days processing per lb} \times \text{Wage}) \\
&= p \times t \times y - \frac{t \times D1 \times w}{T} - D2 \times w - (1 + E) \times (t \times y \times D3 \times w).
\end{aligned}$$

Rather than accounting for capital costs and depreciation, I have assumed that equipment (such as smoking facilities) adds a premium above the labor cost of processing. Table 1 reports the distributions assumed for each of the thirteen parameters needed to produce these estimates. These are based on scattered observations taken from archival and other sources, which are detailed in Appendix A. When my knowledge of these is weak, I have tried to assume a diffuse distribution. If the simulated value of π is negative, I set the IRR to 0. Since Nigeria was a small producer in the global market, I assume no general equilibrium effects. Because the IRR evaluates a single project, I do not need to consider the rate of return to alternate projects when calculating it. Rather, if I want to know whether land would be better planted to yams, I should compare the IRR from rubber to the IRR from yams.

Figure 2 gives the results of this exercise. In spite of reasonably optimistic assumptions on the price distribution, the communal plantations were indeed a risky proposition. In roughly 26% of simulations, the internal rate of return is zero. The average of the non-zero realizations, however, is fairly high, at roughly 63%. At the median of the parameters, it is just under 48%. This is because, while establishment costs were low, year-to-year revenues were highly uncertain.

Establishment costs are small on average, running a little under £7. The main difficulty is that the mean revenue of slightly more than £185 is eaten up by year-to-year costs. On average, tapping costs take up 48% of total revenue. This is remarkably close to the one half share paid to itinerant tappers during the 1960s, especially when considering that under some arrangements only sheets would be equally divided, while all the revenue from lumps would go to the tappers (Blanckenburg, 1965). Annual upkeep accounts for less than 1% of revenue in a typical year. The fatal expense is processing; this eats up an additional 33% of revenue, so that operating profits are often negative.

TABLE 1. Parameters

Parameter	Meaning	Distribution
	<i>Physical properties</i>	
M	Years to maturity	U[5,10]
L	Lifespan of plantation	U[20,30]
t	Trees per acre	U[1000,2000]
y	Annual yield per tree in lbs	U[0.5,1.5]
	<i>Labor requirements</i>	
$c1$	Man-days clearing per acre	U[50,150]
$c2$	Man-days planting per acre	U[25,75]
T	Trees per tapper	U[100,200]
$D1$	Man-days per tapper	U[100,200]
$D2$	Man-days annual upkeep	U[10,30]
$D3$	Man-days processing per lb	U[0.1,0.7]
E	Equipment multiplier	U[0.5,1.5]
	<i>Prices</i>	
p	Producer price in d per lb	U[10,50]
w	Wage in pence per man-day	U[6,15]

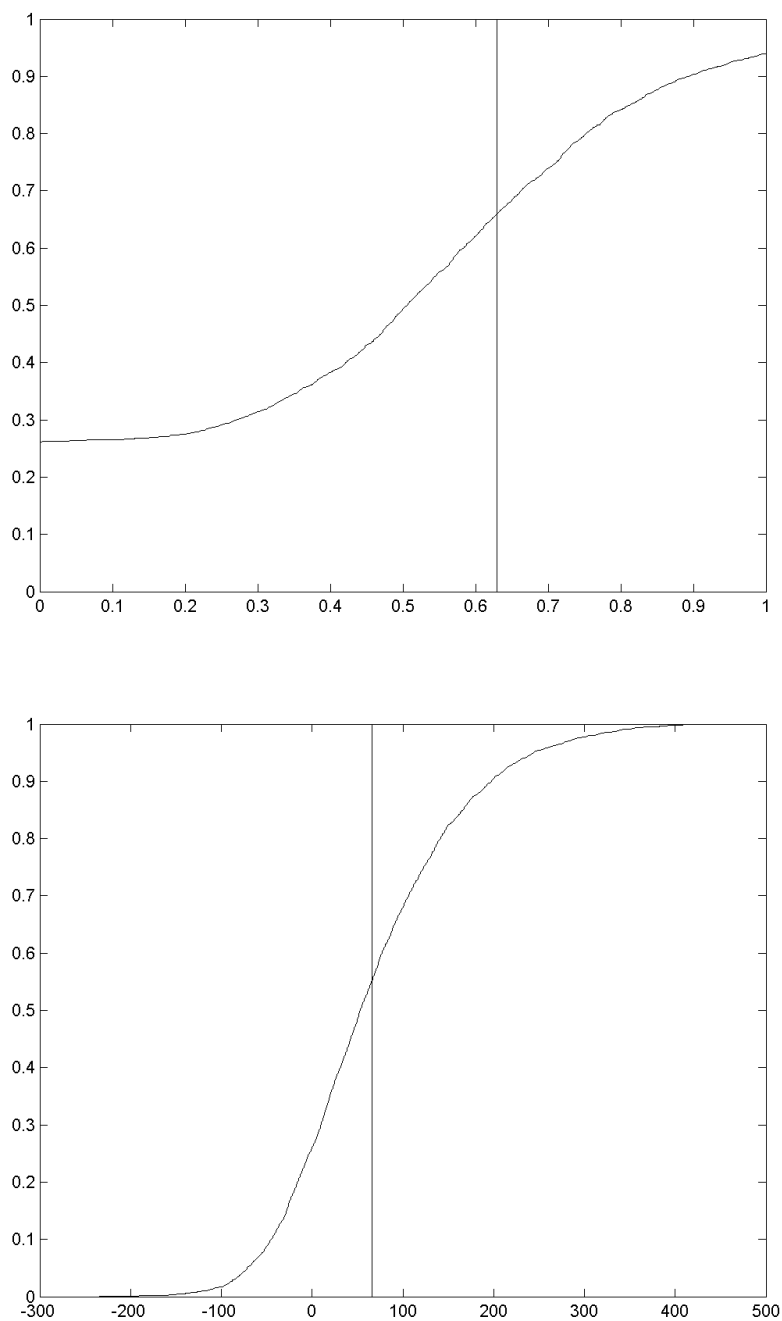
On average, they are £66. This is also reasonable from a back-of-the-envelope perspective. If, on average, a plantation spends half of its gross revenue on tapping, the price of rubber must be twice the expense of processing it in order to turn a profit. Where processing facilities were dispersed, output quality was low, and labor scarce, this condition was unlikely to be met.

4.4. **Summary.** The problems of plantation rubber in Benin are, like the difficulties faced with wild rubber, of broader relevance. In the Amazon, it has been frequently argued that the region fell behind Asia because plantation rubber was not established. Resor (1977) suggests that plantations were uneconomical in Brazil because the *Para* grew better in Asia. Dependency theorists attribute the failure of Brazilian plantations to surplus extracted abroad from the wild rubber industry, while Marxists point to social relationships as constraints, and Warren Dean theorized that endemic leaf blight was the principle obstacle (Coomes and Barham, 1994). In Benin, the lack of incentives for foreign investment were similar to other peasant-dominated industries throughout West Africa, and were determined in part by policy hostile to concessions. Like cotton in Mozambique or terracing in East Africa, success of the project assumed that Africans would be willing to provide elastic supplies of labor in return for little compensation, and these demands were resisted. Other colonial labor demands, notably the requisitioning of carriers, competed with the needs of the plantations. Finally, vulnerability to the global market hurt Nigerian rubber, much as with other African economies dependent on exports of primary commodities.

5. CONCLUSION

This was not the end for the rubber industry in Benin. The government abandoned its support of the industry in 1921. After 1935, however, planting took off and exports began to grow. Anshel (1965) believed that this was due to increases in the global price of rubber that followed

FIGURE 2. Simulation results



Notes: The top graph shows the CDF of the internal rate of return produced by the simulations. The mean of the nonzero IRRs is given by a vertical line. The bottom panel gives the CDF of the simulated operating profits (in pounds). The mean (including negative values) is marked with a vertical line.

on international supply restrictions (of which Nigeria was not a party). As pointed out above, however, the prices of the 1930s were below those that prevailed to 1910, and were low during the early years of the planting boom. Usuanlele (nd) suggests instead that the impetus for planting

came from colonial demands for taxes, paid in cash, from land alienation for forest reserves against which plantations of tree crops were a viable defence, from urban residents looking for investment opportunities, and from migrant peasants looking for new sources of income. Indeed, the rapid expansion of forest reserves is one of the dominant themes of Benin's history from 1916 to 1938 (von Hellermann and Usuanlele, 2009). In addition to tree crops as a Lockean claim on land, this changed the factor ratio making labor less relatively scarce (Usuanlele, nd). The British supported both plantation and wild rubber during the war, but were ambivalent to its future prospects. Their concerns notwithstanding, Benin's rubber exports continued to rise through independence, peaking in 1914.

In this paper I have argued that geography is not destiny, and that agency does not always lead to rapid adoption of new crops and technologies. Institutions, governance, information, and inequality can all prevent or delay the success of an industry. In the case of Bini rubber, the British could not replace existing property rights with institutions that encouraged preservation of natural resources. The British could not forecast the world market and plan accordingly, nor were they effectively able to pass new skills onto Nigerians. Neither expatriate firms nor Nigerians had the information needed to forecast profits with reasonable security. Officials expected the bulk of the necessary work to come from those who stood to benefit the least. It should not be surprising, then, that the Nigerian rubber industry was so slow to develop.

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APPENDIX A. PARAMETER OBSERVATIONS

Below, I have abbreviated Southern Nigeria Annual Report as SNAR, Report on the Forest Administration of Southern Nigeria as RFASN, BP 5 1915: Report on the Tapping Operations on the Communal Rubber Plantations for 1914 as BP5/1915, and BP 364 1914: Report on the Communal Rubber Plantations for 1914 as BP364/1914.

M (Years to maturity): That the communal plantations were first tapped in 1910 suggests they took roughly 7 years to mature. Christy (1911, p. 96) states that *Funtumia* will give a fair yield in its sixth year.

L (Lifespan of plantation): I have no observations, so I have assumed 30 as a reasonable guess. For *Para*, Anschel (1965, p. 145) assumes planting starts in the sixth year and continues for 24 more years.

t (Trees per acre): Christy (1911, p. 108); *Funtumia* in Benin City plantations was planted 4 to 6 ft apart, implying roughly 1750 per acre. He also notes (p. 97) that 3 or 4 times as many *Funtumia* can be planted per acre as *Para*. Blanckenburg (1965) reported average *Para* densities of 300 to 500 per acre (trees planted on average 9 to 15 ft apart). Igbafe (1979, p. 346) states that there were 256 plantations containing 142,978 trees and covering 118 acres (1212 trees per acre) in 1907.

y (Annual yield per tree in lbs): RFASN 1906; 2 to 3 oz per tree per tapping. SNAR 1910; 1.402 oz per tapping for trees over 18 inches. SNAR 1911; 1.59 oz per tree. Bell (1907); 1 lb of tree per year expected from *Funtumia* in Uganda. Blanckenburg (1965) states that “low yielding local varieties” give 200-400 lbs of dry rubber per acre per year, while “improved varieties” give up to 1200 lbs (though he is likely referring to *Para* for both). He quotes the Ministry of Agriculture’s estimate of 200 lbs per acre, and believes in his study villages it is closer to 300. Christy (1911, p. 181-187) gives results from tapping on several Kamerun plantations, but does not clearly state whether the results are for a single tapping, or annual; in the one instance where he gives an annual figure (p. 186), he suggests that between 2 and 6 oz per year is possible per year depending on the height of tapping for excision tapping, incision tapping (p. 189) gave 1 lb of dry rubber over twelve months. His own summary (p.193) suggests that in years 6 through 10, a *Funtumia* tree will give 4, 5, 9, 12 and 15 oz of dry rubber per year. BP5/1915 gives yields in Benin, Ifon and Ishan that correspond to 0.06, 0.05, and 0.08 lbs per tree, respectively. BP364/1914 gives yield figures per tree tapped of 1 to 1.6 lb. Egboh (1985, p. 162) suggests that *Funtumia* yields were generally 60 lbs per acre, as opposed to more than 300 for *Para*.

c1 (Man-days clearing per acre): Forde et al. (1946) estimate that clearing in ecologically-similar Yorubaland takes 42 to 98 man-days per acre. For Benin, they do not give man-day estimates; clearing, seed, and weeding together on a 4.35 acre cocoa farm cost £12/7/6 over 3 years. On a 5 acre garm in Benin, the total costs of clearing were £10. These suggest clearing costs of £2 to 3 per acre, which at 9d per day suggests 55 to 80 man-days in clearing.

c2 (Man-days planting per acre): Anschel (1965, p. 143) reports 36.4 man-days per acre “for establishment” of *Para*. This seems low if it does not include clearing, so I take it as a measure of planting time.

T (Trees per tapper): Usuanlele (nd, p. 258); during the Second World War a tapper could produce 2 pounds of rubber daily. Weinstein (1983, p. 17); Amazon tappers tapped 100 to 200 trees daily. For *Para*, Anschel (1965, p. 240) reports an average of 271 trees per tapper. Blanckenburg (1965) states that a tapper producing lumps from *Para* can tap 600 trees per day, but only 450 when tapping for sheets.

D1 (Man-days per tapper): For *Para*, Anschel (1965, p. 145) reports that one tapper will tap 2 acres a day 150 days per year. BP5/1915 stated expenses to the “native communities” of £258 for wood, carriers and plantation labor for 37,375 trees.

D2 (Man-days annual upkeep): Anschel (1965, p. 143) reports 10.5 man-days of weeding per acre per year for *Para*. Blanckenburg (1965) states that an FAO team estimates 60 man-days of labor are needed per acre of *Para*; it is not explicitly stated whether this includes tapping as well. If it does, it seems low. He also noted that food crop farms were much better weeded than rubber plantations.

D3 (Man-days processing per lb): SNAR 1911; experiments in the Mamu reserve cost 8.25 d per lb of dry rubber, for both tapping and preparation. SNAR 1912; similar experiments cost 3.98 d per lb “apart from cost of supervision, harvesting, and preparation.” Blanckenburg (1965) estimated 2d per lb as processing costs during the 1960s (which exactly offsets the increase in price). BP5/1915 stated expenses to the government and forest department of roughly £435 for staff, carriers, “rubber shed boys,” tapping implements, and shed depreciation for 37,375 trees.

E (Equipment multiplier): For *Para*, Anschel (1965, p. 243) reports that a mature plantation bringing in £277 in gross revenue will face costs of “tapping, collecting and processing” equal to £36.3 along with depreciation equal to £37.9 if rubber is inter-planted and £61.3 if it is planted alone. The costs of “tapping, collecting, and processing” are exclusive of the $\frac{1}{2}$ share paid to tappers, so this suggests the cost of depreciation was 102% to 168% the cost of “collecting and processing.” He reports an average wage per day of 4.75s (p.81), suggesting 158 man-days per acre. Since he also assumes (p.104) 404 lbs per acre of rubber, this suggests 0.38 man-days are needed for processing one lb of *Para*. During the 1960s, it was not economical for farmers to invest in rollers and smokehouses, and so many worked through cooperative societies.

p (Producer price in d per lb): SNAR 1908; 1s 6d per lb (18d per lb) for Benin lump, when comparable *Para* was selling for 41.5d per lb. Other Benin City samples were valued from 32d to 44d per lb when comparable *Para* selling for 54d per lb and Benin lump was selling for 24d per lb. SNAR 1910; 6s 6d per lb (78d per lb), for rubber much better than what was normally exported. SNAR 1911; 3s 8.75d per lb (44.75d per lb) when the price of the best *Para* was 4s 6d (54d). The report also suggests a price of 1s 6d per lb (18d per lb). Anschel (1965) reports export prices that average £153 per ton from 1900 to 1921, or 16.39d per lb. SNAR 1912, 3s 4d per lb (40d per lb) of which $\frac{2}{3}$ went to the producers and $\frac{1}{3}$ to the government. Dumett (1971, p. 89) states that during the Gold Coast rubber boom, rubber sold for £4-5, of which producers received £2 per 60 lbs, or 8d per lb. Blanckenburg (1965) reports that in April 1962 farmers received 1s per lb of dry un-smoked rubber (generally grade B2), and 1s 2d for rubber processed and smoked in the cooperative station. Bata paid 13.75d per lb of B2 to its suppliers at that time; it paid 17d for RSS1, when the London price was 23.75d; this suggests farmers received $\frac{12}{13.75} \times \frac{17}{23.75} \approx 62\%$ of the London price. He thus estimates that 300 lbs per acre yields £15, half of which goes to the tapper. BP5/1915 states that, netting out freight and other charges, rubber was sold for 16d per lb, and that Miller offered 21d per lb in Benin City. (Egboh, 1985, p. 167) gives a price of 12d to 15d per lb of Benin lump in 1907. He (p. 176) states that the “purchase price” of rubber rose from 12d per lb in 1909 to 42d in 1910. CSO 26 09125 Assessment Report on Benin Division; most rubber

from plantations around Benin City during the late 1920s was bought by James Thomas of Sapele for 1s per lb. BP 209 1914 - Forestry Report 1913; 1s per lb for “Benin lump” in 1913.

w (*Wage in pence per man-day*): SNAR 1899/1900; 9d to 1s (12d) per day. SNAR 1907; the cost of a “native labourer” never exceeds 3d a day, while unskilled labor varies from 6d to 1s per day. Frankema (2010) uses colonial Blue Books to show that praedial wages in Lagos and the surrounding rural areas ranged from 6d to 15d in the period 1900 to 1915; he has confirmed these figures with me in personal communication. CSO 26 09125 Assessment Report on Benin Division; in 1927 casual labor was paid £1 per month, and laborers made extra money in their spare time. This same report estimated the income of a man and wife at roughly £23.5. Ben Prof 8/1/2 Civil Judgment Book 1909-1911; a 1911 contract from Bey and Zimmer stipulated 15s per month plus 4s subsistence per week for laborers.