RUBBER TAPPERS OF THE UPPER JURUA RIVER, BRAZIL

The Making of a Forest Peasant Economy

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SUMMARY

This thesis studies the forest labour process of seringueiros (rubber tappers) in the contemporary Amazon. It investigates labour processes from a Marxist anthropological perspective, focusing on value and exploitation on the capitalist periphery. The analysis is supported by an ethnographic description of contemporary seringais (rubber estates) in the State of Acre, where I was born.

This work is organised in three independent parts. Chapters 1 to 4 constitute a study of the local history of rubber estates and their interface with world and national history. They deal with the cycle of expansion and decline of the rubber trade on the Upper Juruá region of Acre (1870-1943), the renewed prosperity of the extractive economy in the post-war period (1943-1980) and the conflicts between rubber patrons (patrões) and tappers during the last decade (1980-1990). I conclude that the contemporary rubber estate system was a product of regional Brazilian politics rather than a response to the imperatives of the world economy. It developed into its present form as a result of Brazilian State economic policies, which favoured and subsidised a technologically stagnant regional elite in an area marginal to the world market. Another conclusion holds that a forest peasantry with a highly-diversified local economy developed on the contemporary estates. This forest peasantry possesses its own stakes in the forest economy. It is not simply a proletariat forced to remain in the forest and supply the world or national market by virtue of debts.

Chapters 5 and 6 describe in detail the trade-post system and the debt system on the basis of field work done on the Tejo River valley. I describe the trade-post institution as based on the monopoly of natural resources and of trade, supported by state agencies, extracting rents and mercantile profits from a population of rubber tappers operating independent economic units in the heart of the forest. I argue that system is unable to control the forest labour process. I also interpret debt relations as a consequence of the extractive character of the forest economy and not as an imposition of trade-posts.

Chapters 7 through 10 proposes the model of a forest house economy, including its social groups, its use of the natural resources, its labour process and its overall working. Far from specialised rubber producers, the rubber tappers' forest house economy is characterised in technical terms by the amplitude of forest niches they occupy (including hunting, collecting and cultivation). The technological and social patterns of this economy possesses ecological and technological characteristics that are essentially different from non-forest peasant economies ("settler" economies in the Amazon), and also from the large-scale productive units (fazendas). My argument favours the inclusion of the tappers' extensive economic strategies in the forest as part of a wider development policy.
To Manuela
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This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration.

GLOSSARY

Aviamento - Advanced supplies; also manioc-flour equipment
Aviar - To supply in advance or fiada (aviador;aviado)
Barracão - Trade-post
Barranco - River bank (barranco) cultivator
Batelão - A covered boat; as used by a regatão or patrão
Baleeira - A flat-bottomed, covered boat
Caboclo - Indian or descendant of Indians
Capoeira - Abandoned clearing in a forest
Casa-de-farinha - Manioc processing house
Colocação - A settlement; set of trails and its territory
Colocar - To settle someone in a colocação
Embarra - Small game
Empunharem - To make (someone, something) panema
 Esto - Basic, bulky, supplies for a rubber tapper
Estrada - Rubber trail; more generally, a road
Faca - Tapper's knife, and by extension a tapper
Farinha - Manioc flour
Fiala - On credit; in confidence; credit system
Freguês - Someone who buys on credit; a customer; client
Igarapé - Small river
Lamparina - House lamp using kerosene
Madeira - Wood; specifically a rubber tree unit
Marreleiro - A petty retail trader in a seringal
Mata bruta - Virgin forest
Mãe-da-caça - Mother-of-the-game; a forest entity
Mãe-da-seringueira - Mother-of-the-rubber tree; a forest entity
Novena - Annual nine-days of rosary; associated fairs
Panema - Condition preventing success in hunting
Paraná - Small river with flooded banks
Patrão - Trader who advances merchandise; a boss; owner
Pêla - Rubber ball of 50 kgs or more
Poronga - Forest lamp
Prancha - A rubber plank of 10-12 kgs
Princípio - Rubber bundle of small size as sold to regatão
Rancho - Food, especially game
Regatão - Itinerant river trader
Renda - Payment for rubber trails; rent
Roçado - Manioc garden plot; any cultivated area
Seringa - Rubber tree
Seringal - Rubber estate; zone under an owner or trader
Seringueiro - Rubber tapper
Saldo - Positive credit balance ("berracha de saldo")
Terra firme - River bank which is never flooded; upland
Terreiro - Back-yard
Tingui - To fish by the use of poisoning
Uba - A flat-bottomed one-trunk canoe
Várzea - River bank subject to flooding; floodplain
Vereda - Trail habitually used by a wild animal
Vizinhar - To share game with a neighbour (vizinho)
ACRONYMS


BNDES - Banco Nacional de Desenvolvimento Econômico e Social. National Bank for Economic and Social Development.


PROBOR - Programa de Incentivo à Borracha Vegetal. Programme of Incentives to Vegetable Rubber.

MAP 4 - RIOZINHO ESTATE (SERINGAL RIOZINHO)

LEGENDS
- Trade Post
- House
- Path
- Rubber Trail

TACARATU SETTLEMENT

FERREIRA'S HOUSE AREA

MATO GROSSO
MAP 5 - TACARATU SETTLEMENT

COLOCAÇÃO TACARATU

Rubber Trails of Ferreira (one house)

- Rubber Trail
- Seringueira

0 100 m
Introduction

This thesis has the objective of studying the forest labour process of seringueiros (rubber tappers) in the contemporary Amazon. The motivation for this study was my interest in investigating labour processes from a Marxist anthropological perspective, focusing on value and exploitation on the capitalist periphery. Following the decisive incentive of my supervisor, Dr. Hugh-Jones, I combined this interest with an ethnographic description of contemporary seringais (rubber estates) in the State of Acre, where I was born.

The continued existence of these rubber estates constituted something of an enigma. Why has a native forest extractive economy, based on so-called debt slavery, been maintained on the periphery of the Brazilian Amazon for over a century? How come seringais still exist on the eve of the twenty-first century? Between the original research and the final write-up of this thesis, other enigmatic issues emerged. Following Chico Mendes' murder, the rubber tappers became known world-wide, and for some time after that event were promoted as heroes who defended the preservation of tropical forests (Maxwell 1991:24; Allegretti 1990:252-64). This appeared as encouraging news, for it suggested that migrant populations occupying forest areas could adapt to forest life and learn to respect nature over a period of decades. However, this picture remained somewhat paradoxical. Rubber tappers had been described as a miserable population of impoverished workers living in sub-human conditions, forced to endure a tropical hell through debts that were impossible to settle, condemned to isolation and deprivation in order to produce rubber (Cunha 1967 [1909]; Furtado 1959; Pinto 1984). The only reasonable recommendation seemed to hasten the disappearance of the rubber tappers. Beyond the social conditions unbecoming of human dignity, the tropical forest labour
process itself had been described as brutalising, leading more than one writer to the conclusion that the true function of debt slavery was to force rubber tappers to accept a labour form from which they spontaneously would flee if given the chance - fleeing not to become independent forest workers, but to abandon the forest altogether (Silva 1982). Capitalist expansion fronts, involving large firms or independent colonists, both with government support, were supposed to eliminate the residues of the extractive economy, which was seen essentially as a large-scale predatory system whose whole raison d'être resides in the transfer of information and energy from the periphery to the metropolis (Bunker 1985; Almeida 1990a, 1992; Hornborg 1992; Alier & Schupmann 1991:34). The peasantisation of the rubber tappers was treated only as a recent and transitional phenomenon (Bakx 1986).

The rubber tappers' political movement in the 1980s introduced a new element to this picture. Many tappers not only remained in the forest immediately following the patroes (rubber estate owners and traders) exodus from the area, but also planned to stay there in the future - composing a scenario marked by the continuity of the forest economy in areas of the Amazon occupied by rubber tappers and other extractors. This proposition initially emerged as a response to an agrarian crisis, as rubber tappers who were expelled or under threat of expulsion from extractive areas expressed their rights to forest territory (Bakx 1988, 1990). However, the beginning of this programme coincided with the end of government subsidies, which in the past had been pocketed by estate owners and rubber processors. Established in 1985, the tappers' association at that point began to combine their defense of land rights with a globally-appealing argument of the public interest involved in the tappers' management of forest resource, thus exchanging the language of subsidised poverty for a language of investment and sustainable development (Hecht & Cockburn 1991). This thesis provides data and interpretations for the discussion of these issues. Thus, the analytical focus on labour processes and social relations in the forest economy, combined with a concern for the historical context, is intended to contribute to a better understanding of the alternatives for the future development of the forest economy.

Summary

This work is organised in three independent parts. Chapters 1 to 4 constitute a study of the local history of rubber estates and their interface with world and national history. They deal with the cycle of expansion and decline of the rubber trade on the Upper Juruá region of Acre (1870-1943), the renewed prosperity of the extractive economy in the post-war period (1943-1980), the conflicts between rubber patrons (patroes) and tappers during the last decade (1980-1990). I conclude that the contemporary rubber estate system was a product of regional Brazilian politics rather than a response to the imperatives of the world economy. It developed into its present form as a result of Brazilian State economic policies, which favoured and subsidised an technologically-stagnant regional elite in an area marginal to the world market. Another conclusion holds that a forest peasantry with a highly-diversified local economy developed on the contemporary estates. This forest peasantry possesses its own stakes in the forest economy. It is not simply a proletariat forced to remain in the forest and supply the world or national market by virtue of debts.

Chapters 5 and 6 describe in detail the trade-post system and the debt system on the basis of field work done on the Tejo River valley. I describe the trade-post institution as based on the monopoly of natural resources and of trade, supported by state agencies, extracting rents and mercantile profits from a population of rubber tappers operating independent economic units in the heart of the forest. I argue that this system is unable to control the forest labour process. I also
interpret debt relations as a consequence of the extractive character of the forest economy and not as an imposition of trade-posts.

Chapters 7 through 10 proposes the model of a forest house economy, including its social groups, its use of the natural resources, labour process and its overall working. Far from specialised rubber producers, the rubber tappers' forest house economy is characterised in technical terms by the amplitude of forest niches they occupy (including hunting, collecting and cultivation). The technological and social patterns of this economy possesses ecological and technological characteristics that are essentially different from non-forest peasant economies ("settler" economies in the Amazon), and also from the large-scale productive units (fazendas). My argument favours the inclusion of the tappers' extensive economic strategies in the forest as part of a wider development policy.

Research

This thesis is based especially on three kinds of sources. The first is direct observation during field work in the municipal district of Cruzeiro do Sul, Acre, covering the following periods: September 1982-January 1983; March-November 1983; and June-August 1987. The second involves my volunteer advisory activities for the National Council of Rubber Tappers (from 1985 to 1988) and for the Tejo River Rubber Tappers' Association (from 1989 to 1992). Third, I have relied on my personal experience and biography.

The first period of field research (September 1982 to November 1983), in Cruzeiro do Sul, and particularly on the Tejo River, resulted in two household surveys covering the Riosinho area of the Restauração Estate (a sub-estate of the Tejo River's major rubber estate). During the period of research, the Riosinho Estate was formed by a maximum of 69 houses, which I surveyed in October-November 1982, and during those same months a year later, applying a questionnaire with information on family (spontaneous lists of relatives' names and residence), domestic history (summary biographies of house heads), and economy: this last category included information on rubber production, agriculture, hunting, and domestic consumption (including work equipment). I also produced a field diary, focusing on labour and consumption patterns. I resided on the Tacaratu settlement (with my friend Mr. Ferreira, in whose house I had the status of a hired hand) and the Floresta estate (at Dodô Timóteo's house), though I also spent many days at other settlements and visited Mr. Sebastião Corrêa's trade post on a few occasions. In 1987, I paid a return visit to Riosinho, while accompanying union organiser Chico Gini in meetings on Riosinho and a nearby estate, employing part of my time to update population data. On this occasion, I conducted interviews concerning plants, game and soils. These data are the basis for chapters 7 to 10.

During the house surveys, I took notes on tappers' accounts with the barracão (trade post), and on many occasions studied accounts and debts in detail with the house heads. In my short stays at the trade post I tried to obtain additional accounting material and observed the transactions at the shop. These data are used in Chapters 5 and 6.

I consulted documents and periodicals in the Municipal Library of Cruzeiro do Sul, the Center for Historical Documentation of the Federal University of Acre (in Rio Branco), the Cambridge University Library and the British Library. Other documents generously were ceded by Dr. Manuela C. Cunha, who undertook research in the archives of the Saint-Esprit Congregation in France, whose missionaries had frequented the Upper Jurua region since the late nineteenth century. This material was the basis for Chapters 1 and 2. Chapter 3 on national policies relies on different sources such as official statistics and reports, laws and newspapers. Chapter 4 includes information obtained in my 1987 trip and in several visits every year since then (ranging from weeks to months).
I could not use all of the material obtained. I kept a diary on labour and consumption habits, and adopted from the start the practice of accompanying my hosts on their work outings. I had to draw maps, make measurements and take photographs. I employed published statistical data from the IBGE (the government statistics agency) as well as data from the RADAMBRASIL project, covering the Brazilian part of the Upper Jurua region. Early research (1982-3) focused entirely on the daily life of rubber tappers. One basic difficulty lay in the fact that tappers' houses form groups of two or three on a settlement, linked to other settlements by paths involving a two or three-hour walk through the forest. Since I adopted the practice of studying work activities by participating in them, it became difficult to make casual visits to other settlements, except on weekends. Settlements were quite different from one another in their basic economic orientation. It became apparent that survey data based on questionnaires afforded only a normative and idealised picture of activities, which appeared far more varied and complex from the vantage point of direct, personal observation. Survey data revealed patterns and plans. Observation as a participant revealed actions and processes whereby plans interacted with circumstance, and varied from house to house. Thus I faced a dilemma. To remain only a short time on each settlement meant a rupture in the continuity of work patterns whose minimum dimension should be at least a year; but to remain too long on a single settlement meant accepting a single pattern as general within the many possibilities manifested by different houses and settlements. Instead of one location viewed by a single observer, there was a wider group of 25 micro-locations forming a network covering around 23,000 hectares. Under these circumstances, where the focus was a settlement where I became "employed" and had to assist the head in all the activities he undertook, the final result was a discontinuous sequence of observations and flashes of different styles. But the data could not be aggregated as a statistic for a "typical" house. The requirements of statistical analysis cannot be satisfied with the register of some weeks of hunting at one house, weeks of rubber extraction at another, and a period of agricultural activities at yet another. The rubber tappers' society is by no means homogeneous.

Beginning in 1985, I came into contact with union leaders who were involved in the rubber tappers' movement. My involvement as a voluntary adviser to this nascent movement focused first on the establishment of an autonomous rubber tapper's organisation having as one of its goals the creation of Extractive Reserves in Amazonia. This activity led me to the acquaintance of other rubber tappers and estates throughout the Amazon, where social relations and technical patterns could vary tremendously (Novo Aripuanã on the Madeira River, Amazonas; Xapuri, Brasiléia and Assis Brasil on the Purus Valley, eastern Acre; Rondônia State). I am thus aware that the description presented here cannot claim to be valid without qualification for regions other than the Upper Jurua River.

From 1988 I became deeply involved with the project of establishing an Extractive Reserve in the Upper Jurua area where I originally did field research. I became friends with union leader Francisco Barbosa de Melo (Chico Ginú) whom I knew since 1982 from upper Tejo river, and who from 1987 made several censuses on the Tejo River as a research assistant. Ginú became the first Reserve leader. I also became friends with Antônio Batista de Macedo, who established the National Rubber Tappers' Council Association's activities for the Upper Jurua and, besides inspiring the project of creating an Extractive Reserve on the Tejo river, led the social movement which resulted in the Reserve's creation. My activities included meetings with tappers in Cruzeiro do Sul (the first in 1986) and on the Tejo River since 1987 (where I assisted Chico Ginú); community meetings to organize the new local institutions (beginning in January 1989); the elaboration of projects and reports (usually helping out Antonio Macedo); research for the Tappers'
Association, and contacts with government authorities at the environmental agency (IBAMA) and Justice Department, as well as with scientific institutions (University of Campinas) and technical organs (EMBRAPA). In 1990, the estate originally researched in 1982, 1983 and part of 1987 and then visited by me every year became the first Extractive Reserve, by the Federal Decree of 22 January 1990, and its land was officially expropriated on 15 January 1992.

Chapter 1

THE RUBBER BOOM IN THE JURUÁ VALLEY, 1850-1912

Introduction

The formation of a population of rubber tappers or seringueiros, which emerged with the institution of the seringais or rubber estates, passed through several phases in the Juruá Valley. The first phase, prior to 1870, may be characterised by the commercial extraction of rubber by the Amazonian Indian population; in the second phase (1870 and 1912), known as the rubber boom, the extractive frontier advanced rapidly in the direction of the Upper Juruá River, through the territorial expansion of the extraction zones and the migration of rubber tappers under a system not unlike indentured labour; in a third phase (1912 to 1943), the rubber estates survived as enterprises oriented towards a regional market and a stable population; in a fourth phase (1943 to 1985) Amazonian patrões (patrons, estate owners and commercial agents) became the political and economic clients of the national state; finally, the period beginning in 1985 and extending to the present day has been marked by the exit of the patrons from the Amazonian scene and by the concurrent emergence of rubber tappers’ organisations fighting for land rights and proposing alternatives for the development of the forest economy (Table 1.1).

Trade and Extraction, 1750-1870

Already in the early years of the nineteenth century (1813-18), the Juruá river was visited by river traders from Ega sought to acquire especially turtle wax, sarsaparilla and Indian slaves in their expeditions up the Juruá (Castelnau, 1851:87,128-9; Osculati, 1854:239; Herdon 1853:190,284), relying on Indian labour.
Thus, by 1850 traders already had reached the Middle Jurú all the way to the Tarauaca River, exchanging commodities with the Indians for cocoa, sarsaparilla, vanilla and copaiba oil. The dry season also was the period for rubber extraction, and this product found its way back to Tefé between November and December, when the rains filled the river floodplains (Castelo Branco 1922; Tastevin c.1919-22). However, the labour supply was constrained by the limited size of indigenous populations, which became smaller as a result of resistance, flight and disease (Oliveira Filho 1979:126; Ribeiro 1970:42-7; Cardoso de Oliveira; Lazarini 1981:v), while the demand for rubber grew steadily between 1850 and 1870. In 1853, dried pirarucú fish led regional exports in value (£7,000), followed by sarsaparilla. Rubber occupied a modest fifth place, with a total value of less than a thousand pounds sterling, less significant than tobacco, copaiba oil, Brazil nuts and mixira (turtle wax) (Tavares Bastos 1975 [1886]:134). But by 1855, latex already had climbed to second place, surpassed only by pirarucú, and by 1857 was the most important article in terms of export earnings, generating over £13,000 per year (Bastos 1975 [1886]:134). In 1863, rubber accounted for almost a third of the total value of regional exports (half a metric ton, worth £50,000), growing to over one thousand metric tons (worth £130,000) by 1865 (Tavares Bastos 1975 [1886]:134-5, 136, 229, 233-4).

However, the Indian population was insufficient or unwilling to supply the required number of workers, and the caboclo frequently was described as averse to disciplined work, preferring seasonal collecting activities and the sale of forest products to itinerant peddlers (Moran, 1974; Parker, 1985). For example, in 1852 Captain Araújo e Amazonas complained that the inhabitants of Barra (today Manaus) "spend the summer in what they call work; which they do by going to the river banks to acquire turtle wax and manatees, and pirarucú fish; and they go to the forest to extract sarsaparilla, copaiba oil, cloves, etc.; which in effect might be called work, should they not do it in permanent distraction, with dances, excursions, dinners, etc." (Araújo e Amazonas 1852:25; cf. Bates 1895[1863]).

The Boom Phase, 1870-1912, Preliminaries

The conflict between growing demand for rubber and the limited labour supply found a solution in the importation of non-Indian rubber tappers to the Amazon. Between 1880 and 1910, the annual output of the Brazilian Amazon increased an average of 10,000 tons per decade, reaching a peak of 40,000 tons in 1912. The productivity of individual rubber tappers may be estimated between 200 and 400 kgs. per year during this period. These figures suggest that between 25,000 and 50,000 new tappers migrated to Amazonia during each decade of the boom. This suggests a territorial expansion on the order of 75,000 to 150,000 km² per decade, the time it took one decade to occupy the entire Jurú Valley (1885-1895) as well as the Purus Valley (1870-1880), incorporating an area of 150,000 hectares, which covers the current state of Acre.

The transportation of prospective rubber tappers from other parts of the country was financed by the accumulated capital of Belém mercantile interests. Beginning in the late 1870s, successive waves of migrants poured into the Amazon Valley, especially to the upper reaches of the rivers only recently opened to white occupation, such as the Purus and Jurú, as well as the Madeira, attracted by the extensive concentrations of high-quality Hevea brasiliensis in the upper courses of these rivers, were no prior owners existed. The transportation problem was solved with the introduction of steam navigation on the right-bank tributaries of the

1. The Catauxi of the Jurú were among the indigenous peoples who supplied rubber to river traders during this period. For the trade in Indian quasislaves on the Purus see Polak 1894:iv; The South American Missionary Society, 1876 passim, esp. Vol.10, 1976:234-8; Clough, 1872; Chandless, 1887:299-301.

2. By 1850, the population of Amazonas Province was around 40,000 (Araújo e Amazonas 1852), mainly of indigenous background. In 1920, the population of Amazonas including Acre reached 360,000.
Amazon (Bastos 1975 [1886]:passim; Coelho 1982:24). This contributed to the mass influx of peasants from the northeastern province of Ceará, whose backlands were punished by repeated drought crises between 1877 and 1880. In 1878 alone, 54,000 peasants moved on to Amazonia, while some 50,000 others perished in misery in the northeastern backlands (Stokes, 1974:24-9).

Juruá River Occupation

In 1870 the first steamship went up the Juruá. By 1876, the Middle Juruá received the visit of a steamboat every month, and in 1877, the first Northeasterners began to arrive on the river (Castelo Branco, 1922:134ff.). The rapid pace of territorial expansion developed, in part, because the mere speculation in new rubber zones became a good business. Once back in settled areas, the first explorers sold their claims and shortly thereafter rubber tappers, financed by commercial backers in Belém (and later Manaus), began to pour in on both conventional river craft as well as steamers. On the Juruá, a rubber estate worth one million reis (c. £50) in 1885 was worth fourteen times that value in 1892; prices could rise as much as tenfold in a single year, as new trails were opened and more tappers introduced, and some reports related that certain persons specialised in opening rubber estates for resale (Castelo Branco 1941:197).

In this feverish rhythm, much of the extensive municipal area of Cruzeiro do Sul was occupied by rubber estates, between 1885 and 1895. By 1900 most rubber estates in Cruzeiro do Sul had been established and had reached the Breu, which in effect was the southern limit of *Hevea brasiliensis* (Tastevin 1920:133; n.d.; Parissier 1898a, b, and c; Castelo Branco 1922, 1941, 1947, 1950). This rapid change may be gauged by Chandless’ account of the late 1860s, since at that time he was unable to enter what is now Acre because his oarsmen entertained a mortal fear of the valiant Nahua, present in that remote region. In effect, during this period the Yaminahua, Sharanahua, Amahuaca, Cashinahua, Poyanawa, Kontanawa, Arara and other Pano-speaking groups inhabiting the upper course of the Juruá Basin represented more an inconvenient obstacle than a convenient source of labour. These groups were removed from the rubber extractors’ path, often exterminated by killers who organised massacres for a living, abducting Indian women to be turned over to rubber tappers as prizes, while only on exceptional occasions “domesticating” Indians in settlements that were to supply forced labour to plantations and rubber estates. These Pano-speakers retreated to lands in Peruvian territory, beyond the reach of *Hevea brasiliensis*, where their descendants live to this day, with the days of the corrierias (massacres and slave raids) firmly embedded in their memory (Siukind, 1973:41; Aquino, 1982:68; Ribeiro 1970:44; Cabral, 1949; Parissier 1989b:78-79). The Ashaninka (Campa), on the other hand, followed a different course, entering Acre during this same period, possibly forming alliances with patrons in their skirmishes against the Amahuaca and other Panoan groups, their traditional enemies (Mendes, 1991:19).

In 1904, when a joint Peruvian and Brazilian military expedition went up the Juruá River to determine its course and population, it counted 325 rubber estates on the Juruá, among which 74 fell within the present municipal boundaries of Cruzeiro do Sul (Mendonça 1989 [1907]:8-17). Also in 1904, referring to the same area of Cruzeiro do Sul, Colonel Thaumaturgo de Azevedo, first Brazilian authority in the region, reported 7,781 inhabitants (5,880 males), which probably meant about 4,000 rubber tappers producing a total of 1,398 tons (349 kgs. per tapper).² For the same Cruzeiro do Sul area, Tastevin gives the figure of 12,000 inhabitants for 1912 (Tastevin, 1920:140; Thaumaturgo de Azevedo 1905).

³ In 1904, the total population of the Upper Juruá in Acre, including Cruzeiro do Sul and also the Taraucá and its tributaries, reached 14,208 (10,581 males). Approximately 8,000 rubber tappers were responsible for a registered output of 3,382 tons of rubber (Thaumaturgo de Azevedo 1905).
The Tejo River: the Last Frontier

The Tejo river constituted a particularly important rubber producing zone within Cruzeiro do Sul, with some 600 tappers by 1912, and together with the Brazilian Jurúa river upstream to Vila Thaumaturgo it produced around 600 tons rubber (Castelo Branco 1922:709-13, Prefeitura do Alto Jurúa 1914). The Tejo River apparently was first claimed by a Portuguese man (Parissier (1898b); Mendonça 1989 [1907]:197 [111]; Tejo (Tagus), Tamisa (Thames) and other European designations are used along this river to this day. Initially settled by 1895, by 1897, the lavish steamer Contreiras, belonging to Melo & Co. of Belém and including an orchestra among its luxuries, paid an annual visit to the remote and wealthy Tejo River, in a six-month journey carrying rubber and rubber tappers, while occasionally running into Peruvian caucheros (rubber extractors) up from the Jurúa headwaters (Mendonça 1989 [1907]: 199 [113]). By 1899, the headwaters of the Tejo had been explored to the Manteiga and Riozinho igarapés (small rivers). Until around 1911, the Tejo estates were dispersed among several independent owners. Bonifácio da Costa, son-in-law of the steamer’s captain, managed the principal trading post on the Tejo until 1912, when Melo & Co. of Belém became the main proprietor in the Tejo area (Prefeitura do Alto Jurúa, 1914-15).

At this point, the rubber trade found support in a significant transportation network. During the rubber cycle, the Tejo area was cut by many mule trails, thirty-five of which still existed in 1920. The Tejo rubber estates were supplied and managed from their headquarters at the mouth of the Tejo, described in 1905 by Mendonça as having “great warehouses, an excellent office and around twenty houses, along with cattle” (Mendonça 1907:110;27;194). According to Tastevin, the Tejo headquarters had houses for the employees, namely the fishermen, the mateiros (which he first says are “in charge of supervising the rubber tappers” and later describes as “specialists” in marking rubber trails or “woodsmen”⁴, the woodcutters, and the common labourers. Mendonça adds that there were “shelters for temporary workers”, stocks of firewood to supply the steamers, W.C.s over the water and deposits with manioc flour, dried piratucú, beans, rice, salt, biscuits, wheat flour and everything that may be found in a grocery store; “everything that a civilized man might need” (Tastevin 1920:136; cf. 1925a:413-22; 1926:46-49; 1928:213-15).

These descriptions suggest that by 1911, just before the collapse of the market for natural rubber, the Tejo river had become a centralised trade area with investment in transportation, supplies, opening of trails and supervision of tappers.⁵ The fact that the Tejo was one of the most distant rubber zones suggests the high profits generated by the rubber business. It should be noted, however, that the Tejo river also attracted rubber tappers because of its high natural productivity. According to a rubber tapper who penned his memoirs, a single tapper could collect anywhere from six to ten kgs. of rubber per day in the Manteiga and Riozinho, while in 120 days of annual work could produce a ton, which was reason enough to overcome his fear of Cashinahua and Catuquina Indians (Cabral, 1949:35-42)⁶. These figures are still valid this area, which is were I did field research. Cabral’s memoirs describe how in 1899, after working as a tapper in a middle Jurúa estate,


5. See previous note. Where they exist, today’s mateiros are still ‘specialists’ who can mark trails linking rubber trees (cleared by another man), and inspect yearly the trees to check the tapping technique used.

6. The Cashinahua have survived in the neighbouring Jordão river (Aquino, 1982; McCallum, 1989). Besides Cabral’s memoirs (Cabral, 1949), first-hand accounts of the Tejo during the boom days may be found in Mendonça (1989 [1907]), a military man, Castelo Branco (1941), a judge, Araújo (1910), a lawyer, and Father Tastevin (n.d.: 1919-22).
he followed his brother with five men to work in the unoccupied Riozinho and Manteiga estates, authorized by the local owner. They were on their own to build up their barracks, open up new trails and fight the neighbouring Indians (Cabral 1949:43-49). I proceed to add more pieces of information of the characteristics of the upper Juruá rubber zone.

**Limitations in Land Ownership and Political Power**

In 1903, the eastern Acre territory was formally incorporated into Brazilian sovereignty (Stokes 1974). At the same time, in the western Acre area which was claimed independently by Peru, caucheros entered in conflict with the rubber tappers in the Amônia river, just as few miles downstream of the Tejo river. The caucheros were nomadic extractors who covered a determined area in search of the Castilloa elastica tree, which they struck down in order to obtain forty to fifty kgs. of caucho latex all at once, producing in this fashion a total output of between two and four tons per season (Pennano 1988:53). Caucheros never settled permanently, disappearing once and for all from the Upper Juruá after the boom years. The rubber tappers established themselves in permanent installations, produced an yearly output around half a ton rubber, received regular supplies and constituted a fixed population whose boundaries were limited to the natural distribution of Hevea brasiliensis.

In 1904, colonel Thaumaturgo started a Brazilian administration in Cruzeiro do Sul which he founded at the mouth of the Moa river. In the same year, the Peruvian garrison at the Amonia river was defeated with the participation of the...
of foodstuffs, bottled drinks, clothing, tools, medicine and firearms, though with a deficit. No wonder the Cruzeiro do Sul elite became irritated by those of Rio de Janeiro who treated the town as if it were a mere camp in the forest.

During the boom years, in fact, rubber exports produced revenues comparable to those generated by coffee exports and Acre was the richest source of rubber. Local patrons complained that federal taxes were excessive. They also alleged that the distance separating them from the federal capital of Rio de Janeiro made it impossible for efficient federal administration to exist. In 1910, the patrons rebelled, pleading independent state status within the federation. But the federal government responded by sending troops and stifling the uprising that same year, as reported by one of its leaders in a book aptly named "The End of the Epopee" (Costa 1973[1924]).

The absence of local political institutions had important effects on the land issue. The land, in practice forests that were rich in rubber trees, became monopolised by the patrons; in a legal sense, however, this monopoly was not bolstered by legal titles, with the exception of deeds issued by the State of Amazonas before 1904. In the early years of the boom, in order to take control of a rubber zone, one needed simply "to occupy the area, to erect whatever building one wishes, and to exploit it": as long as no one challenged this form of appropriation, the occupant might remain decades in the area, as reported by one of its leaders in a book aptly named "The End of the Epopee" (Costa 1973[1924]).

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for a small fee, but since what really mattered in the early days was the effective occupation of rubber trails and not the legal ownership of the areas, the estates expanded with no concern for boundaries or areas (Magalhães 1977; Araújo 1910). After 1904, the federal government did not create mechanisms for the formal acquisition of land by patrons, or to validate titles issued by the Amazonas State at a time when the region officially belonged to Peru. Thus, according to Antonio José Araújo, a lawyer who worked in Cruzeiro do Sul after 1909:

All the land in Acre is devoluta (public), it is not legitimate property, nor can it be legalised for lack of laws to this effect, and it is kept under the power of a few individuals only under the status of posse (claim) ... while the private individual does not own land, which belongs to the Union, or rather to the Territory (of Acre), on the other hand there is not one square foot of land that he has not appropriated (Araújo 1910:104-5).8

One consequence was that rubber tappers could claim the right of de facto acquisition, just as the patrons did. The point was apparently taken by Thaumaturgo de Azevedo in his decree number 4 of December 1904, which states:

The aviado [he who receives an advance, usually a tapper] or fregues [client] who, by his own initiative, opens new caucho or seringueira trails, beyond the property of the patrons, has a right over them and will not be subject to rent, being, however, obliged to deliver to the aviador [lending party, or patron] the rubber produced, to be recorded on his credit balance (Thaumaturgo de Azevedo 1905:191).

8. In 1913 the federal government set a deadline of three years for the purchase of land - a solution refused by the patrons then in the middle of a deep economic crisis (Rego Barros 1981:153). Additional sources on the land issue dating from 1907 are summarised in Gonçalves (1991:35-36), confirming the picture proposed here.
Implicit in this article of the decree (called "illegal" and "dictatorial" by lawyer Araújo) was that a category of independent rubber tappers could emerge.

**Trade Monopoly, Debts, and Violence**

Another effect of the federal rule was that the patron's capacity to coerce the rubber tappers by violent means was apparently restricted at least at some moments during the boom. One of the issues was the trade monopoly sought by patrons, "owners" of rubber territories. In fact, during the rubber boom period a group of small, itinerant merchants operated throughout the area with river craft of one to five tons, propelled by oars or poles. These *regatões* (peddlers) made up for a shortage of capital through high turnover rates and through their specialisation in commodities with a high value relative to weight (Parissier 1897, Belarmino de Mendonça 1907:109,141; Tastevin 1913; Moraes 1936:66-74; Andrade 1937). The patrons certainly must have sought to undermine these itinerant peddlers. One indication of this emerges in Thaumaturgo's second decree of 1904, his "River Law", inspired by the "constant complaints against the restraint exercised by owners who judge themselves endowed with exclusive rights over the [water courses of public domain] on the grounds of having rubber estates on both banks of them" (Thaumaturgo de Azevedo 1905:194-6). The "River Law" was passed to guarantee the itinerant peddlers rights to navigation and commerce, subject however to the proviso that itinerant traders proved to the patrons that they had not sold any merchandise to rubber tappers in debt.

This point suggests that there could be rubber tappers able to pay their debts and still purchase from itinerant traders or to itinerant priests.9 The generic image of debt-bondage as a single and homogeneous system during the rubber boom should therefore be qualified. An instance of this image is provided by Father Parissier:

"...in order to pay his often fictitious debt, the tapper is forced to make yet another season at his patron and extend thus indefinitely his slavery, and if, overwhelmed by despair, he tries to escape, [the patron] chases him as if he were a robber, and he will not be able to find any employment elsewhere."

(Parissier 1898c:83).

Parissier asserted that, in theory, the rubber tappers could pay off their initial expenses and their annual purchases at current prices, but most tappers remained in debt because patrons manipulated the classification of rubber categories, and probably cheated on weights and accounts as well. However, according to Father Libermann account, agricultural and construction labour remained extremely scarce in the lower Jurua, because "nearly all the able men go to the seringais, that is to say, to collect rubber, because this is better paid than whatever other job" (Parissier 1898c:168). There is thus an apparent contradiction between the fact that debts were the means to impose abusive prices and thus exploitation, and the fact that rubber tapping "is better paid than whatever other job".10

Alfredo Lustosa Cabral, who worked on the Tejo headwaters in 1989, writes in his memoirs that in the rubber estates in the middle Jurua and in the Amazonas in general, debts were impossible to pay off, the rubber tree's yield was 150 to 200 kgs annually (2-3 kgs. a day), and the trade was strictly monopolistic. This was called the "toco" system, where all rubber belonged to the patron to pay off debts. In contrast, in the "upper river rubber zones" such as the Tejo headwaters, "the rubber tapper was free, he had a right to extract the rubber on his own account" (Cabral

9. Father Parissier wrote that the best time to receive contributions to the church fell between October and January, after the tappers settled their accounts (Parissier 1922:113), and Father Tastevin confirms this opinion indirectly when he asserts that the patrons did not approve of visits to the church during this period of the year (Tastevin 1914).

10. On the possibility of positive balances and the consumption of "superfluous" items, see Walle (c.1911:65, 148, 173); Wagley (1964:87, 173).
1949:118). According to Cabral, in these places owners leased a pair of trails for 66 kgs rubber and the tapper purchased his merchandise to the patron or to any other seller (Cabral 1949:118). This suggests that there were different trade arrangements which were applied in different zones. Indeed, according to Woodrofe, in one such system, "all rubber must be sold to the proprietor who makes it a condition that he may pay in goods or cash"; in the other system, "the rubber must be delivered to the proprietor who sends it to the local market, paying all the freight and other charges, deducting for himself 15 per cent as a commission and paying the remaining 85 per cent of the net proceeds of the sale to the seringueiro" (Woodrofe 1916:56-7). This is confirmed in the memoirs of a federal administrator's son, who wrote, based on his experience in 1913 in the Upper Juruá, that

The extractor leased two trails for which he paid the rent of 60 kgs rubber. The surplus was destined either to the payment of his debt towards the proprietor [i.e. toco system], or embarked on the extractor's risk and responsibility [i.e. embarked rubber system] (Rego Barros 1981:199' parentheses mine).

The point in this seemingly too subtle distinction was that in the second case the rubber, while "delivered to the proprietor", remained the tapper's property, a system known as the "embarked rubber" system. Older tappers and trade-post employees describe the workings of the latter system as follows. At the beginning of each year, individual patrons received merchandise on credit from suppliers in Manaus or Belém; in turn, they supplied the rubber tappers at the outset of the season. At the end of the season, the tappers turned over their rubber to the patrons, who shipped the product once a year to Belém or Manaus. There, the rubber (which carried the initials of each tapper who had extracted it) was classified and priced accordingly. The patron then settled in rubber (at current prices) the merchandise he had received in advance the year before. At that point, he either remained in debt or enjoyed a positive credit with his supplier. Back in Acre, the patron then assessed the value of each tapper's rubber (at the current market price) and deducted the tapper's debts from this total. The sale was thus "at the risk of the tapper", which contained an incentive element.

An incentive system, while increasing the productivity in remote areas where direct supervision was nearly impossible, implied the possibility of positive balances. Even a small debt was sufficient to force a tapper to remain on a rubber estate until he settled it, but a small positive balance never was enough to buy the year's supplies, from either the same patron or another, without contracting new debts. Nonetheless, a positive balance allowed for the tapper to buy at least part of his supplies from an itinerant peddler or even from a different patron. On the other hand, excessively high debts could force the rubber tappers to escape without paying the patron. There were frequent complaints on the part of patrons against such evasions and in particular on the lack of action on the part of federal administration to force fugitives to return to the seringal. In principle, the spatial characteristics of the rubber estates, at times spanning entire rivers, facilitated the control over exchange, making it difficult for tappers in debt to leave the estates or sell their product to itinerant peddlers (Parisier 1898b:34-5; Mendonça 1989 [1907]:227, 141; Moraes 1936:66-74; Tastevin 1914, 1925; Azevedo 1905). However, the movement on foot along the trails deep within the estates could hardly be controlled in the same manner, and the backwaters were out of reach of the trade post personnel.11

The contemporary sources confirm the common knowledge that patrons used routinely of violence against tappers and agree in describing the rubber patrons as "feudal masters" (Tastevin,1914:502ff; Thaumaturgo de Azevedo,1905:20). Judge 11. On flight and other forms of resistance, see Reis (1953:95); Levi-Strauss (1978 [1955]:484); Wagley (1964:92); Allegretti (1983:49 ff).
Castelo Branco wrote that during the first ten years of occupation (presumably 1895-1905), the rubber tapper was a "true slave, subject to severe punishment, including whippings" (Castelo Branco 1922). However, Thaumaturgo says in his first report as a federal authority in Cruzeiro do Sul that he arrested some of the "most powerful and feared" patrons charged with violence, arousing "stupefaction" amongst the others (Thaumaturgo de Azevedo, 1905:20; Tastevin 1914:502 ff.). It may well be that Thaumaturgo's "Labour Law" prohibiting the use of violence on the part of patrons against tappers and peddlers (Decree number 15, December 1904; Thaumaturgo de Azevedo 1905:188-194) did not remain only a dead letter during some of the administrations which followed. Thus, writing in 1910, the lawyer Araújo complained that the military administration in charge in 1909 had interrupted the practice of "legitimate coercion". Araújo found it necessary to request the government to force tappers "who desert the estates" to "return to their posts until they settle their accounts" with the argument that the patrons had invested capital in each rubber tapper (Araújo, 1910:103-4), being at the same time "the most disinterested people that I have ever known." 

12. In 1905, the year following Colonel Thaumaturgo de Azevedo's arrival on the upper Jurua, the army lieutenant Luiz Sombra was sent to the upper Tarauaca River (an affluent to the upper Jurua) in order to repress the corrierias against Indians (Gonçalves 1991:20; Sombra 1913).

13. "Does the patron not suffer a setback every time they (the workers), following bad counsels, abandon their shanty and the rubber trails in the middle of the night, in quest of other places where they might escape from the debt they owe? The '44 regime has been substituted by the regime of the law (federal administration). Instead of tracking down fugitives, the patron must track down the authorities. But the authorities tell him that in our country and under the government under which we live, one may not coerce a citizen to work against his will . . . Thus one can explain one of the most serious accusations against His Excellency Dr. Bueno, present prefect of Alto Jurua". Araújo, 1910:104.

14. "The hands represent . . . an appreciable inversion of capital . . . certainly it is a loss, both in the patron's labour and in the patron's capital, the fact of (a rubber tapper) falling ill, escaping or dying" (Andrade 1937:105). " . . . it is the owner who introduces the workers. He makes large advances and takes risks to lose them by the constant escapes, diseases and deaths" (Araújo 1910:103).

Oral tradition records stories of estate overseers who ambushed and killed rubber tappers who had come out ahead in their accounts and left the estate with money, and other brutal practices which are also part of oral tradition include the torture and murder of tappers, particularly on "lower" rivers such as the Gregorio. Owners could prohibit the cultivation of garden plots, forcing rubber tappers to purchase foodstuffs as part of their debt, and did not allow the tappers to burn and plant agricultural plots during the dry season. 

On the other hand, the rubber tappers themselves were capable of reacting against the patrons. As early as 1889, Parissier reported:

in a country where no policy is possible and the law of the mighty rules absolute, the caboclo never goes into the forest, or even steps outside of his house, without his rifle . . . when they aim at the patron, they may encircle the trade post, kill whomever they can and put fire to the shed. This is what happened to Mr. Bonifácio . . . who has escaped but for a miracle, but who lost at a single stroke 300,000 francs, the equivalent of 30 tons rubber (Parissier 1889c:68).

As mentioned above, "Mr. Bonifácio" was an estate owner on the Tejo River and boss at the main trade-post. The evidence from other reports suggests that such violent uprisings continued to occur. In 1908, a report sent to the federal administration by Bueno e Andrada says that in the upper Jurua region "disorder was widespread and many conflicts occurred between patrons and rubber tappers as a consequence of a fall in the price of rubber" (apud Gonçalves, 1991:28). Writing in 1913, when the tappers were again "revolted" with the fall of rubber prices, Father

15. Fishing and hunting were tolerated, because they did not necessarily compete with extraction activities. Guns, ammunition and salt were advanced (Parissier 1898b).
Tastevin related that several violent deaths took place in the forest (Tastevin 1914).16

Balance: Some Conclusions on the Rubber-Boom Phase

The rubber estate system has been portrayed as an example of a periphery engendered by world capitalism, not only transferring surplus value to the centre but also transferring raw material and information, degrading nature in the process (Wolf 1982:326-9; Bunker 1985; cf. Kahn 1980:204). However, it can be argued that extraction activities in the Amazon did not create enclaves as in the case of guano in Peru, nor were they vertically controlled from the centre — but rather by trade companies as Melo & Co. —; and that workers resisted spoliation and monopoly with varying degrees of success (Weinstein, 1983:14-23). The existing evidence for the Upper Juruá, the westernmost frontier of Brazilian expansion led by rubber extraction, confirms this picture.

During the boom years, the rubber estate system required vigilance and coercion for three reasons: to ensure the patrons' commercial monopoly; to impose a monopoly of access to rubber trails; and to guarantee the payment of debts by restricting the free movement of rubber tappers. But in the upper Juruá patrons did not have a full support on the part of federal authorities, who stayed for short periods each and were sent directly from Rio de Janeiro. Estate owners faced the competition of the itinerant peddlers, legal obstacles to establishing property rights over frontier resources, and the difficulty of controlling the movement and activities of workers within the isolated forest, both due to the dispersion of persons over huge areas and due to limitations imposed by federal government. On the other hand, rubber tappers reacted sporadically, not only leaving the estate without settling their accounts, but also with violence. The patron-client relationship was not that of the all-powerful estate owner and the passive rubber tapper (Hecht and Cockburn 1989:165; Almeida 1984, 1988). The conclusion is that the working of an economic world-system is influenced by class relations, political regime and ecology. Regional and temporal differences must also be considered before general conclusions on the working of peripheries.

It is useful at this point to outline a comparison between rubber empires throughout Amazonia during the boom phase. As the previous sections should have suggested, the Hevea brasiliensis rubber estates of the Upper Juruá differed significantly from areas like the Putumayo, in ecological, political and social terms. Ecologically, the Putumayo was a Castillia elastica zone (rather than a Hevea brasiliensis zone); the Hevea brasiliensis of the upstream areas could be sapped permanently producing a sustained flow of income. In the Putumayo zone, labour was recruited from the local indigenous population, which was treated as a natural resource much in the same fashion as the Castillia elastica, while in the upper Juruá zone labour was imported with high costs and required skills to sustain productivity. Furthermore, unlike other areas, the northeastern migrants and the patrons in this region were ethnically homogeneous. Other differences were of a political nature. The Putumayo, practically inaccessible to public administration, lay in a region disputed by Peru and Ecuador, a sort of no-man's-land where the patrons wielded absolute control, a fact that placed it alongside the Belgian Congo as terror zones due to denunciations of atrocities against labourers (Taussig 1987). The upper Juruá was from 1904 within direct reach of the Brazilian federal administration which stifled local uprisings both in western and in eastern Acre during the boom.

Economically, while areas like the Putumayo developed as enclaves of British capitalism, the rubber estates of the Upper Juruá and Purus were financed by merchants who were not directly subjected to British capital (as emphasized by

16. Cases of rubber tapper's insubmission are mentioned in Chapters 2, 3 and 4 for later periods.
Weinstein 1983). Indeed, the main reason behind the "Acre Revolution", when eastern Acre rubber bosses seceded from Bolivia, financed by Belém and Manaus merchants and backed by the governor of Amazonas, was the Bolivian project of turning the area over to American interests, which would assume direct administrative or military control over the area (Stokes 1974; Tocantins 1961). The upshot of the "revolution", however, was the installation of federal and military administration from 1904, against the wishes of the local patron elite, whose leader in eastern Acre, Plácido de Castro, himself a rubber patron, was assassinated during the prolonged conflicts with federal administrators (Prefeitura do Alto Acre, 1907; Costa 1973 [1924]; Assembléia Nacional Constituinte, 1946; passim).

Flight, attacks on trading posts, the consumption of items not reduced to "subsistence", the pervasive presence of river peddlers and the possibility of positive balances all suggest that the system was characterised by a struggle over distribution, and not simply by the automatic pumping of a maximum surplus. The patrons' monopoly was based on the fact that each tapper hypothetically was specialised in rubber extraction and depended on exchange to acquire commodities for extractive activities and for consumption. Under these ideal conditions, a perfect monopoly could establish virtually arbitrary prices, provided that patrons could have complete information and violence could be employed fully and at reasonable costs.

On the other hand, such system would not necessarily increase productivity, which was historically low (less than the current average of 400kgs/year) in the Amazon. A system based at least in part in incentive could more easily exploit the differences in natural productivity or individual ability, given the difficulty of monitor directly workers dispersed at the rate of one per 300 hectares of tropical forest. The locus of violence would thus be the monopoly itself, trade process not the productive process; nor real incomes at the "minimum subsistence" level were required, provided that in the average most of tappers were in debt. These hypotheses suggest that the point was not necessarily maximizing net profits at the local level (as a balance between imports and exports), but obtaining a maximum overall product, thus guaranteeing a continued supply to the local patrons themselves. This suggestion is reinforced by the persistent accounts that local patrons remained themselves in constant debt -- thus under the obligation to sell to the Belém trader only. Patrons faced no great pressure to cut back on expenses or to increase efficiency. Local patrons remained constantly in debt, but debt meant that they had also credit. 17

We might imagine the following model for the boom period. Rising prices and abundant capital financed the exploitation of rubber estates at increasingly greater distances. Since Amazonian producers monopolised the world market and demand continued to rise, prices were pressed upward, because supply was never great enough -- neither the accessible natural areas nor the labour supply proved sufficient. Tappers in the least productive zones would have to be remunerated at least at the subsistence level so that the patrons could enjoy a return on their investments, after deducting expenses. Anything less than that would entice the tapper to abandon the rubber estate, with or without debt. The most productive rubber estates such as the Tejo river would generate extraordinary profits. In order to appropriate these returns, local patrons themselves increased supplies and thus their debts with suppliers in Belém and Manaus.

Instead of increasing the output by investment in the intensification of extractive techniques -- both to increase worker productivity or to subordinate

17. "The aviador patron needs, say in June, 500 million reis. The exporter advances him the sum ... The patron, must turn over rubber ... at a price already established by exclusive buyers. The shipment is not sufficient to pay the debt. The exporter ... forces him to sign another contract with the rubber harvest as collateral ... And this situation is repeated and remains the same form many years, because the relation of the rubber tapper to the patron is roughly the same as the patron to the exporter" (Parliamentary Papers, Defesa da Borracha, 1913 in Carone 1973:157-8).
workers to capitalist control, transforming the labour process\textsuperscript{18}, patrons could use a combination of sheer violence against free trade and incentives to increase the total output. Indeed, the labour process remained in the hands of the rubber tappers themselves throughout the boom period. This meant that the tappers, in controlling the labour process, developed a base for their subsequent permanence in the forest even after the collapse of world wild-rubber prices.

\textsuperscript{18} "A wage labour regime, which might prove a solution to the problem, was not practicable on the rubber estates due to the physical impossibility of controlling workers on those Mesopotamian latifundia" (Rego Barros 1981:199).

\section*{Chapter 2
CRISIS IN THE RUBBER MARKET, 1912-1943

Limits of the Extractive Rubber Economy

Up to 1870, the extractive economy of the Jurua and Purus Valleys remained an external arena with respect to the world market, in the terms defined by Wallerstein (1989:27). Extraction was carried out through seasonal expeditions that maintained barter relations with existing indigenous societies. Around 1870, this region became a periphery, following Wallerstein's concepts: world demand was now reflected immediately through the occupation of new areas and through the increase in workers, with a corresponding increase in the volume of commodities circulating in the region. However, this kind response to world demand did not mean an increase in the productivity of individual workers or of forest areas. The reason for this was the absence of any real subordination of the work process under the control of capitalists.

The intensification of the control over the circulation of rubber could in principle force tappers to work more - although evidence of tapper resistance suggests that exploitation had its limits. Direct supervision over the extractive process was not an effective solution as labourers were spread throughout hundreds of hectares of forest. As already suggested, the role of coercion as employed by the patrons was therefore more that of guaranteeing a commercial monopoly - thus avoiding the competition of other suppliers, increasing profits through monopoly price-fixing - than that of assuring direct control of productive activities. Indeed, though boom-period statistics vary, they suggest productivity rates similar or inferior to present-day ones, with 350 kgs. per year on the Lower Amazon and 700 kgs. per...
year in upland Acre (Chaves, 1913:48), or a 400 kgs. average output and 800 kgs. maximum (Walle 1911:167). Other say that 230 kgs was the average (Santos 1980:235).

Given its low and limited productivity both as measured in terms of rubber output per tapper and in terms of rubber output per area, boom-period expansion developed with the horizontal expansion of extractive activities to all *Hevea brasiliensis* (as well as other similar species) frontiers.

Only significant technical innovations could reverse the natural limitations to the expansion of the total volume of production - determined by the physical boundaries of forest areas with natural *Hevea brasiliensis* - and at the same time subordinate workers and improve their individual efficiency. This revolution, however, did not occur in the Amazon, but in Malaysia, Indonesia, Ceylon and Indochina, primarily through the development of plantations based on indentured labour (Coates, 1987; Dean, 1987; Tocantins, 1961). Beginning in 1912, the rubber extracted from domesticated *Hevea brasiliensis* trees planted under the plantation system in Malaysia -- with seeds previously smuggled from Amazonia -- flooded the world market. Under the plantation system, each cultivated hectare included between 200 and 400 rubber trees, which were tapped by a single worker; in the extractive enterprise, 300 hectares of forest were needed to occupy a tapper with the same number of trees. Individual annual output on the plantations was between one and two tons, while the average output in Amazonia remained at about 400 kgs. per year (though maximum output could surpass a ton). In other words, the domestication process increased the productivity by area three hundred times, while increasing individual output at least two-fold. Consequently, the total volume of production, peaking at 42,000 tons in the Amazon in 1912, reached over 100,000 tons in Asia already by 1915 and, in the decades that followed, levelled off at something over 1,000,000 tons, though occupying an area ten times smaller than the Amazon (Santos 1980:235). Economically speaking, the rubber extracted in Amazonia became superfluous on the world market from one day to the next.

The main consequence if this was the disruption of the commercial structure of the rubber trade, initiated by the insolvency of import-export firms in Belém and Manaus (Weinstein 1983). The principal characteristic of the rubber estates of Amazonia, however, was their resiliency. Between the peak year of the rubber fever (1912) and the worst year of the recession (1932), production in Acre State as a whole fell from 12,000 tons to 3,000 tons, while prices plummeted at a much greater rate, from a maximum of 26,000 reis to a minimum of only 4,000 reis (Table 2.1).

Within the municipal district of Cruzeiro do Sul, output fell from 1,300 tons during the boom to 500 tons already in 1923. But the local estates continued in existence in the upper Juruá, although transformed.

Local population rose from 13,000 to 15,000 between 1913 and 1920. According to Judge Castelo Branco, population loss by out-migration as a response to the crisis was more than made up for by natural growth through births, a new tendency made possible by the development of families. Around 1910, the Tejo River produced 160 tons and employed 600 rubber tappers; in 1920, this figures fell slightly to 120 tons and 500 tappers, working 812 rubber trails (Castelo Branco 1922:615).

Current observations suggest processes that help explain the resiliency of the rubber estates during the crisis between wars. From 1982 to 1991 rubber prices fell from US$1.80 in 1982 to 40 cents in 1992 as paid to tappers. At the Riozinho Estate in the Tejo headwaters where I did field research, the number of families fell from a maximum of 68 to 53 between 1982 and 1991, a decline to 78% of the previous level.

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1. Population statistics for 1913 come from a municipal census, while data for 1920 is from the national census, subject to methodological reservations. See also Castelo Branco (1923:721).
that hardly may be considered mass flight, while the overall Tejo river population did not drop significantly. Now in the Thamaturgo area as a whole only 65 percent of the houses extracted rubber, while 35 percent cultivated riverside plots producing tobacco, sugar and beans, while others sought employment on small cattle ranches near the river. Thus, the main result of the acute fall in prices in the 80s was a transference of many families from the hinterland extractive zones to riverside agricultural activities (Almeida, 1991).

Both in the 1980s' crisis in rubber prices and in that of the period of 1912 to 1943 local response appears to have been the same: the conversion of labour and resources from rubber production to other extractive activities and to agriculture. This provides a central hypothesis to explain the resiliency of rubber estates during the initial crisis.

Weak Rubber Estates

With the fall of rubber prices, patrons loosened their grip on the commercial monopoly. During the involution years, patrons who no longer could operate by advancing merchandise to the tappers chose to lease rubber trails to tappers without monopoly clauses in the contracts. In 1919, several advertisements similar to the following example were published in the Acre press:

Any number of trails in this well-preserved estate for lease, at 25 kgs. of fine rubber for each trail, and the lessees will remain free to buy merchandise for their consumption and sell the rubber they produce to whomever suits them best (Loureiro 1986:100).

Writing in 1922, Judge Castelo Branco reported in reference to Cruzeiro do Sul:

At present this labour system (the aviamento) varies, as some patrons only receive rent from the rubber tapper, without selling him any merchandise, while others lease trails, leaving it up to the labourer to purchase this merchandise or tools necessary for rubber extraction (Castelo Branco 1922:721).

And a decade later the change was confirmed in reference to the middle Juruá river:

...the labour regime has changed. Thus today there are many rubber estates leased to the seringueiros themselves, who pay rent to the owners, varying from 50 to 100 kgs., for every pair of rubber trails: under this hypothesis, tappers enjoy the liberty to buy and sell freely, which they do preferentially with the itinerant merchants (Andrade 1937:106).

The Commercial Association of the Upper Juruá decided in a meeting in 1913, in Cruzeiro do Sul, to stimulate agriculture, create agricultural schools and encourage the cultivation of rubber trees. In addition, the members of the association asserted the rubber tappers' right to purchase goods "wherever they please" in cases of excessive prices charged by patrons or of spoilt merchandise. These late concessions to old tapper demands may also be seen as reactions to the social upheaval that reigned on the rubber estates in the aftermath of the crisis, or as an attempt to retain rubber tappers who threatened to abandon the estates in droves (Prefeitura do Alto Juruá 1912-14). Reports on the bankruptcy of estates emerged side-by-side with accounts of revolted rubber tappers who fled from the estates without settling their debts. The shock felt by the Tejo River rubber tappers

2. In 1913, writing from a rubber estate he visited on the Azul River, a tributary of the Moa, Father Parisier related: "At this time the trading post is ruined, and the personnel, in revolt, has fled or threatens to flee without paying their debts, leaving the owner in a most critical situation" (Parisier 1922). In November of the same year, Father Tastevin reported on "the great misery caused by the bad rubber harvest and the fall of rubber prices on the world market" (Tastevin 1914).
thus was described by Father Tastevin in 1913, who in this year visited his entire course:

The entire country suffered from extreme scarcity. All one had to eat was manioc and beans, and even this threatened to disappear. In some places there was no sugar or coffee... One must remember that this is a rubber region par excellence, where all hands are busy with the extraction of this precious gum. All food and all beverages are imported by river in steamboats belonging to the large trading companies of Manaus and Belém. Therefore, when the steamboats fail to arrive at the expected time for one reason or another, the spectre of dearth immediately appears (Tastevin 1914).

In a report written that same year, a public official of Cruzeiro do Sul described how the Tejo River rubber tappers were reacting to the insolvency of Melo & Co.:

at this time the tappers of Melo and Co., 500 or 600 strong, threaten to abandon collectively the rubber tree trails, only because they have heard that this company, based in the capital of Pará, now faces a most difficult situation (Prefeitura do Alto Juruá 1914-15).

This same account asserted that the “older rubber tappers” not only fled but also attacked the trading posts:

Also the Indians who live on the Breu River, seizing the opportunity of the pitiful state of abandon in which all that area now lies, now descend to the Tejo River committing acts of the worst kind. The set fire to dwellings, ambush and kill rubber tappers and arouse fear in every mind. In great numbers, armed with rifles, and said to be led by former rubber tappers, the Breu River Indians have thus become a dangerous element of unrest in the Tejo River region (Prefeitura do Alto Juruá 1914-15).

In 1918, the empire constructed by Melo & Co., the Pará firm that had bought up the Tejo River on the eve of the crisis between 1910 and 1912, collapsed in bankruptcy. The property was acquired by Nicolau & Co., which in turn went under in 1942. Raimundo Quirino Nobre, a former manager of Nicolau & Co., became sole proprietor. Nicolau & Co. maintained a fleet of twelve steamboats of the gaiola (“birdcages” propelled by a stern paddle) type, but even these gave way to the canoes of itinerant traders and to locally-built craft of ten to twenty tons, which after the 1940s were propelled by three to eighteen horsepower outboard motors. The trails covered by mule trains, which allowed for bi-monthly visits to the rubber tappers’ homes (quinzenas), disappeared. Tappers in the most productive areas of the Tejo headwaters, a place that cannot be reached even by canoe, now had to carry their product along forest trails. During the rainy season, rubber was transported by the tappers themselves to the warehouses, from where tons were floated downriver on rafts to Cruzeiro do Sul. Restauração estate, the main rubber estate on the Tejo River, saw three schools closed in 1923 (Castelo Branco 1923:645). The estate’s church, which prided itself for possessing the region’s largest bell and for holding novena ceremonies, also disappeared. In short, the rubber estates had decapitalised.

Regionalisation of the Economy

How could the population survive now that rubber production had been reduced drastically and prices had plummeted? On estates near the municipal seat of Cruzeiro do Sul, rubber output fell to less than half of what it had been, but agriculture began to flourish, not only to supply tappers and patrons in the forest but also to attend to the urban market for manioc flour, sugar, coffee and other articles.

previously imported. Sugar mills and pastures became part of the Moa River landscape, favoured by its proximity to the town of Cruzeiro do Sul. After the crisis, similar activities developed along the Jurúá, taking advantage of the fertile alluvial soils. The remote Tejo River area now received manioc flour from the Moa and other rubber estates and not, as before, from the Lower Amazon (Tastevin 1914; Castelo Branco 1922:719 ff.). The Nicolau & Co. estates, under Nobre’s management, now traded in hides and timber, besides rubber.

Together, headwater areas of upland forest like the Tejo (with rubber, timber and hides) along with downstream, riverside areas like the Moa River (with agriculture) soon contributed a diversified productive base for exports from the Jurúá area of Acre to the Lower Amazon. “The region...has transformed itself into an agriculturalist, timber producer and exploiter of hides,” wrote one contemporary (Andrade 1937:29).

To be sure, the annual statistics published by Cruzeiro do Sul’s municipal authorities, along with the 1920 census, show the increase of agricultural and ranching products on municipal export lists as a function of falling rubber prices: beans and hides as of 1917; manioc flour and cotton as of 1919; rice, maize, sugar, coffee, dried beef and tobacco as of 1920; bricks, vegetable oil and timber as of 1921; and cane brandy as of 1922. In 1922, 53 tons of manioc flour and 31 tons of muscovado sugar produced on the Upper Jurúá were sold on the Lower Jurúá or in Manaus (Prefeitura do Alto Jurúá 1913, 1914; Brasil 1920; Castelo Branco 1922:709-13). By 1936, the Jurúá River as a whole produced cacao, manioc flour (exported to Manaus and Belém), muscovado sugar, cane brandy, coconuts, rice, copaiba oil, andiroba oil, vegetable ivory (jarina), timber, as well as otter, jaguar, deer and snake skins (Andrade 1936:116-20), and in fact Cruzeiro do Sul exports its high-quality manioc flour to this day. Local tinsmiths and blacksmiths began to supply work implements such as knives and buckets used in rubber extraction; clothes were confectioned locally; river vessels came to be built in the region, inaugurating a solid tradition of master-artisans that survives to date on the Upper Jurúá. To this day, sugar, tobacco, and beans are produced along the Jurúá banks, moving on to the city of Cruzeiro do Sul or to the Jurúá tributaries, from where comes most rubber.

This process explains why the rubber estates remained in existence. They now became estates in which rubber was just another article in a diversified agrarian-extractive economy, based on the domestic forest economy of rubber tappers who now became collectors, hunters, fishermen, manioc farmers and small ranchers as well. With a low population density (about 1 inhabitant per km²), the economy based on abundant game and fish reserves, on fertile swidden agriculture with long fallow periods, and on an arsenal of forest resources created several patterns of permanent occupation of the forest niches, whose fabric resided in groups of two-three houses (colocacções).

Rubber tappers and riverside cultivators did not necessarily witness a decline in their standard of living. If measured in terms of quantity and quality of food consumption, in terms of work routine and in terms of personal liberty, the quality of life for rubber tappers probably improved. At the beginning of the 1920s, Father Tastevin commented that the tappers’ diet had improved substantially with the fall of rubber prices.

4. In 1950, Cruzeiro do Sul was described as the only municipality in Acre with a significant income from agriculture, and its agricultural district Japiim (today Mâncio Lima) was characterised as “a real exception within the panorama of the Acre economy” (Guerra, 1955:114).

5. Interview with Rubem Messias, 5 August 1983.
of rubber prices. Besides manioc and sugar, crops included rice, maize, beans, peanuts, watermelons, squash and potatoes - planted on the river banks during the dry season for quick harvest with little labour input, as one may witness these same items planted and harvested along the banks of the Jurua between June and October. In 1920, Father Tastevin observed:

... for the moment, the fate of agriculture is linked to the price of rubber, meaning that the higher the price of rubber, the more the patron is able to buy goods and obtain wealth through trade; and the less rubber brings to him, greater are his own needs and the need to feed his workers (Tastevin 1920:145).7

One consequence also noted by Tastevin was the constitution of families, now a definite advantage, since

... older boys could tap rubber trees, while the father would fish and the women would occupy themselves with agriculture, washing and sewing (Tastevin 1926).

The situation worsened, of course, in terms of imported goods, but this probably affected more the patrons than the tappers. An employee on a Tejo River rubber estate recalls that during the worst period for rubber prices papaya leaves were used to wash clothes, embauba wax and rubber were used as fuel and the bark from certain trees (envira) was used to roll cigarettes, while match sticks were split into two or four parts as an economic measure.

The high productivity of rubber in Acre attracted a new population, and it was this productivity that permitted the purchase of work tools and necessary articles, such as salt and ammunition, even when rubber prices fell to one-fifth of what they had been during the boom. An economy that had dedicated 180 working days to the production of rubber and the consumption of manufactured goods (clothes, soap, fuel), tools and foodstuffs (pirarucu, flour) was transformed to one in which only 90 days a year were dedicated to rubber extraction and the consumption of outside articles, as it came to produce foodstuffs (meat and flour) and a few manufactured goods. The population density that could exploit rubber in a stable-fashion coincided with that which the forest could support, using near-indigenous subsistence strategies (swidden agriculture with the use of iron tools, hunting with the use of firearms, and general collecting activities).

Conclusions on the Depression Period

The preceding comments confirm Weinstein's assertion that rubber tappers survived the decline in purchasing capacity because they could count on a subsistence sector (Weinstein 1983). To extend this notion to the Upper Jurua, one is led to admit that a subsistence sector developed after the boom, and that it was accommodated within the rubber estates. According to Weinstein, the main effect of the crisis lay in the insolvency of financial concerns in Belém and Manaus. In fact, the Tejo river rubber estates of the Nicolau & Co., received from the bankrupt Melo & Co., were able to survive through the combined strategy of diversification in extractive activities on the estates (pelts, timber and rubber) and of diversification of activities at the Belem head office (industrial production for the regional market). At the same time, the company gave its managers or local bosses autonomy, which paradoxically allowed these to accumulate enough wealth during the crisis years to buy out the estates by 1940, on the eve of the transformations to be described in the following chapter. The tappers themselves became a category more like forest peasants and less like specialized extractors, while the vertically-integrated properties of the boom years turned into estates oriented towards

7. My father's mother, who lived in the Purus valley, remembered the days when her husband, a rubber tapper, received the patron's permission to plant beans and manioc, as that time they began to have fresh manioc flour, instead of the sour flour that had been brought in from downriver.
subsistence production and regional market activities. Surviving local patrons lost political and economic power, while rubber tappers developed families and diversified their economic activities. Wallerstein’s comments are pertinent here:

Since the world market had a lowered demand, it was not rational for the landowners to produce at the same rate, or for some of them to produce at all. We then saw occur what has sometimes been called ‘inversion’. Cultivated areas were left untended. The workers were permitted, nay encouraged, to take up a plot of land and feed themselves off it. Trade with the rest of the world diminished. Handicrafts, which had previously died out, were revived. The commercial estate seemed to be reverting to the status of a self-sufficient manor once again. The encomienda was transformed into the hacienda. The landlord himself moved from the city to the rural area, to partake at least partially in the isolated subsistence economy (Wallerstein 1979:124).

Some local patrons became impoverished landowners whose descendants are rubber tappers or itinerant traders. Others continued to derive some income from the leasing of rubber trails, though moving away from the forest; still others formed small cattle ranches within the rubber estates. These transformations may be illustrated by the personal stories of Tejo River residents. In sum, during the critical years between wars, surviving rubber estates, like those in upriver areas of Acre, remained marginally linked to the world economy, becoming estates with deeds — though mostly without legal validity) over forest areas inhabited by rubber tappers, cultivators, fishermen, hunters, as well as small traders and artisans.

Authors such as Furtado (1959) have assumed that survival conditions in the forest were intrinsically inferior to those of the arid backlands of the northeast and therefore tappers, lured to the forest by the promise of fortune, would remain in extractive activities only as long as chronic debts forced them to stay. However, there are no reports of rubber tappers who starved to death as a result of the rubber crisis, in contrast with the backland Northeast’s droughts. The forest had supported indigenous populations with population densities comparable to those of the rubber extractors for centuries, and indigenous subsistence techniques were easily adapted by tappers with a minimum of imports, basically limited to iron tools and weapons for hunting. In other words, it seems likely that rubber extractors had their own interests in the forest, as they do today. They were likewise able to assert these interests in an arena of conflict with the patrons.

During the boom years, when Acre alone produced from 10 to 15 thousand tons of rubber, at least 17,000 and at most 30,000 (depending on what productivity coefficient is adopted) rubber tappers were in activity; in 1985, there were 25,000. During the crisis years, this section of Brazilian territory that had been occupied exclusively as a function of the rubber trade remained inhabited by rubber tappers who had become forest peasants. As asserted above, these characteristics distinguished the Upper Juruá rubber concerns from the cauchero empires of Fitzcarraud, Arana and Vaca Díaz, and allow for an explanation of the persistence of the estate system during the crisis in the rubber trade. Native populations and natural resources were not simply plundered as in the extractive enclaves. Instead, stable local systems of forest exploitation by permanent migrants emerged, including both patrons and rubber tappers. With the onset of the market crisis, these systems reallocated the respective proportions of export activities and productive activities oriented towards internal consumption. This conferred stability to the economic system, which lasted throughout the period spanning the years between wars, without any assistance from the public sector. This stability was not an effect of the coercive power exercised by patrons, nor did it have to do with the weight of debts on clients. It resulted from the capacity of a migrant population of rubber tappers, originating from semi-arid peasant regions, to adapt to the tropical forest economy. This fact also allowed for the survival of patrons
on their involuted estates. A peasantry developed neither from pre-existing caboclos\(^8\) nor from the patrons' abandon of the estates as in the eastern Acre (Bakx 1987): the fundamental transformation had occurred within the system itself during the crisis, when a new social type emerged in the Amazon, the forest peasant.

8. These new peasants were not caboclos (Parker 1985), or the product of the disintegration of indigenous societies. In Acre, the word "caboclo" applies specifically to Indians; but Acre tappers substituted an indigenous population that had been decimated or forced to retreat after preliminary contact, with the exception of a few small groups recruited as agricultural or extractive labour (the Poyanawa and Huni-kui on the Moa; the Arara, Jaminahua and Cashinaua on the Upper Juruj tributaries and along the Tejo).
The economic policy defended by the patrons was quite simple. They sought measures to protect prices without incurring in transformations of the property and distribution structures. According to Barbara Weinstein:

... most of the proposals and suggestions made by the regional elite were neither realistic nor practical... The Amazonians' stubborn insistence on the efficacy of price supports bordered on folly... A proposed tariff discount on foodstuffs destined for the Amazon, a measure designed to reduce the cost of living, ... was an open invitation to smuggling. And the campaign to defend rubber reached its lowest point when the Paraenses demanded a higher import duty on all manufactured goods containing plantation rubber (Weinstein 1983:229).

This chapter shows how all these measures, without exception, came to be adopted in the post-war period, when Amazonian rubber patrons became a regional political elite comparable to the coronéis of the Brazilian northeast in political clout. The estates received price, capital and incentives, furthermore enjoying an additional feature not present during the boom: sanctions of the federal government backing up the patron-traders' power of coercion over rubber tappers. During four decades (1943–1985), a period which witnessed a rapid and significant advance in Brazil's industrialisation process - particularly in the motor vehicle industry - the activities of the rubber estates pressed the limits of their resiliency: no technical innovations were introduced, the extractive ecology remained intact, and social relations followed the pattern established during the inter-war period, only now the patrons enjoyed broader political power.

The most notable economic characteristic of the post-war period is that rubber became a state monopoly: the nascent Brazilian industrial sector found itself forced to buy rubber from forest estates that were financed by the government. Politically, the State began to sustain the local patronage system so that many characteristics which may appear to have been vestiges of a hypothetical labour coercion inherited from the boom years in fact developed as a result of the new clientelistic relationship forged between the federal government and the patrons. Thus there emerged a sort of "second serfdom" for Amazonian rubber tappers.

The "Battle for Rubber"

Around 1932, the price of rubber reached its nadir. Japan's role in World War II and its subsequent control over Southeast Asia altered this situation dramatically. The Japanese invasion cut off the allied forces' access to the principal cultivated rubber exporters, which were located in the Dutch, British and French colonies. Rubber proved of great strategic significance, since its use was vital for military ground and air craft tyres as well as for other applications, and had been identified as one of the major bottlenecks in the war effort (Martinello 1988:77-78).

Brazil exported rubber to Nazi Germany until 1942, when the Vargas government decided to join the allied forces, a decision which included an agreement to ship all rubber exports to the United States and to increase aggregate production. Government measures had followed the so-called Washington agreements of 1942, involving the American Rubber Development Corporation and the Brazilian Rubber Credit Bank. At that point, prices immediately doubled, rubber exportation became a state monopoly and the Brazilian government took on the task of transporting 50,000 northeastern labourers to headwater areas of the Amazon forest, areas rich in native seringueira rubber trees. Rubber extraction practically achieved the status of a military operation (Martinello 1988:96; Lenharo 1986; Decree 4.841, 17 October 1942).

In October 1943, a presidential decree established a monopoly over the Brazilian rubber trade to be controlled by the Banco de Crédito da Borracha S.A. (Rubber Credit Bank), with American capital owning 40% of its stocks (Martinello
allowing rubber patrons to continue to exploit the forest areas they claimed for six years, independent of valid property deeds (land use could be proved by receipts of commodities supplied to tappers). Rubber prices came to be set by the bank, whose norms established that 60% of the product’s value was to go to the rubber tappers, 33% to the patron and the remaining 7% to the owner of the property, thus distinguishing labourer, trader-businessman and land owner.

The State took on the task of transporting labourers through the "Comissão Administrativa para o Encaminhamento de Trabalhadores para a Amazônia" (CAETA - Administrative Commission for the Introduction of Labourers to the Amazon), also created by presidential decree in September 1943. Workers were transported from the Brazilian Northeast to the Amazonian urban centers, and from there to the rubber-bearing forest areas (Decree 5813, 14 September 1943). CAETA underwrote transportation costs, lodging, medical expenses and food, supplying each tapper with a kit containing clothing, sandals, a hammock, a sack, and eating utensils. Its term of responsibility ceased once the tapper was turned over to a rubber patron. In those days, tappers were called "rubber soldiers", and the exemption of rubber patrons, itinerant peddlers and rubber tappers from service in the armed forces, at this moment when Brazil was recruiting troops to send to the Italian front, underlines the strategic-military dimension of the whole operation.

Patron-tapper relations were regulated by contracts which stipulated a six-day work week in rubber activities, which virtually undermined domestic economic activities such as agriculture, fishing and hunting (Caderneta do Seringueiro, 1943 and 1945). According to the contracts, sale of rubber to anyone but the patron became a criminal offence, whether or not the tapper had any outstanding debts. Another clause prohibited indebted tappers from leaving the rubber estates, though debts (along with tappers’ labour) could be transferred from one patron to another (Caderneta de Seringueiro, 1943 and 1945). These conditions reflected the character of government support of the rubber estates, recreating the commercial monopoly that the patrons had been losing since the end of the boom period.

It is likely that the Cruzeiro do Sul authorities attempted to restrain itinerant merchants by summoning wartime federal legislation, while on the other hand, tappers and independent traders resisted to this. Local authorities now sought official support, arguing that "contraband" was proscribed officially by the laws and decrees passed by the federal government. Thus, in 1946, Colonel Mâncio Lima of Cruzeiro do Sul wrote a letter to the governor of Acre, a military man named Guimard Santos, pleading his support against what he called "an open insurrection" of rubber tappers and itinerant independent traders, presumably against the new measures which legalised the monopoly. Lima argued that local Cruzeiro do Sul authorities already agreed to reduce taxes on "itinerant commerce" and to postpone the register of "rubber brands" that were to identify the origins of each latex ball. Both measures were designed to restrict commerce outside the trade posts, but according to Mâncio Lima, these concessions had little effect because "the real problem lies in the prohibition against purchasing contraband rubber smuggled from the estates." Mâncio Lima blamed especially the itinerant traders, since they "incited disobedience to the laws governing the exploitation of rubber
estates. (Colonel Mâncio Lima to the Governor of Acre, in Guiomard dos Santos 1946).

Protection for the Patrons

The final balance of the “Battle for Rubber” was quite modest, though. From 16,000 tons in 1942, output rose to only 24,600 tons by 1947 (Pinto 1984). This means that the 50,000 who were said to have migrated to Amazonia would have added 8,600 tons or 170 kgs. per tapper, while the average annual individual output stood at 400 kgs. per tapper.

Although the “Battle for Rubber” proved a fiasco in economic terms, its principal result lay in the important victory achieved by local elite of patron-traders. For the first time in the history of Brazil, the regional interests of this elite came to be recognised by the central government. Internally, the aviação supply system associated with a trade monopoly - re-emerged from its stagnation, now backed by credit from the government; externally, rubber prices and market were guaranteed by the same government. By 1946 the war had ended, but until 1950 Amazonian patrons forged a new battle, aiming to preserve the status quo of government protection over the extractive economy. Amazonian patrons triumphed in this dispute. The Brazilian constitution of 1946 determined that three per cent of the federal budget was to go to the Amazon; in 1947, the state monopoly over the commercialisation of all types of rubber was renewed to 1950; rubber imports and prices were to be controlled by the government (Law number 86, 8 September, 1947, in Braga c.1965; cf. Pinto 1984:95-112), and in 1950 the state monopoly was extended indefinitely (Law Number 1.184, 30 August, 1950; in Braga c.1965.)

Now under the organ called Banco de Crédito da Amazônia (Amazonian Credit Bank), whose president was appointed directly by the president of Brazil, rubber prices came to be established by the government. Now that the war was over, the only market for the Amazonian rubber production was the nascent Brazilian tyre industry.

This industry, which enjoyed considerable growth in the 1950s, came to depend increasingly on imported raw materials as well as synthetic products (IBAMA 1988:46), since the total output of the Amazonian rubber estates remained stagnated from then on, always short of the peak of 42,000 tons reached in 1912. Industrial entrepreneurs complained that the Amazonian rubber was inherently unable to cope with the increasing industrial demand, and also that it involved higher costs than those of the plantation areas from where the product could be imported.

While Brazilian natural rubber production levelled off at around 20,000 tons per year during the post-war period, demand rose year after year. Already by 1958, Brazil managed to supply little more than 51% of the 43,000 tons of natural rubber annually consumed by native industries; by 1980 the Brazilian industrial sector consumed nearly 300,000 tons of rubber, seven times more than in 1958, including nearly 210,000 tons of synthetic rubber, 60,000 of natural rubber imported from countries like Indian and Malaysia, and only 30,000 tons produced in Brazil (Ibama 1988; 1985:3-4; 1985b; Pinto 1984). The government supported synthetic rubber production (based on imported petroleum), while establishing a quota system whereby industries could import rubber produced outside the country after

3. Between 1953 and 1979, rubber prices were readjusted according to the inflation or above it. When corrected for the inflation, prices varied from 100% to 230% over the 1953 levels, except for the period 1966-67 (98% and 92%) and the years 1973-1974 (96% and 86%). Pinto 1984:130, Table 14.

4. After the peak of 42/44 thousand tons in 1912 (according to different sources), Brazilian exports went as low as 6 thousand tons in 1932; they rose gradually up to 14 thousand tons in 1943 when the “Battle for Rubber” started; in 1944 the rubber output (from extraction alone) reached the 20/30 thousand tons interval, where it would stagnate until the present. IBGE 1987:309.
demonstrating that they had acquired Brazilian rubber, paying a higher price for both than the market price (Law 5.459, 21 June, 1968, Art.22,1). SUDHEVEA (Superintendência da Borracha) collected the difference between the price paid by industries and external prices.\(^5\)

Clearly this system created a direct conflict between industrial capitalist (automobile and rubber products manufacturers) interests, on the one hand, and the petty-trade capitalist interests of the Amazonian rubber traders, on the other. The interests of the latter prevailed within Brazilian power circles, which may be explained by the nature of the electoral system. Acre Territory became a state in 1961, and in cooperation with the other Amazonian states (Amazonas, Rondônia, Mato Grosso and Pará), Acre could influence the direction of important political decisions.\(^6\) The Amazon region's political representation in the National Congress, which increased in the post-war years with the transformation of Acre, Rondônia, Amapá and Roraima into states could lead the Brazilian State to maintain a consistent policy in defense of rubber prices and markets during the period spanning 1945-1985, managing to act as a cohesive political force against the interests of southern tyre manufacturers, who were only a small fraction of economic interests centred in São Paulo. This afforded the Amazonian patrons, though a hindrance to accumulation on a national scale and totally insignificant on a world scale, a power to cut into the profits of powerful multinational tyre corporations such as Goodyear.

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5. The tax charged on imported rubber was calculated as the difference between the internal price and the international market price f.o.b. (at Santos port). From 1980 to 1985 international prices oscillated from US$0.74 to US$1.03; prices paid to tappers ranged from US$1.29 to US$1.83, and prices paid by industry to rubber-mills ranged from US$2.6 to US$4.0. IBAMA 1988:25; Superintendência da Borracha 1985:1.

6. In 1988, president José Sarney needed Congress's approval to extend his presidential term from four to five years. An Acre Senator, based in Cruzeiro do Sul, did not make a secret of a bargain in which ten of the eleven Acre votes supported the President, in exchange for governmental support to the Acre-Pacific road and credits for other projects. Bezerra 1988; Acre 1988; Peetean 1986;

At the same time, though, this political advantage bolstered regional employment and income - an argument frequently used by the patrons, and not totally unfounded.

The Second Battle for Rubber

These conditions led the federal government to launch an ambitious project aiming to modernise the rubber production: the Programa de Incentivo à Produção de Borracha Vegetal (PROBOR - Natural Rubber Production Incentives Programme), which was formalised by decree in 1972. This program was implanted jointly by the Ministry of Industry and Commerce and the Superintendência da Borracha (SUDHEVEA), the latter organ presided by a man from Acre (SUPERINTENDENCIA DA BORRACHA, 1972). Offering generous government funds and technical support, SUDHEVEA hoped to stimulate rubber producers to develop seringueira rubber plantations in Amazonia, overcoming the obstacles that had defeated Ford in his attempt to develop similar plantations earlier in the century. However, a basic flaw in the policy lay in the fact that it was based on the Amazonian patron-trader class. No patron had ever invested his own resources in rubber tree cultivation, neither during the boom years nor in the period of decline that followed, and much less during the post-war years. Rubber tappers, who now operated their holdings through a combination of extraction, agriculture and collecting, were largely ignored (except in the final phase of the programme, in a few projects implanting small rubber-processing units). The programme did not invest in small-scale, domestically-run production, in contrast to the policies adopted in Malaysia, where in 1973 over 60% of the total output came from small properties (Norgaard 1980:791) and where state agencies played an important role in the cultivation of rubber and palm trees at the family level (Robertson 1984:264; Hill
1982: 141ff; Bahrin, n.d.). This neglect of the rubber tappers may have been the major flaw of the SUDHEVEA plans.

In addition to the incentives to Amazonian rubber traders, PROBOR also directly stimulated two economic systems that competed with each other: the plantations and the "native" rubber reserves. Thus, PROBOR's first sub-programme (the first in a series of three projects) aimed at "the recovery of the native rubber trees", seeking to boost production by 10,000 tons (a 50% increase) simply through the utilisation of idle capacity. In practice this meant financing owners or lessees of rubber estates so that they could acquire tools and "hunting instruments" - in other words, the reinforcement of the old aviamento supply system. More significantly, in the case of rubber traders who leased and did not possess legal title to the estates, PROBOR accepted the obligation of "rubber harvests to be achieved during the operation" as collateral for the loans (SUPERINTENDENCIA DA BORRACHA 1972:11). Thus, a lease contract for a rubber estate was sufficient to guarantee special SUDHEVEA loans, which were proportional to the number of rubber trails on the estate and, consequently, proportional to the number of rubber tappers who might be employed. The rubber tappers' production thus constituted the ultimate guarantee for loans contracted by the patron-traders. Not unlike the wartime legislation mentioned above, the government once again provided a legal foundation for the patrons' monopoly over rubber production, since the patrons could now claim that the rubber tapper's production belonged to the bank, as a "collateral" for the loan.

This second "battle for rubber" was as much a fiasco as the first. Amazonian rubber production was expected to triple within a decade, from around 20,000 tons in 1973 to over 60,000 tons in 1981. Instead, production grew to only 30,000 tons by 1981, reaching a peak of 40,000 tons in 1985. It should be noted that the increase in production between 1979 and 1988 owed less to Amazonian output than to the development of rubber plantations in southern Brazil, where investments stimulated by government prices led producers to substitute orange and coffee plantations with rubber. Thus, around 1988, Amazonian production stood at around 22,000 tons, the same as fifteen years earlier, which demonstrates that the increase in production was based on the greater use of planted rubber trees in the South, while Amazonia used the same labouring population and on the same extractive techniques that had been used during the war. In 1986, the political manipulation of funds distributed by PROBOR was exposed by the press nation-wide, and following an official investigation, the projects were suspended in the midst of a scandal.

The Failure of Rubber Tree Domestication

One might argue that the rubber patron-traders who employed PROBOR funds to speculative ends or to invest in land acted rationally, not unlike the tappers who refused to become cheap wage-labourers on plantations financed by the programme. Just as the tappers' labour had a high opportunity cost - since they could dedicate their time to the forest subsistence and commercial economy - the capital offered to the patrons had a similar cost because it could be invested profitably in several activities, from the traditional rubber operations to the

7. São Paulo newspapers' agricultural supplements often informed their readers of the advantages of rubber cultivation under the government-supported prices. There was however the risk of a future loss of government protection (while rubber-trees took a minimum of 7 years to start producing) Guia Rural Abril (vol1), April 1987:101-105; Folha de São Paulo 8/9/87; Jornal do Brasil 10/10/87; O Globo 24/08/1987; Folha de São Paulo 19/01/1988; O Estado de São Paulo 29/05/91; Actualidades Agropecuarias n.48, Nov. 1979; Tentências, Abril de 1980.

8. "Plano da Borracha fracassa, conclui auditoria do Ministério da Indústria". Folha de São Paulo 30/03/1986 A summary of findings from an official report: "Insufficient stocks in a deteriorated state, production smaller than expected ... liberation of funds based on political criteria, decisions bolstered by unrealistic projections and an accumulated debt of 1.7 million cruzados" (1.7 million dollars at the time).
financial market to cattle-raising on the floodplains -- rather than in the risky, long-term plan of rubber-tree domestication.

These ideas can be illustrated through the vicissitudes of the PROBOR projects in Cruzeiro do Sul, on the Upper Jurua. Legal title or a lease contract to a rubber estate qualified a patron (seringalista in the post-war official jargon) to request PROBOR funds. At that point, the patron received the benefits of long-term loans (with ten-year payment plans and interest rates lower than inflation). Local offices provided technical support and determined what procedures were to be employed (clones, chemical pest controls and processing plants). But one obvious alternative was the employment of loans to develop a cattle ranch under the cover of a rubber plantation.

In one typical case which I personally followed, PROBOR funds were used to clear a forest area and transform it into pasture, thus investing in cattle and labour. A small nursery was kept alongside the river to show to PROBOR inspectors in case of surprise visits. PROBOR funds also were used to pay for the land title to heirs of the original owners, following a suit pressed by a lawyer in Manaus seeking to revalidate an old deed from the pre-1904 period. The whole area, now with a consolidated legal title and with an established cattle ranch, was then resold and the profits invested in a commercial establishment in Cruzeiro do Sul and in further land acquisitions.

Although cases like the above were the rule, at least three businessmen in the municipal district of Cruzeiro do Sul utilised programme funds to cultivate rubber trees seriously, and all three projects failed, underscoring the social and ecological barriers to the idea of transforming the labour process through the domestication of rubber trees and the creation of wage-labour plantations.

The first case was the Carlota estate, run by Lobão, member of one of the pioneer families of the region. Lobão set up a plantation based entirely on wage labour and on a combination of rubber, coffee, guarana and cacao cultivation. The plantation was less than a day's journey by boat from Cruzeiro do Sul. Lobão established a small residential nucleus, complete with zinc-covered houses with sanitation facilities, electricity, running water, a chapel and a store, as well as stairs and walkways connecting the riverport to the houses. The bishop contributed with medicine and clothing. By 1983, Lobão had created nurseries for rubber trees, coffee and guarana, and had cleared some 100 hectares for pastures and another 250 for rubber tree cultivation, having planted 60,000 coffee bushes (he expected to plant 50,000 more), and 3,000 guarana plants.

On the occasion of my first visit in 1982, the labour force was made up of twenty workers who were equipped with chainsaws and who had a full time routine beginning at 4 AM six days a week, controlled by radio and earning a minimum wage. This staff remained much smaller than that which Lobão needed, in spite of the advantages supposedly afforded by this "Recanto do Amor" (Corner of Love), as advertised on the radio. The main reason for this is that rubber tappers calculated that they could earn two or three times the daily wage offered by Lobão (in nominal values) by extracting wild rubber from the forest. Thus, on the plantation men were paid 500 Cruzairos per day (women were paid 300) while a kilogram of rubber was worth 360 Cruzairos - the smallest amount produced by a tapper in the least productive area, the floodplain, stood at 3 kgs. per day.

A tapper who resided near the river could dedicate his or his families' time to raising beans, tobacco, watermelon, manioc, maize and other agricultural products, which could either be consumed or sold to river traders. On the other hand, the "Corner of Love" prohibited its workers from cultivating manioc or any other food crop. Debt did not exist in the "Corner of Love", but workers did not have access to credit either, which meant they had to work continuously to meet their subsistence needs. The only free time available to fish on the nearby lake was at night or on
Sundays. Lobão frequently complained about the riverside peoples' attitudes. Instead of working for a wage, they preferred to "live on the riverbank, planting for subsistence on the beach and making manioc garden plots on the mainland."

The main reason for building the residential nucleus near a lake, far from the riverbank, was precisely to break these attitudes. The land agency, INCRA, when completing the formal definition of Lobão's property deeds, took special care in locating the 100 hectares of each tapper-squatter well away from the river, in the depths of Lobão's estate. The idea was that these families, once removed from the riverbank, would become a permanent source of wage labour for the enterprise. But the riverside people never moved into the bush, giving up their new land titles in order to maintain access to the abundance of the river banks, preferring to pay "rights" for the use of rubber trails than property taxes to the land agency and preferring debts to wages.

Lobão counted on the arrival of immigrants from southern Brazil to provide the labour he was unable to extract from the forest economy. Conveniently, INCRA was in the process of recruiting migrants for Cruzeiro do Sul, from where they were taken by plane and settled on a dirt road near the limits of Lobão's estate. A first shipment of families arrived in Cruzeiro do Sul in 1982, lured by promises of free homesteads complete with schools and medical assistance. When they were left at the newly-opened dirt road at the beginning of rains, the men stayed on in order to keep their claims, while their families were forced to beg in Cruzeiro do Sul for food and shelter.

Lobão made a final attempt to solve the labour question by recruiting Campa (Ashaninka) Indians from the Amonia River, offering medicine and clothing (actually donated by the Church) as well as salaries greater than those offered to Brazilians. In 1983, when I visited the "Recanto do Amor" for the second time, the Campa were installed in a large barracks, but they did not stay on long. Lobão had confused the Campa practice of extended journeys in search of commodities with what he thought to be a permanent decision to abandon their traditional way of life for the comforts of regular labour. By 1987, PROBOR had been discontinued. There was no more money to invest. The project had been abandoned.

The "Corner of Love" project may be used as yet another example of the "woes of managers of tropical plantations having to deal with workers averse to the discipline of wage labour" (Schwartz, 1961). The permanent wage-labour economy competed with the domestic economy for the scarce labour of the region. In contrast, the rubber extraction for a patron combined with the agricultural, hunting and fishing activities carried out within a single family unit of production. A similar argument was adopted by Kenelly to explain the failure of Fordlândia (Kenelly 1989).

However, the other two cases of attempts to implant rubber plantation seem to confirm Warren Dean's hypothesis contending that Amazonian plantations were thwarted not by social barriers but by ecological ones. Both of these projects managed to solve the labour dilemma by abandoning the idea of permanent wage labour recruitment. Instead, they developed plantations alongside traditional extractive estates (where, as we have seen, rubber tappers operated domestic economies and performed transactions through advances and payments in kind). In both cases, the labour force was made up of rubber tappers also employed in the forest economy, whose labour was thus of a temporary character. Instead of competing for labour with traditional estates, then, the patron-entrepreneurs of Pucalpa and Treze de Maio plantations offered a supplementary money income source to rubber tappers. I visited one of these projects, run by the Messias family, in 1983 and again in 1987. The plantations failed, due mainly to plant disease. The healthiest trees were of feeble stature and low yield. But the entrepreneur did not consider the plantation's failure inevitable; instead, he blamed it on the technical
advice imposed by the government agency, which demanded homogeneity in all projects (any short-cycle or permanent crop was prohibited and the cultivation of rubber trees had to be on completely cleared grounds), imported clones (native rubber trees were to be uprooted) and chemical control of pests. Homogeneous stands fell easy victims to plagues, chemical agents themselves caused the death of thousands of trees (applied according to technical advice), and native trees which survived inspection and were not uprooted proved much healthier and greater in diameter than the imported clones. According to the local entrepreneur, if he had enjoyed the freedom to experiment with local species and to combine several crops, the project would have been a success. This speculative opinion is supported by the success of small stands of native rubber trees grown alongside local vegetation, which I had the chance to observe on the banks of the Jurua and Madeira Rivers.9

Local Control of Public Funds

Besides the generous SUDHEVEA funds, local patrons from Cruzeiro do Sul also had access to Banco do Brasil credit for commerce with rubber tappers. During the early years of the 1970s, this easy credit revived the extravagance of the golden age of the rubber boom in Cruzeiro do Sul, only different because the money invested in cattle, money markets, and superfluous luxuries came from the Brazilian government. In 1972, a federal intervention in the Banco do Brasil reduced this euphoria somewhat, and many property deeds (though legally dubious) passed on to the bank. One of the consequences was the possibility of traders who became prosperous during this period to become "rubber estate owners". Many heirs of traditional families, or descendants of the early settlers, became impoverished or lost their properties altogether. On the other hand, long-time managers and other estate employees, along with a few cultivators and itinerant traders, managed to accumulate capital and use the state machine to become land owners and to diversify their economic activities, investing not only in traditional rubber estates but also in cattle raising, the lumber business and in urban commerce.

Observed in greater detail, the stories of success and upward mobility also show how the benefits of this period were appropriated by a small number of emergent families. Three generations of patrons distributed in three principal families succeeded in exploiting all the most advantageous business prospects available in the region: rubber estates, sawmills, ceramics works, urban commerce and cattle ranching. These three "houses", mixed by intermarriage and which I will call M, S and C, are also the principal actors in the recent history of the Tejo River, which they leased one after another from São Paulo purchasers during the 1980s - subject of the chapter that follows. Thus, seven marriages in the M family within a single generation of new patrons united urban merchants, federal bank employees, municipal administrators and military men within a family block.10 If one considers the M, S, and C families as an extended unit, one could travel for days along the Jurua without ever leaving its territory, and in the same fashion their stores occupied entire blocks in Cruzeiro do Sul. The group succeeded in capturing public funds and channeling them to a new generation of sons and daughters. In contrast with the old elite, which sent its sons off to school in Rio de Janeiro, the sons of these new patrons were educated in the tasks of management on the banks of the Tejo River in 1986 was part of my role as an advisor to the National Council of Rubber Tappers. In the Ribeira Valley, São Paulo, which has a rain cycle similar to the Amazon, early plantation projects (in the 60s) also were affected by the leaf blight, and I witnessed in the 80s that abandoned nurseries and rubber tree stands flourished after becoming "bush". These stands were rediscovered only in the 80s and exploited by the Japanese families of the region.

9. The trip to Madeira River in 1986 was part of my role as an advisor to the National Council of Rubber Tappers. In the Ribeira Valley, São Paulo, which has a rain cycle similar to the Amazon, early plantation projects (in the 60s) also were affected by the leaf blight, and I witnessed in the 80s that abandoned nurseries and rubber tree stands flourished after becoming "bush". These stands were rediscovered only in the 80s and exploited by the Japanese families of the region.

10. Four M's (from the same sibling group) married C's (three belonging to a sibling group). These alliances included patrons, urban merchants, and Banco do Brasil employees. Another three M's (from the same sibling group) married members of the S family (a bank employee, a municipal employee and a rubber patron).
rivers. At the same time, this group effectively managed to block out competition, particularly from the declining elite of older proprietors. For example, one M leased an estate from a Nobre heir, managing the estate with money from the Banco do Brasil. After six years of profitable activities, Nobre reclaimed the estate and installed his own son, who recently had returned from Rio de Janeiro, as manager, but he was unable to obtain a loan from the Banco do Brasil and as a result the enterprise soon failed.

Social Barriers to Modernization

Why did the modernization policy of the 1970s and 80s fail on the rubber estates? First of all, government policy in the 1970s basically was misguided for having been addressed to the wrong group. A policy seeking to start a technical revolution consisting in replacing extraction with cultivation of rubber trees was directed by priority to an elite of patron-traders. But these patrons chose to employ funds on the supply of rubber tappers under the extractive economy (having profits guaranteed by government prices), or in land purchases, instead of risking them on an enterprise that would take ten years to come to fruition. On the other hand, those patrons who intended to “modernize” their estates faced the lack of interest on the part of rubber tappers who for their part had the option of maintaining their subsistence-oriented forest economy. Since the property structure was not reformed, rubber tappers continued to be denied the status of productive agents, and tappers, who in fact managed extractive activities and agricultural production, were thus ignored in the plans.

PROBOR’s failure attested to the existence of ecological barriers, as proposed by Warren Dean (1987). This, however, applied to the development of homogeneous plantations with imported clones and chemical control of the leaf blight, since no evidence exists that same barriers blocked the domestication of native *seringueira* rubber trees on family scale and as part of mixed crop. A system based on small holdings and less capital-intensive, however would depend on granting to rubber tappers formal rights to the forest. In other words, peasant agro-forest systems based on public investments would imply an agrarian reform on the rubber estates, but this was unacceptable to patrons. If these assumptions are correct, then there was a social and political barrier to the domestication of rubber trees in Amazonia, not only an ecological one. This social and political barrier was the power of the patrons over land and public funds.

Thus, Dean’s hypothesis arguing that enterprises such as Fordlândia failed not for socio-political but for ecological reasons needs to be complemented. It assumes a combination of wage-labour and large-scale plantations, but it does not consider seriously the possibility that households could domesticate the forest with an appropriate technology, and still be economically viable. Between the natural density of around one tapped tree by hectare and the 400 trees per hectare in intensive plantations, a middle term of semi-domesticated forests could well prove feasible, both ecologically and economically.

Between 1912 and 1943, attempts to introduce rubber production based on domesticated plants and wage-labour, with direct investment by industrial capitalists (Fordlândia and Belterra) failed not only as a consequence of worker resistance to disciplined wage labour (Kenelly 1989) but also because extensive homogeneous plantations proved ecologically unfeasible (Dean 1987). The failure of these projects in the period that followed also bares these same factors, only now undermining a government policy directed towards the wrong social group employing the wrong agro-forest technology.
Property Titles

During the 1970s, the rise in land prices engendered by the government policy of colonising the Amazon laid bare the fact that patron-traders in Acre did not possess valid deeds to the estates they treated as their own properties. Until 1976, public lands could be acquired either through the legalisation of occupation (in the case of squatters with up to 100 hectares), or through "regularised property titles" of areas up to 3,000 hectares (2,000 in border districts), or still through public proceedings (for agro-pastoral projects), but none of these conditions applied to the patrons who "owned" areas ranging from 40,000 to 400,000 hectares in the Juruá Valley. This situation changed with a law passed in 1976, allowing for "regularised titles" over large areas (Magalhães 1977), at the same time that the government of Acre began to adopt an aggressive policy attracting investors from southern Brazil. This was when the Tejo River region, covering 6,000 km² (about 20% of the total municipal area of 31,312 km²), a small part of Nicolau & Co.'s holdings devolved to Quirino Nobre, was transferred to Consulmar enterprises, based in São Paulo. This deed was confirmed in 1982 by the land agency during a "land regularisation project", when it was announced initially that rubber tappers also would have right to their own lots, which later was ignored. As a result of such procedures, within one decade the Acre state which legally was made up of vast areas of public lands, came to display one of the highest concentrations of property in the country (Duarte 1987:60). Patrons claimed rights to occupation to whole estates on the basis of "animus domini" (Magalhães 1977).

11. In 1988, this argument was upheld by INCRA's coordinator in Rio Branco, Acre.

Conclusions

The analysis above should be contrasted with the interpretation proposed by Bakx in an article published in 1991. Bakx asserts that the State's action in the early eighties "eroded the power base of the traditional landowning class", opening a vacuum for the appearance of autonomous rubber tappers, who opposed "violent struggle as they attempted to halt the advance of the ranching front which had been facilitated by that very [State] intervention" (Bakx 1991:50). Then, Bakx examines the "State measures which have sought to defuse violent confrontation in the Acrean countryside and so stem the rural-urban exodus that it engendered", focusing the "colonisation schemes and producer cooperatives", exemplified by INCRA and PROBOR projects respectively (Bakx 1991:49). Since our own analysis stressed that the State supported the patrons both on land and on financial issues, as exemplified by the PROBOR projects and by INCRA action, Bakx's argument calls for some commentary. 12

We deal first with the land issue. As stated above, until the early seventies, the patrons had no valid title to land. In Eastern Acre, as Bakx points out, there were titles issued by the Province of Amazonas (until 1898), by the Independent State of Acre (1898-1904); by Bolivia and Peru (prior to 1903). Bakx's affirmation that "Land titles not descended from or based upon titles issued by the above were deemed invalid" (Bakx 1991:55) implies that land titles descended from or based upon titles issued by the above authorities were "deemed valid". What is true is that none of these (never validated by the Brazilian Republic, and covering only a fraction of the area occupied by the estates, usually 10% in upper Juruá) were valid, but were used to claim valid titles (Magalhães 1977, Silva 1982). Thanks to special.

12. Bakx focuses on the "differential response of the residual rural population to State intervention" (1991:49). In 1980, the "economically active population" of 91,588 included 46,886 'rural workers' (51%) and 23,203 rubber tappers (25%). Is this a "residual" figure?
ad hoc legal measures adopted during 1975-1976 and to Incra "regularisation" programs of the early eighties, the patrons were able to sell their claims (not yet validated legally) to southern investors at a period of soaring land prices. This is described by Incra (and apparently accepted by Bakx) as "the regularisation of the situation of those large property owners with legitimate title so as to facilitate their access to credit and federal incentives" (my emphasis). As for the squatter's rights (these did have a legal basis to claim up to one hundred hectares only), simple arithmetic shows that in a "traditional" estate with an average of 400 hectares per family, "regularising" 100 hectares per family and "regularising" the remainder for the "traditional" landowner (on the basis of a new, ad hoc legislation designed for Acre only) was indeed a scheme for wholesale appropriation of the public domain by patrons (in the Jurua, the tapper's share remained a dead letter). Thus, as a consequence of measures taken by the Acre government between 1975-6, while in 1972 the total titles on record at the land agency (including ranches, agricultural areas and rubber estates) added up to 5 million hectares (a third of Acre's land surface), this figure jumped to over 11 million hectares in 1976, and to over 15 million hectares in 1982, more than the State's physical surface (Silva 1982:32-33). One can hardly say that the conflicts between rubber tappers and southern investors did take place on the wake of the demolition of the "traditional" landowners "by the State" (cf. Bakx 1991:52,55 passim). That "many state owners abandoned their estates and left the resident tapper population to survive as best it could, cultivating subsistence crops and selling rubber to itinerant river traders", is a sign that state owners in Eastern Acre were able to convert land into money, leaving to newcomers the task of actually evicting the squatters. In Western Acre, where land was purchased only for speculation, the sellers did not bother to leave.

Now we may deal with the issue of financial support. The case of PROBOR III investment in rubber-processing units for rubber tappers' cooperatives in an area of land conflict and friction (Brasileia, Eastern Acre) should not suggest that there was any policy intended to create a significant category of rubber-producing smallholders in the Amazon. During PROBOR's final year, SUDHEVEA collected 26.3 million dollars in taxes on imported natural rubber (Allegretti, May and Rueda 1990:3); from which 226 thousand dollars were earmarked to pay PROBOR I projects (dating from 1972-1977), 11 million dollars went to PROBOR II projects (dating from 1978-1981), and 10 million dollars were dedicated to PROBOR III projects. How great was the tappers' share? In Western Acre they received nothing at all. In 1988, 50.4% of payments by PROBOR for existing contracts went to landowners and planters, while 3% went to "community assistance" and to the "settlement of colonists and protection of Indian communities" (Allegretti, May and Rueda 1990:9). This hardly can be called a "blow to traditional landowners."

Rubber patron-traders succeeded in institutionalising their monopoly over commodity distribution and labour beginning in 1943, also managing to appropriate public funds on a large scale in the 1970s. Between 1975 and 1982, they used the state machine to take control and then sell land titles, when the focus of the Amazonian economy began to shift away from extractive activities to stock raising, agriculture and lumber exploitation. The "traditional" system of the rubber estates and the "debt slavery" associated with this system continued in existence in Western Acre, stimulated by a final flurry, both utilising federal funds in the so-called development plans between 1975 and 1985, and obtaining money from the sale of land titles.

13. In Malaysia, the main rubber producer in the world (1.6 million tons by 1980), the total planted area is 1.7 million hectares. From this, 1.1 million ha belong to smallholders (less than 40 hectares per holder), producing 950 kgs rubber each (Barlow 1978, apud Norgaard 1980:791; COT-CAT 1981:31, section 6.5; Hill 1982:159-147ff). In Thailand (half a million tons of rubber, 1.7 million hectares), 95% of the output comes from 600,000 smallholding families (COT-CAT 1981). The small-holding sector in Malaysia was strongly subsidized by governmental projects (Bahrin and Perera n.d.; Robertson 1984:260-69, 276-280).
Chapter 4

PEASANTS AND PATRONS ON THE TEJO RIVER (1980-1990)

Introduction

This chapter treats the relations between tappers and patrons in Tejo river and in the sub-district of Thaumaturgo during the 80s. The focus is on problems of hegemony in the forest extractive economy. The notion of hegemony involves a process by which one group exercises domination through a combination of "consensus" and "coercion" (Gramsci 1975: 1519, 1638 etc.). This Gramscian idea leads to a concept of violence-biased regimes or "labour repressive" systems (Barrington Moore Jr. 1966: 434, 470). The cases described below furnish examples of a "labour-repressive" system, which includes the ingredients of violence, contested legitimacy, corruption and cooptation.

In treating tappers as peasants and in considering patron-tapper relations within a framework of hegemonic struggle, one arrives at the logical conclusion that the patrons failed to dominate the tappers through direct repression alone - or slavery. Purely repressive measures do not significantly increase labour productivity in an extractive economy; nor do they attract workers to a labour-scarce area. Instead, the combination of policies of terror and violence (bolstered here by judges, police authorities and priests) and policies of material incentives, cooptation and corruption made a lot of sense.

The Tejo River, 1980-1985

The rubber estates where field research was carried out have their main headquarters near the mouth of the Tejo River, two hours by canoe from the settlement of Thaumaturgo. We may begin with a description of some events in the Minas Gerais rubber estate near Thaumaturgo during my first visit, in September
1982. Residents were apprehensive about the presence of a group of policemen in the service of the patron-trader Carneiro. The controversy had begun when Carneiro seized some rubber from a tapper's canoe, threatening him with a shotgun. Carneiro justified his position as a reaction to the "invasion" of the Minas Gerais estate by itinerant peddlers (regatões), a complaint which Carneiro took to Cruzeiro do Sul, the municipal seat, where he sought support from his own boss (patrão) Magalhães. Through his prestige and political influence, Magalhães was able to recruit a police force to accompany Carneiro on an expedition to the Minas Gerais estate.\(^1\) The police then paid the tappers a visit, confiscating their rubber whether or not they had debts with the trader. When the tappers sought to file a complaint in Thaumaturgo about that which they considered a grave injustice, they heard the following explanation from the local police authority: since the Minas Gerais estate operated on a Banco do Brasil loan, all the rubber thus belonged to the bank and could not be sold to peddlers. The confiscation was necessary to avoid further 'smuggling' of rubber by these itinerant merchants.

Local residents, both those involved in the episode and those who were not, did not agree. For them, "the tapper who is not in debt, who has paid for trail rights and other accounts, is owner of the rubber." The tappers did not protest against debt payments as such, but rather asserted the principle that a person free of debts and with the rent (renda)\(^2\) settled is free to buy and sell as he is free to come and go as he wishes. But the right to buy and sell freely meant the possibility of choosing better terms of trade and of maintaining debts that could be kept at manageable levels by the tappers, and the repressive wave set off by Carneiro meant that many tappers were exercising this very right, which allowed them to remain "free of debt" with the patron-trader. If Magalhães wished to acquire rubber under fair conditions, through his relationship as supplier to Carneiro, he would have to compete with the itinerant peddlers. Instead, Magalhães chose to use government-subsidised violence to impose an undisguised monopoly. It is important to stress that, for patron and police authority alike, coercion found its justification not in tappers' debts to the patron, but in the idea of a state monopoly over rubber, which was extended to patrons who received state funds.\(^3\)

Even the principle that indebted tappers could not "sell rubber outside" was disputed. When the patron failed to provide for basic needs tappers felt justified in "selling his rubber outside" - that is, to itinerant merchants, local peddlers and even neighbouring patrons. For instance, in 1982 one indebted tapper in the upper Tejo bought some medicine from a river trader, paying for it in rubber. While the local patron Furtado (at the São Francisco Estate) saw this as sufficient grounds to evict the tapper, the accepted view among the local population was that the circumstances justified the tapper's transgression: first, he had an urgent need of medication for his son, and the patron did not have the necessary medicine in stock; second, the patron refused to act as guarantor in the tapper's transaction with the trader who sold the needed medication. Thus according to the rubber tappers, a welfare prerogative came before monopoly considerations. Tappers also saw the violence itself as illegitimate. A head of house valued moral values of personal dignity and independence.\(^4\) For these heads of houses, the

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2. Renda will be translated either as "trail rights" or as "rent" (for a more detailed discussion, see Chap.5).

3. The tapper's view of rules is consistent with the pre-war period situation. The patron's interpretation had a post-war tone, assuming a state monopoly over rubber trade.

4. In 1982, the case of the rubber tapper who killed a patron who decided to attempt to expel the tapper personally from his own house was still fresh in people's memories.
humiliating invasion of their homes or canoes and the confiscation of their personal possessions by the police was unacceptable. To be arrested and beaten by the police was even worse. Both were seen as moral insult.

The notion of rights payments or rent was part of the "common sense", but its rules also were the source of conflicting interpretations. For the tappers, the payment of rent was illegitimate when the tapper was responsible for the opening and maintenance of the trail. One well-documented case occurred along the Cruzeiro do Vale stream, parallel to the Tejo River.

In 1982, Corrêa & Irmãos company bought up the property titles, which later were legalised by INCRRA (the federal land agency). Though the titles covered an area of 14,000 hectares, the company sought to gain control over an area of 114,000 hectares, within which lived Damião, Darzinho and his other brothers. Corrêa wished to collect rent from Damião and his brothers, but Damião did not agree. I haven't paid rights since I arrived, since I've been there seven years (from 1984 to 1991 on the same tapping site), and never paid rights. Even when I came down from upriver there was no payment here since three or four years before (rights had not been paid for this spot since 1981). I was the one who reopened the trails, which were in the bush, since no one knew where the outlets to the road were" (Account of Damião Gonçalves da Silva).

Indeed, the patron's ownership was dubious. The Corrêa company took Damião and his brothers to court only in 1989 for lack of rent payment ("trail rights") between 1982 and 1989, but the real reason was that Darzinho and his brothers had established a cooperative. A judicial decision against Darzinho, one of Damião's brothers, decreed his eviction of the tapper from "rubber trails", but not from homes and crops. Darzinho obstinately refused to leave the estate: the forest where he and his brothers lived had abundant game, rubber, livestock and agricultural produce.6

Strong Patrons on the Tejo River

Since at least 1895, the Tejo river was owned by several patrons; on the eve of the crisis of 1912, most of the area with Manaus titles was bought up by the powerful Melo & Co., which, bankrupt in 1918, sold out to Nicolau & Co.; in 1942, during the wartime phase of rubber production, Nicolau went under and sold out to his local manager, Raimundo Quirino Nobre; and Nobre sold property titles to Evlário Maia in 1967, who passed them on to Consulmar Industrial Enterprises between 1974 and 1976 (via its subsidiary company Santana Empreendimentos Agropastoris S.A.).

When Consulmar enterprises bought up the rubber estates on the Tejo (including Restauração), the former patron Geraldo stayed on as local patron-lessee. With his demise in 1980 the change of ownership had a local impact. One

5. The biography of Damião illustrates several points made in chapters I-III. In 1913, Damião's father arrived from Ceará on the Cruzeiro do Vale estate, opening a tapping area at age 13, and remaining their until his demise at 65. After the crisis of 1913, the family began to plant manioc, and according to Damião "...the original estate did not have this captivity that it now has. (...) At first you could sell rubber whenever you pleased, mainly to the local peddler; the estate owner was a sort of small trader ... he [the patron] went as far as to split matches to help the people; from a little kilo of salt he would give a spoonful to one, a spoonful to another...". After 1943, prices improved - "the merchandise was favourable". "Nobody took out [i.e. sold to outsiders] a single kilo of rubber", but on the other hand rubber tappers often received "a small bonus" at the end of each year, taking advantage of rising prices. In the late seventies and early eighties, "the patron did not allow the tapper to sell the product outside, since it was financed; if he sold a kilo out, he was put out, and then they created submission to not sell rubber outside ... Then they started getting ambitious." (Damião da Silva, 1991).

6. Corrêa & Irmãos vs. Manoel Gonçalves da Silva (Case Number 6.735/89, Fórum de Cruzeiro do Sul). "Where I live is a good place to settle. There's a lake, good for fishing. During the summer (dry season) nobody worries much about food. Summertime there is fish, there is game, all kinds of game. With the onset of the cooperative in 1989, the rubber area became a "mine". (...) They're getting on us because my business is good" (Damião da Silva, recorded in 1991).
new manager hired by Consulmar remained indifferent to the rubber trade, preferring to build a runway on the Peruvian border for suspect activities. The Tejo River abruptly became "a river without a patron".

That the Tejo became a "river without a patron", to adopt the terms used by the tappers, meant that there no longer existed a strong patron. The smaller patrons who lived at the trade-posts did not possess enough power or prestige either to secure bank loans or to mobilise repression - this power, as stated in the previous chapter, was monopolized by a cartel of Cruzeiro do Sul families, and the minor patrons of the Restauração area needed a strong patron above them in order to face the itinerant traders and the tappers.

The Corrêa company came up from a humble background and it is said that the "old Corrêa man" gathered his wealth by selling granino or muscavado sugar. The old Corrêa succeeded in accumulating capital and lands in the 1970s, and was the first to take advantage of PROBOR funds. Sebastião Corrêa, one of the sons of the old Corrêa, entered the Tejo River in 1981 during the "patronless" period to sell goods. Enthused by the high output of the rubber tappers, Corrêa obtained a lease contract with Consulmar enterprises of São Paulo and in 1982 introduced himself as a new strong patron of the Restauração estate.

Corrêa's first problem was the competition from itinerant river traders who dispersed the product. Through a Banco do Brasil loan, Corrêa bought a great shipment of merchandise to the Tejo in June, in what appeared to be the beginning of a new age of large-volume supply - supposedly making the presence of itinerant traders superfluous, attracting new tappers and stimulating greater output. Always maintaining a calm demeanour, Corrêa seemed willing to negotiate with the rubber tappers whom he described as a brutish folk, who should never be provoked. His first measure was to propose to the itinerant merchants the purchase of all tapper debts. Corrêa's offer meant the elimination of delays in collection - the trader needed only to go to the head office in Cruzeiro do Sul to receive payment.

At the same time, Corrêa promised the tappers that he would supply the estate to the extent of making trade with the itinerant merchants unnecessary. However, as 1982 drew to a close, with the settling of accounts in January-February of 1983, the tappers began to realise that Corrêa was a wolf in sheep's clothing. In the annual balance sheets for 1982-83, Corrêa charged the tappers 60% interest over the debts bought from the itinerant merchants, in a year when annual inflation stood around 30%. For their part, the itinerant traders noticed that their "orders of payment" could not be discounted in cash without waiting for weeks, and since they owed their own creditors in Cruzeiro do Sul on short term, the delay in payments meant they would have to pay considerable interest. Thus Corrêa, although appearing to negotiate with tappers and itinerant traders alike, in effect severely punished both for dealing rubber "outside the trade post". When a few peddlers returned to the Tejo to resume trade with the tappers, Corrêa met them with law suits. On a brief visit to the post while awaiting the rains, I witnessed and photographed an incident where Corrêa recruited a small police force to scare a tapper accused of "selling liquidated rubber outside" - the classic accusation of a crime against the patrons' monopoly, the most serious offense to the customary rules of the rubber estate. Patrons like Corrêa, who used tame methods, also were capable of using wild methods as well. A inherent problem in the extractive economy based on trade arrangements with autonomous forest peasants was the

7. "When I was a boy, each of us had only two sets of clothes. My father didn't owe anything to anybody... In my day there wasn't any radio on the Tejo. There was only one engine. When the 'black mule' came about, by God, that was something amazing. Nowadays, who doesn't own a watch? Watches and record players. Nowadays everything is good."(Noe, a middle Tejo rubber tapper and marreteiro).

"The Tejo River was too disorderly. Many people no longer worked. They bought on credit from the patron and then went to the hinterland and kept on buying from the river trader. By the end of the year, they had nothing to pay the patron with."(Timoteo, an upper Tejo rubber tapper and marreteiro).
great range in individual productivity. Some tappers had an annual output of less than 400 kgs and remained usually indebted; the average output was around 600 kgs. In the Riozinho igarapé, almost half of the global output of around 42 tons came from 14 households (of a total of 66) producing over one ton of rubber.

On the lower side of productivity, the patron tried to evict the "lazy" tappers, to be replaced by more productive ones. The basic problem, then, was not to immobilise tappers but, on the contrary, to expel unproductive or rebellious ones and to attract others. He could simply cut off supplies to tappers with small outputs.

It was said that Corrêa planned to expel all tappers who produced less than 300 kgs a year. Besides that, Corrêa would say: "I have confidence in these tappers only when they are five or six (in a single settlement), like the Nonatos. Those who work alone extract little latex, they have other work, these are not tappers, they are a waste of time." Widows and couples with many small children, who needed to produce food on their garden plots, were included in the "hit-the-road" category.

However, these tappers resisted the patron's pressure. When Soledade, a single woman head-of-house with several children living in the Riozinho Estate, wished to make a purchase at the Restauração trade post in 1983, the manager told her: "Soledade, your debt is too great. You owe 48,000 Cruzeiros." Soledade replied, "that's not right." The manager: "I am right, Soledade." She said: "My debt is 32,000 Cruzeiros. You are stealing." The manager then said: "Corrêa's orders are to sell only to those who have rubber." To which Soledade retorted: "I have some rubber. The merchandise is yours but the rubber is mine. And I'll give it up as suits me best. But I will pay my bill only at the end of the year." The manager stood firm: "Soledade, clients in debt cannot sell their rubber outside." From then on, she did not return to the trade post, and began to buy from a Tarauacá river trader, through a clandestine trail that cut through the back reaches of the estate - beyond the reach of the estate's supervision.

On the upper side of the range of productivity, the real issue was that these tappers could strike positive balances in their accounts with a cumulative effect. One method to deal with those cases was to push high-value merchandise to these tappers, in order to offset their credit. The largest producers received from the trade post Japanese watches (Orient and Seiko were the preferred brands), six-band radios, gasoline engines (9 HP Briggs-and-Stratton, the "black mules", made in Philadelphia and used to power canoes; or 3 HP Montgomery, preferred to operate manioc flour mills). The incentives policy assumed the capacity of identifying individual productivity. The patron could identify a group of men at a distance and comment: "Look, those are the Cunhas. They're all one-ton tappers!" Another method was to offer larger stocks to be re-sold at a minor trade-post, and also the job of collecting debts from the other tappers for a per cent payment. As a consequence, the tapper with a surplus was transformed into a petty patron indebted towards the patron above him.

Corrêa's lease consisted of a contract of three years, from 1982. Already in 1983, the abundant merchandise began to disappear, and even the manager had to buy powdered milk from an itinerant merchant to feed his child. Corrêa now refused to make cash advances even to the most productive tappers who needed to go to town to treat illnesses in the family. As such, Corrêa began to show that he was not really a patron, but only a peddler, or a marreteiro.

Early complaints already surfaced at the end of the first year (1982-83) when the tappers realised that the customary practice of annual advances at fixed prices

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8. Nascimento had a positive balance of 300 Cruzeiros, and obtained an advance of 800 Cruzeiros which he invested in the years supplies. Within two years, he possessed a wooden house in Cruzeiro do Sul with a refrigerator, gas stove and sewing machine.

9. Today 11HP and 16 HP diesel engines are preferred to power canoes and boats.
was abolished. Under the new system the rubber turned over at the end of the year commanded three different prices. Should the client refuse this system, the alternative was to turn over rubber at current prices but to pay interest on the value of the merchandise advanced. The rubber tappers were outraged:

"Now with Corrêa here, it's difficult to take out any savings. In the old days, merchandise was sold at a price that did not change all year, and rubber was bought at the price it had at the end of the year. Now prices go up with rubber prices. In the end, the system of three prices and the interest system come out the same."

Several itinerant traders returned and managed to stay, notwithstanding the legal actions against them. Most itinerant traders who stayed on were sons, sons-in-law or relatives of the resident rubber tappers. How could one prohibit a son from visiting his father - even if he brought merchandise that may draw the interest of neighbors willing to buy and pay in rubber? There were other reasons for protest: Gedeão, book-keeper of the central post, himself once a rubber tapper, was famous for his accounting errors, and I spent long hours in each household that I visited that year, checking account by account at the request of the tappers.

During the dry season of 1983, between August and October, goods became scarce, but they were not replaced with the advent of the rains: now the patron awaited the rubber harvest to cover his own expenses, which would start only with the next rain period by December. Finally, in the third year, from June 1984 to 1985, Corrêa abandoned altogether his incentives policy. Debts contracted by tappers still outstanding would have to be settled by force. But instead of undertaking this task personally, Corrêa transferred his lease to the estate to another important family of patrons, the Cameli's.

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**The Union Arrives on the Scene**

Beginning in 1985, government rubber policy changed significantly. The PROBOR projects were interrupted amidst a public scandal. Rubber prices began to fall in real terms. Galloping inflation made long-term advances unthinkable, at the same time when the Banco do Brasil raised interest rates on their loans to rubber traders. At the same time, union organisation backed up the tappers' resistance to the trade post monopoly and contested land claims.

This was the context for the transition from cooptation to violence in the interior of the Tejo River area, as the Restauração estate's lease was transferred from Corrêa & Irmãos to Cameli & Filhos in 1985. Already in 1986, Cameli recruited a police unit to accompany the overseer "Banha" (Lard) on a debt-collecting expedition. The outfit interrogated children in an attempt to discover rubber hidden in the forest. When the tappers did not come forward with amounts of rubber great enough to satisfy Banha's demands, the police would take sewing machines, diesel and gasoline engines, and even milch cows. This is a sample account made by a rubber tapper:

"There I was, working to make my living. I made a thousand kilos of rubber to pay up my account. When the other patron came, with this Manuel Banha, they went into the estate, taking the police with them, and went as far as my house. I wasn't there, my wife was. They already showed up with the police there, ordering me to present myself that same day, though it was already night, but I had to be there to settle accounts. Or else he'd take away the cow, the only thing I owned. I'm father of six children, it was the only thing I owned, this cow, to give milk. I went there, and the police made me turn over the cow. They went and got the cow, and still made me go back half hour by water. There I ran away to Vila Thaumaturgo. I got there and they kept my cow. They got it inside my house. That's why I became so disgusted. Because
I was so ashamed! I drank so much jacuba [flour and water] to make so much rubber, but it wasn't enough - so they kept my cow.\textsuperscript{10}

Another indebted tapper was forced to carry a sixty-kilogram load of rubber on his back to the Riozinho stream, cutting through over five kilometres of difficult forest terrain. This man was a highly productive rubber tapper, and now he was treated as if he was a thief. Revolt soon began to spread. Chico Ginu, the local union delegate, at the time was returning from a training stint in Cruzeiro do Sul, to find the headwaters of the Tejo - along the Riozinho, Manteiga, Camaleão, Boa Hora and Machadinho - stirred up by indignation. This was Ginu's community, where he could count on the support of his friends and relatives, along with other union members. Almost a hundred rubber tappers assembled and agreed to act, while at least fifteen had the courage to accompany Ginu to the estate's headquarters, where Ginu gave an inflamed speech demanding the immediate evacuation of the police. The police retreated immediately, for they did not wish to risk an open conflict with the tappers (each armed with a hunting gun) on their own grounds, in exchange for a meager supplement to their regular salary. Following this incident, even those tappers who had looked down on the union began to admit that it served some purpose. In 1987, when I returned to the Tejo area after a three-year absence, Chico Ginu's name was known even on the Lower Tejo, and the event had been registered in song and in verse. Though many tappers never recovered their possessions confiscated by the police, they had achieved an important moral victory and, moreover, the union had recovered its own self-respect.

- The role of the union was the more significant because by 1986 it was largely discredited in Tejo headwater estates as a result of Correa's shrewd tactics in the previous years. In 1978, a rural labour union had been organised in Cruzeiro do Sul, under the auspices of the National Confederation of Agricultural Workers (CONTAG). By 1980, tappers from the Upper Tejo (Riozinho and Manteiga igarapes) were crossing the forest to the Tarauacá headwaters in order to attend union meetings, following the same trail used to acquire goods and sell rubber clandestinely.\textsuperscript{11} In December 1980, João Claudino, a tapper coming from Tarauacá, inaugurated a local chapter of the union on the Upper Tejo. Within a short span of time, Claudino scored an important victory, after leading a group of tappers to the Restauração trade post and demanding a 30% reduction on all debts as well as the cancellation of debt and rent payments of a tapper who had been arrested and punished by the Thaumaturgo police during the previous year at the behest of Armando Geraldo. Claudino also counselled the tappers to refuse trail rent payments. Claudino confronted patrons on their own grounds. In one case, he lent money to a debt-free rubber tapper who needed to travel urgently.\textsuperscript{12} In another case, the union succeeded in collecting 260 kgs. of rubber from twelve tappers on short notice, in order to pay transport costs for medical treatment. Furthermore, the union acted as arbitrator in conflicts between tappers over the invasion of garden plots by livestock, or over the right to rubber tree trails.\textsuperscript{13}

The union began to demonstrate that the rubber tappers could act collectively, provided adequate leadership and coordination. More important, one

\textsuperscript{11} In 1980, Raimundo Lino (from the rural union of Tarauacá) advised suggested that Upper Tejo rubber tappers open a trail to the Tarauacá River. In 1983, this clandestine route still was in use.

\textsuperscript{12} Geraldo's widow refused to cash a money order sent by a manager, and Claudino cashed it. When the manager collected the corresponding rubber, João Claudino assembled a dozen tappers and headed for the trade post of Restauração. Claudino asked the group: "If this happened to you, and they came into your home to take your rubber, would you have the courage to go onto the boat to get your rubber back?" As the story goes, the answer came in unison: "I would and I do!" Then Claudino said: "Then let's go!"

\textsuperscript{13} I witnessed some such arbitrations in 1982 and in 1983 in the Riozinho Estate.
of Claudino’s plans, if successful, would deal a serious blow to the estate monopoly. Union members were to contribute ten kgs. of rubber apiece to buy a boat with a cargo capacity of three to four tons, powered by a Montgomery engine, at a total cost of 800 kgs. On the Riozinho and Manteiga alone, where there were 110 rubber tapper households, the contribution of 80 households would suffice to make the transportation of “debt-free” rubber to Cruzeiro do Sul and the return of merchandise purchased with cash, thus reducing the price of goods to at least one-half.14

But coordination and leadership had its costs. Claudino needed a full-time staff and had to cater for large meetings.15 Claudino built a large, paxiuba wood lodge, and planted a prodigious manioc plot that was to provide food as well as a source of income. These were investments that most tappers would refuse to cover through increased union dues. The patron Corrêa, instead of contesting Claudino’s authority, extended him whatever credit he wished. Claudino’s debt increased rapidly, for he hoped to offset his expenses with the expected returns of the union boat’s trade and of manioc flour production.

In 1981, Claudino had recommended that no one pay rent on rubber trails, but in 1982 the union president Saraiva asserted from Cruzeiro do Sul that these rents or “trail rights” were to be paid up. The patron then proposed that Claudino himself collect these rents - receiving a percentage of the rubber collected. Thus, in the final months of 1982, as the period of rent collection drew near, Claudino signed an agreement by which he was to collect the rubber trail rents for 1982, receiving 15% of the expected return of 15 tons of rubber.16 This step proved fatal for Claudino’s authority. In the tappers’ view, Claudino had been bought by the patron. He was “weak”.

Besides, trade post employees received instructions from Corrêa to advise the tappers not to pay Claudino “if they didn’t feel like it”. Neither Claudino nor Roberto collected a single kilo of rent rubber. Claudino had not only unpayable debts but also an unfulfilled contract with the patron. In the upshot, in January 1983, Claudino consented in leaving Restauração in exchange for the cancellation of both his debts and his contract - also gaining the post of manager on a Corrêa estate on the Jurú Mirim, and a promise of a Banco do Brasil loan.

These incidents demonstrate how rubber tappers were able to articulate resistance by coordinating individual acts through a union-supported leader. On the other hand, though, they also show that independent actions at the local level were limited by lack of material and symbolic resources. The tappers’ movement against the monopoly policy was expressed as a confrontation of individuals: tapper leadership had to be as strong as the patron, able to muster its own client following, to extend credit, to substitute the patron and face him in the arena of legitimacy. Under these conditions, any tapper movement without external support comparable to the support offered by the state to strong patrons was doomed to fail.

Although defeated in one battle, the union had scored a point in a larger war. More than simply an alternative local authority (and also an intermediary to the hospital, the land agency, the pension institute, and other institutions), it provided a vehicle through which the dissatisfaction of the tappers could be formally articulated, along two important notions. First, debt disputes between tappers and

14. This followed the example set by the most productive rubber tappers such as João Nascimento, Chico Farias, his brother Chagas Farias, old Ginu man, Chico Roberto, and João Nascimento. Old Ginu’s son, Chico Ginu, became a union leader along with Chico Roberto, under Claudino.

15. Chico Roberto, a tapper recruited to assist Claudino, received 10% of all union dues plus the promise of 500 kgs. of rubber per year, to compensate his losses while away from the rubber trees.

16. The Restauração rubber estate had around 224 households (an average of two rubber trails each). Since each house was to pay 66 kgs. of rubber for trail rights, the total expected as rent was 14.8 tons. The amount promised, 15%, thus represented around 2.2 tons. Of this total, 500 kgs. would be paid to Chico Roberto.
patrons no longer were to be considered criminal issues but rather labour questions. Thus they were not to be settled by the police but rather by labour courts and unions. Second, the notion that tappers possessed rights over the land they worked, which in their case implied rights over forest resources, meant that they could not be expelled from the area they occupied. Thus, the issue of trail rents should be treated as a land question and not as a criminal case. This was a prelude to the legitimacy crisis that followed.

The Tejo River 1985-1990: Crisis of Hegemony

In 1987, the Cameli group planned to move from rubber to timber extraction on the Tejo River. They owned sawmills in Cruzeiro do Sul and heavy equipment already used in other areas near the Tejo (including the Campa, or Ashaninka, Indian territory). When a survey team made an inventory of hardwood species, seeking to confirm the area's reputation for mahogany, and also selected areas for headquarters and other functions, some tappers realised that these plans were to involve drastic disruptions in their usual way of life.

At this time, in the mid-1980s, when patrons prepared themselves to abandon the rubber trade and begin the predatory extraction of timber, the rubber tappers began to establish relations with social movements in other parts of Acre and of Amazonia. In 1985, the Conselho Nacional dos Seringueiros (National Council of Rubber Tappers) was founded.

The Council proposed the establishment of Extractive Reserves as a solution to guarantee their permanence in the forest. In 1986, the Council began to organise municipal chapters, and that year a meeting was held in Cruzeiro do Sul with forty participants. Between July and August of 1987, Ginu and Roberto took advantage of the presence of the anthropologist to gather further support to their union and to spread the Council's news. Ginu, now the main union's delegate at Restauração, insisted on two issues: the new patrons' neglect of rubber trails and their plans of large-scale lumber extraction, with its destructive effects on the peasant economy of the tappers. The new patrons had no interest in investing in the conservation of the rubber trees. They did not employ mateiros (forest keepers) and they urged young and recently arrived tappers to employ predatory techniques, which could foster high productivity during a year or two, but which killed the trees after a short while.

In Ginu's words, repeating a metaphor frequently summoned by tappers, this was as much as killing one's mother, whose milk provided their life support.

In January 1988, Chico Mendes and other National Rubber Tappers' Council members invited Antonio Macedo to direct the Council's activities in Cruzeiro do Sul. Macedo, son of a tapper, had been a rubber tapper, tractor mechanic, boat pilot, cultivator and, finally, Indian scout for FUNAI (a post that did not require formal training), where he gained notoriety for his work in founding indigenous cooperatives in Acre, particularly in the upper Jurua valley where he had been born at the headwaters of the Tarauacá river. Macedo began his Council activities by organising a meeting in the interior of the Tejo area and in July 1988 he developed a project to create an Extractive Reserve on the Tejo.17

In October of that year Macedo organised in Cruzeiro do Sul the First Conference of Jurua Valley Forest Peoples, which included the participation of around 700 rubber tappers, as well as women and children, coming eighty-five rubber estates of four municipal districts in the states of Acre and Amazonas.18 The central themes discussed were rent payments and patrons' violence. At the end of the conference, sixteen delegates were elected to represent the tapper population on

18. The 700 participants of the 1988 conference arrived in 80 different boats at their own expense, attracted by radio messages (I acted as a secretary for the meeting).
the Council. The union had worked for many years with agricultural labourers in areas surrounding Cruzeiro do Sul and intervened to mediate agreements with patrons on the rubber estates - but by then, under the presidency of a cousin the Tejo's patron, it had become a conciliatory instrument manipulated by the patrons. Thanks to the external support represented by the Council, now grass roots union delegates in the forest such as Chico Ginu had a direct channel through which to voice their demands of not paying rubber trail rents and of denying the commercial monopoly.

During the October conference the rubber tappers, in fact, openly criticised rent payments and the monopoly patrons' violence, in a spontaneous burst of protest, in the course of a meeting that had planned to discuss less burning issues, such as the proposal to create extractive reserves as well as educational, health and cooperative projects. Skipping several stages in their struggle, the tappers aimed directly at the consequences each project implied - the elimination of the patrons from their forests. Following the conference, tappers in some areas effectively ceased paying "rights on rubber trails", while others established their own informal associations for autonomous rubber trade (O'Dwyer 1989).

A project inspired by Macedo for the Tejo River sought the creation of a commercial cooperative, nothing less than the abolition of the commercial monopoly within the Tejo area and - not to mention the suspension of "rights" payments. The project was approved by the National Development Bank (BNDES) in Rio de Janeiro in December 1988 - still under the impact of Chico Mendes' murder, which had occurred earlier that month; international politics reached the Upper Juruá and altered the local correlation of forces from without. Already in January 1989 the first working meeting took place in Vila Thaumaturgo, involving "community managers" chosen throughout the Tejo area to manage financial funds, construct new storage posts and operate the boats. At the same time, the meeting determined operating rules, fees to be collected, credit mechanisms and the nature of the commodities to be purchased; the terms of the contract with the bank also were discussed, integrated and applied to the association's bylaws, which were to serve to orient the community managers.19

During the second half of the 1980s, state economic policy shifted from rubber to other activities, notably stock raising and timber extraction. In 1988, the state government of Acre was preoccupied mainly with obtaining funds from multilateral banks to complete road projects connecting Acre to the rest of the country and to the Pacific Ocean, while at the same time negotiating with prospective lumber importers. Seeking to show an ecological concern capable of placating the protests of environmentalist lobbies against World Bank loans to pave roads, the state Secretary of Planning in Acre State backed up the National Council of Rubber Tappers' request to the National Development Bank (BNDES). At the same time, it began to announce since January 1988 that the state's development policy no longer emphasised cattle raising and now was to be oriented by agro-forest strategies, including the Extractive Reserves proposed by rubber tappers.

In January 1988, the state government inaugurated an "extractive reserve" covering 30,000 hectares in São Luís Remanso, an area that had not made up part of the plans of the tappers' organisation and where the federal government had intended to implant an agrarian colonisation project. Thus, the suspension of the World Bank loan to pave the BR 364 highway, which had resulted from Chico Mendes' exposé made during a trip to the United States and reinforced by environmentalist lobbies, had hopes of a reversal. This explains how the BNDES, a federal bank for development projects, came to approve in the end of 1988 the Tapper's Council project with the support of the Acre State's government.

19. The planning of activities (bylaws, maps, family rolls, budget, profit margins, etc.) is reported in Almeida 1989.
When the Tejo-based extractive reserve started with the tapper's managed cooperative in 1989, however, the situation changed and the State government turned soon against the project. In the upper Jurua, the tappers' claim over an area covering 500,000 hectares directly affected the major local economic and political bosses, the Cameli and Correa. Through Macedo's actions, the National Council of Rubber Tappers dealt a blow to the patrons' hegemony at the very heart of one of the "traditional" areas. To be sure, in 1988 the Cameli family held a lease over the Tejo area, which they sublet to the Messias family, while developing their plans of extracting high-value timber.

A cooperative with sufficient financial clout to cover the entire Tejo Basin, which included at least 400 families, represented a blow that the patrons' had never felt before. By April 1989, around fifty tons of merchandise were stocked on three boats in Cruzeiro do Sul, the first of them called "Chico Mendes". In order to forestall the cooperative's operations, the Camelis who leased the estate from Consulmar, their subletters Messias and other lesser patrons joined forces and filed a lawsuit. The litigation sought specifically to prohibit Antonio Macedo, representative of the tappers' Council, and Chico Ginu, union delegate on the Tejo, from entering the area with the boats loaded with merchandise. As a reaction, Macedo drafted community managers Dolor, Damasio, Rubenir, Pedrinho, Gomes, Leonardo and Damiao - all Tejo rubber tappers - to take their canoes and appear in Cruzeiro do Sul on the eve of the court hearing, set for April 25. While Tejo rubber tappers thus were mobilised in Cruzeiro do Sul, in an unprecedented show of force before the court, the patrons counted on the presence of experienced lawyers from a Rio Branco law firm, who also represented the Uniao Democratica Ruralista (UDR), the powerful national association of large land owners.

The lawsuits filed by patrons constitute rare written examples of how labour relations on the rubber estates were perceived by patrons. "Proof" in this case rested on the fact that the Banco do Brasil had extended a loan to Messias (who sublet from Cameli, who in turn was Consulmar's lessee) to "finance the natural rubber harvest", which was to be done through the "exploitation of the rubber estate." The loan was to be used to purchase "utensils and tools" as well as "consumer goods for the sustenance of the rubber tappers." As collateral for the loan, Messias placed "all the natural rubber extracted from the estate", which meant the rubber that was to be extracted the following year. The lawsuit claimed that the cooperative would impede the patrons from honouring their debts to the bank. The patrons' lawyers argued that the presence of Macedo and Ginu on the estate was "violation of property", based on the idea that bank obligations created monopoly rights:

"It is necessary to emphasise that the first plaintiff will not be able to meet his obligations with the Banco do Brasil if the invasion should take place, which will bring about disastrous consequences." 20

Worse yet:

"It is true that the crisis brought about by the activists has generated a great deal of uneasiness and dissatisfaction, especially among banking/financial institutions, which already are refusing to fund future harvests and, consequently, considering the fact that extraction is the mainstay of the local economy, one can easily imagine disorder taking over the region." 21

Patrons invoked not law, but tradition. Citing directly from the patrons' lawsuit:

"In the municipal district of Cruzeiro do Sul as well as throughout the Jurua-Valley the payment of rights by rubber tappers to estate owners has been consecrated by tradition and through the practice and custom of over one hundred years."


21. Ibid.
hundred years, with the occupation of tapping sites and rubber tree trails, from where latex is extracted... The estate owners, proprietors and exploiters of the natural resources of their rubber estate-properties in Amazonia, ordinarily are those who outfit the rubber tappers with merchandise, they are their suppliers, financial backers, transporters, fighting to Brazil's boundaries, extending and raising the nations sovereignty to the most remote corners, in many cases where the devil himself refuses to go to seek his souls. And in that distant, inhospitable and inaccessible place, agreements between patrons and rubber tappers are always honoured. The payment of trail rights is universally accepted throughout the Jurua Valley, and that is a public and well-known fact.22

While lawyers argued for the legitimacy of patron traditions, the rubber tappers now found allies of their own at the national level, who sought to defend human rights. Beginning in March 1989, the Attorney General undertook an investigation of the Tejo River rubber tappers' situation. Aided by federal attorneys and a lawyer from a non-governmental organisation, the tappers faced the patrons' lawyers and managed to block the lawsuit against them, forcing the judge to abstain from any decision. Community managers took a canoe convoy up the Tejo River, carrying merchandise on such a scale as to humiliate the patrons. From this date on, the Tejo River monopoly ceased to exist, and the tappers suspended trail rent payments definitively.

At the same time, the federal government under President José Sarney, through the powerful Secretary of Environmental Issues Fernando César Mesquita, seized the opportunity to demonstrate its own humanitarian and ecologically-minded policy towards the Amazon. In the international context of the 1980s, the "environmental" dimension of the tappers' proposals afforded a precious political trump for the federal government, but the Upper Jurua Extractive Reserve Project conflicted with the Camelí's interests, which made up an essential part of the political support upon which the Acre state government rested. World politics began to affect the local scene, pitting Acre state government, now in retreat in the Jurua case, against the federal government - creating space for the activities of local organisations such as that of the rubber tappers. In January 1990, a presidential decree transformed the entire area into the first extractive reserve to be defined by federal law, and in January 1992 the area formally was expropriated. The Tejo River case was a precursor to similar movements on neighbouring rivers. The effects spread to several other estates, where five new tapper associations were formed and where rents also ceased to be paid.23 Tappers in other zones near the Tejo river also contested prices and the repression of free trade, and asserted that rent payments for rubber trails should not be paid by old-time residents who had opened their own trails. Now, all these issues were to be formulated under a general argument: that tappers had rights to the forest they occupied and to free trade, as well as access to public institutions as citizens.24

Conclusion

The notion of debt-slavery, as applied generically to Amazonian rubber tappers, already has been criticised by others (Taussig 1987:60-66; Weinstein 1983:23-24). What remains to be explained, then, is the meaning and function of the

22. Ibid.

23. Ibid. In 1991, Judge Heitor Macedo reopened old cases and ordered the expulsion of tappers from other areas, such as the Cruziero do Vale river.

24. The trail rights and monopoly issues generated a polemical debate in the Rio Branco (Acre state capital) press. Cf. "Gazeta" and "O Rio Branco", September-October 1988. The polemics broke out when the Camelí family paid a reporter from "O Rio Branco" to publish an article with accusations against Macedo, myself and other persons, to which I wrote a page-length answer, published in the "Gazeta".
patrons' undeniable violence and its association with debt. I will argue that violence is employed in order to guarantee a monopoly situation. The domestic economy of the tappers utilizes nature and commodities. These resources are monopolized by the patron-traders supported by customary rules and police power, and this appropriation becomes materialized through the payment of rents (for "rubber trails") and monopoly profits (through advances of commodities).

In this chapter I described tappers' movement in the 1980s as a transition from a situation of contested hegemony to a situation of crisis in the hegemony. In the first situation, tappers accepted that patrons were owners and that they were entitled a degree of monopoly over indebted tappers, but they still found unacceptable the abusive commercial gains derived from trade monopoly and the use of violence to back up such abuses, as well as the illegal physical expulsion of settled tappers which derived from land monopoly. In the second situation, the exploited group, bolstered by the intellectual and material support of outside allies, begins to formulate alternative principles of legitimacy and means of opposing themselves to violence (Cf. Lenin, 1975 (1902), cap.II, a.).

In the first situation, rubber tappers are based on what Gramsci called "common sense" - which justified a permanent, undeclared war on the patrons' monopoly over commerce and land, assuming the forms of smuggling, hearsay, individual resistance and strikes, or the "weapons of the weak" in Scott's terms, while the patrons employed violence and individual corruption as weapons of the powerful (Scott 1985, 1976).

In the second situation, the patrons lose their control over both "good sense" as well as over the state apparatus of banks, lawyers, judges and churchmen. The tappers begin to articulate their struggle against arbitrary violence and monopolies by adopting the language of land rights, free trade, individual freedom, and access to education and public health. Thus, the legitimacy of the monopoly over commerce and over forest resources is questioned.

In the first situation, the local struggle remained based on the "moral economy" level, or the interpretation of customary legitimacy from the perspective of the forest. Later, the global struggle incorporated the goals of technical and cultural advancement on the part of rubber tappers. A global economics logic would predict the disappearance of wild rubber extraction in tropical forests. But between the world system and real historical events lie national and local political structures. The alliance between local movements and national or international organisations affect power relations, or, put in another way, local class struggle.
Chapter 5
TRADE POSTS

Introduction

This chapter deals with the trade post institution as a commercial system, not as an institution for labour management. We are thus making a clear distinction between, on the one hand, units of customary appropriation of resources and of trade-monopoly, and on the other hand the units of work and of natural resources management. The former units are the *seringais* or rubber estates, headed by patrons; the latter are the *colocações* or forest settlements headed by tappers and leased from the patrons who often also act as traders who advance merchandise to tappers. The control of access to estates or the monopoly over trade does not guarantee also the control over the work processes.

Weinstein advances this hypothesis with reference to the boom years (1983:182ff). Bakx, to the contrary, asserts that there is a "production relation" and not an "exchange relation" between the patron-trader (*seringalista*) and the rubber tapper (Bakx, 1986:72, 74): in other words, that the *seringalista* is not only a shopkeeper but also a taskmaker. We should first mention that the term *seringalista* (*seringal entrepreneur*) accepted by Bakx is a post-war neologism to replace the term *patrão* in official jargon only. The detailed argument proposed by Bakx in support of his thesis mentions that the tapper "must tap his estradas each day".

1. Mayor Thaumaturgo de Azevedo (1905) classified labour relations in Cruzeiro do Sul within the categories of "rendeiros" (tenants), "meeiros" (sharecroppers) and empregados ("employees" or wage workers). The context suggests that the first two occurred between tappers and patrons.

2. Bakx (1983:75). Bakx's quotes refers to Galvão, Wagley and Ross, none of whom refer to Acre or to the "upper rivers", and none of which document the labour activities.
(emphasis mine), when both field research and census data show that the average working week has four tapping days in contemporary estates under patrons and older estates did not enjoy a higher productivity; that "cooperative activity... tended to occur under the direction of the seringalista, e.g., in the formation of teams to open up new estradas or guide ox trains and so on", while in the Upper Juruá such activities ended with the rubber boom and tappers could open up new trails on their own even before; he also argues that the patron employed "armed guards, 'fiscais', to police the estate" and that "the fiscais checked that the seringueiro tapped in the prescribed manner... and kept out the river traders", apparently mixing up the distinct roles of armed guards (non-existent on contemporary Upper Juruá estates) and of mateiros or trail inspectors. He goes on to add in support of the "task-master patron" thesis that "the seringueiro was also obliged to stamp the pelas of rubber with the mark of the seringalista", which fact "had the effect of re-enforcing the notion that the pelas belonged to the seringalista and not to the seringueiro", when under the "embarked rubber system" the existence of both the patron's and the individual tapper's mark in fact asserted the individual tapper's ownership until the rubber was transferred by sale to the trade post. Finally, "the fiscais were ordered to destroy any such subsistence plots that were discovered on the seringal", which presumably refers to the boom period (Bakx 1986:76).3 Thus, Bakx's argument that tappers were labourers under a capitalist boss (Bakx 1986) and his later argument that a forest peasantry of tappers only emerged in Western Acre during the seventies (Bakx 1990:50) is far from being conclusive.

We have argued instead that the peasantization of Acre rubber tappers in the upper Juruá valley can be traced to the end of the rubber boom (Chapters 1-2); that patrons were unable to modernize rubber production because among other factors they did not manage the actual labour process (Chapter 3); and that the patrons' main concern was to maintain a monopoly through coercion and incentives over autonomous forest peasants (Chapter 4). In this chapter the role of the trade-post institution will be described in more detail. The main feature which will emerge from this description is that the sistema do barracão or trade-post institution managed to collect rubber and supply merchandise from innumerable individual and autonomous producers disperse in the forest through a many-tiered structure of non-monetary trade of a discontinuous nature, though punctuated by seasonal rhythms and characteristically of a long-term character. Another result of this description is that the barracão, represented by the patrões, operating with long-term advance of bulk merchandise, was complemented by the network of regaços on a itinerant retail trade, and by the permanent marreiro petty trade. And although this structure of trade posts, itinerant peddlers and forest shops channeled the rubber produced by the Tejo river's 491 houses in an annual ecological and economic cycle, establishing links through debts and credit with even the most remote units, the real production process almost always occurred within the forest beyond the reach or action of any external management.

The Rubber Estate Region

The Tejo River, a tributary of the Upper Juruá River, is part of the Thaumaturgo district of the Cruzeiro do Sul municipality (Map 2). This district comprises the Juruá Basin above the Amônia River's mouth, and Vila Thaumaturgo settlement (a population of 400 inhabitants) is the only urban area, with an air strip for single-engine planes, an army outpost with half a dozen soldiers, a church without a priest, a school, a few shops and a television set. A 1991 census of the Thaumaturgo district (not included Vila Thaumaturgo, nor the Arara-Jaminawa and Campa Indian territories) revealed a total of 5,983 persons in 856 houses, over an

3. On these points, see chapters 1-4.
area of 5,062 square kilometres. The Tejo River valley, the richest in population and rubber output in the Thaumaturgo district, had 3,432 inhabitants in 491 houses spread over an area of about 2,644 square kilometres, which excluding the Arara-Jaminawa Indian territory at the Bagé River headwaters not counted, leaves around 2,362 square kilometers (Map 3; Table 5.3). Field research was carried out mostly on Riozinho, an igarapé at the Tejo headwaters with around 390 inhabitants living in 66 houses, on an area of approximately 230 square kilometers (Map 4; Table 5.3a).

Thus, while Thaumaturgo district as a whole (Vila Thaumaturgo excluded) had 1.18 inhabitants per sq. km., the non-indigenous Tejo basin had 1.45 inhabitants per sq. km. and the remote Riozinho had 1.7 inhabitants per sq. km. These numbers, which increase as one goes farther away from the banks of the Jurua, reflect the basic feature of rubber extraction in the Thaumaturgo district. It is an activity oriented towards the hinterland zones (centros), away from the riverbank areas (margem). The Tejo River is the main example on the Upper Jurua of this sort of hinterland specialized in rubber production, and Riozinho is the Tejo River’s pearl as far as rubber extraction is concerned.

The remaining Thaumaturgo district inhabitants live either on other Jurua river tributaries (Amônia, Arara, São João do Breu, Acuriá, Breu) where they are seringueiros (rubber tappers) as on Tejo River, or on the Jurua river banks where they are mainly cultivators, or barranqueiros. By 1991, around 70% of the Thaumaturgo district population (excluding Vila Thaumaturgo) could be classed as rubber tappers, while the remaining were either river bank cultivators, or artisans, or worked on a dozen small cattle ranches along the Jurua banks. Note however that although the barranqueiro’s main purchasing means derived from the seasonal crops of beans, maize and tobacco, while rubber was the seringueiro’s main currency, both barranqueiro and seringueiro were cultivators. Thus, over 90% of the Thaumaturgo district houses had their own manioc gardens, irrespective of being “rubber tapper’s” houses of “river bank cultivators” houses (Almeida 1991).

The Tejo basin itself is clearly divided in "lower course" (o baixo) and "upper course" (o alto), and in "banks", the margem, and "hinterlands", the centros. On the Lower Tejo there were the rubber estates of Boca do Tejo and Iracema, holding about 13% of the total Tejo population. On the middle course of Tejo river both hinterland estates (the Bagé estate, on the Bagé paraná and the Chaleira igarapé with 21.8% of the Tejo population) and riverbank estates (the Horizonte, the Fortaleza and the Maranguape with about 21.1% of the total Tejo population) existed. But the most populated zone was that of the Tejo headwaters, where the Tejo river branches off into several small courses - Dourado, Riozinho, Manteiga, Camaleão, Boa Hora, Machadinho -, with their own trade posts, which together form the Restauração Estate, with 44% of the total population and accounting for half the estimated total of rubber (Map 3, Table 5.3).

The Fractal Structure of the Rubber Estates

Although the overall density of settlements is higher the farther one goes away from the margin, it is accompanied by spatial dispersion of the rubber tapping sites as they approach the Tejo headwaters, when the waters split into a seemingly endless series of igarapés, paranás, brooks and footpaths. Rain rarely falls between the months of June and September. The water level of the Jurua diminishes laying bare huge sand banks, while the Tejo itself becomes a thin veil of water covering a shallow, sandy bed, clogged with tree trunks which block even the lightest ubá and interrupted by rapids. By then, one drags canoes, axes are used to clear the way, and even the flat-bottomed ubá must be hauled land sometimes. The smaller streams
such as the Riozinho allow only foot traffic. Between October and December, sporadic rains cause repiquetes, or flash floods, but only between January and March the water level of the Tejo make access possible to the middle course of the river, while during the heavy rains even the Upper Tejo temporarily accommodates boats and the Riozinho can be negotiated. For the 490 households spread throughout at area of 230,000 hectares of the Tejo river, both the supply of merchandise and the shipment of rubber are conditioned by nature's rhythm and by the fractal geography of the upper courses.

The structure of rubber estates may be described as a tree whose trunk spreads out to successive secondary branches until it reaches its leaves. The main trade post at the Tejo river's mouth (the seat of a major estate) feeds several of the Tejo middle estates (either on the banks or on hinterland tributaries) and the Upper Jurua's middle trade post; the latter branches off into several tributaries and corresponding minor trade posts. Thus, a major estate splits off into middle estates, and these finally are divided into minor estates, the smallest units with their own commercial network and system of rent payments. Let us consider this fractured structure within the Tejo River hinterland, where all three levels - major, medium and minor estates - are well represented (Table 5.1).

The major estate (an unnamed unit which I call "Tejo Estates") comprised by a group of estates appropriated by Consulmar enterprises, leased to a single, main, strong Cruzeiro do Sul patron (during the 80s, the Corrêa & Sons Co. or the Cameli & Brothers Co.), with a main barracao (storehouse) at the River Tejo's mouth. The medium estates under the Tejo Estates were the Horizonte, Fortaleza, Bagé and Restauração, and they were either sub-let to medium patrons or managed by employees as with Restauração. Minor estates (an assemblage of colocações, forest settlements) were minimal units in that they did no have any other units subordinated to it. The Restauração Estate included seven such minor estates: Dourado, Manteiga, Riozinho, Camaleão, Boa Hora, Boa Vista and Machadinho. These had each their own petty resident patrons (often marreiros or employed manager), formally or informally, and independently or lease. The Riozinho is our example of a minor rubber estate.5

The tree-like structure of the estate complex makes it possible to understand the hierarchical multiplicity of patrons. First one must distinguish between lease patrons and patron-traders, each constituting its own structure, within of which one may identify the three-tiered tree-like structure. As a result of these concurrent and hierarchical patron structures, the notion of a "patron" may refer to different persons and roles within Tejo river. There was the major patron-trader with shops in Cruzeiro do Sul and who supplied merchandise to the main trade post at the Tejo mouth; there were the mid-sized patron-traders (who sometimes lived on the Tejo River for two generations and were supplied by the major patron-trader, thus belonging to the patrão-aviado category); and minor patron-traders, those resident petty traders usually supplied by one mid-sized patron-trader or mere marreiros absorbed under them.

This trade structure did not coincide necessarily with the (customary) property structure based on the payment of rent (Diagrams 5.1 and 5.2). At the top of this property structure was the São Paulo company which claimed the whole Tejo River Estates' rent. Below this there was the Cruzeiro do Sul company (Corrêa & Brothers in 1982-1985) who leased the Tejo River Estates, which could sub-let parts of the Tejo River Estates as exemplified by the Cameli & Sons' sub-letting of the Restauração Estate to the Messias in 1988. But there could be minor patrons on the

5. Major estates cover hundreds of thousands of hectares (around 200,000 in Tejo); minor estates span between 20,000 and 30,000 hectares in size.
Tejo who were not patron-traders and who only collected rents, as in the case of the Maranguape Estate and the Iracema Estate.

At the top of this hierarchy, there were major patron-traders, wealthy men with business and luxurious residences in the town of Cruzeiro do Sul; at the bottom of the ladder there were minor patron-traders who lived on the Tejo River and included former rubber tappers such as Valdemar on the Dourado Estate whose son was also a rubber tapper. Sales, a minor patron-owner without capital to run a trade in merchandise, also had sons working as tappers. A forest peasant could pay rent to a lease patron who resided on the estate, while at the same time maintaining an account with the patron-trader of a neighbouring estate.

In short, though the tree-like structure of the estates made each forest house part of a vertical chain, consigning each person to at least one patron, a partial discontinuity between trade and ownership, together with the hierarchy of minor, medium and major levels, made the resulting structure more open to choice and competition than would appear at first sight.

We proceed to consider rent, a dimension of the rubber estates as units of rubber trees owned by someone, and the supply of merchandise to the Tejo River estates, a dimension of the rubber estates as units of trade.

Rent for Rubber Trails

The main natural resource of a estate is a set of wild seringueira rubber trees found along the rubber trails or estradas. A rubber trail also constitutes a measure of labour, production, as a number of rubber trees which are tapped in a day’s work. A number of rubber trails, usually around a central clearing, makes up a colocação (a forest settlement). The colocação is thus a resource unit above the trails, as a continuous territory comprising a group of trails. While each trail was rented by an individual house, a colocação could be exploited by a cluster of forest houses whose heads rent each a number of the trails.

In 1991, in the Tejo River Basin as a whole (2,632 square kilometres), there were around 1,414 trails distributed among 166 colocações, but only 982 active trails were rented by 491 houses (Table 5.3). On the Restauração Estate (around 1,156 square kilometres), in 1981 there were around 657 trails from which 451 being rented by 205 houses in 105 settlements (Table 5.2, 52a). Houses are situated in groups of two or three on a central cleared area within each forest settlement, exploiting as a whole an area ranging from 11 to 15 square kilometers in which each house uses a section of over 5 square kilometers as if it were a slice of a pie (Table 5.5; Maps 4 and 5).

Rent was the responsibility of individual house heads, whose names were registered in the main trade post along with the number of trails rented. There was no record of “tappers”, nor were the “trail rights owners” (titulares) mistaken for tappers (faca or “knives”). The number actually rented ranged from a minimum of one trail to four and even more trails. A house head (either man or woman) who rented a trail was not necessarily a rubber tapper. Effective labour on the trails, and the number of trails rented, was a domestic issue, to be resolved by the house head renting the trails from the patron. In most cases, labour came from the domestic group, though there were cases where employees were hired by the house head, and where one house took on other houses as its own clients in private arrangements.

In principle, trail tenants paid thirty to thirty-three kilograms of rubber (from which the usual tare for excess water was not deducted) per trail composed of 120 trees. Rent could not be paid in cash or with any product other than rubber and did not depend on the productivity or the exact number of trees. Since each house ordinarily rented two trails, the average rent on the Riozinho Estate stood at 66
kilograms of rubber per house. This amount corresponded to about ten per cent of the total average output of each house.

Reports from the boom years (1870-1912) mention that rent was paid as a proportion to output varying from 20 to 50% (a sharecropping arrangement) in the middle Jurua river; as it is reported for the Tejo river, it was a fixed amount of 66 kgs per "pair of trails" (a "rent in kind" system) already in 1899 (Cabral 1949), which is confirmed by old tappers who say that rent exists in this form "since the beginning of time". Although rent averaged 10% of production, the point about a "rent in kind" is that variations in output owing to individual or natural productivity accrued to the house head; furthermore, rent in kind was not affected by price fluctuations and could not be manipulated by the accounting system. Such a system was therefore compatible with the observed stratification of rubber tappers' houses.

Now let us consider the process of rent collection by the Restauração trade-post. In 1982, the Restauração Estate recorded rent payments in books with the following information: name of the colocação where the trails were located, the total number of trails in the colocação, the names of house heads and the respective number of trails rented, and the number of idle trails in the colocação. Rent owed and amounts paid up also were recorded. In 1981, the Restauração records showed 105 colocações, with 205 houses renting 451 trails; the total number of trails was 657, which meant that 206 trails remained idle. In other words, 69% of the trails effectively were occupied, while 31% were not. These proportions were reproduced on the smaller Riozinho Estate (Table 5.2a; cf. Table 5.3). It should be kept in mind that these years were favoured by exceptionally high government-supported prices and loans. Thus, the low overall occupation of trails could only reflect the scarcity of labour, since there was no sensible unemployment in the Cruzeiro do Sul region at the time.

In 1982, the new patron Corrêa took control over Restauração. One of his measures was to introduce the "half-trail" unit as accountable for rent payments. With this innovation, Corrêa was reacting to the tappers' practice of increasing the number of trees in each trail, in reality incorporating well above the standard 120 trees each for extraction in each trail, while paying rent for only one. In effect, this meant that houses opening new trails were asserting the principle of not paying rent for new trails. As a consequence of Corrêa's measure, between 1982 and 1983, the number of rented rubber trails in the Riozinho Estate increased seven per cent, with an increase both in the number of houses paying rent (from 59 to 63) and the number of trails per house from 2.20 to 2.23 (Table 5.6).

On the other hand, by the end of the first year of the Corrêa era, many tappers had not paid rent. Thus, towards the end of 1983, though by the estate's account the 63 houses owed 3,905 kilograms of rubber (on the Riozinho Estate), only 2,662 kilograms had been collected (Table 5.6). Moreover, the actual amount of registered rent represented for each house a payment of 62 kgs. of rubber per house (and not 73.6, for the average of 2.23 trails). This occurred due to the individual negotiations between the patron and the houses which had as an effect the reduction of rent rates. For example, one house rented four trails but paid for only three (90 kgs.); another house exploited 3.5 trails (as recorded in the trade post), but paid 100 kgs. instead of 105; another paid only 45 kgs. for two trails. The book-keeper, who had worked as a rubber tapper on the estate during half of the

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6. Production was estimated in around 300 tons for 491 households; for an average of two trails per household, total rent would be 32 tons of rubber, an estimate confirmed by tappers and employees. This meant US$54,000 in 1982 (Rubber price: Cr$400; exchange rate: Cr$220 to one dollar; price paid to the rubber tapper: US$1.80). (IBAMA 1988.)

7. For Marx, "rent in kind" (as opposed to "sharecropping", "rent in labour" or "money rent") afforded the producer "more room for action to gain time for surplus-labour whose product shall belong to himself...". "Similarly, this form will give rise to greater differences in the economic position of the individual direct producers" (Marx, 1962:776,768).
harvest, was to pay only 30 kgs. for two trails. Two houses simply refused to pay rent, with special reasons of their own: they were female-headed houses, one run by a widow and the other by a single woman, each with several children, and when a fourth woman asked the patron to open an account and put the trails in her name, given that her husband was chronically ill, she pleaded that he "pardon the rent". But this rule was not always observed, since a fourth female-headed house head paid rent with pride.

In sum, reasons alleged for reducing or not paying rent included thus labour investments (trail extensions opened by tappers) and household handicaps (age, sex and illness), but discounts could also be a result of bargain as part of the final negotiation between patron and house head. The fact that rent allowed for exceptions can be interpreted as suggesting that the institution itself was seen as abusive. This may explain also why, contrary to what happened with rubber used to "pay up accounts", rubber destined to pay rent was not subject to tare deductions: "rubber to pay rent is tare-free", it was said, while the patron of Restauração claimed that he charged rent only because he had to pay his own landlord, although the deeds to back up such an allegation were never presented to the tappers.

The patrons who claimed rights to trail rental fees never proved their possession to the rubber tappers; on the contrary, it was the rent payment made by tappers which, in a sense, proved ownership as based on "custom", while "custom" itself prevailed only because it was sustained by municipal police authority since outright non-payment could justify the eviction of tappers with the support of court decisions (Table 5.7). Rent was not so much a means for extracting a major surplus from tappers, as a means for legitimation.

Rubber and Commerce

Credit and debts, advances and payments constituted the sources of wealth on the rubber estates. The financial and mercantile capital circuit in these estates worked in the following fashion. Three large public banks - the Banco do Brasil, Banco da Amazônia and the Banco do Estado do Acre directly financed the largest patron-traders in Cruzeiro do Sul provided only that they demonstrate rubber estate leases, giving to them loans to be paid within one year. Such annual loans were paid with interest set lower than the 1982 inflation rate, with the future rubber "harvest" serving as collateral (in the cases of sub-patrons who let a estate, and did not own property themselves, rubber was the only guarantee offered). The size of such bank loans was determined according to a rule of thumb: each pair of rented rubber trails (and thus each house) was worth 400 kilograms of rubber as collateral, the average productivity per worker in Acre during lean years. Thus rents guaranteed finance capital.

On an estate like Restauração, which had 225 "pairs" of trails rented to house heads in 1982 (or 451 trails), a loan could reach as much as the value of 90 tons of harvested rubber, or around US$162,000 in money. This money was presumed to be used in the purchase of merchandise, classified as "work instruments" and consumer goods. Fabrics and hardware were acquired in São Paulo, Brazil's industrial capital. Cargoes were sent by ground transport overland to Belém, and from there floated up the Amazon and Juruá Rivers. Major patrons such as the Cameli possessed their own rivercraft which also transported rubber and bulky merchandise.


9. Two streets in São Paulo (Florêncio de Abreu street and 25 de Março, respectively concentrating hardware and garment shops, also have hotels occupied almost exclusively by Acre patrons and traders, with one serving as a base for Cruzeiro do Sul buyers.
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for Cruzeiro do Sul commerce, such as gas. Major patron-traders also managed to avoid paying sales or value-added taxes, by declaring their companies as part of the Duty-Free Zone of Manaus. These exemptions were sufficient to offset transport costs over the course of 5,300 kilometres, by land and by river, from São Paulo to Belém and Belém to Cruzeiro do Sul, or even to transport goods by air and still achieve profits. Since the major patrons also owned stores in Cruzeiro do Sul, part of the merchandise was sold to urban consumers, to minor patron-traders, to rubber tappers, and to river traders who sought to replenish their stocks for resale on the upper river courses.

Between March and April, at the beginning of the tapping season, the major patron in Tejo river supplied the principal trade post - the Boca do Tejo trade post, in the Tejo’s mouth - on bateiros and baleeiras, rivercraft of 5 to 25-ton cargo capacity, powered by 18 to 36 HP diesel engines. Part of the merchandise remained stocked at the Boca do Tejo post, while the rest was sent upriver on flatboats to the medium trade posts along the Tejo, particularly to the Restauração post. On the Restauração Estate, goods were stocked in the storehouse, and in part distributed to smaller trade posts such as the Riozinho’s, now transported in canoes or flat-bottomed, one-ton uhuá boats, as long as the water was deep enough. Up until this point, the merchandise was transported in the patron’s vessels and by his employees. The rubber tappers themselves carried supplies on their backs from the minor trade posts (though sometimes from the Restauração post) to their homes, having to walk for at least two and up to six hours in the furthestmost forest settlements. There were no convoys or any other system of transporting merchandise to the hinterland settlements. By the end of the whole process, the merchandise was split up in several stocks (in the principal, medium and minor posts), and in the tappers homes as aviação or year’s supplies). Each of these stocks constituted an advance, to be paid in rubber at the end of the yearly ‘harvest’. The corresponding chain of debts linked rubber tappers to the minor deposits, the minor deposits to the mid-sized trade posts, the mid-sized trade posts to the main trade post, which in turn owed to the bank (Diagram 5.2).

The average expected output of the Tejo Estates was 300 tons of rubber, which would mean 612 kilograms produced on the average by 490 households. Deducting around 30 tons of rent payments, the remainder should correspond to the value of debts for merchandise advanced to the rubber tappers. As we have seen, the bank loan could be worth 196 tons (490 pairs of trails worth 400 kgs. each). The 205 houses of the Restauração Estate were expected to produce something on the order of 120 tons of rubber, and on the Riozinho, a smaller estate, the approximately 70 households were expected to generate around 42 tons.

After collecting the rubber from the seringal houses as payment for the merchandise advance, the main patron would sell rubber to refining plants in Cruzeiro do Sul (there were two plants with about 25 employees apiece), and pay back the banks, keeping a profit. The plants (usinas) then would supply tyre manufacturers in São Paulo (such as Goodyear, Pirelli and Michelin) which must buy it to meet the quota set by the government rubber agency.

With the rubber bought from the estates in Cruzeiro do Sul and surrounding municipalities along the Jurua valley, the processing plants exported as much as 3,000 tons a year (figure from 1982). Including the production of the other river valleys in the state, Acre contributed with 13,000 tons of a total 20,000 tons of rubber extracted from the Amazonian forests by 1982 (Table 5.2).

10. Transport costs increased values paid in São Paulo by about 30%. But these traders obtained a 30% discount through tax exemptions. Knives or tape-recorders could cost less in Cruzeiro do Sul shops than in São Paulo.
Personnel and Equipment

In 1982, the head office of Restauração Estate was composed of a group of wooden edifications including the trade post, the residences of the administrative personnel (manager, assistant manager, and book-keeper), and the houses of other residents. Only the trade post was more impressive, with piles of rubber on the veranda and a variety of merchandise in the store: six Elgin sewing machines, five three-band radios, three chainsaws, three gas stoves, five engines (two 10-HP Briggs & Stratton, one 3-HP Montgomery, one 8-HP Tiete and one 3-HP Branco), and twenty-five wristwatches and clocks by October 1982. Besides these "valuables", one could find tools, pots, plates, pressure-cookers, clothes, hammocks, blankets, biscuits, coffee, sweets, cooking oil, soap, powdered milk, cosmetics, lighters, combs, medicine. Basic goods such as regular soap, salt, kerosene, dried beef, beans, sugar, tobacco and ammunition were in stock, but not in plain view. A diesel-powered generator supplied electricity. A radio transmitter connected the Restauração trade post to Cruzeiro do Sul.

The main store had a large, 150 kg. scale and a counter with a few smaller scales and adding machines behind which the manager or his assistant occupied a desk and jotted down the clients' purchases. In the back of the building there was a warehouse with stocks, as well as the patron's or manager's office, where records of accounts, inventories, purchases, payments to river traders, rent receipts and expenses with personnel were kept.

The manager's residence, where the patron stayed during his visits, stood on one side of the warehouse. The assistant manager's house was on the other side, and the book-keeper's house behind it. These buildings differed from most rubber tappers' houses for being made of timber planks instead of palm tree bark, and covered with zinc instead of palm tree leaves.

The manager, Edmilson, was the patron's trusted employee. While the patron was away, it was he who made crucial decisions about sales, credit and loans. The assistant manager helped weigh rubber and also attended customers in the store. The book-keeper maintained the individual accounts of rubber tappers and performed the general accounting of the store. Though the residents of the main settlement depended in part on warehouse food stocks, most of their basic food was bought from an autonomous cultivator and from neighbours who sold meat and fish (a permanent hunter never stayed around for very long).

The trade post, located on the top of a steep bank, was connected to a rudimentary river port by a stairway. Among its rivercraft, the estate had a baleeira (a flat-bottomed boat with an eleven-ton capacity) and canoes powered by 13-HP diesel engines, which could carry lighter loads, including two flat-bottomed canoes (ubás), used to go up the Tejo during the dry months between June and September, when even the flat-bottomed baleeira would get stuck. The rivercraft were operated by two permanent employees, Dico and Zuzu, who live in the Tejo's mouth headquarters and not on the Restauração Estate. Emergency trips also could be conducted by a resident of the other bank, Osterno, who used his own canoe and charged for his services. Dico, Zuzu and Osterno played an important role in "taking the rubber out" from the tappers' homes, and in accompanying the canoes guiding the rubber balls, when these were floated downriver.

In 1983, there was a mateiro on Riozinho Estate, hired by the new patron. His job was to visit each rubber trail at least once every year, inspecting its state of preservation. Before being hired for the job, this man, a Riozinho resident, was himself a tapper and also a part-time tinsmith. The mateiro (literally, "woodsman") held the authority to prohibit the tapping of a particular tree, or of a particular tapping flag on a tree when he found damage done. In such cases he made a mark on the damaged tree or flag, an "x" for instance, which the tapper would encounter...
on his next journey to that trail. The prohibition would be valid for the whole season or for the whole year, and it could be extended to a whole trail. The mateiro could also suggest the expulsion of a tapper as punishment for serious damage inflicted to a tree.

While occupied permanently with the hundreds of trails he had to visit each year on a mid-sized to large estate (small estates rarely could afford hiring a woodsman), the mateiro could not keep tabs on the daily work routine of the individual tappers, and his task was concerned with the technique employed, aiming to avoid the dilapidation of the rubber trails, the rubber estate's natural capital. The rubber trails, not the land, the constituted natural resource holdings that made up the rubber estate: it made sense to preserve them. Depredation of the trails and smuggling of goods constituted indeed the two major crimes against the rubber estate in old times.

The Riozinho tappers, particularly the older ones, refused to accept the new mateiro's authority. They argued that he did not have enough expertise on the job, and some alleged that they could teach him a lesson on tapping techniques. The main patron did not insist with the mateiro nor replaced him. The fact that the new patrons leased the estates for only three years may explain why they did not show much interest in mateiros, or long-term conservation of trails.¹¹

Besides its commercial function, the central area of an estate also gathered together other services. There lived at the Restauração head office area a blacksmith and a schoolteacher, and further away there was a carpenter (two lived in the forest hinterland). These people were not trade post employees, but settlers whose residency rights derived from the fact that they rented rubber trails. The teacher was the blacksmith's daughter-in-law and did not receive any remuneration for the classes she taught in a one-room school without walls, built by the men of her house. The carpenter frequently was called upon to erect wood constructions or to build canoes. The two tinsmiths were rubber tappers who bought their raw material (oil cans) from tappers and sold pails or tin cups to the trade post or directly to the tappers.

In the past, Restauração's central settlement had a church, known for having the largest bell in the region. There was no permanent priest, and the Restauração received the visit of clergy only during the annual desobriga ceremonies of baptisms and marriages. By the early eighties, a priest still visited the area for desobriga once a year. The main role of the church in old days, however, was to hold the annual novenas: nine days of prayer and commerce, during a fixed period of the year, commemorating the patron saint's day. Several novenas are celebrated to this day along the Jurúá, which function also as commercial fairs, drawing together a great number of river traders, rubber tappers and Indians. In the past there also used to be a "hostel", really a simple wood construction where dozens hammocks could be hung, to accommodate men and women who had come to the post for religious feasts and commerce. The central settlement also had a levelled area, which served as a football pitch, where young tappers fanatically engaged in matches.

When tappers visited the central post for sporadic purchases or in case of emergency, this would involve often spending the night, when tappers lived far away. Patrons or managers were then expected to extend hospitality, offering lodging and meals to tappers during their visits to the main trade post. But this rule ordinarily was not observed, and only the friends of the patron or the manager received now such treatment. For the other tappers, there was the alternative of seeking shelter with the residents of nearby house (though there were plans to erect a new hostel), and buying biscuits, sweets, condensed milk and canned beef. Cachaca, or cane

brandy, was not sold because the patron feared that it would result in violent incidents involving drunken rubber tappers, but the tappers would substitute it with pure alcohol mixed with artificial fruit juice bought at the store, or would purchase it from the river traders.

Besides the major trade post, other smaller storehouses or simply "goods deposits" existed on the minor estates along the small streams that formed the headwaters of the Tejo. The managers of such deposits supplied merchandise over a smaller area, collected rent and helped the main trade-post personnel. They might be recruited for the position by the current patron, as was the case of Timoteo on the Riozinho. Until the previous year, Timoteo was one of the most productive rubber producers on the Riozinho; now he managed stocks supplied by the Restauração trade post and kept his own book-keeper to run a store-house by his own house. The book-keeper also tutored the children.

Timoteo's two grown-up sons tapped rubber trees and himself and his wife worked on the manioc garden. He continued to be a house head paying "rent" and holding rights over trails tapped by sons.

Other deposit managers had been since long marreiros, or forest-based petty traders, on their own account. These marreiro-managers received merchandise from the central trade post and would resell it to tappers, using the rubber to pay for the products and drawing a profit from price differences, but also would assist the trade post employees in the transport of goods and in the reception of rents. Such marreiros operated other trade-posts within their own houses, without employees. During the 1980s, the presence of three different patrons at the Restauração and the implantation of a cooperative did not affect the three main marreiros on the Restauração Estate's hinterlands, who passed from marreiros to the status of "supplied-managers" (patrão aviado), from "supplied-managers" to "cooperative managers" (gerente de cooperativa), and from "cooperative managers" to autonomous marreiros again. Thus, the minor posts were at the fringe of the formal trade-post structure, and continued to operate without it, being then supplied by itinerant traders or buying at other trade-posts downstream.

Recruitment, Rubber Removal and Weighing

There were two ways of becoming part of a rubber estate such as Restauração. One was to ask the patron or manager at the trade post for access to a colocação. This consisted in allocating a set of idle trails on one of the settlements, for which the person would now pay a rent. At the same time, the new trail lessee would have an account open at the trade-post. The patron could also recruit a tapper elsewhere, as Corrêa did in Cruzeiro do Sul and in Vila Thaumaturgo. The other was to obtain trails by transfer from another rubber tapper, or to be recruited by another tapper to work on the trails rented by him. Tappers who received rubber trails through transmission or recruitment by other tappers usually presented themselves to the patron or manager at Restauração to settle rent payments and to open an account at the trade post. But this was not always necessary when a house head who exploited a trail was the client of another tapper, who possessed rights to the trail and was responsible for accounts with the trade post.

Between 1982 and 1983, in the Riozinho, I recorded six cases of rubber tappers who were recruited directly by the trade post for the Riozinho, increasing the rent-payers to a total of 66 households (three other houses did not pay rent). One of these quit his former patron Carneiro; another quit a seringal on the Tarauacá river on the over the backwaters of the Restauração, bringing with him his own client. Both were cases of tappers unhappy with their former patrons and with a balance. Besides these six new tapping houses, other fourteen new house were formed, of which ten as the result of newly married young men who came to occupy part of their father's, father-in-law's, or brother's colocação, or an idle trail within
the estate where they already lived. Other four new houses moved in from neighboring igarapés (thus from minor estates belonging to Restauração), answering the call of relatives or acquaintances to occupy idle rubber trails. These twenty new houses did not increase significantly the total number on the Riozinho Estate, since other houses disappeared in the same period as a result of out-migration or death.

A patron or his manager in principle had the authority to evict a house head, or descolocar a person. However such an action had to be justified either for smuggling rubber out while in debt to the trade-post, or failing to pay the rent, or for doing damage to the rubber trails. If a house head refused the notice to leave, the patron could resort to the Cruzeiro do Sul police. The patron would also cut off credit to the house in question. Attempts to expel tappers by merely cutting off their credit at the trade post did not succeed in the cases I observed on Riozinho, since rubber tappers always could make clandestine supply purchases from itinerant traders, or buy from nearby marreteiros.

I did not witness any successful eviction, which may have been a consequence of my presence in the area. Besides the presence of an unknown stranger in the area, it seems likely that the union played an important role in reducing evictions in the early 1980s by establishing the principle of tapper's rights to property improvements resulting from their own labour, which implied the payment of compensation for planted areas in the case of "justified" eviction.

At the end of January and the beginning of February, the trade post employees had to undertake a crucial activity. By necessity, the removal of rubber from the densely-forested hinterland took place during heavy rains, or using the repiquetes - flash floods that offered rare opportunities to float the rubber bundles, which weighed more than 50 kilograms apiece, downstream. Patrons expected the tappers to help to transport the accumulated rubber of their settlements to the trade post, I witnessed cases in which five tons of rubber remained stocked in hinterland areas of difficult access from one year to the next, because the crucial rains were missed. Once removed from the interior of the estate and placed at the trade post, the rubber bundles were tied together in long floats weighing scores of tons, which in turn were piloted down-river by canoes, to the mouth of the Tejo and on to Cruzeiro do Sul.

"Weighing the rubber" constituted another important activity exercised by the trade post. The operation ostensibly consisted in determining the weight of rubber stocks in the hinterland settlements, along the year. But in reality the operation also meant the nominal transfer of rights on rubber stocks to the trade post: this was called "liquidation". Weighed and liquidated rubber (marked bundle by bundle) could not be sold to marreteiros or river traders, unless it was "stolen".

Weighing had to be authorised by the house head and performed in his presence. Neither wives nor children could substitute the head during the weighing. And there were house heads who refused to liquidate. These cases involved highly-productive tappers who disagreed with the price and interest rules of the liquidation process, but also included tappers with low productivity who had personal disputes with the trade post. Since the weighing procedure involved the political relations between the trade post and house heads, sometimes the manager himself led weighing sessions, negotiating directly with the tappers. This occurred on the Manteiga River, an area where the rural union's strength was felt in 1982-83, and in the years that followed.

The weighing operation took place outside, since rubber was always kept in the open (theft did not occur). Differences emerged over the scale (spring scales at
home showed one result, while the manager's scale showed another), over the
number on the scale (the result could be altered by a crooked pointer or by faded
numbers), over the use of calculators (according to the managers, electric
calculators did not calculate fractions of kilos), and over the volume of the tare,
which in theory would involve a deduction for the volume of water in each bundle.
The amount of water depended on how long the rubber had been stocked (it started
out "green", gradually becoming "dry" with time), but the estimate usually was an
arbitrary exercise, varying from five to fifteen percent of gross weight. River traders
were reputed to cheat tappers both on the weigh-scale and on the tare discount,
while patrons were reputed to cheat on accounts.

In 1983, the first series of weighings took place between June and August in
four visits to the Riozinho estate, which accounted for the product of the first cut on
the Jurua (from April to July), or the dry season harvest. A total of 68 households
were visited for weighing, though not on the same occasions. The total production
weighed in at 20 tons (20,027 kilograms), in bundles averaging 64 kgs. apiece (except
for a group of brothers who introduced 10-12 kilogram strips of rubber, an
innovation to which we will come back), and an average household output of 294.5
kgs. per half season. This production of 64-kilogram bundles was "to settle accounts",
and did not include rubber sold in smaller amounts of ten to thirty kilograms, to the
river peddlers and marreteiros. Individual household productivity varied
considerably, ranging from under 100 kilograms (two female-headed households)
to over 700 kilograms for the half-season (Tables 5.8 and 5.9).

Besides the apparent function of transferring rights over rubber from houses
to trade-post, another purpose behind the weighing of rubber was to evaluate each
household's purchasing capacity, in order to calibrate the amount of merchandise to
be supplied over the course of the year. But an inevitable conclusion is that through
the weighing procedure, the patrons implicitly recognised that the rubber belonged
to the households and not (as they argued in legal cases attempting to preserve their
monopoly) to the bank, or, by extension, to the patrons who were financed by the
bank.

The trade post did not have personnel to construct or maintain the
footpaths, bridges and stairways that connected the main settlement to the tappers'
homes, nor did it develop any regular or even irregular transport system (using draft
animals or boats) linking the trade post to the colocacões, which took two to six
hours to reach on foot (see map 4).

Supply of Goods and Accounts

This is why I tell you that I am surprised with my account. I didn't buy
spoons, plates, knives, a motor, a shotgun, a saw, a new hammock, a blanket:
only sugar, coffee and oil. What surprises me is how the others manage to
pay. Because I buy none of that. It's been three years since I bought a
knife for the house . . . Luxury, no sir: coffee is food, oil is food, sugar is food. One
can live without these articles, but in a disgraceful manner. Look: we can live
without smoking, which isn't easy! (Freitas, a rubber tapper)

Merchandise introduced from Cruzeiro do Sul was stored at the mouth of the
Tejo, then transported to the Restauração warehouse and finally distributed to the
minor patrons (which sometimes we call 'marreteiro-managers') Timóteo,
Raimundo Leitão, Pedro Paiva, and Zé de Luna. Inventory balance sheets were
kept at the Restauração trade post, composed of stocks from the previous year
(including those in the smaller deposits) and the merchandise received during the
current year from the main trade post at the mouth of the Tejo. In order to
appreciate the significance of these stocks, which were to supply over 220
households (almost 70 on the Riozinho Estate), goods may be divided into several
specific categories.
Goods that were used throughout the year (not including long-term durables), which had to be acquired at the beginning of the year, were called "estivas" (gross goods). The "estivas" included articles for domestic consumption (salt, soap, sugar, cooking oil, powdered milk for children), hunting needs (ammunition), and fuel for engines used in the flour-making process. In contrast with the "estivas", the "luxos" (luxuries) and "vicios" ("vices" or "habits") were articles of current consumption which may be consumed in an intermittent fashion. The line between "estivas" and "luxos" varied from house to house. Some consumers considered sugar and vegetable oil "luxos" or even "vicios" (generally, "luxos" included olive oil, guava paste, canned cream, crackers, powdered fruit juice, candies and powdered chocolate; "vicios" clearly were alcohol and tobacco), others saw them as basic food. Other articles of domestic consumption included "fabrics and garments" (fabrics, blankets, hammocks, pants, blouses, shorts, towels, shoes, boots, sandals), "miudezas" (odds and ends - buttons, thread, needles, as well as non-food items such as cigarette paper, lighters, toothbrushes, soap, razor blades, combs, mirrors, pencils, etc.). "Medicine", including especially powerful antibiotics, but also remedies for malaria, intestinal diseases, "fevers", infections and a host of other disorders, along with aspirin, were part of any respectable store’s stocks, and also constituted as part of the river traders’ offerings, along with "odds and ends" and some "luxuries".

"Utensils" included both non-domestic equipment (for agriculture, extraction, fishing and construction) as well as domestic items (such as pots and pans). These articles lasted for over a year. Finally, the "móveis de valor" (valuables) were long-lasting articles with high unitary values, including gasoline and diesel powered engines, chainsaws, mattresses, suitcases, gas stoves, sewing machines, radios, watches and clocks. The term "móveis de valor" suggests that these goods constituted investments, which evidently is the case with gas stoves and frequently with diesel engines (since gas is not available and because some households did not use their engines, displaying then in front of homes in a show of affluence).

### AVIAMENTO GOODS SUPPLIED BY TRADE-POST

<table>
<thead>
<tr>
<th>NAME</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estivas</td>
<td>Consumption goods, basic</td>
</tr>
<tr>
<td>Salt, Oil</td>
<td>(Flows)</td>
</tr>
<tr>
<td>Soap</td>
<td></td>
</tr>
<tr>
<td>Ammunition</td>
<td></td>
</tr>
<tr>
<td>Fuel (kerosene)</td>
<td></td>
</tr>
<tr>
<td>Vicios (vices)</td>
<td>Consumption goods, non-basic</td>
</tr>
<tr>
<td>Luxos (luxuries)</td>
<td>Of occasional use</td>
</tr>
<tr>
<td>Remedios (medicines)</td>
<td>(Intermittent flows)</td>
</tr>
<tr>
<td>Miudezas (trifes)</td>
<td></td>
</tr>
<tr>
<td>Sewing</td>
<td></td>
</tr>
<tr>
<td>Cig. smoking</td>
<td></td>
</tr>
<tr>
<td>Body care</td>
<td></td>
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<tr>
<td>Writing</td>
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</tr>
<tr>
<td>Utensilios</td>
<td>Production goods, durable</td>
</tr>
<tr>
<td>Agriculture</td>
<td>(Funds)</td>
</tr>
<tr>
<td>Tapping</td>
<td></td>
</tr>
<tr>
<td>Fishing</td>
<td></td>
</tr>
<tr>
<td>Building</td>
<td>Household equipment, durable</td>
</tr>
<tr>
<td>Kitchen</td>
<td>(Funds)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Tecidos</td>
<td></td>
</tr>
<tr>
<td>Cloth</td>
<td></td>
</tr>
<tr>
<td>Garments</td>
<td></td>
</tr>
<tr>
<td>Hammocks</td>
<td></td>
</tr>
<tr>
<td>Móveis de Valor</td>
<td>Investment Goods</td>
</tr>
<tr>
<td>Motors</td>
<td>(Long term funds, saleable)</td>
</tr>
<tr>
<td>Machines</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field research

To summarize, a first classification of goods distinguishes (a) non-durable items acquired at the beginning of the season and consumed over the course of the year ("estivas", "miudezas", "luxos" and "vicios"), (b) durable items used over several
years, which may be repaired or substituted over time ("utensflios"), and (c) those durable items that may be kept as property holdings ("m6veis de valor"). Another important additional classification distinguished between basic items in any of the above categories (such as salt, soap, petrol and ammunition, which always are needed in day-to-day consumption; or such as the flour-mill engine, a permanent, long-term necessity) and non-basic items (whether "luxos" or "vicios" for ready consumption, or "m6veis de valor" kept over long periods).

ANOTHER VIEW OF THE AVIAMENTO GOODS

<table>
<thead>
<tr>
<th>BASIC Items</th>
<th>NON-DURABLE</th>
<th>NON-BASIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Luxury food, vices</td>
<td>Soap (&quot;sabonete&quot;)</td>
</tr>
<tr>
<td>Soap (coarse)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammunition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>?</td>
<td>Basic Mudezas</td>
<td>? Luxury miudezas</td>
</tr>
<tr>
<td>Basic Cloth</td>
<td></td>
<td>Luxury cloths</td>
</tr>
<tr>
<td>DURABLE</td>
<td>Kitchen sets</td>
<td></td>
</tr>
<tr>
<td>Utensils</td>
<td>As equipment</td>
<td>Valuables</td>
</tr>
<tr>
<td>Valuables</td>
<td>stock or display</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field research

In principle, the "goods of value" may be used not only as accumulated wealth or equipment stocks but also as capital: this was the case when a motor or other instrument was lent in exchange for some sort of gain. Indeed, I observed on different occasions payment for the use of a chainsaw or a flour-processor (equipped with a 3 HP engine, a metal plate and tools to grate and press manioc), both of them expensive equipment. But these (rare) payments were often part of a transaction that included the purchase of manioc (together with the right to use the manioc owner's equipment) and the hiring of the chainsaw owner's labour. I never witnessed a tapper calculating the depreciation cost of his equipment (either that used in rubber tapping, or to make flour) in his assessment of the total value of the products of his labour (rubber or flour).

The foregoing description seeks to make sense of the composition of stocks in the trade post during any given year. All of the articles here described were in stock at the Restauração store at the end of 1982, but new items flowed in during 1983, brought from the main trade post to the Restauração post or supplying the various other smaller stores directly. The merchandise introduced to Restauração between January and August 1983 (not including the goods stocked over from 1982) had a total value of 29,000 kilograms of rubber, using the final prices paid by traders at the smaller posts to the main trade-post. At least another 15% must be tagged on to account for the small trader's commission, resulting in the total value of 33,000 kilograms of rubber at tappers' prices - a little over one-fourth of the total expected output of all the minor estates composing Restauração.13

Once transferred to the tappers' houses, the goods were converted into a growing debt to be paid in rubber (Table 5.9). In a parallel process, houses accumulated stocks of rubber until it was transferred all at once to the trade post. The tapper did not know at any given moment the precise size of his accumulated debt; and, through the weighing procedure, the patron had only an approximate estimate of the final stock of rubber.

River Traders and Forest Petty-Traders

Traders who carried their stocks on boats and canoes and sold merchandise at the tapper's door for payment in rubber, the regat6es ("river traders" or "river peddlers"), are as old as the trade-post itself. These river peddlers represented, as it were, an 'informal market' in the extraction zones, side by side to the monopolistic

13. The following is based on trade-post bills and stock inventories, 1982.
trade-post system. The regatôes were autonomous traders, without any connection either to the (nominal) owner of the rubber estate or the patron-trader; they possessed only small boats of one to five tons, and purchased goods from urban merchants on relatively short terms (three months) and high interest (30%), in quantities up to the equivalent of five tons of rubber. These traders sold rubber to the same processing plants in Cruzeiro do Sul that bought rubber from the patrons.

While the trade posts faced the problems of storing bulky goods for the totality of houses and for year-long periods, and transporting them throughout the forest, restricted by the rain cycles and having to project the annual output and payment capabilities of their clients, river traders operated on a small scale and with a restrict temporal standard. The river traders' goods were light in weight, "non-basic" in character, and turned over quickly. On the voyage upriver, goods were left directly at the tappers' homes, and on the return trip, the itinerant trader collected payment in rubber. A river trader would wait patiently in the vicinity or even at the tapper's river outlet until he received payment. The river trader's boat also was his home, with a small cover and a fireplace in which to prepare food.

Though each journey yielded only a small amount of rubber, the river traders could return often with with fresh merchandise, turning over their petty trade capital several times during the year. While affording the tappers the opportunity to buy goods and sell rubber in direct payments, they cut into the patrons' monopoly. Though they did not supply households with the "estiva" portion of the monopoly, they substituted the trade post by furnishing some non-durables (except food) to houses whose supply-line had been severed because of low productivity or relatively high debts (which means that supply did not correspond to production during the course of the year). If a river trader was in reach, a tapper who was not being supplied by the trade post could easily produce within a couple of days ten sixteen to twenty kilos of rubber (worthy approximately one US dollar a kilo) to pay for powdered milk for children, medicine for the sick, alcoholic beverages or "luxury" items for adults, such as candy, shoes or perfume.

As a canoe approaches on the bend of the river silently (to save fuel but also because the river is shallow, making it necessary for two men to move the boat with poles), the colocação population becomes excited and runs to the shore. From under a plastic cover, the boat discloses wooden crates with a great many small articles. A young tapper buys shoes, another purchases a can of powdered milk, and an old man acquires some sweets. These purchases will be paid with a few kgs each.

In 1983, after six months under a new and powerful patron, there were in the Restauração six tons of rubber (about five percent of its total estimated production) committed to eight river traders who operated in the hinterland, including an itinerant photographer and a dentist. This was the rubber still outstanding, that is which had not already been transferred directly to the river traders, who were waiting to receive it. This also was the debt bought by the patron, under the condition that the traders agree to leave the area, as mentioned in a previous chapter. Taking into consideration only these cases, which were recorded in the trade post, an average river trader had a credit of 774 kilograms of rubber to receive from 24 different clients (on the average, 10 from Riozinho and 14 from the other sub-estates of Restauração); the average debt per client stood at 40 kgs. of rubber (Table 5.10). The real volume negotiated by river traders over the whole year must have been much larger, and the traders did not disappear after the agreement with the patron.14 It was not uncommon to find as much as thirty percent of the total house budget committed to the river traders and local peddlers. The rubber tapper Ferreira had the largest debt on the Riozinho Estate, in a case of high volume

14. In the following year, the patron took the issue to court.
purchases from the river traders: sixty per cent of Ferreira's 490-kg rubber production went to the itinerant traders (Table 5.11; Table 6.3, Account II).

The informal forest market included another category. The "marreteiros" are small traders with fixed residence in the estate hinterland ("forest traders") (Table 5.12). They are often rent-paying household-heads and thus also are 'rubber tappers' in a wider sense (family members, employees or clients work trails rented by the head). As an example of the continuum going from tappers to petty traders, Ferreira's neighbour, also his stepson, whose household also produced considerable quantities of rubber and manioc flour, was a marreteiro, because he sold merchandise to other houses for profit. In another house on the same settlement (colocação), another of Ferreira's stepsons spent the tapping season at his brother's working as a tapper but also acting as a marreteiro (he was married to a regatao's daughter), selling the goods he brought in his luggage. At one point, he enjoyed credits of 106.75 kilograms of rubber, spread among seven clients, including his own stepfather Ferreira. Thus, in this settlement of three houses, one belonged to an indebted house head, Ferreira (who owed heavily to peddlers and the trade post alike), while the other two were headed by stepsons, one a resident marreteiro/tapper, the other hosting a a seasonal marreteiro/tapper.

Other marreteiros were more specialized as individuals, but as a rule their houses as a whole included agricultural activity, tapping and hunting just as the others. These marreteiros sold at higher prices, which was inevitable since they had to make purchases from river traders, from the trade post or more rarely directly from urban merchants. The patron tolerated more widely the marreteiros than the river traders, because unlike the itinerant merchants, the rubber they received as payment was stored along with the other rubber accumulated in the house, and sent along to trade post at the end of the year.

At this point, it may be worthwhile to comment briefly on the terms employed here. The term "regatao" designates the person and profession of the itinerant merchant in a boat; in Portuguese, the verb "regatear" means to bargain or to haggle, and may or may not be related to the term "regatao". "Marreteiro" comes from the verb "marretar", taken unambiguously throughout the Amazon only to designate the act of buying and selling for profit, using bargaining or any other method, licit or illicit, as fits. River traders or "regatoes" may be considered itinerant "marreteiros".

The transition from "marreteiro" to minor patron "aviado" (supplied) by the main trade post, or a "minor patron" as I have called them sometimes, occurred from time to time - this constituted one of the ways in which the trade post absorbed petty forest commerce into its own structure, transforming the "marreteiro" into a trade post debtor while at the same time holding him responsible for the rubber tappers of his settlement. This strategy could work because marreteiros were sedentary, as opposed to regatoes.

We have already mentioned the fact that several "marreteiros" on the Restauração Estate held on for ten years under three different patrons, and in times without a patron, without refusing to participate in the cooperative in 1989, but continuing to trade after the cooperative dismissed their services as "cooperative managers". This continuity, rooted in their participation in the forest economy and in local social networks, confirm that the "marreteiros" were not simply an appendix to the estates' monopoly structure. Instead, they should be seen as part of the forest peasant economy, of which tapping, cultivation, hunt and trade were part-activities.

In fact, in 1987, the year when the trade post was closed up after a rebellion had expelled the Camelis' collection team in 1986, there was an immediate proliferation of both river traders and "marreteiros" - four of these within Riozinho alone, all of them also heads of forest houses. It would be difficult to estimate the volume of rubber circulating within this horizontal forest trade, precisely because the number of "marreteiros" fluctuated in direct proportion to the economic power of the patrons. When the patrons introduced little merchandise, the number of itinerant traders increased to meet tappers' demands, as did the number of tapper-"marreteiros" who acquired goods from the river traders to resell to their neighbours.

**Conclusion**

A consequence of the above argument is that trade-post patrons were not concerned with the efficiency of the productive process itself. On the contrary, as the following example illustrates, the "shopkeeper" character of the patron-trader entered in direct conflict with productive efficiency. During the early 1980s, one family of tappers on the Riozinho Estate began to construct their own rubber presses to replace the smoking house. Between 1983 and 1987, this technique spread to most other houses in the district. The method proved labour-saving and in principle allowed for daily productivity to double, without additional capital costs. Meanwhile, the patron of Restauração sought to discourage the use of this method introduced independently by the rubber tappers, asserting that "he did not know how to work with rubber planks." The main reason for the patron's opposition to this technical innovation lay in the fact that the final product were light rubber planks, easier to smuggle and with less water content (the tappers claimed that tare should be smaller or not deducted at all). Planks diluted the distinction between "rubber used to settle accounts" and "rubber used to pay river traders", the first as bundles of fifty to sixty kilograms apiece; the latter, in the past, suspect small bundles, the "principios" ranging from 10 to 30 kgs (beginnings). Planks, pressed sheets weighing ten to twelve kilograms, were suspiciously similar to "principios". Since patrons were concerned first with preserving the monopoly, they were suspicious of the plank system. Thus, the patrons' role in the productive sphere consisted, in this case, of impeding and not of organising production.

The data presented in this chapter show that the trade post that I studied in the 1980s did not control the labour process and only partially realised its function of controlling the circulation of goods. There remains no doubt as to the existence of a "labour-repressive" system on the rubber estates. But repression, as illustrated in preceding chapters with several examples, must be understood as the repression of individuals (such as clients owing rent or selling rubber) and not as the control over the labour process. In this perspective, repression aimed to secure the monopoly over natural resources and over merchandise - these were the arenas of conflict between patrons and the peasant economy of forest houses. The patron acted as a mercantile capitalist under a monopoly regime, and precisely because he failed to control the labour process, the attempt to control the circulation of goods and people physically were his basic strategies.

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Chapter 6

DEBTS, RUBBER AND MERCHANDISE

Introduction

The debt-peonage system was deceptively transparent, and the casually authoritative way that it was and is still today referred to by outsiders, whether 'mere' travelers or sociologically astute historians and anthropologists, helped mystify even more the network of histories, moral obligations, and coercions ensuring that, just as indebtedness ensured peonage, so peonage ensured advances of credit (Taussig 1987:63).

The case of the Tejo and Riozinho estates suggests that patron's power did not follow a syllogistic scheme going from debt to enslavement to control over labour. Both rent payments and rubber collected as debts involved conflict. Taussig observes that debt-peonage may be narrated as a story "whose plot moved, in Gramscian terms, from dominio to egemonia, from the opening blast of brute force (the correria or slave hunt) to the succeeding phase of debt-peonage and the subculture of mutually respected obligations it assumed" (1987:64). This suggestion of a combination of physical and economic coercion with selective and differentiated incentive contracts will be taken up in this chapter as an alternative to the theory of debts as a facade for disguised forced-labour camps.

The "subculture of mutually-respected obligations" (in fact not so much respected as having a claim to being respected) is summarised by Taussig in the postulate that "just as indebtedness ensured peonage, so peonage ensured advances of credit". Weinstein has suggested that debt relations - beyond obviating the use of

1. For such syllogistic reasoning, see Furtado 1962; Cunha 1967:24 ff; Paula 1979; Teixeira 1980:262, 222, 245; Silva 1982:18; Pinho 1984; Balck 1987:77-8; Coelho 1982:78; Coates 1987:94; Bunker 1985:67; Martinello 1988:45; and Geffray 1991. Teixeira and Balck are anthropologists; only Teixeira provides actual data on debts and work. But his own data show that tappers were indebted only "on the average".
money and allowing for the imposition of "forced commerce", an expression I borrow from Bhaduri (1983) - constituted a demand of the tappers themselves, who expected patron-traders to provide long-term advances in kind (Weinstein 1983:23-25). It is not difficult to illustrate this with examples. A Juruá riverbank cultivator who neither paid rent nor was a trade post client complained about an itinerant trader who wished to settle his credit balance in cash, since this sort of "account liquidation" would represent the rupture of a tacit contract implying the continued supply of goods, even when he did not dispose of a positive balance. In this case, the preservation of debts served to guarantee the continuity of mutual obligations, and in particular, to establish a continued flow of commodity advances. In this respect, the aviamento supply relation is not simply the result of coercion or of a paternalistic/clientelistic culture. The aviamento supply relation represents a long-term exchange agreement which is pervasive in the rubber, fishing and agricultural economies throughout the Amazon, within the contexts of imperfect markets and of demonetised economies (Santos 1989:51 and 1971: 159). Why, then, has so much emphasis been placed on the role of violence in maintaining debt relations and, at the same time on the role of an ideology based on moral kinship ties (Geffray 1991) in reinforcing these same relations? This may be due to the inability to distinguish between the aviamento relation and a violence-based monopoly.

We shall argue that, even though the rubber tappers may consider the advance credit system (and the corresponding debts) as legitimate, this does not mean they accept as equally legitimate either the monopoly clauses demanded by the patrons or the use of violence to ensure this same monopoly, which is not respected by either tappers or itinerant merchants. It follows, then, that rubber tappers should not consider as fair or moral the exchange relations with the patrons either, when they see the latter resorting to violence in order to extract usurious profits thanks to monopoly prices. This is confirmed by the resistance movements discussed in previous chapters, where in a first moment rubber tappers did not fight against the debt system as such, but against its use as a means of exploitation, through the extraction of exorbitant profits. Furthermore, there is no evidence to support the assertion that a morality of patronage led rubber tappers to preserve the aviamento or debt system against their own interest. Using the words of economic historian Roberto Santos, the tappers do not confuse the "tacit contract" of commodity advances against future payment in kind with the "complementary pacts" which ensured a monopoly or with the ideology which deemed parallel commerce "immoral" (Santos 1974:22).

The Rules of the Trade Post

Rubber tappers began their purchases between March and April, at the beginning of the summer season, and later at two or three-month intervals throughout the year. On the remote Restauração Estate, in 1982, goods arrived from the mouth of the Tejo (the major trade post) in June, September and November. A house-head living on the Rizinho Estate had the option of going to the next store house (the Rizinho "Deposit") or to the Restauração trade post, at an additional distance of three to six hours on foot. Once at the trade post, after-some informal conversation and a rest, he would buy goods on credit, without

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2. The aviamento or advance supply system, deprived of violent coercion, "would resemble, without adding much, the truck-system or shikomi of the Japanese fishing industry" (Santos 1980:156).

3. Santos defines the aviamento as: "...a commercial contract for the sale of goods on credit, a mutual contract referent to the money lent, a civil contract committing the purchase and sale of rubber at an established price ... including complementary pacts (based on the notion of the 'immorality' of the tapper to sell rubber to anyone but his creditor" (Santos 1974:22).
having to deposit any money or rubber at this point, and usually not taking into account the price of the products acquired. The articles purchased were recorded on a "purchase receipt" or notas de compra. In principle, a copy of this "receipt" would be given to the house head, the only person in his house allowed to buy goods at the trade post. "Purchase receipts" were then transcribed in a notebook for each house head. In January, at the end of the tapping season when rubber was turned over to the trade post, these accounts were tabulated in the form of balances. Though double-accounting was used, accounts were complicated for several reasons, including the existence of multiple categories of debts and credits, the presence of two accountable currencies (money and rubber), the variation of prices over the course of the year and the levying of interest and "commission" charges. Only rarely did a Riozinho house head know how to read, though most were quite capable of performing mathematical operations in their heads (Table 6.1).

The debit column of accounts included the closing debt of the previous year (in kilograms of rubber, converted into Cruzeiros at the current price quotation); the cash value of the dated purchase receipts (including a "commission" charge if rubber was to be paid at the final price in the season); and debts for cash advances (with 60% interest). Debts that one tapper owed to another also were accounted for here (in this case, they were tabulated also as the other's credit). The sum of the debt column or current gross debt was expressed in money. The credit column included the "liquidated" rubber turned over to the trade post and converted into money (at distinct prices corresponding to the periods of purchases, if the merchandise was debited without "commission" or interest; or at the final price if goods purchased were charged interest), plus credits in Cruzeiros for transactions between rubber tappers and for products or services sold to the patron besides rubber. These items made up the gross credits.

The final money balance was calculated in the equation of gross credits minus gross debts. If this balance was negative (a net debt), it was converted into rubber at current prices and forwarded to the following year's account (if rent had not yet been paid, it would be added on the next year's account). If the balance was positive (net credit), it would remain as a credit in money on the next year's account - though, at the rubber tapper's criterion, it might be converted either into goods or cash for "rubber surplus", in this order of frequency. A further type of transaction was sometimes registered separate from the accounting procedure described above: the encomendas (advance orders), which involved particular goods, usually of high value, ordered specifically for an individual rubber tapper, in exchange for a previously-negotiated amount of rubber (a shot-gun was a typical case). These encomenda transactions were liquidated with payments in rubber and were not treated as the usual accounting debt, even though there was a period of months between the order, delivery and final payment of the goods in rubber. They were seen as "cash" and were not affected by uncertainty on the terms of exchange; they did not affect the previous balance, just as was the case when the trade post turned over cash directly in exchange for rubber "in cash", i.e. surplus rubber delivered on the spot or not, in a previously agreed amount.

Transactions between rubber tappers having both accounts at a single patron-trader could be cleared through the trade-post accounting, generally in the case of somewhat elevated sums, such as those involved in the sale of garden plots or livestock. They were recorded informally on the spot, without requiring the presence of a trade post representative, on "receipts" (simple pieces of paper written by a literate person) passed from one tapper to another, who authorised the trade post accountant to transfer the amount from the buyer's account to the seller's. For instance, when in 1983 a house head at the Jarana settlement decided to move to another settlement, he sold his manioc gardens, coffee and coconut palms to
another house through a "payment order" cleared by the trade-post, involving hundreds of kgs. The trade post was not notified beforehand of these transactions. Small transactions, however, could be consummated directly through the transfer of rubber from one tapper to another, usually small lumps that could be easily produced and transported, just as purchases from regatões or marreteiros. The sale of beef on special occasions, such as union meetings or parties in the forest hinterland (paid for in rubber on credit or on sight at the going urban rates) were examples of these small transactions in which rubber played the role of currency.

This local circulation of rubber might result in the flight of rubber from the estate's monopoly, when transactions involved parties from distinct, neighbouring estates in the forest. Thus, the rubber credited to a house head could include a variable proportion obtained through transactions with other tappers, whether transferred directly or by the accounting process. Finally, besides the rubber obtained through petty forest trade, the house-head's credit could also include the rubber of sharecroppers, employees and tapper-clients. Although the trade-post did not distinguish the sources of the rubber delivered by a house head, the debit due to purchases was subdivided into direct purchases by the house head and by subordinate houses, sharecroppers or employees, and in principle the latter had to be authorized by the house head.

On the rubber estates, the circulation of specie was exceedingly rare. On the Riozinho estate, there were middle-aged rubber tappers who had never been to a city and did not know how to use money, and most children had never seen money either. Ideally, a trade post should possess its own money supply, but money was somewhat like certain kinds of merchandise, such as medicine, which had only occasional use and in emergency situations (cf. HUMPHREY 1985:52). Cash advances received different treatment than the advance supply of goods, because they drew interest (called juro) and because cash advances only could be justified to cover expenses outside of the rubber estate, as in the case of illnesses requiring emergency travel. Even on these occasions, in most cases the rubber tapper did not leave the estate with cash, but with an "order of payment" issued by the trade post, authorising a commercial establishment in town to furnish the cash (before 1980, at 30% interest for any period up to a year, reaching 60% in 1982), a procedure which meant the rubber tapper would remain tied to the patron's commercial establishment while in town. In principle at least, however, tappers with "surplus rubber" at the end of the year had the right to receive its value in cash on the estate itself.

Manipulation of Accounts

The stages leading up to the final balance allowed for an ample margin of account manipulation by the trade post, beginning with the records registered throughout the year - the many purchase receipts and the weighing of rubber frequently included mistakes, often outrageous ones, such as debiting the same purchase to two different accounts from the same colocação (settlement) - and often occurring in the accounting process itself, with its labyrinth of different prices, interest rates, currencies and payment plans, which in most cases rendered the final result practically impossible to estimate beforehand with accuracy, and only in rough terms within a broad margin of error.

However manipulated, the double accounting system recognised in principle that the tappers had an exclusively commercial relation with the trade post - a relation governed by prices, which although fixed by a monopoly, could not be altered once a transaction was consummated. On the other hand, the context for this accounting procedure was a brutal difference in the degree of information and control between parts involved in the commercial transactions. Does this mean that
both commerce and prices were mere theatrics, masking the expropriation of rubber by the trade post in arbitrarily-assessed quantities, in exchange for goods whose quantities also were assessed arbitrarily by the same trade post?

In considering trade post commercial strategies, we shall see that this clearly was not the case. Though manipulated, the gross debt was in fact tied up to the going prices, however high or abusive; manipulation was constrained by the appearances. Once the arbitrarily high monopoly prices were established, commodity prices spread throughout the rubber estate, quoted in rubber. Rubber tappers can easily assess the inflation along the last years quoting the successive rubber-values of powder milk or of cooking oil; thus, "in that year (or at the time of patron X, a can of powder milk cost one kg rubber; now it takes four kgs rubber to buy the same" is a typical and accurate comment about the fall in real value of rubber from 1985 to 1992. Hence, the tappers' insistence in maintaining steady prices all year long makes sense, since under the assumption of constant prices prices gained an immediate transparence as rubber quantities.

Patrons could have argued that prices kept constant over the year had to be much higher than prices on the urban market, since they both anticipated future inflation and paid profits. Tappers reasoned that, given constant prices all season long, they stood to gain with the rise in rubber prices if payments for rubber were set at the final price quote, in a system where official price hikes were first announced informally and later by radio. In the 1970s, the Brazilian government established several radio stations in remote border regions as part of a national security policy. The Cruzeiro do Sul radio station transmitted personal messages from town to tappers in the forest, as well as messages from patrons. But until 1982 messages with the price of merchandise or of rubber could not be broadcast. Information was dangerous because the tappers could put it to use.

A crucial characteristic of the transactions involving the interval of a year resided in that effective prices were not really known until the final balance - when the final price of rubber was established ("the town price"), after having increased two or three times during the year, which apparently made many rubber tappers think that this system worked in their favour. This hypothesis may serve to explain why, in 1982 and 1983, most of the rubber tappers on Riozinho Estate refused to accept that their rubber be settled at "several prices" at the end of the year - which in effect meant that the monetary value of their purchases were expressed in rubber at different rates (of rubber) throughout the year. The tappers wished to derive benefits from the "higher price" of rubber at the end of the year when their yearly production was "liquidated" - preferring to accept payment of a 30% "commission" over their goods purchases, whose prices they insisted maintaining constant during the year, for the right of having the "final price of rubber" paid for their product. With the escalation of Brazilian inflation in the 1980s, these rules became increasingly impossible for the patrons to observe.

It must be noted one consequence of the principle according to which "surplus rubber" or borracha de saldo could be converted into cash: this could be used not only to buy goods "out", but also at prices much lower than the standard trade-post price. In order to prevent tappers from achieving positive balances, some patrons (especially those possessing bank loans) pushed greater amounts of goods upon their clients.4 Heavy debts or high level of purchases came thus to be associated with workers who were both hard workers and "courageous", or spendthrift tappers - "thriftiness" was not a general rule (cf. Gudeman 1990:162ff). We must thus bear in mind that the notion of "heavy debt" was not absolute but

4. We assume here a patron who had access to generous bank loans. But remember the alternative strategy of seeking to thwart the exodus of "surplus rubber" by summoning the police.
rather relative to the productive capacity of a household, since the advance (and corresponding debt) of a "valuable good", say a gasoline engine, worth 400 kgs. of rubber would be an exceedingly high risk for a trade-post if it benefited a house whose annual output was 400 kgs. (it would simply leave the debt outstanding at the end of the year), while it might represent an investment in the case of a house, capable of producing 1,200 kgs. (who would convert it into an increase in the rubber product turned over to the trade-post). Thus, "heavy debt" was not a synonymous for unpayable debts. In considering this accounting strategy in detail, one finds that the accumulation of high gross debts over the year were stimulated, but they could represent at the end of the year a low debt in net terms (that is, when they corresponded to an equally high gross production as well).

The problem with the patrons' strategy was that a category of tappers who were both "hard workers" and "thrifty" did exist. A house producing 1,200 kgs. of rubber and possessing livestock might refuse advances of unnecessary goods, thus ensuring a cash balance ("free of debt") at the end of the year, provided that the rules were observed. In this case, the patron would have to adopt another strategy to keep the tapper's rubber within the trade post. One such strategy was that of reducing his own profit margin per unit good (although not total profit), by selling goods at "city prices" in exchange for the "surplus rubber". Thus the trade-post could use both a monopoly price and a "free-market" price.

By affording the access of some tappers to non-monopoly prices, "surplus rubber" could result in a cumulative effect, as demonstrated by a few highly-productive tappers on Riozinho who, during the 1980s, in making their annual purchases with balances left over from the previous years and during a period of rising rubber prices, were able to remain "in the black" and to accumulate wealth in the form of "valuables" and cattle. For these tappers, the next step was the patrons' attempt to recruit them as sub-patrons, converting them from creditors into debtors of capital advanced in the form of merchandise.

The accounting system's apparently unlimited capacity to manipulate accounts has led some observers to formulate two propositions. The first proposition (1) posits that no tapper could achieve a positive commercial balance (the trade-post would raise prices until the balance was offset); the second, stronger proposition (2) argues that tappers' consumption would lean towards a minimum while at the same time production would lean towards a maximum (the trade post would raise prices to the point where the minimum necessary was equal to the maximum produced).

The picture outlined above contradicts these propositions. In logical terms, they would be inevitable indeed provided certain conditions were met, to wit: (3) a perfect monopoly (smuggling would be impossible on the part of clients); (4) a total monopoly (there would be no production except of rubber, forcing clients to obtain every item of consumption at the trade post and barring them from "purchasing direct from the forest with their own work"); (5) an inescapable monopoly (clients could not leave the game because flight would be impossible). But it should be clear both from the historical record and from the ethnographic description that these

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5. A house of means might also use livestock as collateral for loans, increasing the security of patrons' investments.

6. Here, for simplicity, we identify highly-productive house heads as "hard workers". Nonetheless, a large rubber output might be produced with little individual labour input in a big house; and a low output of rubber might be related to hard work in agriculture and hunting. Thus, "hard working houses" is not an assessment of individual productivity.

7. Highly-productive houses included those headed by Chagas Farias, Timóteo, Nascimento, Leão, Cunha. All of them were above the mark of 1,000 kgs/year.

8. These sub-patrons, receiving advances from other patrons, are identified by the term "patrão-aviado" (supplied patron).
conditions were not necessarily valid, and thus there is no reason to expect propositions (1) or (2) necessarily to occur.

If they did in fact occur, one might expect certain consequences, to wit: (6) tappers would be homogeneous (differences would be erased by the trade post, which would appropriate productive margins for itself); (7) there would be no accumulation on the part of rubber tappers; (8) bargaining between tappers and patrons would have predetermined results and would not allow for tapper gains. In the remainder of this chapter, it is suggested that (6), (7) and (8) do not occur, based on real examples and on statistical data on debts. In other words, social differentiation among tappers, local accumulation and even the exploitation of one tapper by another all can exist precisely because there was no absolute monopoly (a combination of perfect, total and inescapable monopoly as in 3, 4 and 5) on the rubber estates. This conflict in the sphere of distribution exists between the accumulation of mercantile monopoly profits by patrons on the one hand, and the accumulation of productivity gains by rubber tappers, on the other.

House Account Strategies

The examples which follow of interaction between the trade post and forest households come from the same colocação or forest settlement where I lived and, consequently, where I was able to observe in detail the movement of debts between September 1982 and November 1983. The "Tacaratu" settlement was occupied by four houses. Three were located in the principal clearing and had independent accounts with the trade post: one house where old Ferreira lived with his wife Nazaré; Nazaré's married son Chagas' house; and the residence of Assis, another married son of Nazaré. Juvenal, Ferreira's brother, lived in a separate clearing, in the same settlement. Juvenal was Chagas' "client". Chagas rented the trail tapped by

Juvenal from the trade post, and Juvenal's purchases were made through Chagas' account.

In February 1983, Chagas obtained a copy of his final balance from the Restauração trade post. Chagas had a ton of rubber (1,061 kgs.) to his credit, which was weighed at three different occasions, "corresponding to his purchases and his rent during the 1982 harvest", according to the formal account records of the trade post.9 Once rent was deducted (90 kgs. for three rubber trails), 971 kilograms of "tared" rubber remained. By his own accounts, Chagas should have had a debt-free balance. My own estimates concluded that around 611 kilograms would suffice to pay his gross debt; the 360 ks. of "surplus rubber" already had been exchanged for cash in January, when Chagas used it to purchase articles at the Vila Thaumaturgo novena. However, contrary to this expectation, Chagas final negative balance rose to nearly 100 kgs., which could not be explained even through an "error" (although the trade post accounting showed only 581 kgs. of rubber on Chagas' credit, an "error" of 30 kgs. according to our own calculations). The debit apparently had been calculated according to the accounting rules described above. The 100 kgs. of net debt rubber represented 55,425 Cruzeiros (approximately US$250), converted at the going rate (Tables 6.2, 6.2A, 6.2B).

Chagas first thought that the patron had charged interest on the money paid out in January in exchange for his "surplus rubber", which would have been contrary to the accepted rules. He arrived at this conclusion when he noticed that part of his account included a 60% "interest" charge. According to the current rules, 60% interest was levied on cash forwarded - but with the exception of payments for

9 The cases under study exemplify how my own efforts to understand the trade post accounting based on both current receipts and final account statements, assisting the tappers of many other houses. During 1982-83 I never had access to the trade post general balance sheets. I obtained a copy of these only in 1987, thanks to an ex-employee.
"surplus rubber". Chagas' reaction was filled with indignation: "I'm going to tell him that I thought I had done business with a man!"

An important detail worth pointing out is that Chagas had calculated precisely the amount of "surplus rubber" available for cashing in and the trade post had accepted this calculation in January. For Chagas, this "surplus rubber money" had to be available before January 20, first day of the Vila Thaumaturgo novena, when minor and major patrons, river traders and local peddlers, urban merchants and neighbours get together for a week at a riverside bazaar. By that date, he had not transported all his rubber to the trade post yet, nor was his final balance prepared, but the trade-post accepted to grant him money for his "surplus rubber" which he threatened to take over to Vila Thaumaturgo anyway.

It is instructive to consider how Chagas spent the 176,000 Cruzeiros he received from the trade post, for the 360 kgs. of rubber handled as "surplus rubber". First, Chagas bought basic provisions ("estiva" goods) for 1983 at the novena, at market prices, from his own patron (there competing with the other merchants), spending only thirty percent of his cash (50,000 Cruzeiros): 36 litres of kerosene, 60 kgs. of salt, two sacks of sugar (60kgs), a box of soap bars, eight kgs. of coffee, three kgs. of shot for hunting and a kilo of gunpowder. It also should be noted that these goods were not readily available at the fair, since the patron displayed stocks composed mainly of "luxury" goods; Chagas was to receive the basic goods he purchased at the fair directly from the Restauração trade post, once he had returned to the estate.

The only difference lay in the fact that the transaction, settled outside the estate and independent of the debt mechanism, carried much lower prices. Chagas spent the remaining 70% of his cash on "valuables" and "utensils" (according to the classification outlined in the previous chapter), bought from different river traders -- a record player and two records, clothing, scents, a complete set of new pots and pans for the kitchen, a metal cabinet in which to store flour, two metal tubs, batteries --, along with small expenses with food. Chagas thus self-financed the consumption of durable and non-durable goods for the following year. He was able to estimate his surplus because he had opted to pay the so-called "commission on goods" (a mark-up of 30% on merchandise prices) in order to turn over his rubber at the year's final price quotation. Adding up his purchases at the trade post (including the 30% "commission", a term which distinguished this charge from "interest"), he now arrived at the total of nearly 408 kgs, which together with the rent and to his surplus rubber added up to 858 kgs or 80% of his delivered rubber (Table 6.3). The 272 kgs of his client's purchases at itinerant traders (plus 30 kgs not accounted for) added up to 29% of the delivered rubber, leaving an excess of 9% over the delivered rubber (Table 6.3). Now the interests charged by the trade-post on his client's purchases to itinerant traders amounted to 102 kgs of rubber, or precisely 9% in excess of his delivered rubber. The problem with Juvenal's account was that most of his purchases had been made from river traders, and were increased by 60% "interest" charged by the patron, who had by the end of 1982 bought up the river traders' debts in exchange for their promise of leaving the area (see Chapter 4). This interest added up to 102 kgs. of rubber, about the final (and unexpected) debt that Chagas found on his account. Apparently, Chagas was aware of the volume of his client's debts, but he did not suspect that the patron would levy "money interest" on these debts. The patron sought to justify his actions by claiming that in order for the river traders to leave the area, they had to be paid "in cash" (when a 60% interest was charged). After going over the details of his account, Chagas redirected his indignation towards his own client, accusing him of falling deep in debt to the river traders by purchasing presents to give to the young women of the neighbourhood, in the hope of landing a wife. As a matter of fact, this was not true, since Juvenal's major purchase was a new shotgun, really an investment and not a "luxury", but one which he probably would not be allowed to obtain from the patron, since he was a
tapper of low productivity (also, Chagas charged 25% higher than the trade post prices). Chagas then sought out the patron Corrêa and complained that he had not authorised Juvenal to make such purchases from the river traders. The patron replied that, in any case, since Chagas was Juvenal's patron, he was responsible for his client's debts.

Though neither Chagas nor his wife Maria could read, there can be no doubt as to the fact that Chagas had calculated his account so as to remain with a zero balance at the trade post, and to maintain a stock of goods - while the patron had insisted that he purchase much more, trying to seduce him with a diesel engine and an ubazada de mercadoria, or a canoe filled with goods, which presumably Chagas could resell at a profit to other rubber tappers. When Chagas refused to fall into what he considered a "trap", the patron called him a coward: "By the Virgin Mary: are you afraid of bills?" Chagas played safe, but the patron was clever, as Chagas admitted: "Nobody fools him. He never was fooled and never was marretado (i.e. never lost money in a business deal)."

Unlike Chagas, and like many tappers, old Ferreira (Chagas' neighbour and stepfather) easily was satisfied with the vague notices of his account offered by the trade post manager, such as: "Your bills with the river traders have already been paid off..." Or, to cut back on trade post supply advances, "Ferreira, your account is getting a little heavy..." When Ferreira asked to see his account, the book-keeper's wife sought to appease him, saying: "Padrinho, you're not in too deep with the patron. You're in pretty good shape."

10. Though illiterate, Chagas could propose and solve problems such as the following. What is better: pay a bill of 5,000 Cruzeiros to a river trader in rubber, at the current rate of 800 Cruzeiros, or transfer it as a "trade post order", waiting for rubber prices to reach 1,000 at the trade post, and then paying 60% interest on the account?

11. Note that a tapper is the godfather (padrinho) to the trade-post's clerk's wife. The clerk Gedeão first entered Restauração in 1982 as a rubber tapper, marrying a local woman. He later was recruited by the patron as an accountant, since he proved capable in reading and arithmetic.

At the end of the year, Ferreira owed 274 kgs. of rubber, while he had produced 499 kgs. This was a heavy debt -- that is, 55% over his total output. Taking out 33 kgs. for rent (though Ferreira tapped two trails depicted in Map 5, he refused to pay rent on the one he personally had opened), 466 kgs. remained. But Ferreira had paid 278 kgs. to river traders and local peddlers, leaving only 188 kgs. of "account rubber" (the trade post recorded only 177). The rubber turned over to the trade post, at 548 Cruzeiros each kilo, would yield 97,000 Cruzeiros in money terms, but his account owed 247,542 Cruzeiros. His debt corresponded to 274 kgs. of rubber, almost exactly the amount he had spent in purchases with the river traders (Table 6.3, Account II).

Unlike Juvenal, however, Ferreira did not pay high interests, since he usually paid for his purchases directly in rubber, and generally to socially close river traders: 77 kilos to Chico Farias (Chagas' brother), 40 kilos to Altevir Farias (another brother of Chagas), 65 kilos to Magalhães (Altevir's father-in-law), 53 kilos to Furtado (patron of Dourado sub-estate, within Restauração), and 43 kilos to Timóteo, a river trader whose father was patron of the minor trade post of Riozinho (Table 5.9A). Had Ferreira not bought anything from the river traders, he would have to direct all his production to square away his account at the trade post. Buying from the river traders he obtained many small additional items.

Taking a quick glance at the third house of the settlement, headed by Assis, one also finds a heavy debt as a proportion of the total product. Assis produced 700 kgs. of rubber during the year, about half of what a young and strong tapper like himself was capable of producing, though no one could accuse Assis of not being a hard worker. Alone, without grown sons or hired hands, Assis tended one of the largest manioc plots in the region and was proud of it. Of 700 kilograms of rubber
produced, Assis bought goods worth 300 kgs. (a proportion similar to Ferreira) from river traders, and after paying rent, the remaining amount of rubber proved insufficient to settle his account. Like Ferreira, his debt to the trade post added up to about the same amount he had spent on purchases from river traders, also with direct payments which avoided "interests".

The foregoing examples of three houses from a single settlement show both the range of rubber productivity (500 to 1,000 kgs), the patron's account manipulation, and the diversity of strategic responses on the part of the house heads. They also show how "debits" only have meanings as part of a different productive capacities and different purchasing strategies. Ferreira's debt was high in relation to his productive capacity (55% over his current output), while Chagas' debt was low (9% over his current output), and thus Ferreira owed half of the following year's expected production, while Chagas owed less than one tenth. At the same time, Chagas had by then purchased his basic needs for the next year (and had in fact accumulated over the year), while Ferreira's debt was inclined to grow even heavier unless he was to cut his consumption drastically or increasing his production. 12

One obvious reason for differences between tapper house was the number of house tappers. Chagas was a middle-aged house head, with two adolescent sons (from a first marriage) and a young wife, his second, capable of undertaking the arduous tasks of cultivation. He and his sons could thus exploit two rubber trails, cultivate reasonable maize and manioc crops, as well as hunt - not to mention a dozen head of cattle (descended from a cow acquired by his first wife), thirty head of swine, chickens and ducks. Chagas did not need to buy flour or meat (which he would not find for sale anyway), and he had slaughtered an ox each year during the last two years, whose meat he sold to tapper neighbours in exchange for rubber.

Note however that besides having sons able to work (although only part-time), Chagas's rubber included that delivered to him by a client who worked a third rubber trail, thus increasing his total volume of rubber production; and two also grown-up girls lived as foster-daughters in his mother's house, although Chagas benefited from the settlement's working team including his stepfather Ferreira, his brother Assis, and his client Juvenal, who lived in the forest a short distance away. By contrast, Ferreira, Chagas' stepfather, godfather and neighbour, was too old to work efficiently as a rubber tapper and, following a stroke, had lost much of his former hunting ability; his stepsons all were heads of their own houses and did not have time to contribute much labour to their stepfather's unit; his wife also was old, limiting herself to household chores, leaving Ferreira alone to undertake cultivating activities and to take care of two god-daughters, the Chagas' female children, "given" to Ferreira. Ferreira tried to attract hired tappers (empregados), young single men of 17 or 18 years old, but these were attracted precisely by houses whose total productivity might benefit them, but they showed little interest in supporting the house of an old man like Ferreira.

Juvenal was a mature, adult tapper who lived on his own as a client, but there were other cases of house heads with a full domestic group who remained the client of another, thus avoiding dealing directly with the trade post. This was the case of Ivan, a tapper who loved the forest and its game, and who was less interested in larger agricultural or rubber production. He had planned to pay off his bills and leave the estate by 1983, but he stayed on another year because he did not have the "positive balance" he had expected.

12. On the Bom Jardim settlement, the record Nascimento's house had a net debt at the end of 1983. But on that year, Nascimento (1,800 kgs) bought a house in Cruzeiro do Sul, along with a refrigerator, a fan, a jug and some chairs, and in previous years he had purchased a gasoline engine, two Singer sewing machines, a gas stove, flashlights, shotguns, a radio and two Japanese watches. He along with the cattle he kept near the house, these were bonuses paid for by the labour of four adult sons, as well as by Nascimento's own solid management, as he was one of the first to buy his basic needs at urban prices with his "surplus rubber" (borracha de saldo). In
In the foregoing analysis, we have assumed that the basic strategy adopted by the trade post sought to maximise the total volume of rubber. In order to do this, the trade post sought to maximise gross debts, subject to the productive capacity of each house. This was achieved by increasing the volume of commodity advances (at a given price that already included profits and costs), and then imposing an additional mark-up over the capacity of the household to pay. Had this strategy been executed perfectly, two consequences would have resulted. First, the gross credit of the tapper (result of rubber turned over and other transactions) would be canceled by the gross debt (merchandise advanced), and thus all the tapper’s rubber would be committed to the trade post. This effect would increase the proportion of the total production bought up by the trade post at monopoly prices (as "debt rubber"). This was a monopoly effect. Second, rubber tappers would be encouraged to produce more rubber as they received more merchandise. This second effect influenced the total volume of production: it was an incentive effect. Such a basic strategy, however, could only work "on the average".

The Distribution of Debts

Accounts included annual flows (gross debts and credits that grew at different paces throughout the year), while the final balance was composed of a defined net quantity determined only at the end of the rubber harvest.

Even the trade post faced the unpredictable nature of this process. Hence, the trade post adopted a global policy dealing with averages and totals, around which houses were expected to oscillate between greater or lesser margins. By quantifying the variables mentioned, these hypotheses can be checked with data.

13. It should be noted that these effects of differential supplying would be superfluous in systems with direct repression of the labour process or with an abundant labour supply.

14. The data cover the 1982-83 harvest (balances of January and February 1983, obtained at tappers’ houses); the first half of 1983 (weighings of August 1983, covering half of all houses); the 1983-84 harvest (balances from trade post books, covering 70% of all houses). In these different sources, and in the same sources, part of the data originally appears in money values (Cruzeiros, converted by me in Dollars and Pounds Sterling) and part in kind (kilograms of rubber). There are inconsistencies, but the data should be taken as indications on the order of magnitude of debts (both global and average), as well as on the differences between individual producers.
66 productive houses), we get a total output of 43,230 kgs (43 tons roughly), and a total debt of 9,900 kgs (roughly 10 tons). These figures are within the order of magnitude which would be expected on the basis of interviews.

Clearly, the distribution is biased for the debt side: 65% of houses sample had net debts, and the average among those with net debts was 273 kgs (42% over the average output of 655 kgs/year), while the average among those 35% houses which manage to strike net credits was only 73 kgs rubber (11% on the average output). The data from this harvest show, however, a very high variation between individuals houses. Individual balances for 1982/83 ranged from net credits worth 200 kgs rubber to net debts worth 898 kgs of rubber.

According to trade post balance sheets (obtained only in 1987) for 48 houses, the average gross debt stood at the end of the 1982/83 harvest at 675,000 Cruzeiros (US$675 or £452 at going exchange rates), while the average gross credit was 584,000 Cruzeiros (US$584 or £391); the average balance was thus a debt of 91,000 cruzeiros. At the rate of 500 cruzeiros to a kg rubber, this figure corresponds to 182 kgs rubber (compare with the figure of 150 kgs obtained on the basis of individual accounts and interviews). Based on the trade post data (Table 6.5), we see also that the gross credit (average over 48 houses) included 525,000 Cruzeiros in rubber turned over (483 kgs. of rubber, without including rent) and 59,000 for credits of some other sort.

The same book gives information on the accounts for the 1983/84 harvest. The net debts left over from the 1982-83 harvest were incorporated into the gross debit of the 1983-84 accounts, including inter-harvest expenses debited to accounts. The 1982-83 negative balances were increased by the purchases made between the liquidation of the previous harvest (sometime between January and March of 1983) and the month of July 1983, resulting in the transfer of a debit of an average of 399 kgs. of rubber in July into the account.\textsuperscript{15}

In the trade-post books, the gross debt registered in July 1983 (incorporating the net debt of the 1982-83 season and the inter-harvest debts) appeared as a single item in the final gross debt of the 1983-84 harvest, which averaged 675 kgs. of rubber. In other words, debts left over from 1982-83, along with additional purchases made before July 1983, accounted for 59% of the final 1983-84 debt. Once the tappers had turned over the rubber from the 1982-83 harvest, the average final net debt remained at about 68 kgs.

It would appear as though the balance of February 1984 showed a smaller average net debt than the balance of February 1983 (68 kgs. versus 150 kgs.). The average product turned over to the trade post in 1983-84 was 483 kgs. to settle accounts and 66 kgs. for rent, or a total of 543 kgs. per house. Over this total, 66 kgs. represent 12% (compare with 150 kgs. of debt for the previous year, over an estimated total production of 650 kgs on the average, or 23%).

The moral of the story is that the average house maintained a constant net debt ranging from 12% to 23% from one year to the next. There is reason to suggest that this order of magnitude was a the result of a conscious policy on the part of the trade post, which sought to guarantee a high profit return in spite of the variation between individual house. In 1987, a former estate manager's (active from 1982 to 1984) observations begin by explaining how debts were transferred from one year to the next as a consequence of the incongruity between periods of production and periods of advance supply:

\textsuperscript{15} Note that for July 1983, I converted debts into money expressed in quantities of rubber, using current prices. In practice, the trade post used different prices depending on individual arrangements made with tappers. Therefore, the figures in rubber must be seen as mere estimates.
Almost all the clients owe at the end of the tapping season and that debt remains to be paid with the production from the following season, and then comes another debt and so on. Like, for example, these debts left over from 83 will be paid off only in 85 with the production from 84. That's because one year's accounts only are settled the other year in April or May.

In 1983, explaining the role of permanent indebtedness in the accounting system, the same manager had told me:

I'll give you an example. It's not a real one, it is between you and me, it's just to give you an idea. Suppose the merchandise is worth 20 million Cruzeiros. At the end of the year, many rubber tappers do not settle their whole account, and the rubber turned over doesn't reach 20 million . . . But the merchandise cost only five million. The patron is who sells it for 20 million. So that's a lot to pay, even if the tappers stay in debt. Look, this merchandise is bought in São Paulo. The price in Cruzeiro do Sul already covers transportation, taxes, everything. It's already yielding profits. Then he tacks on another eighty or a hundred percent to that price. That's how it is when it gets here. Then we add on another twenty percent. So, when the client complains we give him a fifteen percent discount, which still leaves us with five percent over the price at which the merchandise arrived here. Then we don't have any losses . . . Even with the client in debt, he only owes in terms of our price, but the rubber he turns over already is enough to pay for the merchandise.

Average accounts included thus costs, profits at different points of the mercantile hierarchy, individual bargains and some tapper's refusal to settle their entire bill, as well as an average debt.

On the Riozinho Estate, the average debt of about sixty-six houses represented a macroscopic variable, as did the total volume of goods advanced (the aggregate gross debt in money terms) as well as the total volume of rubber turned over by the tappers of within each category (gross credit in money terms). We find the trade post acting upon these macroscopic variables through the fixing of prices for rubber and for merchandise (within the different classes of goods), increasing or reducing the total volume of merchandise available at the post according to each kind of good. In acting upon these variables, the trade post affected the total product turned over by tappers' houses. A global, statistical approach was enough to maintain profits and the average debt; it did not require a mechanical control of individual cases.

Excessively high profit taking (for example, much higher prices for "luxuries") could lead to a reduction in the amount of rubber turned over for these goods, hence reducing global output; excessive profits in the "basic goods" sector could lead to an increase in net debts without a corresponding increase in production - up to the point where other control variables would step into action, such as the use of physical violence to stifle river traders' activities or the seizure of tappers' possessions.

In other words, the same macroscopic state (for example, forty tons of rubber distributed in 480 kgs. per account for advance purchases and 60 kgs. for rent) could result from a great number of different microscopic conditions. On a hypothetical rubber estate with two households, a macroscopic state characterised by an average production of 600 kgs. of rubber could occur when house A produces 400 kgs. while the output of house B is 800; or when house A produces 800 kgs. and house B 400; or when each house produces 600 kgs. and so on. Thus, the persistence of debts on the average is consistent with the oscillation of individual houses between debts and credits. Some macroscopic states allow for a great many micro-states to exist (metaphorically, these states have high entropy), while other states do not permit micro-state variations (low entropy). Hence, considering the hypothetical example
above, if the macroscopic state is characterised by an average production of 1,200 kgs., which, shall we say, also represents the maximum production, then only one microscopic state would be possible on this hypothetical rubber estate of houses A and B, where both houses produce exactly 1,200 kgs. of rubber. This macroscopic state of maximum exploitation would permit a minimum of variation (it has low entropy). Situations characterised by low entropy are unstable and the price to maintain them involves a considerable degree of coercion and violence (which is analogous to the maintenance of great differences in temperature, when it is necessary to expend energy with refrigerators or heaters).

Within the context of the early 1980s, the Tejo River rubber tappers operated under conditions marked by a relatively high degree of internal disorder. This meant that the trade post could not predict the individual behaviour of each household, nor could it obtain a theoretical maximum product - on the other hand, it proved able to predict average and total performances with confidence. The trade post advanced goods whose total nominal value was greater than the total production expected (including 15% to offset costs with managers and employees). This level of exploitation allowed houses to react differently, as individual houses ranged from "productive" to "unproductive" units. Most had debts that passed from one year to the next, thus remaining tied to monopoly prices; even those house who were not in debt were forced to assume debts at the beginning of the harvest; a few accumulated resources to finance themselves and were then benefited by the cumulative effect of non-monopoly prices.

Morality and Exploitation

I'm going to tell Sebastião that there is no patron here! Epaminondas, now, there was a patron: he may have cheated, but he was a patron in times of need (words of one of Chagas' brothers).

Just as the political relations between patrons and rubber tappers have been presented as a combination between violence and non-consensus legitimation in the Chapter 5, in this chapter we have argued that the advance commodity trade is an arena of dispute. However, it may appear as though I agree with a hypothesis concerning the "morality of patron-client relations", because I have argued that tappers accepted the principle of legitimacy with respect to the advance supply and debt system. The term "debt fetishism" may be taken as a label for the idea that the commodities in circulation become identified with the persons who receive them as advances and who by extension would become the property of creditors (Taussig 1987:70). However, we have reiterated that "debt fetishism" is denied by the rubber tappers who see themselves as autonomous agents. Therefore, we need to look more on the notions of legitimacy and morality of exchange.

The terms of trade could be considered unfair by the tappers, even though the existence of advances was viewed as legitimate. In conversations held at a distance from the trade post, it was common for tappers to entertain the notion that the patrons cheated them - irrefutable evidence of this comes from the fact that many patrons turned rich simply buying and selling rubber, the only source of wealth that could be converted into the merchandise that came from the distant world "below", or downriver (cf. Allegretti 1979). But this should not affect the legitimacy with regard to debts. A debt constituted the counterpart of an advance or credit. Unavailable to tappers through public banks, credit was monopolised by the patrons, which then constituted the single major source of long-term credit available, just as the lease-patrons afforded the only access possible to forest resources. Rubber tappers were constrained by prevailing institutions who concentrated both forest trails and credit in the hands of a few. But they were also
constrained to operate a demonetised economy at the fringes of the commodity circulation, which included gift-giving, barter and monetary trade expressed in an accounting rubber currency, and which could only operate on delayed credit on the short, middle and long term (cf. Humphrey 1985). In order to clarify this, one must demonstrate that patrons, river traders and local peddlers (actors in the forest trade scene) may be distinguished by the nature of their stocks as well as by the different terms of trade each adopted.

In the global forest economy, patrons, river traders and local peddlers were complementary figures, occupying different commercial niches. Resident peddlers ("marreteiros") offered goods in the neighbourhood to tappers whose credit at the trade post had been restricted, or when there were no river traders nearby, serving somewhat as forest "drugstores" accessible at any moment provided one had "cash rubber" to pay with; river traders sold low-weight "luxury" and "vice" goods in retail and on short credit terms, lasting weeks or at the most months; patrons operated with basic ("estiva") goods, such as salt, soap, fuel and ammunition, on a large scale and with long credit terms of a year, but which could be transferred to subsequent years. In social terms, patrons, river traders and local peddlers could be found on a scale ranging from distant to close: strangers living in town, acquaintances, or neighbours and kin. On a temporal scale, they ranged from long-term to short-term credit: annual debts that could be extended to several years; short-month terms, or immediate payment. In material terms, they cover a scale ranging from large stocks of basic articles to small stocks of superfluous items: from the "estiva" of work implements and current consumer goods, to luxury articles, or liquor and odds-and-ends. Finally, these three commercial types may be distinguished in terms of obligations or responsibilities, which in fact is a consequence of the other differences between them. For instance, the extended temporal dimension of patron-tapper relations meant the continued supply and continued debt over time, which assumed the form of bi-lateral obligations: the patron was to continue supplying tappers (even in the in the case of illness or other disability) and to extend debt payments over several years; the tapper remained committed to "paying off" his debt sometime in the future.

If indeed the content and terms of trade were different between these three types, whether or not a moral difference existed remains to be seen. We argue first that all three categories share a common core of marretagem, the act derived from the verb marretar which means to purchase with the intention of reselling for profit, or "to cheat".16 This term applied especially to the small transactions of local peddlers, involving bargaining and immediate profit turnover, but it also was used by tappers when criticizing patrons, who were supposed to be more than a simple marreteiro - insofar, that is, as he fulfilled his obligation of extending long-term credit.

As we mentioned above, the marreteiro lived in the neighbourhood. Thus, he was inevitably neglected to comply with extra-commercial obligations were based on kinship and neighbourhood. They sold on short terms, with visibly high profit rates; but, as neighbours and relatives of their clients, they failed to offer services normally associated with kinship positions. The superimposed functions of merchant and relative cast the marreteiros in conflicting roles. In one case, a river trader stayed over at a daughter's house along with his son, who had suffered an accident, in a settlement where he often sold medicine at "river trader prices"; during his stay, however, he had to ask neighbours for medicine, assuming the role of "relative". Comments heard in the neighbouring houses were clearly negative. While in his role

16. The dictionary meaning is "to cheat". According to Miyazaki and Ono, the term marreteiro is used to designate one who interferes in an already-established transaction (advances-debts), selling goods cheaply or buying them expensively, breaking the existing harmony. It possesses a derogatory meaning. (Miyazaki and Ono: 366 and Santos 1989:53).
as marreteiro he would sell remedies for profit, he now did not seem ashamed of asking for medicine in his role as "relative" (and thus would have to settle the amount acquired in kind, following the tappers' ethic). Such ambiguity would not arise had it involved a patron, precisely because he was not a relative and, furthermore, would be expected to advance medicine as his part of the quasi-contractual relations he had with the tappers (who would pay usurious prices).

For many rubber tappers, cash loans constituted the only situation in which interest was acceptable. When one tapper demanded that another pay "interest" over the time his rubber was held over at the second tapper's house, union delegate Chico Ginu determined, in a public meeting, that "rubber doesn't pay interest, only money does." Once fixed in rubber values, debts extended from year to year could not be altered. The confiscation of goods to pay off debts was illegitimate - though payment for them could be extended, tappers assumed that payment should not be compounded by cumulative interest nor should have a deadline. This tacit principle was respected within trade post accounting. In informal transactions between tappers, I witnessed debts of over a year paid off in initial nominal values (with no distinction made between inflation, "profits" or "interest"). Thus, rubber tappers' critical views on profits and exploitation applied both to marreteiros, regatôes and patrões, although in each case the particular diagnostic of unfairness depended on the fulfilment or lack of fulfilment of complementary obligations, such as neighbourhood rules, or long-term credit.

17. This elementary problem created serious accounting problems for the rubber tappers' cooperative, founded in 1989. By the accounts of the tapper-managers, patrons had "profit" margins of over 1,000% per year which they reduced to 30% (the current inflation rate for one month being above 20%).

18. Priests would appear on the rubber estates only once a year, and were identified with marreteiros (local traders) because they peddled not only the sacraments, but also clothing and other products. By contrast, the venerated "Brother José", a layman who wandered throughout the region and had become the

Many of the tappers I knew reacted to being cheated in commerce, in a range of ways which could include the use of the "weapons of the weak" (Scott 1985). As an example of the latter, one tapper complained to me, as we drank cachaca brandy on our way home through the forest after making a purchase at the Riozinho trade post, of the amount of labour that would be necessary to square away that particular bill at the prices charged, arguing that he at any rate would not pay the total amount charged. In many conversations, I heard tappers asserting that the patrons were becoming simple marreteiros: that is, they only undertook marretagem, or the middleman activities of buying to sell, and selling to buy. One tendency that developed beginning in 1982, when the new patron implanted a system using three different rubber prices, "the three price system", confirmed this feeling. This tendency was to intensify after 1985, when the next patron began to reduce the time between purchases and payments and to collect debts on short notice, calling on the police to seize tappers' possessions in cases of debtors who fell behind on their payments - which provided the setting for police violence on the Riozinho and Restauração estates and for the "strike" led by Chico Ginu, both in 1986. The same tappers who accepted, within certain limitations, the tacit contract involving reciprocal obligations with patrons, also were capable of open rebellion when these obligations clearly were violated. Precisely because there was a consensus around the fact that patrons also grew rich from the labour of the rubber tappers, patrons no longer were considered patrons and only mere marreteiros when they refused to offer transport to a client who had been bitten by a snake, or denied credit to a tapper of high productivity, or refused to supply goods over a long period, or most revered "saint" of the Upper Juruá, developed a reputation for refusing to touch money under any circumstances.

19. See Chapter 4. The "Alagoas Estate Rebellion", another documented example of rubber tapper revolt against the trade post, also was set off by changes in rubber and commodity price policies, which also accompanied a change in patron (Allegretti 1979).
charged progressive interest, or seized goods in order to settle outstanding debts. There then would be no reason for rubber tappers to pay for their own long-term commitments.

The tappers' critical posture towards cheating in trade (which was vaguely associated with the concept of profit) naturally belongs to the age-old tradition according to which the accumulation of wealth was considered an objective that was incompatible with the continued reproduction of the good, a tradition which goes back at least to Aristotle (Politics, I,8 and Nicomachean Ethics, V,3; Marx n.d. [1987]:152; Parry & Bloch 1989:4; Gudeman & Rivera 1990). One explanation for the form this view assumed among rubber tappers is that different spheres of circulation coexisted on the rubber estate, which may be grouped as trade (trade post, river traders, local peddlers), barter (between houses independent from one another) and the exchange of gifts (between houses within a single interconnected settlement). These different spheres of circulation were not coterminous, and had different uses.

Within the sphere of gift exchanges, the agents were co-habitants of a hinterland settlement who also maintained a game meat relationship, in which fixed portions of any slain game animal (though sometimes including fish or other articles collected) were transferred to neighbours: a side, a rear quarter, a front quarter, etc. The reciprocal notion of bestowing neighbours with game meat was associated with the mystical danger of the panema, or bad luck that might strike a hunter as a consequence of the inappropriate consumption of meat by women of the receiving house: in sum, this regime was marked by the dangers of excessive proximity (Galvão 1951 and 1976; see also Chapter 7, 8). In the barter sphere, agents were house heads from neighbouring settlements, and the items exchanged were either the products of labour (flour, rubber, baskets, manioc) or labour itself (days offered by children or adults to execute specific tasks); the rule of exchange was based on the equivalence of labour-values between independent household heads; in other words, goods and services were exchanged using labour-time as a measure - child-days were converted into adult-days, rubber-days converted into flour-days, and so on. Finally, in the commercial sphere, the agents essentially were unequal parts (patrons, river traders and the "social outsiders" who were the marretoiros), and the goods were merchandise introduced by social outsiders and produced by the tappers (rubber); the underlying ideology was that of marretagem - the notion that someone gained at the expense of another, a zero-sum game.

The gift exchange code, or language, regulated relations within units of cooperative action and consumption, which were the extended houses or macro-houses of the hinterland settlements. The labour-value code was employed to gauge transactions between tappers of independent houses, and was equated to the tappers' product, rubber. Exchange between rubber tappers (producers of wealth) and patrons were not expressed in either of these codes. How could one establish the labour-value of a gasoline engine imported from Philadelphia, or of a Seiko watch from the free-trade zone of Manaus, against rubber? How can one speak of "kinship" or neighbourhood relations with a patron who lived in an urban palace, where it was inconceivable that a rubber tapper be received and given food, as was the custom of the forest? In these cases, the appropriate code was that of marretagem - a Commodity/Rubber/Commodity circuit, where an initial stock of merchandise generated merchandise of greater value ("I won't sell an object if I can't buy another one!", in the words of one marretoiro).

Exactly how great is the difference between "another object" M' and the previous one M? The marretagem ideal does not determine how much. The trader's own cleverness and ability establish this difference within bounds given by the

20. Even tappers who were blood relatives of the patron did not have any intimacy or "social kinship" with him.
market (prices heard on the radio) or barter practices. There may be a minimum and maximum profit for these traders, but the exact point depends on the agents' personal qualities and is not determined a priori. Distribution in this competitive arena is determined post facto by the relative force of the agents involved, by the capacity to bargain and by resistance. Therefore, in essence the marretagem trade theory differs from a deterministic theory of exploitation - according to which the surplus value rate is fixed by a minimum of subsistence consumption.21

This conclusion leads to another problem. If there is a line between tappers' gains and patrons' profits, which is not determined in economic terms but by the post-facto correlation of political forces, then why are profits considered abusive after a certain point? In a preliminary treatment of this problem, let us consider a profit margin emanating from exchange relations and reproduced from year to year. A sudden increase in that margin will be perceived as abusive. This first answer assumes that tappers react to changes in the degree of exploitation. Hence, there would be no need to measure exploitation in absolute terms - in order to recognise exploitation, one only needs to perceive a change for the worse, which has to be attributed exclusively to the exchange relations between patron and rubber tapper. In this respect, even tappers who had sided with the patrons began to recognise as exploitative the transition that occurred between 1983 and 1984 on the rubber estates: "He who had two shirts now will have only one."

Barrington Moore Jr., in a proposition also discussed by James Scott, has suggested that there is an objective limit from where the relations between peasants and lords can be identified as exploitation. Here, "objectivity" means a social consensus regarding the acceptability of the state of things (Moore Jr. 1974 [1966]:471). It is obvious, for example, that a lord who takes the wives of his subjects, who steals their food and who does not preserve peace is an exploiter. In attempting to improve upon Moore Jr.'s formulation, James Scott fleshes out the idea that there is a "subsistence ethic", which is obvious to peasants: "a right to subsistence . . . forms the standard against which claims to the surplus by landlords and the state are evaluated" (Scott 1976:7). There is much to say in favour of these ideas in the case of peasants, who have weathered famines and natural catastrophes, and who may be treated as "averse to risk", but this focus distorts the situation of rubber tappers that I have known. Tappers did not seem to adopt an "image of limited good" when wealth derived from their own labour - which is consistent with their folk 'labour-value theory' in rubber and manioc flour regimes. Though tappers made pacts with the "rubber tree mother" (and not with the devil) to increase productivity, and could use analogous pacts with "mothers of game", thus increasing hunting "happiness" or luck, these pacts were not used to criticise hard-working tappers (Taussig 1987) or an idiom to criticise illegitimate profit-making. Nor did I perceive "thriftiness" (cf. Gudeman & Rivera 1990): on the contrary, a category of tappers seemed to have a Dionysian urge to acquire goods and novelties, not unlike that described among certain indigenous groups (Hugh-Jones 1989), which urge was compatible with the notion that incurring on high debts was a proof of "courage" in a high-productivity tapper.

To be deprived of powdered milk (imported from Holland), of a shirt (introduced from São Paulo), of a Seiko watch (from Japan) or of a gasoline engine (imported from the U.S.), and to be deprived of health services and education (attributed to patrons' greed and not to natural factors) are more significant as evidence of greater exploitation than to be deprived of manioc or meat, in an economy where manioc is produced at low risk and never is supplied by patrons.

21. That this theory comes from Marx is debatable. Marx said once that "The matter resolves itself into a question of the respective powers of the combatants" (1950(1898):401-402). The point is taken e.g. by William Baumol (1979:ix), but see Morishima & Catephores on the same (1978:106).
While in this economy the relative abundance of manioc depends on the personal effort of the producer and the availability of game meat depends in part on mystic factors, in the rubber tappers' opinion shortages of imported goods (whether consumer goods or articles used in production) clearly were linked to the traders' greed. Given this perspective, an assessment of changes in the level of exploitation carries much more weight than a fixed idea of "subsistence". While not involving a drop below the "subsistence level", since only part of the tappers effectively could acquire "luxuries" that might be substituted by cheap local products, the loss of access to canned butter for women following childbirth, or to Dutch powdered milk for small children, or to ground coffee from São Paulo for workers represented real deprivation. These changes reduced the economy's entropy, that is, they limited the degree of dispersion in the individual houses' patterns.

These ideas bear some relation to economist John Roemer's exploitation hypothesis, which proposes that we adopt the possibility of distributive changes in society as a criterion for the existence of exploitation (Roemer 1982:194 ff). Roemer identifies persons belonging to a coalition S (for example, tappers of a rubber estate) as being exploited by group S' (persons outside of the coalition, such as the patrons and managers), when three conditions are satisfied: (1) "There is an alternative, which we may conceive of as hypothetically feasible, in which [the coalition] S would be better off than in its present situation;" (2) "Under this alternative, the complement to S, the coalition N - S = S', would be worse off than at present;" and (3) "S' is in a relationship of dominance to S" (Roemer 1982:194-5). Therefore, what defines the exploitation of a coalition of rubber tappers on an estate is the possibility that they may abandon the game (say, by expelling the patron), improving their own lot (and not making it worse for any of the coalition's components), while the only ones worse off would be those outside the coalition (patrons and managers, in this case). There is a subtle aspect to Roemer's exploitation hypothesis: the rules for leaving the game must be specified. If, for example, the rules determine that the tappers "take the forest with them" in leaving, the rent-patrons' game (in the case of agrarian reform), and all the tappers obviously become better off (because they cease paying rent) and the only ones worse off are the patrons, then this suggests that the prior situation was one of exploitation (of a feudal sort), which only was sustained by the monopoly control over the forest by the patrons, as a consequence of political dominance. Hence, this exploitation was based on the monopolistic appropriation of the forest. However, if the rent patrons had provided services that the tappers could not execute without them (for example, the conservation of trails), then the tappers situation after the expulsion presumably would have worsened, and the prior situation could not be considered one of exploitation in Roemer's terms.

If the tappers' coalition "takes the trade post" when withdrawing from the game, which means access to financial credits, and all the tappers become better off (because they no longer have to pay abusive interest and monopoly prices) and the only ones worse off are the patron-traders, this means the prior situation was one of exploitation (moved by usury capital). This exploitation was based on the monopolistic appropriation of access to credit, guaranteed by the patron-traders' political dominance. It should be noted that the existence or absence of exploitation depends on the capacity of exploited groups to organise themselves: in the rubber estate example, even eliminating monopoly barriers, the rubber tappers still must overcome problems of communication, organisation and leadership, which accompany the difficulties involved in distributing goods throughout the forest (transport, storage and distribution). Analogous to the hypothetical situation described in the previous note, if patron-traders had offered services of communication and articulation that could not be substituted, the tappers would be worse off without the patrons, and there would be no exploitation in Roemer's
terms. It is worth mentioning here that the cooperative constitutes a solution for taking over the economies of scale formerly controlled by the trade post.

Conclusion

In this chapter, we have described the trade strategy of patrons, which tended to maintain a stable commercial monopoly over the rubber tappers, based on the maintenance of average debts that also were stable over time. At the same time, we have endeavoured to show that the existence of average debts and high profit margins was compatible with the existence of individual variations between rubber tappers, emphasising the economic mobility of some tappers and the relative autonomy of individual tapper houses. In other words, the commercial exploitation of individual producers (or houses) is consistent with a model of several houses with internal differences as a result of demographic variables (as in models similar to Chayanov's). On the other hand, we have suggested that the possibility of variation between houses and particularly the accumulation on the part of a minority of houses show that the profit margins of the trade post were not the maximum possible. There was a conflict between the patrons' accumulation, on the one hand, and the freedom of houses to establish their own economic strategies, on the other.

Chapter 7
FOREST HOUSES AND PERSONS

Introduction

As employed here, the concept of house refers to a unit formed by a group of persons; to a material heritage which includes a residence and its possessions; to a territory of natural resources; and to a repertoire of knowledge and routines that inform people's actions over nature with the intention of reproducing a good life. Thus defined, the house is a discrete unit of technical action that comprises a group of persons (who), a territory (where), material objects (what), technical procedures (how) and forms (what).

It is also a unit of social action, which establishes relations with the external world at given points in time and is reproduced over time. As a unit of economic decision-making, of natural resource management and of distribution of labour and consumption, each house is represented by its head, who also exercises the function of deciding over the use of material objects, of labour, and of natural resources, as well as over which technical procedures are to be adopted. The head also answers for the house in social interaction, commerce, alliances and conflicts. It is he who keeps an account at the trade post and who pays rent for the use of rubber trails; in

1. Here, the "house" (casa) corresponds to the Greek oikos and the "house head" to an oeconomicus or "estate manager" (Xenophon 1990: 271; Aristotle 1977, 1977a; Descola 1987; Almeida 1988; Gudeman and Rivera 1990). It should not be confused with the slightly more specific uses whereby a "house" or "maison" refers to a kinship group defined by "claims on a particular estate" and perpetuated through cognates or adopted heirs (Levi-Strauss 1979; Goody 1990:469), or with the notion of a household or a domestic group (Netting, Wilk and Arnould 1984). The use of "house" as a translation for casa in the sense defined above should also preserve the association of casa in current Portuguese with a physical building (extended here to a territory and its resources), a household ("family") and a home (Portuguese lar, a domestic fire or, more generally, a set of technical activities involving a household)(See Pina Cabral 1991:128ff).
principle, he also decides when to torch forest clearings for cultivation, how many trails are to be tapped and when to sell an ox. The house group is composed of relatives, children, godchildren and domestic hired help. These people have their own interests, which may come into conflict with the house head's orientation; for example, individuals may have personal rights over part of the house's property (such as head of cattle or of other livestock, personal objects, etc.); and there are cases when the house head is a woman or even another relative who exercises a considerable degree of power over house decisions. The incorporation of members into the house group (household) occurs mainly through marriage, adoption, fictive kinship and friendship, and not on the basis of contracts.

Houses are production units involving various labour processes, reproductive units involving family relations, and consumption units with a common budget - even when spatially discontinuous and accommodating persons who do not eat under the same roof. On the other hand, houses have an ethical orientation, in that the house is oriented towards its members' welfare, and decisions should ideally be weighed with the criteria of justice, equality and sensibility, to which in principle considerations such as efficiency in bargaining or profit-taking should be subordinated.²

Julian Steward and Robert Murphy have written that extractive economies, exemplified by fur collectors and rubber tappers, are characterized by "an almost complete economic dependence upon trade goods which were exchanged for certain local produce", in combination with the "functional nature of local production," which "led to reduction of the local level of integration from the band or village to the individual family." Furthermore, at the local level, the basic ecological character of the extractive economy resides in the fact that "each environment affords a resource for trade purposes which could best be exploited by individual families controlling these products within delimited territories." The "gradual shift from a subsistence economy to dependence upon trade is evidently irreversible," and "the culmination point may be said to have been reached when the amount of activity devoted to production for trade grows to such an extent that it interferes with the aboriginal subsistence cycle and associated social organization and makes their continuance impossible" (Steward and Murphy 1977 [1956]:52).

Steward and Murphy's hypothesis, which was formulated around the case of the Mundurucu Indians who had become rubber collectors, might explain why rubber tappers isolated family did not form villages, rather becoming spatially distributed in isolated family units throughout the forest. This would have to do with the maximisation of extraction returns. Such dispersion means more than simply low demographic density, which can be compatible with the existence of an elaborate social organization (say, ten houses grouped together in a central clearing, exploring a territory of thirty square kilometres). Here it is a question of reducing sociability to the level of the "family", expressed physically in the isolation of individual units (let us say, ten isolated houses exploring three square kilometres each). It would be a case of social entropy, so to speak. Extractive economies connected to trade posts would lead to an increase in entropy with regard to spatial organization and social life. Families would represent the highest form of social integration at the local level. Trade would integrate these sociologically minimal units at a higher level, through visits punctuated in time and involving clients distant in space. The world market therefore would provide the only real social articulation of these houses

2. Houses are not classified according to a distinction between "subsistence" and "market" economies, nor are we identifying them to a "pre-capitalist mode of production" in opposition to a "capitalist mode of production". Within capitalist societies, different types of technical units co-exist, such as firms, houses, and public enterprises (cf. Gudeman and Rivera 1990 on the first two types).
from without -- truly specialized in the techniques of commercial extraction. A confirmation of such an image would be provided by the existence of a vertical political system associated to ritual kinship, paternalism and dependence.

In the preceding chapters, part of this confirmation was given, in the sense that we described a vertical, fractal-like commercial hierarchy whereby forest houses are linked to national urban markets through the trade posts. But there is no confirmation of ritual kinship including patrons of and generalized patronage over atomized families. What we find, therefore, is not a patron-client system but rather a mercantile system, marked by quasi-contracts of a commercial nature between patron-traders and houses, partially legitimized by rules which were subject however to dissent, and essentially based on a combination of violence and interest.

Instead of rubber tappers, we face forest peasants organized in houses. Such houses are not however isolated atoms. They are found in groups using the colocações, or settlement areas. This chapter shows how the articulated groups of houses extend into "macro-houses" to occupy and use the colocações, and these into macro-house networks, which are related through common social activities and share a moral identity, constituting thereby systems which are not isomorphous within the larger and smaller rubber estates. Rather, they constitute horizontal, flexible social structures, which overlap across the estates' boundaries, and although subject to fragmentation and change, are real enough (Cf. Tanner 1979; Morris 1982:163ff). These supra-atomic, so to speak molecular features of the social organization of forest peasants are essential to the understanding of their continuity both under the patron-trader regime and without them.

### House Members

In the definition of the house, the concept of family is not included. The domestic group or household which is part of the definition might not compose a family as such, 'nuclear' or not (a forest house might be made up of a group of brothers, friends, a man and his hired help). Instead, our definition focuses on the labour process that involves houses as a unit. However, most members of a house in fact form a group of relatives, and these relations provide the principal language used in the organization of labour processes, as described in the chapters to come. The individuals who make up the house head's relatives may be seen as a stock of men and women who are of working age, of growing boys and girls who work part-time, and of children and aged persons of both sexes. Over time, therefore, a house grows and modifies its composition, insofar as new children are born, old people expire, while other members come and go. In short, while houses may be described as stocks of people at a point of time, they also may be considered as flows.

Focusing on the population of Riozinho Estate, part of Restauração Estate, this chapter describes both the internal organization of houses as well as the articulation between them. At the end of 1982, a population survey revealed a total of 370 persons distributed among 68 houses on Riozinho (Table 7.1). This total included 109 men and 95 women (this classification covered residents aged ten and up), along with 90 boys and 88 girls. Eight men appeared as resident hirelings. One of the houses was that of the Riozinho patron.

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3. To use Hegelian/Lukascian terms, tappers and trappers would thus exist only "in themselves", but not "for themselves". Instead, they would only exist "for others", i.e., the mercantile capitalism represented by trade posts and patrons. Allegretti (1989) associates the vertical structure of the rubber estates with the impossibility of autonomous politically-articulated social movements (absence of groups of a critical size, and of horizontal communication), while others suggest as reasons for the same supposed "phenomenon" the paternalistic character of extra-house social relations (Gelfray 1991).

The number of "men" defined as above corresponds approximately to the use of the term "faca" (knife), used to denote the real or potential number of tappers in each house. Thus, when the Riozinho patron composed an informal list of "facas", he counted 100 "facas" for 63 houses, or an average of 1.6 cutters per house, which is the ratio found in the demographic survey data (Table 7.1, first column 1).

Though in the under-ten category the number of boys and girls was roughly equal, shortly later the number of females would fall off in relation to males (7.1). The greater proportion of men among the adult population may be explained by the fact that Riozinho attracted male rubber tappers. In effect, besides the eight house hirelings in the population, there were houses composed only of men. For example, one house was headed by a man who lived near the Tejo River and rented a series of rubber trails on Riozinho Estate (hinterland area), where he conducted seasonal labour along with his sons, while his wife, daughters and small children remained along the Tejo tending manioc crops and making flour. Since the natural resources and the members of a house might be geographically discontinuous, what appeared to be an isolated settlement in the Riozinho hinterland could be in fact a specialized outpost (with more men than women), of a diversified house having its headquarters, as it were, at the Tejo banks.

In other three cases, groups of brothers (or of a father and sons) worked on the rubber estate while having another residence in town. In another case, a house head residing at the mouth of the Riozinho kept an unmarried son working at a married son's house: here, one brother was a house head himself, while the other worked to help support their father's house. Chagas Farias, left the estate in 1987 and with his surplus production moved to Cruzeiro do Sul. There he kept a manioc plot outside of town, sold bananas to the urban population, and sent his young son to work seasonally as a tapper at Riozinho. Therefore, in such cases the ostensibly specialized male labour in effect contributed to houses located outside the estate. In 1982 and 1983, the patron's recruitment strategy was responsible for the attraction of male work groups, that is three groups without relatives on the estate, since they had permanent residences in town, but in none of these cases such tappers were employed by the trade post. By 1984, part of these groups had constituted their own houses within the estate, developing domestic economies. After all, the status of specialized worker was not at all a stable one. All things considered, then, we may assert that the population of Riozinho belonged either to local houses (structured around "relatives") or to extra-local houses.

The so-called "employees", in Riozinho, were hired by houses. They resided in the houses and worked as part of the labour crews alongside the other males, including cultivation and hunting activities. When they were sharecroppers, they received a percentage of the final product in rubber from the house head; in other cases they worked for a "wage", which was set and paid at the end of the year, in kilograms of rubber or in goods, but nonetheless benefited from the food and laundry services offered by house women. In some cases, their "luxury" or superfluous expenses (such as perfume or hair oil) were deducted from their final pay. One reason why a young man could seek this sort of employment is that some young single men did not have relatives' houses nearby and wanted to quit their

5. Another reason is the fact that women marry at younger ages than men: the age of 12 is considered acceptable (abduction of 13 to 14 year old women was popular on Riozinho), while 16 is ideal for marriage. In contrast, men married after reaching 18. Thus, new houses were formed with the early exodus of women from their parents' houses, often marrying men from outside the estate. Therefore, on the average, families with children over age 10 had less females than males.

6. Of these, two house heads ended up abandoning the estate, after concluding that the cost of food (which they did not produce) absorbed their surplus rubber production. A third, with two sons, developed into two other local houses after the two were married.
parent's house before marriage. These "employees" all were 17 or 18 years old inRiozinho.7

Internal House Organization

Most of the members of a house constitute a kin group (Table 7.4). Kin
groups include individuals who are related as parents and children, brothers and
sisters, or relations growing out of these sets. Eighty-eight percent of 60 households
in Riozinho included such, some with resident hired help. No residence contained
more than one head, that is to say, a rent-payer ou account holder.

A house has its origins in the construction of a new residence by a couple. A
new home could be located in the husband's father's neighbourhood, or near the
house of his wife's father, or near the homes of his or her brothers or sisters. A
recently-formed house might fill up rapidly with the head's adult unmarried
brothers, who on that occasion leave their father's house. Later, these brothers will
form their own houses, while the first house itself expands with the arrival of sons
daughters. When these children arrive at working age, the house reaches its
maximum potential for producing rubber, foodstuffs and game. Older houses lose
their adult sons and in many cases lose one of the head couple as well. These houses
frequently are recomposed through the incorporation of new couples and relatives
(grandchildren, nephews, stepchildren) who are adopted as sons and daughters.
Only in rare cases, old women, incapable of working and without a husband, become
dependents at their relative's house (though I did not see any cases of older men
living with a son or son-in-law). Apparently, older men often can find new wives,
and these houses, in turn, become technically viable when they manage to recruit
boys and girls as foster children. In sum, a house may experience a cycle beginning

7. Domestic employees (empregados) should not be mistaken for clients
(fregueses) of other forest houses (outlined in the previous chapter) which had their
own houses.

with an incomplete formation, reaching its apogee as a completed house, and
declining to a once again incomplete state. It also might recruit new members (as
foster-children, single siblings, or employees), or remarrying at any point in the
cycle, to the point where it becomes impossible to deduce either its size or
productive potential by its age alone.

In theory, a house needed to have an authority, but this did not mean
harmony always was preserved. Intra-domestic conflicts were especially common in
houses recomposed through second marriages. One reason is that children might
dispute the property accumulated by the first house - as in the case of a dispute over
the offspring of a cow that had been raised by a mother who died.

Some houses were female-headed, as those of widows with children, or of
women whose husbands were disabled. Three female-headed houses were recorded
in the 1983 population survey (the 1982 census provided the base for numbers cited
above, though detailed information was available for only 60 of a total 68 houses).
Two houses were run by the widows Isaura and her daughter Nazaré, living on the
same colocação, the most densely populated settlement on Riozinho: besides these
two houses, Isura's sons and married daughters also lived in the neighbourhood.
They did not pay rent (since they considered charging rent to a woman abusive) but­
they had their own manioc crops, and Nazaré had a rubber trail, which was tapped
by her sons. Soledade, a single woman with several male children, headed the third
house, where the boys all produced rubber in small amounts (in her smoke-house,
Soledade had several quantities of rubber in sizes corresponding to the ages of her
sons).

The importance of having a house full of different people resides in the fact
that the house's productive structure requires not only adult male rubber tappers,
but also cultivators (adults and children of both sexes who clear gardens), hunters
(adult males and boys), crop-tenders and housekeepers (women and girls). In terms
of the people who make up its composition, a house is a technical unit whose
dergogeneity stands as an advantage and not a loss. A child might serve as a
specialist in raising ducks - one of many features of the domestic economy, with its
own peculiar technical problems (ducks spend most of the time in streams, facing
the danger of flash floods; they lay eggs at the edge of the forest, etc.). One idea
behind the house is that a group composed of men, women, boys and girls must
remain economically feasible over a period when people are born, die, and change
status, as boys become men and girls turn into women. This, incidentally, provides
an explanation for the high proportion of idle trails. Since each house is a process
with a temporal dimension, idle trails guaranteed a stock of resources capable of
employing a growing number of facas.

Colocações (Settlements) and Macro-houses

Each colocação territory may be imagined as a more or less circular area of
forest, explored by a set of houses (Table 7.3). The colocação territory is marked by
a well defined number of rubber trails radiating from a central clearing. There are
no physical boundaries separating colocações, but the areas crossed by rubber trails
starting from a single clearing are considered part of a single settlement. In 1982,
there were 26 of these settlements in Riozinho, within an area of approximately
23,000 hectares (Table 7.2, 7.2a). Therefore, each settlement held an average of
around 850 hectares of area (8.85 sq km), and an average of 2.79 houses, so each
house accounted for an average of 338 \cdot hectares (3.38 \cdot sq km). The general
population density stood therefore at 1.7 persons per square kilometre in the
Riozinho (Table 7a).

In the Riozinho, leaving aside one empty settlement, the number of houses in
settlements ranged from one to five (Table 7.3). These cases usually led to a
situation of potential conflict. The potential conflict involved in the use of a
common territory by different houses was attenuated when a macro-house (a set of
closely linked houses, often with a leadership) explored as a whole a single
settlement, or part of it. Macro-houses can also act as a unit of consumption or of
technical cooperation, as well as figuring as a "moral" unit under the leadership of
an older house. Macro-houses are social groups of a size appropriate for the
exploitation of resource territories: typically, the colocação of the rubber estate.

Composed of anywhere from one to five individual houses (Table 7.5),
macro-houses form technical units for hunting, for making flour from manioc, for
clearing forest areas in preparing agricultural plots, and for torching these same
areas, and they are physically neighbour houses. The individual house heads of a
macro-house (for example, a father and his two sons, each with their independent
houses) may act as a team, each commanding the production of his own unit. A
macro-house does not need to have a head, though it might have leadership.
Observe that the set of houses that uses a settlement does not coincide necessarily
with what I call a macro-house. Houses claim rights over parts of a settlement (on
the basis of renting trails in that settlement) and manage them, but houses could
either enter a settlement being recruited by the trade-post, or through direct
recruitment by a existing house.

Thus, the internal composition of settlements included the cases a single
macro-house, of one macro-house and one or two additional houses, and of
settlements with one or two isolated houses (Table 7.5). Note that the average
number of houses in those settlements with a single macro-house was 3.13, rising to
3.71 in those settlements with one macro-house plus isolated houses, and to 4 in the

8. We adopt a narrow, definition for the "macro-house" as a set of houses in a
same settlement linked by filial/affinal relations (Ego/son, Ego/daughter's
husband, Ego/wife's son, Ego/wife's daughter's husband), or fraternal/affinal ones
(Ego/brother, Ego/sister's husband, Ego/wife's brother). This definition excludes
the sets of houses linked by contracted kinship ("fictive kinship"), although this does
change significantly the number of "macro-houses".
case of two macro-houses. The settlements with one or two "isolated" houses (with an 1.3 houses per settlement) might have been abandoned recently, although not necessarily so (Table 7.5). These figures suggest a cycle of settlement expansion, fission and abandonment.

Note that the case of two separate macro-houses sharing a single settlement was rare (6% of the total number of houses and one single settlement), and in such a case a settlement might go through a process of gradual fragmentation, as two sub-groups of houses become increasingly separate in the forest, no longer occupying a single continuous clearing. A distinct forest clearing, often set up as an advance post of settlement, may themselves become a separate colocação, gaining its own denomination.

Houses (and macro-houses) easily moved on from one settlement to another, a frequent outcome of conflicts between neighbours, a typical reason being the invasion by pigs over a neighbour's manioc garden, panema accusations, or quarrel between wives. Other reasons for moving could be the temporary exhaustion of local resources, was when a group of houses decided to look for a better environment more rich in game, rubber patches or agricultural areas, often within a short distance of the first one -- a decision which again might be influenced by the existing pressure over trails and hunting areas.

From year to year the distribution of houses was reshuffled (Table 7.9), and as a consequence of both social and ecological sources for spatial mobility, a colocação could be vacant, while others could crowded with as many as five houses as an old macro-house. But these were transitory situations, since settlements went through phases of abandon, reoccupation, growth, and abandon once more. This was possible both because of a low overall density, and because under the patron-property regime no permanent titles tied up a settlement territory to a given house or macro-house. There was no land patrimony permanently associated with the forest peasant's house or macro-house in the upper Jurua. Forest houses and macro-houses were not a vehicle for land property. This is one of the reasons for the emphasis given here to their role as units in the labour processes, while they appropriate territories only in an impermanent basis. The minimal corporateness of a house (macro-house) resides thus in the set of persons which as a whole make up a viable labour unit, endowed with the necessary knowledge, sharing a movable equipment and being able to explore territories in an impermanent basis. As will be seen later, this corporateness includes also a mystical component more apparent in the consumption of game.

But the problem of social organization of a settlement's use was not as simple as keeping the absolute number of houses at a manageable level, but also that of defining leadership. This argument may draw support in the following negative example. In 1982, two neighboring (and unconnected) at the same settlement were about to establish an alliance through the marriage of one family's son to the daughter of another. The couple was expected to remain on the colocação, but if this had been carried through, it would be the only case of a new house pledging loyalty to two older houses at a single settlement: that of the groom's parents and that of his bride's. In the upshot, the marriage did not take place: instead, each of the engaged persons married someone from outside the settlement (the young woman wedded virilocally on another colocação, while the man married neoloctally, moving to his brother-in-law's settlement). Later, as the two older houses became distant from one another in spatial terms, the settlement split in two. Obviously, the problem with the proposed marriage lay in that the new house would

9. In contrast, the Xapuri rubber areas without patron-traders developed a notion of private, negotiable titles to settlements, held by individual houses. In this cases, the inhabitants of a given settlement may be made up of "employees" and sharecroppers vis-à-vis an absent "owner of the settlement", or constitute a "macro-house" who also holds permanent land titles.
be subordinated to two separate authorities (of the father and the father-in-law) within a single work space. This would be inconsistent with the political aspect of a macro-house. In short, while marriages can be either uxorilocal or virilocal, they cannot be both at the same time.

We look further at two different kinds of macro-house structure. Macro-houses with father/son(s) or father/sons-in-law compositions were the most frequent and also were "big", followed by macro-houses of heads related as brothers or brothers-in-law (Table 7.5). Filial and affinity structures, with inter-generational differences, set the basic pattern of stable authority for the technically efficient macro-houses. These vertically-structured larger houses resulted from virilocal marriages (typically father/son macro-houses) or successive uxorilocal unions (father-in-law/related sons-in-law macro-houses), as opposed to neolocal unions. On the other hand, macro-houses with a head and two unrelated sons-in-law were unstable. This suggests that one of the foundations of macro-house cohesion and stability lay in a sort of principle of solidarity among fraternal sets. While the permanence after marriage of a sibling group under a father or mother was common (and corresponded to some of the most productive houses of the estate), some married sons demonstrated a clear aversion to remaining under their fathers' authority. The alternative was the neo-local marriage pattern of the fraternal group. Settlements with this sort of structure frequently were composed by a pair of houses, where two married brothers or sisters live together in the same settlement. In some cases, these fraternal macro-houses were associated with the exchange of brides, which means that the settlement includes two fraternal groups allied through marriage. Under this last strategy, neo-local marriages carry with them the original fraternal cohorts of the couple (or at least part of them): therefore, these marriages allow new houses to emerge free of paternal authority (or that of fathers-in-law), while at the same time preserve technical and emotional cooperation sets of the same age cohort. In this type of allied macro-house, ideological emphasis is placed on reinforced consanguinity. These marriages are important to women, since they become subject to the authority and frequent violence of husbands when they marry neo-locally, but carry the protection of their consanguineous relatives when their own brothers marry their husbands' sisters and become their neighbours. Having a brother as neighbour is obviously convenient for a young woman in a forest settlement. Although a certain degree of violence on the husband's part is accepted by some brothers and fathers of a young married woman, often a marriage is broken at an early stage with the woman's kin support.

Houses and Macro-Houses as Technical Units

Though the Tejo River rubber trails were spatially distributed in colocações, they were rented (or occupied) by individual houses. In addition to rights over rubber trails (by virtue of rent payments or occupation), houses acquired rights over their cultivated plots and other improvements. Finally, houses also possessed rights over hunting and collecting territories, associated with the rented or occupied rubber trails. The several houses of a given settlement divided the total area like slices of a pie, with the exception of garden plots, which were grouped together in a separate main clearing near the flour-house.

In tasks related to rubber production, agriculture, hunting and fishing, macro-houses could act together as collaborative technical or labour units. This prospect of cooperation was one of the advantages afforded by the macro-houses, particularly important during activity peaks in the labour process. In rubber
production, peaks occurred twice a year, when trails were prepared for the latex "harvest"; in agriculture, peaks occurred with the knocking down of trees, the burning of these areas and the coivara, or final clearing of plots for cultivation; in hunting, the capture of deer could benefit greatly from collective action. Groups associated in a macro-house also cooperated in the preparation of manioc flour, in caring for children and domestic animals in common areas, and in raising a new home. In general, one house hosted the labour of others (except on hunting expeditions): in this sense, the labour process belonged to a particular house, which at any given moment could benefit from the cooperative labour of the others. The tacit understanding was that either the labour was reciprocal (to be returned at a later date) or was donated by a young house head who assisted his elderly father's house. The cooperation within a macro-house was thus quite different from that between unconnected houses. In the former case, labour assistance was not measured in order to be paid off later in precise quantities which distinguished half-days and children-days, as it was in the latter case.

In addition to forming extended work crews for peak moments of the labour process, macro-houses also shared work equipment in two important cases: the flour-house and the smoke-house. The flour-house is a manioc-processing facility, which included expensive equipment such as a small gasoline engine (3.5 HP) and a circular or rectangular metal plate of one to one-and-a-half metres in diameter. There is never more than one flour-house in a settlement, and though the equipment ("utensils") belongs to a single house, it is used by the others at no charge. The main manioc plots surround the flour-house, in a mosaic of areas belonging to the individual houses. This way work crews can operate in a contiguous area, covering the same daily routine. The wife or child of one house can bring food or water to a work crew from another. This comes naturally, considering that the son or daughter of a house head probably is grandson or granddaughter, nephew or niece, godson or goddaughter of the members of the next house. When they belong to a macro-house, it is difficult to distinguish the people who cooperate on the agricultural tasks of different houses, except for the fact that the final product belongs exclusively to one of the units. A smoke-house for treating rubber also may be used by more than one house. Though each house has its own hunting and fishing gear, sometimes brothers or sons borrow shotguns, dogs or casting nets.

Once the rubber or flour is produced, and game hunted, the consumption process becomes the private matter of each house. Rubber belongs strictly to individual houses, though within each unit there may exist different rights over the value of the product - including those of the hired help, the young man or woman who helped out, or the young rubber tappers, who expect some remuneration for their part in contributing to the domestic economy. Just as rubber is the property of individual houses (even when stored in common areas or left in the smoke-house), flour is stored separately in each house (in the kitchen or bedroom). Each house's flour stock, which is refreshed every couple of weeks, is the very symbol of its autonomy and welfare.

Game meat constitutes a distinct case. Macro-houses cooperating on hunts do not contribute to a single unit that was to own the product: on the contrary, the group hunts collectively. Whether or not the macro-house hunts as a team, it divides the product according among the individual houses according to precise rules. A fixed portion of the slain animal is sent (not shared on a same kitchen-floor) to "neighbours" with whom a special "neighbourhood" relation has been established. In the jargon of the rubber estate, "vizinhar" (to neighbour) is a transitive verb meaning to share game meat with someone, so that "A neighbours with B" with a portion specified as a quarter or a side plus half the spine. It should be stressed that such "neighbouring" relationship does not apply to domestic animals or to other agricultural, cattle-related or extractive-commercial products: for
example, when an ox is slaughtered, its meat is sold even to brothers, stepfathers or fathers-in-law; and "neighbouring" does not take place either with chickens, ducks or turkeys. "Neighbouring", however, may be extended as to include products collected in the forest, such as the much-appreciated fruit of the patoa, bacaba, acai or buriti palms, made into wine frequently sent to socially-close neighbours, ordinarily coinciding with the macro-house.

The institution of "neighbouring" game meat has a special implication worth mentioning. Along with rubber and flour production, hunting represents the main focus of attention in a man's life. Success in hunting is extremely important to guarantee a good life in the forest. Successful manioc flour production depends upon one's individual virtues as a labourer, competence to choose the right moment for burning agricultural plots, and to select the right soils and stumps. Success as a rubber tapper may increase through pacts with the "mae-de-seringueira", or rubber-tree mother, but it is again essentially due to the house's own efforts. In each of these cases, success is a matter restricted to the house's work crew. But success in hunting depends not only on personal ability and on one's own magic. In this case, success also depends, in a negative sense, upon the voluntary or involuntary behaviour of the other houses. A hunter may be ruined if he or his dog becomes panema (a Tupi term for one who is unfortunate in hunting), a condition inflicted by others who consume the meat of forest animals (Galvão 1951, 1976). What is crucial about neighbourhood relations is that a house receiving game meat from another easily might empanemar (make panema) the hunter who killed the animal. A hunter becomes panema when a pregnant woman, or a woman during her menstrual period, comes in contact with, or pass over, the meat or bones of the game. Thus special care must be taken in disposing of bones, lest a woman in these conditions or even bitches in heat contaminate them inadvertently. Thus, neighbours who share game meat must be trustworthy since they represent a potential threat to the hunting sphere, which is one of the most essential components of the rubber tappers' happiness. Just as trust between neighbouring houses must be complete, in a certain sense the colocação's core, in the form of a macro-house, is a moral unit - insofar as each house is responsible for the integrity of hunters from other houses who have provided them with meat from the forest. And more: the relations between male hunters critically depend on the behaviour of women in the whole macro-house, the only ones to handle and prepare game meat from the forest, once it is introduced into her kitchen. This point helps clear up the distinction between simply occupying the same settlement and composing a macro-house. In settlements with two macro-houses tension and even open conflict are common, and one particularly clear expression of conflict is precisely the absence of game meat neighbouring. 11

11. I lived for a time in a settlement with two neighbouring brothers-in-law (a young "macro-house") who were feuding with another macro-house in the same settlement (father, son-in-law). At one point, I received a pot with armadillo meat, been sent over by one rival neighbour to whom I had given sugar. At once, my hosts threw both the pot and its contents out of the kitchen window, claiming that the gift (which actually tasted bitter, a common fact in armadillos in dry season) probably was bewitched and would spread a "spotted" disease (pinta) to all of us. On the other hand, none of us could kill game, since the rival neighbours, one of them a caboclo, had "closed down the forest" to us. The same caboclo was said to use his magic to obtain women's favours against their will. Thus, aside from panema, one house could affect another negatively in hunting and sexual affairs, by means of mystical powers, in this case a distinctive caboclo (Indian) property.

Relatives and Co-parents

Houses comprising a macro-house usually are linked by kinship (thus, we might call its members a macro-domestic group). "Family" (familia) was the term used to designate the kindred known by a given person -- that is, the people within the sphere of memory who were identified by expressions involving filial descent, marriage (in certain contexts) and adoption. The micro (macro) domestic group is
composed of the part of the family that forms the house (macro-house), as well as hired help and other non-kin.

Beyond this language of real kinship (based on filial, marriage and adoptive relations), "fictive kinship" was widely used to establish inter-personal relations. *Compadres*, ritual co-parents, were chosen, and thus "fictive kinship" could also be labelled as "contracted kinship". This choice is formalized mainly on the occasion of infant baptism. For example, couple A and B have a child, C. They invite D to be godfather (or godmother, if D is a woman). Consequently, A becomes D's *compadre*, or co-father, while B becomes D's *comadre* or co-mother. Once established, this ritually contracted kinship relation lasts forever, just like real kinship. In addressing, it takes precedence over real kinship: a child does not call his godfather by his name, nor by any real kinship term (for example, uncle, grandfather), but addresses (and refers to) him as *padrinho* and always asks for his blessing when first meeting him in a day, a treatment which persists in adulthood. Co-parents now begin to address each other as *compadre* or *comadre*, leaving aside proper names (even in the case of brother and sister). Fictive kinship ties may be set on different occasions and rituals. Beside the main one at baptism (godfather of a child), on can also contract a *compadre*-relationship at *São Pedro* (Saint Peter) and *São João* (Saint John) feasts (godfather of the bonfire), and at birth (godmother of the navel, or umbilical cord).

One acquires relatives by birth, but one chooses *compadres*. Social groups here designated as macro-houses may be linked by contractual kinship relations among their members, and usually do. We might be inclined to conclude that the institution of contractual kinship thus allows for macro-houses to develop a formal constitution, even when its members are not related in the language of "real" kinship. This in fact does occur, in the case of houses in a neighbouring relationship and other cooperative relations and who formalize this situation when house heads become the *compadres* and *comadres* of one another.

It was quite common for *compadres* to be father-son or brother-brother pairs.12 Fictive kinship relations between close and inter-connected houses frequently became superimposed over real kinship. Thus, they would be somewhat redundant if the only point in it were to contract a "kin" relationship. Indeed, the practice of fictive kinship between close relatives, such as fathers and sons or brothers and cousins, suggests that this institution was more solid, in a sense, than simple real kinship.

Why, then, was fictive kinship necessary? One explanation is that fictive kinship, while ideally uniting people, at the same time creates new, contracted formal links and barriers between houses. As emphasized above, the members making up neighbouring houses (the macro-house) are often recruited among members who had belonged to a single house before setting out to create their own separate units. In becoming *compadres*, in a common example when a father is godfather of his own grandson, father and son can overcome the conditions of domestic authority and asymmetry that had marked their relationship as part of a single house. The newborn child marks a phase in the progressive growth of the new house, and now the symmetrical compadre relationship replaces in a sense the assymetrical father/son relationship. Thus, while formal relations between unconnected houses may be forged by *compadre* relationships, at the same time the institution separates houses that in a certain sense are too close.

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12. On Riozinho Estate (1982-3), the patron did not serve as godfather to any child (and hence was not the *compadre* of any rubber tapper). In two cases, tappers were genealogical second-degree cousins of the patron Corrêa, though this genealogical tie was ignored conspicuously. According one of the tappers, a poor man addressing a rich man as "cousin" (primo) might appear as if he was asking for a favour on the presumption of a close relationship.
In another instance, man and his sister-in-law (brother’s wife) who become compadre and comadre will have a an often jocose relationship, which carries however greater overtones of sexual taboo than any other relationship, except that between mother/son and brother/sister. The role of contractual kinship to ensure that a formal distance is kept between “too close” individuals is particularly effective in cases involving opposing sexes as brother-in-law and sisters-in-law who are neighbours. While there is no rigid taboo proscribing extra-marital relations between a man and his sister-in-law, the taboo between a compadre and his comadre is extremely serious.13

Macro-house Networks and Settlements Neighbourhoods

Extended networks made of several linked macro-houses constituted spheres of interaction within which people found marriage partners, held parties, and joined together to face conflicts. If, on a map, we were to connect all the houses that had clearly manifest kinship relations between them (traced from house heads or their wives only), most of the twenty-six settlements would be part of a single network, which extended itself throughout the Riozinho rubber estate and crossed the Riozinho boundaries into other Tejo river rubber estates or into neighbouring rivers (Table 7.6).

In such networks, larger blocks of linked macro-houses stand out, insofar as the relations between their components have a greater density. Unlike houses or macro-houses, these blocks of related macro-houses, occupying different settlements (although often contiguous), do not have any technical function, that is to say, do not act together at the labour processes. One might say that they are the largest groups whose social activities are somewhat self-contained (visits, courting, participation in parties and bigger work crews). In a certain respect, they also comprise units of collective and political action, coming to the fore particularly in situations of conflict and vengeance against similar groups, while also in establishing common alliances and strategies, for example in the development of a cooperative. Often, these groups assume the appearance of a kin group drawing their roots from close ancestors, such as a mother or a grandparent, whose name they adopt.14 Also common are marriage patterns between cousins, which repeated in subsequent generations, tend to keep such kin groups relatively isolated (Table 7.7, 7.7a).

In order to assess the extension of these relations between macro-houses, we adopt a narrow definition for the “macro-house network” as a set within which it is possible to go from one macro-house to another through filial/affinal relations (son, daughter’s husband), or fraternal/affinal ones (brother, sister's husband), or affinal ones (wife’s brother, wife’s father), always based on the house heads in two macro-houses. In this narrow sense, twenty-three of the twenty-six Riozinho settlements (88%) were linked to a single network of macro-houses. Dense links designate then macro-houses linked by more than one such link. The most dense blocks of this principal network were four macro-houses blocks associated each to a living old woman as a focal ancestor. These old women lived each in the major house of a nodal macro-house, surrounded by a forest neighbourhood composed of the macro-houses of sons and sons-in-law: the Farias (linking three settlements, and whose nucleus was the settlement occupied by Nazaré Farias), the Castelo group (five settlements, built around old woman Castelo’s settlement), the Santana group (five settlements, built around old woman Santana’s settlement, and five more around

13. "A pior cama do inferno é a cama do compadre com a comadre" ("the worst bed in the hell is the bed of a compadre with his comadre"), as some put it to me.

14. Hence there are the "Isauras" (first name of the grandmother), the "Ginus" (the father's and grandfather's nickname), and similar technonyms in other cases.
her sister's), the Isaura group (five settlements, old woman Isaura). Such blocks, made up by close settlements, involved at most three generations of house heads.

As these examples suggest, macro-house blocks were often centered around a mother and her sons and daughters. Often these houses were headed by widows (Isaura) or included a remarried woman with a childless husband (Farias and one of the Santanas); or, in the Castelo case, the houses had female heads. These structures may be seen as groups of matrifocal, cognatic descent. They were extended at most over over three generations, functioning as common interest groups and occupying contiguous territories. Thus, following forest paths, one could cross the sub-estates of Dourado, Manteiga, Riozinho, Camaleão and Boa Hora always, or nearly always, meeting houses linked to one another. In going back one more generation (now referring deceased ancestors), the division between some of the blocks describe above vanishes. The most notable case was that of the houses linked to (deceased) old Rita and her sister, both Jaminawa Indians, whose daughters married rubber tappers and whose grandchildren also were married. The two Santana groups (two within Riozinho) once were part of Rita's descendants' group, as were other macro-houses on the Riozinho, Manteiga, Boa Hora, Camaleão and Dourado estates, all contiguous.

We resume now the initial argument of this chapter. Instead of isolated "family" atoms whose only unity lies in the existence of a common trade post above them, forest houses join together first as macro-houses with a strong technical and moral unity, which is reinforced by real and fictive kin relations, and with a common leader. In turn, macro-houses act together as larger units around a strong nodal house, and their common action as a block of macro-houses is revealed in political contexts. These blocks of macro-houses are in turn part of wider interconnected networks, which are spread throughout the rubber estates.

The dislocation of one group of interconnected houses provides an example of common action. When Isaura changed rivers, leaving the Tejo for the Humaitá river, all of the houses connected to her's also moved as a block. Union leadership in Riozinho from 1980 to 1983 (Claudino, Roberto, Nazaro and Ginu) provide another example. When Claudino, the only leader not originally belonging to the Riozinho, left the union, leadership became consolidated around Ginu, who although the youngest of a group, belonged to the broadest network around, covering several sub-estates, being a grand-son of old Rita's. When a cooperative was established in 1989, one-third of the thirteen local posts set up in the Tejo hinterland belonged to the sphere of these interconnected houses, being related to old Rita or her sister, along with their sons, sons-in-law and stepsons in the Riozinho, Manteiga, Camaleão and upper Tejo area.

Macro-houses and blocks of linked macro-houses, kept themselves separate and distinguished, as in the case of Isaura's group (although the oldest to occupy the same forest area continuously)and of "old Rita's people"; or the Farias, who stayed on for along time on the neighbouring Tarauacá River and in which they counted patrons among their relatives; or the Castelos, or the Cunhas. As compared with these blocks, temporary and isolated houses of workers from Cruzeiro do Sul proved unstable. A typical group of young and single rubber tappers (the Fonteneles), recently-arrived from the Lower Jurua, managed to establish a solid local base when they married in succession several young Farias women.

Coalitions and Marriages

Marriage is a means of establishing stable links among macro-houses, as well as a reason for blocks of common descent to break apart, as they spread out within the forest and establish alliances with other groups. The Castelos, the Cunhas, the Santanas and the Nascimentos visited one another, supported one another in
conflicts and in party fights, and married one another. The Santanas were allied to
the Cunhas and Nascimentos; the Cunhas had a strong alliance with the Castelos,
cemented by seven marriages in all; the Castelos exchanged sisters with the
Cassianos (also linked to the Cunhas by marriage); the Farias had one marriage
with a Castelo and one with a Nascimento. The marriages tying together the second
generation of Cunhas, Santanas, and Cassianos tended to be repeated in the third
generation, as suggested by flirts and pregnancies. In short, while one generation of
fraternal sets married one another, in the next generation cousins married cousins
and uncles married nieces.

At least two houses in Riozinho were composed of couples who also were
first cousins (children of brothers and sisters) and four others included couples of
uncles and nieces (sister's or brother's daughter). These were Castelos, Santanas,
Isauras and Cunhas. Such marriages attenuated the disruptive effect of distant
alliances. Potentially, a network of descendants can become completely closed when
couples are formed between cousins simultaneously from both the mother's and
father's sides of the family (carnal cousins). Rubber tappers were aware however
that priests - who visited the area in quick, annual desobriga ceremonies - strongly
disapproved of marriages between such cousins. Two Santana brothers, who were
married to two Nascimento sisters and had children of opposite sexes, told me that
the priest would become upset if one's son married the other's daughter. Therefore,
the tappers consciously avoided the marriages of bilateral cousins, which they called
"carnal cousins", although this was sometimes mentioned as an afterthought. Thus,
when a Cunha (who was married to a Castelo woman) was about to visit his brother
(also married to a Castelo), jokes and suggestions came up about the chances of a
Cunha boy courting a Castelo girl, until the Cunha father mused: "No, you are
carnal cousins." At first sight, these relations may appear quite obvious, and

apparently, local residents had no taboo against marrying or at least having relations
with their female cousins, and even showed a preference for such relationships.15

As house networks spread, they cannot impose themselves over rivalries and
conflicts. There was no intrinsic harmony in kinship, and the unity of a network
group could easily erode over the course of three generations.16 The Farias of

15. I heard a tapper sing the following verse which illustrates the attitudes
mentioned:

O meu primo casou-se com minha prima
Para fazer de mim um pobre sofredor
Foi ao contrário pois quem tá sofrendo é ele
Porque a prima por outro primo deixou

A minha prima deu muita dor de cabeça
Aos seus pais que não sabem o que fazer
Vendo a mesma morando com seus sobrinhos
Desesperados desejam a filha morrer

Que prima falsa essa prima do meu primo
Agora sei que ela não coração
Deixou meu primo por um primo do meu primo
Um primo dele primo dela e meu irmão...

My (male) cousin married my (female) cousin
Trying to make me feel bad
But he's the one who wound up suffering
Since she left him for another cousin

My (female) cousin gave a lot of trouble
To her parents who don't know what to do
Seeing her living with their nephews
They desperately wish to see her dead

How deceitful is this cousin of my cousin
Now I know she doesn't have a heart
She left my cousin for my cousin's cousin
His cousin her cousin and my brother...

16. Aldira was married to Chico Teixeira, having Aldenice. João Nascimento
was married to Mundinha, having Nonato. Later, Aldira married Nascimento, and
Nonato married Francisca Santana, and gave up his son Raimundinho to his father-
in-law Carlo Santana to raise as a foster child. Cario had a grandson, Valdeci, born
to his own son Rui and with Aldenice, Aldira's daughter. On one occasion, Carlo
was delighted to see his foster son (and grandson) Raimundinho (a Nascimento
adopted as a Santana) beat his other grandson Valdeci (seen as a "Teixeira", his
Riozinho provide an example of this, as the group was about to break apart. Old woman Farias lived with two married sons and daughters-in-law (a Castelo and a Santana) in a Riozinho settlement (colocação Tacaratu); a third son and his own sons-in-law (the Fontenele brothers), lived in the contiguous Bom Jardim settlement. A bloody rift broke out between the Castelos and the Fonteneles. Since the Bom Jardim Farias had three Fontenele sons-in-law, and the Tacaratu Farias had a Castelo daughter-in-law, the result was a near-rupture between the two Farias blocks, divided between their ties to the Castelos, on the one hand, and the Fonteneles, on the other. 17

Conclusion

People inhabiting and forming families in the forest over generations were able to constitute relatively long-lasting social connections, in spite of the distances imposed by the tropical forest extractive economy. Although without landed property and without settling villages, rubber tapper house heads nonetheless joined together in macro-houses, which behaved as technical units, as well as in extended macro-houses networks and blocks, which can demonstrate solidarity in common actions. This analysis, supported by the quantitative data from Riozinho Estate, may be extended to wider areas of the forest. Indeed, along the forest paths, rubber tappers kept relations with tappers on neighbouring estates within and beyond Restauração Estate, as well as within and beyond the Upper Jurua, communicating regularly with the Upper Tarauacá and Jordão basins, and permanently with urban residents. Just as these houses were not isolated from one another in their forest clearings, they were not isolated as a whole from the external world.

From the starting point of a tapper house, one can follow downstream the property structure (over areas where rent is collected) or the commercial monopoly structure (over routes where goods are advanced by patrons) (Diagrams 5.1, 5.2). But one might also walk across hilltops and streams, reaching the houses of neighbours associated to extended houses, get-togethers, union meetings, or small commerce within forest macro-houses, and farther ahead come into contact with faraway relatives (Map 5). These internal circuits, cutting across vertical structures of commerce, constitute local webs mapping the long-term interests of forest houses in natural resources and in their own livelihood.

wife’s former husband’s descendant, although also his own son’s son). He commented to his wife: ‘Look, João Nascimento beat up Chico Teixeira.’

17. Parties - where tappers enjoy drinking and displaying valentia and other macho qualities towards women - were reputed to be dangerous occasions, except when attended exclusively by a close-knit macro-house group. They often ended up in generalised fighting and threatening. On such occasions I identified many of the cleavages between macro-house blocks here mentioned.
Chapter 8

FOREST HOUSES AND NATURE

Introduction

I have argued that the house is a discrete unit of labour involving persons (who), territory (where), objects (what) and technical procedures (how). Now the labour process will be understood so as to include the activities of the house as a whole to produce the house itself, combining the house persons led by the house head, a forest territory with a variety of niches, imported and non-imported goods, and a know-how; a labour process which connects matter and form to reproduce each of these components and is oriented towards an end expressed in a notion of a good life.1 From this perspective, the surrounding forest itself, which constitutes the territory of a hinterland settlement, is reproduced through the human activity linked to the houses, just as are material objects, people, ideas. Houses' form exists as an image previous to the actual labour process, and thus orients production and consumption plans. In this chapter some aspects of this image will be described.

Spatial Aspects of the House

A tapper's life is centered around his forest dwelling, a residence on piles with paxiuba bark floor and walls, a straw roof, and a rectangular layout, oriented from the main room to the kitchen, through the corridor with access to the bedroom. The kitchen is a woman's space. It is centered on a wood stove made of clay and ashes where the fire is lit early in the morning, and over which salt and soap

1. "For it is possible for all the kinds of causes to apply to the same object; e.g., in the case of a house the source of motion is the art (techne) and the architect; the final cause (eneka) is the function; the matter (ule) is earth and stone, and the form (eidos) is the definition (logos)" (Aristotle, Metaphysics, III, ii, 6; also VII passim).
are stored, and bananas ripened. Also in the kitchen is the jírar, a wooden platform where women prepare game meat and wash dishes. Among the basic equipment of a kitchen are pots, pans, plates, spoons, metal cups and a clay ewer with fresh water. Adult women or young girls carry wood from the back yard into the kitchen, and fetch water from the igarapé. At night, under the feeble lampírina light, the kitchen floor is occupied by the complete domestic group of men, women, children, nephews and nieces, stepchildren and hired hands sitting in a circle to eat the pirião of mixed manioc meal and broth.

In the front room single men set up their hammocks and male visitors lodge. When they set out to work, the single men grab their well-preserved rubber tapping blades from the straw roof, as well as the poronga lamp, a forest knife and a smoking-bag with tobacco, lighter and cigarette paper; they may take to the forest the shot-gun which also hangs from the wall. The front room is where men fill metal or cardboard cartridges with shot, powder, beeswax and bark before starting out for the hunt. The front room also may contain fishing nets and harpoon heads (the garden equipment, also used by women and children, is to be found at the back end of the house). Visitors stay in the main room unless they are invited to eat, when they pass to the kitchen. The front room is a place for conversation, card playing and dancing to the sound of record players at week-end parties. The main room walls can be decorated with illustrations taken from magazines, advertisements or school books.

While the kitchen and main room have windows and unlocked doors leading to the terreiro (and sometimes have no walls at all), the bedroom has no windows and has a single opening to the corridor, closed by a curtain. This is where a married couple sleeps on a hammock or in a bed under a mosquito-net, along with a variable number of children and single young women on overlapping hammocks, suitcases, and personal possessions.

A house possesses various small house lamps (lamparinas), and larger forest lamps (porongas), both using kerosene. Some houses are distinguished by a sewing machine, a record player, a wall radio or a wall clock in the main room, and framed family portraits taken by itinerant photographers; suitcases, perfumes and a mirror in the bedroom; in the kitchen of some houses one sees a large set of shining pots and pans, and rows of cooking oil here used to enhance the manioc meal or the cooked broth.

A house structure may last ten years, with one or two replacements in the straw of the ceiling, as well as in the walls. As it gets older, it tends to become infested with cockroaches, spiders and ants, the yard becomes impoverished as the topsoil is washed away, and the remaining vegetation disappears, making an old house terreiro, the patio, inappropriate for feeding chickens and other fowl or criação. The kitchen usually has its own foundations, separate from the rest of the house building, which makes it possible to repair and rebuild it independently (Table 8.2).

Although without locks, the forest house is respected by outsiders. One must be invited to come in, after greeting from an appropriate distance, not too far and not too close to the house. Guests leave their guns in a discrete place, often in the forest, and give their knives to the house head who will put them away to be returned later.

A yard surrounds the house. It is a cleared area, sometimes swept with brooms. It has fruit trees, chickens and pigs, the smoking-hut and a suspended garden where women cultivate tomatoes, onions and other plants used for seasoning. Originally created as a forest clearing, a new yard always possesses a stock of tree trunks to be used as firewood in the kitchen, and at least one calabash tree which provides all-purpose gourds, the guiás (one also may find pepper shrubs, lemon trees for medicinal purposes, annatto trees, avocado trees whose leaves serve
as medicine, peppermint and other medicinal herbs, as well as flowers). At the edges of the yard, there is sometimes a field with isolated palms and other trees, where cattle go to pasture, which is the final border between the house and the forest. To have one's house separated from the forest by a beautiful campo is the source of pride for forest peasants.

Houses always have direct access to water, either from a river or a stream, following a trail which leads from the kitchen to the waterside "port", the source of water for the jirau, and the place where women wash clothes and part of the dishes on a solid-wood washboard. Some houses have a hut by the water where women may protect themselves from the sun and enjoy privacy while bathing. Children may bathe at any time and they often swim in the larger pools, while men will wash after the sunset, separate from the women. Drinking water can be taken from the main river, but whenever possible, residents prefer to use somewhat distant streams (igarapés) or springs (cacimbas) as a source for clean, fresh water. Several paths lead to habitual places at the edge of the forest or in nearby capoeiras, where bodily functions are relieved. When the stream is navigable, there is at least one canoe tied up at the house port, used for fishing and as transportation.

A single glance can capture the house, yard, field and stream port complex all together. Anywhere from one to four houses may be found on a single clearing, which with the women and children, along with the rubber smokers, cattle, ducks coming and going from the stream, pigs that spend most of their time in the woods, and cattle that forages along the river banks or in the forest, impress the visitor who emerges from the forest darkness with a feeling of brightness, heat and movement, as if he had hit upon a miniature village. People from different houses in the settlement will often be mixed up in house or backyard chores, particularly small children. On weekends, the articulated group of houses on a settlement might fill up with visitors. Then the activity of the kitchens picks up, the boys and young men play football in the field, and an ox or pig might be slaughtered to be consumed by or sold to the houses paying the visit. Rubber tappers' parties, with music from battery-operated record players, last well into the night, and may extend themselves from one day to the next without interruption.

Seen from above, the yard and its surrounding campo appear as an isolated clearing in a dense forest. Seen from below, the clearing is connected to the other components of the settlement by a series of paths and trails. Several paths lead to other settlements, and at least one of them leads to the roçado (a word that, unless qualified, means a manioc garden) which, in older settlements, is part of a colônia, a continuous mosaic of garden plots belonging to the several houses in the settlement, with varied crops in different stages of development, along with fruit trees used by all houses, extending around the manioc flour house, which is used by all the settlement to process manioc into flour. Usually accompanied by children, women often make the trek from the house to the garden plots almost every day, as part of the routine of weeding, gathering maize to feed the chickens, or obtaining bananas or other fruit. During the two days set aside for making flour every two weeks or so, the entire domestic group gathers in the flour house, accompanied by their dogs. Every hand in the house (macro-house) is needed to make in two days the farinha necessary to last for two weeks, at least one paneiro or around 30 kgs.

The well-trodden path leading to the garden plot is known in every detail by the trees, vines and palms along the way. Other paths may lead to isolated garden plots, especially rice patches that do not need to be close to the flour house. Garden plots do not have fences around them, though at times the path is blocked off by a gate so as to avoid the invasion of cattle. Paths leading to the rubber trails also issue from the main clearing, and off in every direction, as a whole covering a roughly circular area around the central clearing.
As a rule, the area marked by the trails also constitutes the each house's hunting and collecting spaces, which is respected by the other houses of the same settlement and especially by the houses of other settlements, although there may be conflicts between houses in specific cases involving trails which were unused, or when a pursued animal is killed in another house's clearing. Sometimes it is not easy to distinguish between a borrowed section of an idle trail at the neighbourhood and a newly formed section of one's own trail; or there is a problem when one hunter pursues a deer, but it is eventually killed at another settlement's terreiro by another man. The general principles involved are that rights were obtained either by renting trails or by actually using garden plots, hunting and gathering areas. If only a small number of trails are idle at a settlement which is already occupied by two or three houses, however, they tend to be seen as a stock of trails to be employed by these houses when they grow.

The area of a settlement is thus formed by distinct niches of activity: extraction of latex on the rubber trails, hunting and collecting along the forest trails and in the "heart of the trails", planting and processing of manioc at the colonias, raising cattle, chickens, pigs, ducks and turkeys in the yards (allowing them to roam and forage), processing rubber in the smoke house and making food at home.

The Forest

On the Ríozinho Estate, the area of forest surrounding the central clearing of a hinterland settlement with two or three houses covers a continuous territory of 900 to 1,200 hectares. This was a well-known set of ecosystems spatially disposed in a horizontal fashion (Denevan 1984). Such ecosystems may be graded according to the degree of human modification effected upon them. The areas recently affected by the human action of houses (terreiro and campo often abandoned and replaced for alternative clearings); the roçados or agricultural clearings in several stages; the capoeiras or abandoned cleared areas with pioneer vegetation in several stages, which after fifty years only a trained eye can distinguish from the virgin forest; the forest at its climax, the mata bruta. All of these systems and zones represent together a wealth of water, soil, plant and animal resources, organised within the collective memory as one organises goods on the shelves of a store. The men, women and children of a house who go through these resource zones including forest, gardens, field, back yard and waters can name rubber tree by rubber tree, a stump with bee's honey, a palm that might yield heart of, another palm-tree with ripe assai fruits, a curve in the river whose good clay will serve to smooth one's hair, a rubber tree that ripened untended in the forest and is ready to tap, a paca trail, an area with soils and plants that promise a strong manioc crop, a river curve teeming with fish. They spontaneously comment on such topics when walking along the forest paths or trails, just as they never tire of talking about rubber, hunting and gardening events and achievements, either on one's own house or on neighbouring houses (see Tables 8.8a, 8.8b, 8.8c, 8.8d).

Agriculture: Varzea and Terra Firme

Terra firme (mainland), as opposed to varzea soils in the Amazon generally have been described as infertile (in American taxonomic classification, Oxisols and Ultisols; in Brazil, Latossolos and Podsolos Vermelho Amarelos), in contrast to floodplain soils (Meggers 1977 [1971]; Roosevelt 1980; see however Moran 1979; 1984:378), but Tejo River has predominantly eutrophic soils, low in acids (IBGE 1990).

Rubber tappers' agricultural strategies exploit both varzea and mainland soils. Floodplain cultivation dispense with the use of swidden agriculture. Flooded areas on the banks, beaches or forest are used in complete annual cycles, beginning with the end of one rainy season (May) and ending with the beginning of the next
(December). Though with very steep slopes, the clayey, steep river bank frequently is cultivated with maize - sometimes requiring a preliminary clearing with a machete, around June or July, and the crop is harvested in October or November, when the first rains come. Beaches are the convex and sandy side of the river bank, formed by the deposit of sediments washed from the opposite bank. On different beach levels, which possess distinct soil characteristics, cultivators plant beans and maize; watermelon; potatoes. On the floodplain soil above the bank, also rich in sediments, they plant tobacco and manioc (in this case, it is a risky crop, since protracted flooding can make the roots rot). In September and October, tobacco leaves are prepared in riverside houses well into the night, while beans are shelled and dried. On the Juruá itself, often cattle are raised on the sloping banks (feeding on the vegetation grown after the waters recede) while crops are cultivated on the beaches; other times, fences separate cattle from cultivated zones. Both the beaches and the lakes are treated as a group of resources to be used by a group of houses, which are not necessarily located nearby. Typically, a group of houses linked through marriage, kinship and friendship (a macro-house) will divide both beach and bank in strips, while maintaining common pasture areas and using the same lake for fishing. To have access to both the floodplain and the "mainland" represents the best of both worlds. This situation is characteristic of the Upper Juruá, where the floodplain occupies a narrow strip of alluvial ground. Thus, a house may use a mainland area located twenty minutes distance in the forest. With the horizontal combination of mainland and floodplain niches, a single house may enjoy long-lasting manioc and maize plots (associated to a flour-house) on the mainland, and temporary crops of beans and maize on the beach and cattle on the opposite bank. A house of this sort then can combine seasonal crops (tobacco, beans), multi-annual crops (manioc), rubber trails (perhaps rented from different patrons, and located both on the floodplain and mainland) and oxbow lakes (maybe an hour's distance by river). Ordinarily these areas all are rich in game, since houses are concentrated on the margins and only rarely in the center - thus leaving the woods to the animals. Such an area with highly diversified niches sometimes is exploited by three or more houses together.

Agricultural procedures on the hilly mainland of headwaters, essentially based on swidden methods, deal with erosion by the judicious use of aceiro palms and banana on steep slopes, of interspersed crops (fast-growing maize and manioc) and of the protective action of remaining trees after the burning. Gardens may be managed for periods of up to ten years (cf. Tables 8.8a and 8.8b), and final abandonment may not be due to declining fertility.

Mainland swidden agricultural plots require greater efforts than varzea agriculture. The procedure calls for the striking down of large trunks with axes, after the undergrowth has been cleared with a machete; it also calls for the coivara (which is the clearing of remaining trunks from an area that already has been torched); it calls for careful sowing and for weeding, which becomes progressively harder as times passes, and wild animals consume a significant share of the roots.

Although the floodplain shows greater diversity in niches, mainland territory such as the Riozinho Estate have greater population densities (1.7 inhabitants per square kilometre) than the region as a whole (1.2 inhabitants per square kilometre) and than the floodplain in particular - which is immediately recognizable in the air photography of the region. The main reason for this pattern is that the most productive rubber areas are located at the mainland headwaters. It should be observed that Tejo River headwaters are not new frontiers, and have been inhabited at least since 1899 (Cabral 1949), when it had the same high rubber productivity of 10 kgs rubber/day as today (cf. also Tastevin 1925:422).
Swidden Agriculture Techniques on the Mainland

The continued exploitation of an area may last from three to ten years. The clearing of a new plot (first year) calls for an area of virgin forest (which might be a capoiera, or previously cleared area, provided that it has been regenerated for over fifty years). The first stage, in July, involves the clearing of undergrowth by machete; the second and most intensive stage, in August, is when the trees are stricken down with axes; thus exposed to the sun, the area remains abandoned during a variable period covering the driest months of the year (August and September). House heads determine the ideal moment for burning the vegetation, upon which the fertility of the plot depends critically, gambling between the additional gain of greater exposure to the sun and the risk of early showers. The vegetation that is partially burned is then removed from the area to be cultivated (a procedure called the coivara). At this point (September-October), plants of manioc stalks are planted. By December, the manioc becomes ready to be harvested and part is eaten as canjica (a sweetened maize dish); the rest is left to dry, serving a chicken feed over the following year. Ideally - depending on the variety of manioc used - new manioc ripens over a year, and is weeded twice during this period. Hence, the global period between August of one year and August of the next is divided into an intensive male labour phase of initial preparation (August-October) and an extensive female labour phase of weeding (October-August). After a year, the cultivated manioc (maniva) has an efficient size. One essential characteristic of mainland manioc plots is that the ripened manioc may remain an additional year under the ground. The second year of a mainland plot cycle is dedicated to the gradual harvest of the ripe stock, along with the clearing of second-year weeds, which are more aggressive. During the second year, the cultivator may choose to replant manioc as he harvest the first batch - a simple operation requiring only the reintroduction of stem pieces in the open holes. The process of pulling up the roots is followed immediately by their processing, involving all the house members in two days of work, mainly to make flour (and sometimes along with baby food, cakes, juices). In short, the stock of ripe roots in the garden is transformed into a stock of processed flour within the houses. If the plot is replanted as it is being harvested, it affords a second harvest in its third year of activity. During this second manioc harvest maize will not be harvested, since it is not planted during the second year (maybe because the young plants do not receive sunlight because of the size of the manioc plants). It becomes more difficult to clear invading weeds; the size of the roots diminishes. Manioc is not replanted a third time on a row (cf. Tables 8.3 to 8.3d).

At this point, the plot is left fallow during one or two years (thus completing five years since the initial clearing). After the fallow period, the area will be covered by a low vegetation. Then another weeding operation may be undertaken (with a machete and a hoe), and the plot replanted with manioc, or with tobacco, sugar cane or some other crop. This operation is preferred by some older cultivators because it is not necessary to open a new clearing with an ax, though on the other hand requires intensive labour with a hoe to eliminate low-lying weeds.

This new cycle lasts another two years (now seven years have elapsed since the initial clearing was made). The cycle may go on with perennial crops like sugar cane, which remain on abandoned plots or during transitional phases when the land is turned over to a long fallow period.

A colônia is a mosaic of plots at different stages of development, some in their first year, others in their second, still others in temporary fallow; some with manioc, others with tobacco. The plots are surrounded by ubiquitous banana, pineapple and papaya trees. According to rubber tappers, papaya trees grow...
spontaneously in recently-cleared areas from seeds that are spread by animals (Table 8.8a). 

The unit of measure for cultivated plots is 1,000 covas de roça. Each cova (pit) correspond to a maniva bush. One thousand covas, occupying around 0.1 hectare, require around 14 man-days of intensive preparation (clearing, striking down, burning, clearing the burned area and planting), and can yield between 15 and 20 paneiros or as much as 600 kgs. of manioc flour (each paneiro weighs around 30 kilos). A typical plot measures 0.3 hectares and requires around 42 man-days of labour per year (Tables 8.3 to 8.4). These figures do not include weeding visits, often done by women and children throughout the year, in casual visits that are not counted by the house head. In contrast, house heads count two or three annual weedicings (for gardens planted in mata bruta area) during the initial year of the plot, each consuming around three man-days. This means an annual cost of six to nine man-days for 1,000 covas (18 to 27 days for a typical roçado) for systematic clearing, without counting the casual visits.

Processing manioc is an intensive activity in which the entire household becomes absorbed for two whole days. The activity sequence is as follows. On the first day, roots are pulled up and transported to the flour-house by adult males, are peeled (by men, women and children), and are washed in water brought from the stream. Peeled and washed manioc is then grated (by an adult male, using a wheel with aluminum teeth powered by a 3.5 HP engine) and the paste is poured into a wooden vessel. At the end of the afternoon, a man prepares a press, covers the wet mass with leaves and places it with a metal cable between pieces of wood, exerting pressure so as to extract the liquid from the fiber. The second day begins with the removal of the mass from the press and the preparation of the wood stove. Then comes the long and delicate operation of baking the mass in order to obtain 30 to 45 kgs. of flour, which is put in sacks and transported to the house.

Women and children prepare food, bring water from home and prepare other products, among which the massa fina (fine meal) made of starch flour mixed with the liquid extracted from the manioc press, which is an essential foodstuff for infants. Another delicious though less frequent product are the manioc cakes (beiju and tapioca). The peel of the manioc root is taken to the house to feed the pigs. Rubber tappers take great care in preparing manioc flour, always concerned with its quality. Men always take over at the critical phase of toasting the manioc paste, stirring it continuously over a hot stove (on an iron griddle 1 to 1.5 metres long, sometimes circular) with a wooden oar, until the past arrives at the consistency of a crispy, coarse meal so characteristic of the Upper Jurua. Women command the preparation of massa fina, which also is toasted, though with the final consistency of wheat flour.

Two sessions a month, yielding between 25 and 60 kilograms of flour, are enough to supply an average house (including dogs among the consumers), requiring an annual planting of 3,000 covas. The average plot, of 3,000 covas, requires at least 24 flour-making sessions (two a month), each involving the labour of the entire house for two days, or almost 50 days per year each house. The variation in the amount of flour produced depends on the extent of work in the flour-house, and does not necessarily reflect more or less days dedicated to flour making (cf. Tables 8.3).

If a house dedicates 150 days a year to rubber (about 120 days tapping, four-days a week over eight months, plus 30 days to prepare two standard-sized trails) and develops a annual garden plot of 3,000 covas, it will be occupying 267 man-days (150 + 117) to operate the rubber and manioc sectors of the settlement. Since the

2. Around the flour-house, an area frequently occupied by women, there is a dense amount of domestic plants for medicinal and other purposes, such as the oca bush used to prepare a paste used for stream fishing.
total number of man-days per year is limited to 312 (52 weeks x 6 days), simultaneous rubber and manioc production take up 85% of available labour time, leaving approximately one day per week for hunting activities (not counting Sundays). The real income of the house would consist in 1,800 kgs. of flour (3,000 covas x 600 kgs.) and 960 kgs. of rubber (120 tapping days x 8 kgs.). One must keep in mind that these are man-days, assuming that there is only a single adult male worker in the house (Tables 8.3).

Hunting

In the standard division of time during the week, Wednesdays and Saturdays are the preferred days for hunting. If possible, tappers avoid hunting on Sundays; on some places, hunting on Thursdays is strictly avoided. Rain season the ideal season for hunting (the hunter’s presence is less easily detected because the soil is wet; more animals fat).

Riozinho rubber tappers show exceptions to the rule that hunters maximize returns by seeking out species that have a greater presence in the total animal biomass (Robinson & Redford 1991). According to this rule, animals that are most frequently captured should correspond to those which have the greatest amount of meat relative to the total amount available in the forest; they are both more visible and give the largest return per effort. This rule is broken in almost every category of size. For example, both the tailed paca (paca-de-rabo) and the capivara have the size of the paca (Agouti paca), but they are not eaten by rubber tappers. In a smaller category which includes the larger monkeys, neither the anteaters nor the sloths are eaten. In the small mammal category of embiara (Table 8.8d), while the squirrels are highly valued as food, tappers find repulsive the forest rabbits, marsupials of all kinds, ground and tree rodents such as the bamboo rats, along with weasels, wolves and bats. The status of small monkeys is less rigid, and they are often kept as pets.

Many animals are slain simply because they are considered predators. This occurs with jaguars, who visit clearings in search of pigs to eat, but tappers also kill the tailed pacas, though they do not eat them, because this animal preys on the manioc plot. Capibaras, though ordinarily not eaten by tappers, have been practically exterminated along the Tejo River, maybe simply because they are easy to locate from canoes (on the other hand, their fat possesses medicinal properties). Animals such as sloths and anteaters are “neutral”, since they do not serve as food and they are not viewed as man’s competitors – though one type of anteater (the mambira) is persecuted by tappers for no apparent reason. Some individual species in a group are avoided (thus one species of armadillo and one species of squirrel).

Among birds and reptiles there is also a pattern of avoidance, with an even greater degree of exclusion and restrictions. The nambu forest partridges are universally accepted as food without reima or restriction (occupying a position among birds analogous to deer as safe food), and seem to be as abundant as the paca. By contrast, large land birds such as curassows, guans, chachalacas and trumpeters are rare in Riozinho, and I only saw them kept as domestic animals, probably captured while small (the trumpeter is a guardian of the domestic fowl). Killing a parrot or macaw is synonymous to great hunger, though even during serious shortages the small, white egrets, or the japinin birds, were never bothered at the Tacaratu settlement. Among reptiles, river turtles have become very scarce (though they have not disappeared completely), while land turtles are very abundant, even though collected intensively in the forest.

Just as agricultural activities are diversified and occupy different niches within a settlement, the hunting economy also is developed in a variety of niches, employing diverse techniques and affecting different animals in quite unequal ways. This means that concepts like "depletion", analogous to "impoverished soils", are generalizations of little use. It remains necessary to specify what species and
techniques are involved (Vickers 1988:1521). The rubber tappers themselves
distinguish demographic factors (high occupation density drives away game) from
technical factors (the use of paulista dogs drives away game), and from a
consumption perspective they are quite selective when it comes to game -
designating a restricted sub-group within each large animal category identified (see

Hunting, Panema and Reima

Among rubber tappers, the consumption of game is associated to the panema
and reima complexes. Unlike cultivation activities, the consumption of game is
surrounded by dangers of a mystical origin. Hunters facing persistent bad luck will
tend to blame another person for inflicting panema on them. The ultimate cause of
panema lies in a woman who has consumed game killed by the hunter. A woman
might afflict a hunter with panema either on purpose or not. A hunter becomes
inflicted when the meat or bones of game he gave (and did not sell) to another
house come into contact with a woman during her menstrual period or after
childbirth; in fact a woman in this state has only to walk over an area where these
bones are buried to affect the hunter. A bitch in heat can cause panema, which also
afflict hunting dogs in the same way, with disastrous results for a household. Even
hunting trails, along which traps are placed, can become affected by panema.3

A hunter cursed with panema (or enrascado, in trouble) tends to give up
hunting larger game altogether, restricting his actions to embiaras, that is until he
becomes cured by herb baths and appropriate chants. The panema state can last for
years, and is like a grave illness affecting not only the hunter but the whole house

Some very successful hunters attribute their success to the use of hunting
amulets, the cabojos. These amulets may be extracted from animals (such hair balls)
or can be prepared with the nests of rare birds (such as the uirapuru). These hunters
maintain their amulets secret. Forest animals may be protected by "fathers of the
forest", who can punish hunters who hunt the same species repeatedly, or hunt on
with indigenous backgrounds (called caboclos, who on Riozinho are descendants of
Cashinahua, Jaminawa or other Pano groups) are reputed to be lucky hunters
because they can control the mystical forces that govern hunting.4

Reima restrictions divide game meats into one category that is safe for all to
consume, and another whose consumption may be dangerous. An abundance of
game meat is not enough to sustain a woman during the resguardo (post-partum)
period, which might last a whole month, and during which she must avoid any sort of
work, must remain secluded and must not eat reimosa food. A woman with sons who
are hunters might allege that she cannot eat reimosa meats, which means that the
hunters must supply the house with deer meat (the only large game that is not-
restricted), and of non-reimosa embiaras meats, such as agoutis and partridges.

During the post-partum period, women ideally should survive on a diet without
forest foods - typically chicken broths flavoured with butter.5 Great ("lucky") hunters

3. I attempted to photograph the setting up of a trap on a paca trail. The
tapper's wife alleged that I could empanemar or enascar (get in trouble) the trail.
The next day we found a paca in the trap. From then on, I gained the reputation of
breaking panema states. It worked many times.

4. The Floresta settlement, on Riozinho Estate, had two feuding macro-
houses in two different clearings (invasion of crops by pigs started it). The son-in-
law of the head in one macro-house was a caboclo who "closed off" access to the
clearing to the residents of the rival clearing (two brothers-in-law). The caboclo had
also the power to have all the women he desired, and was in conflict with the patron,
who thought that he produced little rubber.

5. During a meeting of cooperative managers in 1989, the only point raised
by women was to request the inclusion of canned butter among "basic commodities".
undeniably attract women. To be able to bring home food from the forest is a decisive argument for winning over a wife.6

The consumption of reioma (restricted) game meat can prove extremely dangerous to sick men and women, and to woman after giving birth. Both complexes affect the hunter’s behaviour and consumption patterns. When combined with the restriction of certain weekdays (Thursdays in some locations, Sundays and holidays in others) and with limitations to the repeated preying on the same species, the notions of panema and reima in a certain way limit the total pressure upon forest animals.

Hunting Productivity

The region easily could accommodate larger garden plots (within a total area of around 400 hectares of forest per house, and annual plots of 0.3 hectares); it could allow for greater rubber extraction (one third of the existing trails remain idle). In Riozinho, density reaches 1.7 persons per square kilometer. No one is concerned about the shortage of land for cultivation; as for rubber trails, approximately 30% of the trails remained idle; but the shortage of game remained a genuine source of dissatisfaction.

On the headwater Riozinho, the average daily amount of game meat per house could be 1.48 kgs.7 On the Tejo area including the Jurua varzea, the average

6. I witnessed a conversation in which a woman accepted to live with a tapper she had never seen before, on the information that there was plenty of monkey meat in his house.

7. On September 1983, during eleven days, three houses (a macro-house) on Riozinho killed eight mammals (47.4 kilograms of meat): one deer (17.52 kgs., 37% of the total volume of meat), two pacas (16.44, 34.7%), two squirrels (0.69, 1.5%), one armadillo (7.02, 14.9%) and two agoutis (5.68, 12%). These figures average to 1.437 kgs of game per house per day; 0.269 kgs/person/day; and 0.479 kgs./day/km². Game meat was available on nine of the eleven days; for three days, the houses also consumed on duck, one chicken and several eggs; bananas and papayas made up meals on four days, and fish was eaten twice. Manioc flour was always available.

was found to be around 2.33 kgs per day per house (mammals only), including by order of weight pacas, deer, tapirs, boars, agoutis, monkeys, armadillos and squirrels (birds and reptiles also were not computed here).8 The contrast in daily house consumption confirms the current opinion that Riozinho has less game than the rest of the region.

Predatory action on tapirs, wild boars and, to a lesser extent, deer (on the basis of the samples mentioned) seem to be higher than natural productivity reported for the Amazonia (Robinson and Redford 1991:422-24), which is confirmed by fact that tapirs are inexistent, and boars and large monkeys are very rare on the Riozinho according to the rubber tappers (cf. Bodmer et al 1988). On the other hand, the comparison with published data reveals that the paca (Agouti paca) also was being hunted at greater levels than theoretically sustainable, though its scarcity was not noticed anywhere, even in Riozinho. One possible explanation is that pacas feed on the rubber tappers’ garden plots, and have a short reproductive cycle. According to the tappers, as much as 25% of the manioc roots are eaten by pacas and other rodents, while ambushes set up at the plots rarely failed to produce game. Namhu partridges, and land turtles are other examples. According to rubber tappers, deer have become more difficult to find since the introduction of "paulista" dogs in the early 1980s. The tappers’ impression is that Riozinho is a place rich in rubber but poor in game (ruim de rancho or "bad for food"), where one faces "hunger".

8. Mammals Hunted, September 1991, 49 houses: Of 108 mammals and 799.132 kilograms of meat, there were 10 deer (175.17 kgs., 21.9% of the total volume of meat), 20 pacas (227.2, 28.4%), 17 squirrels (5.882, 0.7%), 4 armadillos (14.16, 1.8%), 26 cotias (73.84, 9.2%), 21 monkeys (63.0, 7.9%), 8 pigs (90.88, 11.4%) and 1 tapir (149, 18.6%). These figures average to 2.33 kgs. of meat per house per day; 0.33 kgs/person/day; and 0.77 kgs./day/km².
Consumption and the Quality of Life

Above, we have outlined the house’s use of various forest niches, through agricultural, hunting and collecting techniques (leaving the rubber activity to the next chapter). Now we summarise what a house should obtain from these processes.

A house should never be deprived of manioc flour. The point in making the manioc flour is not to extract poison from the manioc. The varieties in use are not poisonous (at most some are bitter to taste). Manioc and bananas can be eaten cooked or roasted, but during a main meal these items do not replace flour. Indeed, instead of making flour, neighbouring Indians bake or cook their manioc, but at a tapper’s home, the absence of flour is a sign of poverty and a cause of shame. Manioc flour is a universal food, with no reima or restrictions due to sex or age. Children under one are fed on a diet of massa fina or a special manioc flour rich in starch, which must be mixed with powdered milk and sugar.

"Hunger" as a scarcity of rancho is a reference to game meat which should be part of every meal, in the form of a broth which together with the manioc flour makes up a pirão. Everyone appreciates the standard farinha and caldo (game broth) staple, followed in some houses by coffee and the strong Jurua tobacco, rolled into cigarettes or chewed. The use of ducks and chickens, eggs and fruits, wine made from patoá or beans does not indicate only food variation, but rather shows the absolute scarcity of game meat, which ideally should always accompany manioc. But game meat, contrary to manioc, is not a universal food. Women on resguardo or protection after childbirth must avoid reima meat (which excludes most of the forest food), and should have domestic food or commodity food (chicken and butter), similar in this respect to children under one (powder milk and sugar). These restrictions also apply to sick persons who should also avoid fruits such as pineapple, orange, lemmón and papaya. Are luxury food, in a sense, both commodity food such as chocolate, guava paste, crackers or sweets, and food gathered from the forest, such as honey, palm tree wines, or palm hearts, or forest fruits.

Note that the presence of manufactured goods (purchased with rubber) constitutes an essential component in the quality of life of a rubber tapper’s house.

Houses are not complete or even viable without hunting equipment (guns, ammunition), fishing equipment (nylon for nets and lead), agricultural tools (axes, hoes, machetes), and extraction tools (blades, tapping knives, tins, pails, sacks); gasoline, metal plates for the flour-houses. Houses also need fabrics and thread, and soap and salt to be used in the domestic processes. These imported goods, acquired as means of production and paid for by rubber exports, indirectly enter as part of the production process in every sector. This means that it is not possible to separate two discrete technical spheres within a house: one of subsistence production and the other of commodity production. This is the reason why I have suggested that basic goods are those used as permanent flows, either as a flow of things (such as manioc-flour, game, salt, soap) or as a flow of services (such as the manioc-house, shot-guns, or tapping knives), in contrast with non-basic goods such as occasional food (fruits, sweets) and non-productive durable goods (non-used mattresses, a motor in stock).

The line separating basic from non-basics cannot be easily drawn, since some items may classified differently by different houses. What looks like non-basic cooking oil or coffee in one house is basic food (for male workers only) for another house in the sense of being used as a continuous flow.

Shiny clothes, water and shock-resistant wristwatches, efficient motors, shoes, new records, and radios all are highly valued by many tappers, who also enjoy decorating the walls of their homes with pages cut out from magazines and books. Men, women and children great pride in their imported possessions, and manufactured articles may draw the same interest as forest animals and plants. Imported objects are used for personal expression and in communication, and the
fact that game meat cannot be exchanged for commodities - in general exchange regimes distinguish that which is given and comes from the forest, that which is exchanged in kind and comes from human labour, and that which is exchanged for debt and carries overtones of exploitation - does not prevent watches, knives and shotguns from entering in cycles of barter-exchange among friends around the neighbourhood (Douglas and Isherwood 1978:3ff; Hugh-Jones 1989; Appadurai 1986, 1989). Such barter exchanges among friends put into circulation novelties such as records, new dog breeds, or new guns, in circuits which sometimes lead to the exchange of an old gun for a new one. Game meat, manioc flour, imported guns or dogs occupy, in their own ways, a central position, whether affectionate or cognitive, social or personal, among the rubber tappers' interests and exchanges. This means that the global quality of life simultaneously is a function of different categories of goods - deer meat, patoá wine, but also chocolate and powdered milk -, and that the consumption sphere is not closed.

Similarly, the forest peasant's technical knowledge should not be seen as closed. Rubber tappers possess a meticulous perception of the forest. They also have a keen interest in mechanical processes. To take apart and rebuild a combustion engine is a matter of pride to many rubber tappers. Watches and motors were especially admired. Watches are tested for macho qualities. A friend of mine asked during the noon break at the trail: How can all clocks be synchronised (among themselves and with the sun)? The tapper mused that the first clock maker must have "lost a lot of clocks" in trying to synchronise the hand with solar movements. Rubber tappers also admired the builders of combustion engines. A toy car given to a child immediately was taken apart by adults who were curious about the spring mechanism. Interest in mechanical objects, from diesel motors to "super-sonho" (supersonic corrupted to "super-dream") airplanes that crosses without making noise - was great.

Domestic economies like that of the rubber tappers are essentially linked to the market both on the production level (which makes it impossible to discern commodity production from subsistence production) as well as on the consumption horizon (which makes it impossible to distinguish superfluous from necessary consumption), and also on the technical level (which makes it impossible to see a "traditional" technology as fixed).

Conclusion

The objective of this chapter was to outline the form of tappers' houses in the forest on the Upper Juruá, as an introduction to a more detailed analysis of rubber-making in the next chapter. Rubber tappers are extractors, cultivators, hunters/fishermen and artisans. They use forest areas whose natural resources are carefully mapped; they use technical procedures which depend both on the forest niches and on imported equipment; they desire game and manioc flour as food, and also imported commodities and are keen on new technical ideas.
Chapter 9

HOUSES AND THE MAKING OF RUBBER

Structure of the Labour Process

We now introduce a definition of labour processes, which corresponds to the definition of the processes of house maintenance during the short-term period of technical activities. This definition follows Marx's idea of labour, which is "above all nothing more than a process between man and nature (...at the end of which...) emerges a result that already had been determined from the outset and, therefore, ideally, in the worker's representation" (Marx 1969:149). Still according to Marx, the components of a labour process as "an activity oriented towards an end" are the labourer, the object of labour (especially nature) and the means of labour (Marx 1969:149). This definition may be traced to Aristotle, who used it to describe the existence of things - substances - as in the articulation between matter and form, through the action of a technical agent seeking an end. In applying these ideas to the study of the rubber tappers' economy, the labour process may be described by specifying the technical agent (the working team of a house or macro-house), the matter (the forest territory), the tools (knives and so on), all this anticipated as an image together with an end (rubber balls and their commodity equivalent). In quantifying these components, one may use the hours of a labourer, the number of trees on a rubber trail, the cost (in rubber) of tools, the number of rubber bundles to be produced, and a final stock of commodities to be acquired.

1. Fortes (1971(1958):87) distinguished a short cycle of economic activities which produce things (which I prefer to call technical actions) from a long social reproductive cycle of persons.

A rubber tapper's house is thus a unit of the labour process, that is, it is a technical unit. It also is a juridical unit, in the sense that the components of the labour process are under the house head control (rule over the house people; rights over rubber trails under a costumary contract; property of tools by purchase; knowledge of technical procedures). A house, represented by its head, takes decisions over the volume of production, over the use of labour-time, over the exploitation of trails and over the techniques employed. I shall use this framework to elaborate an understanding of the labour process involved in rubber production by tappers in the forest.

Labourers

In rubber production, the work group was composed of the facas (knives, or available labour) of each house (house heads, dependent tappers "working for the head", and auxiliary workers including women). Work crews varied from house to house and included the following categories.

1. House heads who were also active tappers.

2. Auxiliary gatherers (children eight and up, women) participated in the gathering of latex, during short periods and usually during daylight hours (when there was the threat of rain, or being responsible for a third, or a quarter, or a "turn in the trail").

3. Auxiliary tappers were mainly ten to fifteen-year-old boys (girls only rarely), who would both tap the rubber trees and gather latex, outfitted with a complete set of tapper's equipment. They would cut regularly one part of the trail (a leg). Some girls would cut and save small quantities of rubber in order to buy shoes or a new dress.

4. Dependent men over fifteen, considered as mature tappers, capable of cutting and gathering the rubber of an entire trail by themselves, and able to smoke an entire rubber ball or bundle.

5. Hired persons, who took care of particular trails or worked in teams of two with the house head. They were remunerated either in goods (a shotgun, for example), or in fixed amounts of rubber or money (to be handed over at the end of the harvest), or received a percentage of the final product (in this case we properly speaking a meeiro or sharecropper).

Summarizing the numerical data from 57 houses in Riozinho, there were 50 tappers who headed houses and 21 mature tappers who were dependent upon a head, including 16 relatives and 5 hirelings. House heads ranged from 18 to 66 years of age, though most tappers were concentrated between 18 and 30. Two houses were headed by women who did not cut trees; and five had heads who did not cut trees (they had dependents or hired help as tappers).

Dependent tappers who were sons of the house head worked "for their father" in his house until marriage. During this stage, the young rubber tapper has the capacity of an adult, but not the responsibilities of a house head with the manioc garden. Tappers who are dependents of the head usually are distributed between ages 16 and 24. A young tapper might leave to work either for a married brother - where labour relations and distribution might be more equal, or the work day less intensive - or as a hired hand at another house, usually on another rubber estate, or by establishing his own house by marriage. On Riozinho Estate, the five hirelings aged 17 or 18, which suggests that the situation of hired help was transitory. Hired help lived in the house and took advantage of the same services as the other
residents, such as food preparation and laundry, services provided by the women of the house (Table 9.1).

For 1980, the population census for the State of Acre recorded 23,830 tappers for the whole state, but a census of agro-pastoral activities declared 38,000 workers in natural extraction for the same state. The difference may be traced to the inclusion (or exclusion) of female labour and of labour under age 16. The effect of this counting procedure is illustrated in the table above. One could argue that the number of 28 auxiliaries in 57 houses (probably underestimating the real collaboration of women and children) is a measure of the internal exploitation to which the house is submitted through the head's decision. While this idea is important, it needs to be qualified because the analysis of individual houses demonstrates that when youths enter the labour process, everyone's work day is reduced.5

The Use of Nature

The image of the tapper's work as a stroll through the forest where he collects a product yielded directly by nature is an illusion. Before I demonstrate this, describing in greater detail the gathering process, it is convenient to distinguish extraction from predation.

Predatory activities are those which involve the permanent and irreversible destruction of a living thing, plant or animal. It amounts to transforming part of the forest's stock of life into a flow. Predatory techniques include searching for, locating...

5. Chagas's house (38 years) included two young tappers, aged twelve and thirteen. One of the two trails tapped had 150 trees (since the standard trail had 120, this one was equivalent to 1.25 trails). The trail was divided into a main course, tapped by Chagas (100 trees, or 0.83 of a standard trail), and a section tapped by his two sons (50 trees, or 0.42 of a standard trail for the two). Cacundo (46 years) had three young "blades" (aged 16, 15, and 14). Usually three of them tapped the same trail of 140 trees (1.17 standard trails) - in other words, at Cacundo's house, with more workers than Chagas', each worker tapped the equivalent of 0.4 trails per day. Similar data have been obtained from the two surveys in Riozinho (1982/83).
The components of predatory/extractive activity include both material objects (equipment for searching, locating and removing, as boats, traps and guns); ideas (knowledge on collecting seasons, taboos and prohibitions; on animal behaviour and plant properties); and direct investment on the forest itself (replacement of animals, sporadic planting, breaking of access trails, and production of foods used by specific prey populations). This formulation stands in opposition to the notion that predatory/extractive techniques are essentially different from pastoral/agricultural domestication techniques because in the former there is no prior investment in the transformation of the object of labour (a glance at the past), nor is any care taken to preserve the object of labour (a glance into the future). Domestication is one mode, but not the only one, of linking the past with the future by means of labour; the concept of human predation/extraction may involve a degree of ideal and material investment along an indefinite temporal horizon.6

Rubber trails constitute exceptional human interventions in the forest. Trails are wide and carefully cleared of vegetation, with bridges and steps linking trees whose bark has been prepared individually to receive the precise incision of a special blade.7 Besides having its bark prepared, each tree is equipped with a set of bowls, along with ladders and bridges. Hence, first the trees are inserted into an artificial landscape, later to have a balanced production assured by repeated repairing and tapping with sustainable procedures. The forest surrounding a rubber tree, nearly a hectare of vegetation, is not brought down for other purposes because rubber trees need their surrounding vegetation. Rubber trails can never be mistaken for other sorts of trails in the forest, which we call "paths". The latter are narrow, grooved and directed roughly along a straight line; the rubber trails are wide, hardly trodden, and meandering along a closed loop, though there are variations with principal bends (voltas) and secondary bends (oitos), cul-de-sacs (mangas) and short cuts (varaões) (Map 5).

The preparation of a rubber trail begins with three tasks: rascar (cutting), raspar (scraping) and empausar (specially preparing the trees). Rascar essentially reproduces the agricultural procedure of cutting low vegetation with a machete, applying it to trails measuring one metre breadth by five to nine kilometres length - a total area of 0.5 to 0.9 of an hectare per trail. The area cut forms a tunnel (at about a man's height) underneath the forest canopy, through which it is possible to walk rapidly or run even at night, free of obstacles.

Raspar involves the scraping of tree with a special instrument, creating surfaces in the form of parallelograms where daily incisions will be made in straight, parallel lines. There were two types of incision: the "half cut" (half the tree diameter for milking, the other half to rest) and the "one-third cut". The incision progressed uniformly either from below to above or above to below. Once the number of scraped areas ("flags") was determined, each received a dish whose size depended on the productivity of the tree or the location of the scraped area (experience dictated the need to use a tin cup with a capacity ranging from 100 to 900 millilitres). Each tree had a supply of gathering tins of various sizes, placed on forked sticks alongside the ladder (the operation was dubbed "entigelar").

The next step (empausar) was to place trunks in such a way as to serve as ladders on trees to be milked, and to install or repair trunks over streams to serve as bridges. Before proceeding to routing cutting, some tappers would spend several days in a preliminary milking of the tree. This was called "taming" the tree, or getting it accustomed to the cut. It was important to accustom a tree during the-

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6. This use of 'predation' and of 'extraction' (analogous to the notion of parasitism) uses biological metaphors (cf. Odum 1983, Chapter 7.1) for special labour activities. We do not use Tim Ingold's terminological opposition between hunting and gathering (human), and predation and extraction (non-human) (1986:104).

7. Cf. Emperaire and Delavaux 1992:2. Trails are of course used not only for tapping, but also for hunting and gathering.
correct lunar phase and with the necessary regularity, in order to increase its productivity gradually until reaching its maximum. By this time, the trail is ready.

The maintenance of a trail is a more difficult task than it appears to be at first sight. The invasion of patches of prickly bamboo (taboca), a characteristic of the tropical forest in Acre, makes the task of preserving a trail quite arduous. The taboca stands have an unpredictable life cycle, and they might fall at any point, forming an impenetrable mass. During thunderstorms in the forest, trees frequently fall. The forest surrounding and above trails invades them during the months they are not used for rubber gathering (August-September, and February to May), cluttering them with branches, vines, trunks and taboca bamboo. Tappers not only maintained but also added new turns to old trails, sometimes making entirely new trails.

When a tapper rented a group of trails, they became his during the period of his contract, a fact made evident with cases of tappers subletting trails. Renting created a right. The initial investment of opening or reopening and maintaining a trail, planned and executed by a house head with the labour and equipment he commanded, created informal use rights over the new trails, but the tapper had no rights to compensation for the labour invested in the opening and conservation of a trail should they choose to leave the estate (in contrast with the case of agricultural improvements).

8. To reopen a trail (130 trees), a tapper spent a total of 26 1/2 days of labour, including two days and a half offered by a neighbouring house, and 23 partial days (since he tapped the part already prepared). In another case, Parafba reopened a trail expending six work days in April to mark the route that was practically lost in the trees, and then clearing the trail in eight additional days.

9. One of the loops shown on Map 5 was opened by the current trail owner who paid rent for only one trail. In another example, the tapper Ivan subletted a trail "officially" with 130 trees from another tapper, but he added another 64 new trees, obtaining a trail with 250 trees. He asserted that he could add still another 125 virgin rubber trees to the trail, located in the "heart" of the loop, but this was not worth the expense of acquiring additional gathering tins.

Work Instruments

Rubber production required labour and trails, but it also demanded equipment. All the equipment used in labour processes involved in rubber production belonged to individual houses: the tins, the smoke house, the press and the rest of the equipment. To remove a rubber tapper's tins from a trail was the symbolic gesture meaning his expulsion - though these implements would be taken by their owner upon his leave. They never belonged to the patron.

The purchase of this equipment was not the basis for the dependence of tappers on patrons either, since most implements were produced simply and locally. Only the raw materials used in these implements, such as tin and iron, were necessarily imported from outside the regional economy. In other words, the functioning of the domestic extractive economy faced no barriers in terms of equipment.

The most expensive equipment used in rubber extraction consisted of tin cups (to gather the latex that oozed from incisions), because of the number involved. Individual tins could be made from scrap metal (vegetable oil cans were a main source), and soldering was unnecessary since the coagulated latex itself sealed the metal. Nonetheless, in order to fit 240 trees, a house needed 500 tins or more. This was not impossible for a young house tapper to invest. Part of the tins could be purchase second-hand from other houses, and a young tapper might receive tins from his father as a contribution to the equipping of the new house.

Rubber tree incision knives were made up of a durable part (a handle of wood, old metal and wire) and a delicate, removable piece, which was the blade, whose quality proved crucial to the milking process. A poor-quality blade not only would kill the tree, but also would break easily. Usually, blades sold at the trade post were of inferior quality, but tappers were demanding in their choice of blades and always sought to acquire the best available in the region, even if that meant
higher costs. The best blades were fashioned by master blacksmiths along the Jurúa, and were sought on trips or ordered through friends and river traders.

The narrow-mouthed tin pails, holding from four to eight litres of latex\(^{10}\), were also manufactured by tappers, with no soldering. Sacks holding from 20 to 30 litres were used to transport the latex when a pail was full. The opening of these sacks are tied by a strip of solid rubber, and they were strapped onto tappers' backs using estopas (rude cloths fashioned as back-packs). Sacks were sewn together by women and fully coated by men with caucho latex mixed with sulphur.

The \textit{poronga} was a kerosene lamp, which could be held in one's hand or teeth by a wooden handle, with a protective device to protect the tapper's face, allowing him to see the trail without being distracting by the glare.\(^{11}\) The forest or hunting knife usually was recycled from an old machete blade, equipped with a new wooden handle as well as a wooden sheath. The rest of the equipment belonged to the smoke house, whose principal item was an underground clay oven built by the tappers and periodically repaired by the women with the kitchen ashes. In the smoke house, the only piece that had to be bought was the basin in which the latex was deposited from the sacks (though some houses substituted metal basins with a piece of smoked cloth, the \textit{bangue}). Tappers built their own rubber presses, following a mechanical design common to flour-house presses.

Expenses with purchased equipment reveal how much rubber was necessary at current prices in order to produce rubber.\(^{12}\) The total equipment cost expressed in rubber (annual costs plus long-term equipment) stood around 140 kgs rubber, which represented about 23% of the average annual output in rubber. The annual replacement cost (48 kgs.) remained around eight percent of the average annual product. These relatively low figures indicate that the tapper maintained a reasonable technical independence (Table 9.2) under the 1982 prices.

**Knowledge**

The foregoing description of the use of labour, of nature and of technical instruments assume the employment of determined procedures. A technical procedure may be seen as a way of doing things - a recipe that includes material ingredients, instruments and qualified labour, and which specifies what product is to be the result. The notion of technical procedures is related to existing knowledge concerning the production of objects produced through the use of labour, instruments and nature. This is a structure which, just as material equipment, may be appropriated, stored and transmitted, as a blueprint for actual labour processes.

Hence, the same equipment, the same people and the same natural resources may be combined for different technical procedures, yielding distinct production results and involving distinct qualities and intensities of labour. Under this definition, technical procedures may differ because of the instruments used (for example, a smoker or a press), because of the persons involved (one worker could tap an entire trail in one day, while a team of two might be employed to tap a similar trail); and because of the particular use made of nature, or because of the know-how which mediates the use of instruments by persons on nature. For example, the bark of a rubber tree might be scraped during the waxing crescent or the waning one, or the same tree might be milked twice or three times a day, or half or one third of the circumference of the tree might be used in tapping; each of these — basin (10 kgs.) and 730 tins (116 kgs.), adding up to 144 kilograms of rubber. The gathering tins had been brought by Brasil.
situations constitutes variant technical procedures or styles. Technology is the collective of technical procedures which might be applied in diverse combinations or variations.

Knowledge of the effect of moon on latex yield, on the one hand, and pacts between the tapper and the "rubber-tree mother" on the other hand, point to different sources of productivity. In the first case, changes in nature; in the second case, changes in the tapper himself (analogous to the "lucky" condition of a hunter after similar pacts with game protectors). Such "mystical" productive forces (Santos Granero 1986:660; Malinowski 1978:passim) were more important in hunting than in rubber tapping, and I could not see them in action in agricultural activities.

The choice of techniques in rubber extraction and processing took place within the range of possibilities offered by forest technology, that is, the forms of use known to rubber tappers. The point to be stressed here is that there were no processes which required the presence of specialists or which fell beyond the common knowledge shared by rubber tappers. Just as there were no equipment barriers to the independent functioning of the domestic economy, there were no technical (i.e. informational/organizational) barriers either.13

Let us consider the processes of tapping, gathering and processing of rubber. The basic question involved in the tapping process is that of short and long-term sustainability. The key to a tapper's expertise resided in his ability to execute incisions of a precise depth, millimetrically spaced and aesthetically pleasing - this was the cut that kept the tree healthy and maximized the amount of latex yielded over the long run. Another basic technical problem lay in the location, number and frequency of incisions per tree (in a specific day and throughout weekly and yearly periods). A competent rubber tapper will use procedures appropriate for each tree, considering the resistance of the outer bark to the blade, the format of the trunk and other characteristics that vary enormously from tree to tree, guided by his own knowledge and manual dexterity. An incompetent rubber tapper wipes out rubber trails, by virtue of errors whether in the delicate incision process, in the division of the trunk or in the tapping schedule.14 Non-equilibrium extraction techniques may result in annual outputs twice as great as those in use, but they destroy the tree after two or three years of exploitation and must be considered as predatory techniques.

The rubber tapping example illustrates the general principle that one essential component of extractive technology are avoidance rules, that is abstention or non-action. It may appear strange that not acting upon a tree can be seen as a technical procedure - but, much like hunting, fishing and collecting cannot be accomplished without game, fish and living plants, which are thus classified as means of production while in a natural environment (Marx 1987:181), abstaining from predatory/extractive activity may be necessary in order to increase or stabilize predation and extraction, and thus such action may be classified as productive investment.15

The limits to tapping intensity, to the number of cutting days per week, and to the number of months of activity per year all were defined clearly, but divergence could exist. For instance, there was no consensus opinion regarding the respective merits of the "half cut or "one-third cut" systems, which differed in the proportion of the tree's diameter used in tapping. The question was whether or not the "half cut" reduced the total productivity of the tree over the long run. I never found any doubts 14. On the cultivated rubber plantations at the São Paulo State, the cost of labour is high as a consequence of the need to maintain permanently employed workers and of training costs.

15. To produce ("to bring forward", "to bring forth", or "to bring about") by means of labour includes both predation/extraction, domestication and fabrication as modes by means of which men/women "treats (nature) as belonging to him" (Marx, 1974:341. idem).
as to the two-day per week limit for tapping a tree, or to the need of four months’ annual rest for trails - which means that any given tree could be tapped only 20% of the year. In the Upper Jurua Valley of Acre, tappers continue to cut at least until January, and waist-deep water is no obstacle to tapping. While the tappers face the risk of losing part of the latex in case of rains (water fills in the cups), this risk is compensated in part by the greater productivity of rubber trails during the rainy season. By July, when polar cold fronts make the temperature drop abruptly below 15 degrees Celsius, the rubber trees increase greatly in latex production but they are not tapped on those days because this would harm them. By August, when the trees renew leaves and blossom, and productivity is low, they are not tapped either. It is explained that the trees need their whole latex to grow the new leaves. This period coincides with the best period when rubber tappers can strike down the forest and burn the dried up vegetation in preparation of garden plots, after a protracted period without rain.

The Riozinho tappers tend to complete at least half the tapping day before dawn. It might appear that the reason for this is that the absolute length of the work day would require night labour; however, even when tappers work only a small part of the trail, they begin work well before sunrise, oriented by the idea that trees cut during the night will yield more, and also because night work is preferred by some (the forest is cool).

16. On plantations, trees can be tapped on alternating days. The life expectancy of the plantation rubber tree is calculated at thirty years, and dead trees are used as fuel.

17. In the Purus-Acre Valley, rubber tappers suspend the tapping activity completely already by December. There, this season coincides with the lucrative brazil nut harvesting season.

The basic process of latex extraction consisted in revisiting the trees during the daytime and gathering latex when it is still in a liquid state, and this phase is associated with the procedure of processing latex in the form of solid blocks of rubber. Up until 1982, this operation took place through two serial sub-processes: the initial production of lumps of eight to ten kilograms of coagulated latex (from *Hevea* sp.) as a “ray-fish”18, with the aid of the *ofe* (also known as *caatinga*) tree sap (*Ficus* sp.); this was cut into strips and made into a bundle on which successive coatings of latex (mixed with a thickening vine, *Philodendron* sp.) were applied, being simultaneously smoked over the *coco* nut (*Orbignya sp.*) fire, until completing a *pêla* (ball or bundle) weighing around 60 kilograms19 (Table 9.3). The proportions of coagulated in the core of the rubber ball to the smoked outer layers varied from tapper to tapper. Some rubber tappers who wished to save on labour increased the amount of coagulated rubber, although this was considered a inferior process (other tappers, although I did not see it in Riozinho rubber, could increase weight adding foreign substances to the latex, including earth and manioc). Non-coagulated rubber had a bad aspect and a strong smell.

In Process II (Table 9.3), the latex could coagulate in the tins (and thus does not need to be gathered on the day it is tapped) or coagulated as “ray-fish” as before (using the coagulant agent); instead of being smoked, it is compressed in the press to extract water and made into planks. Well dried planks make good quality rubber. With this new technique, the second foray into the forest could be put off and converted into greater tapping time. This technique could double the production and it was introduced, notwithstanding the patron’s initial resistance to it.

18. On account of the round, flat form acquired by the latex left to coagulate on a metal basin (the river ray-fish is round).

Beginning in 1983, most rubber tappers began to use a combination of both processes (sometimes on the same rubber, since smoking a plank protects the rubber against bacterial decay; thus smoked rubber has a pleasing smell, in contrast to the acid smell of raw latex). I observed some tappers say that they missed the waning hours of the day spent in the smoke house. In fact, these hours provided an opportunity for informal conversation with neighbours, associated with the pleasure of seeing the final result of one's labour transformed into a handsome ball.

**Work Plans**

Work routines and rules may be distinguished from the daily work activities in real houses: in other words, the distinction may also be expressed as that between the structure and the organization of labour. Idealized routines and statistical averages capture the essentials of a technical language. But labour processes - the use of language through actions, so to speak - vary tremendously in intensity, the composition of crews and technical variants. This variation is related to fluctuations in the composition of the domestic work group as well as in the natural resources and in individual technical styles; and it responds to prices, according to the house's production plans. The description that follows presents idealized work routines as themes upon which individual houses construct their own variants.

Daily work is quantified. Some rubber tappers mark the number of days they tapped with a knife on a post in the house. Many tappers can recall without hesitation the exact number of days they cut trees in each trail that season. They know the minimum and maximum latex yield of each trail, and of individual trees. Though almost all are illiterate, most of them know how to calculate how much dry rubber will result from a given quantity of latex. In the case of house heads, the

20. Each tapping day leaves a single incision in each scraped area of the current season. Actual work can be thus checked tree by tree. This was not done by the mateiro who only was concerned with the state of conservation of a tree.

tappers commonly assert the number of days they intend to tap during the year, or how many kilograms of rubber they intend to produce. The assertions are for instance: "This year I am going to cut 110 days!" Or, "I want to see if make 800 kilos!" To be a tapper and to produce much rubber constitutes a source of pride for young men. Some young men between sixteen and twenty four spoke well of walking or running through the forest in the middle of the night, comparing this positively with all-day agricultural work under the hot sun (particularly wage labour). However, the tenacity of work rhythms - including walking, running, going up steps, crossing bridges, and making precise incisions at heights of one to two metres, without rest until finished - must be accompanied by a resistance to hunger, and the required capacity to sustained labour is much greater than in agricultural work. A tapper with any pride is capable of working six hours tapping without eating, proceeding with the gathering activities after eating only manioc flour mixed with water, while agricultural labour is always punctuated by meals and often by rests. A tapper does not expect that manioc flour mixed with river water and consumed on a broad leaf in the middle of the forest be his only daily nourishment on work days: but the capacity to endure work in the forest with so little food guarantees that the work plan is completed, when there had been no game meat, whose availability essentially is uncertain the day before. Beyond the capacity to work much while eating little, another virtue of the tapper resides in his resistance to sleep. On the eve of tapping days, he must sleep early, since he begins work well before dawn. Stories about the "rubber-tree mother" ("mae de seringueira"), a mystical being who inhabits the woods, are common throughout the forest. Single rubber tappers courageous enough to face her on Fridays at midnight in the middle of a storm were said to increase their production tremendously - provided they remain single.

Daily, weekly and annual production processes are the objects of specific planning and calculations. These processes give origin to individual houses' plans,
involving not only the quantification of production goals but also the distribution of persons throughout the available trails.

Once the choice of technique is established and assuming the components of the labour process described above are given, planning for a day's work requires the allocation of house tappers and of auxiliary on trails. The basic or ideal plan calls for the occupation of 120 trees (one trail) by one worker. Actual plans can vary around this pattern. Thus, the number of trees ranges from 60 to 180, divided among one to three workers in cutting, maybe more for gathering. During the work week, a house distributes tappers throughout a number of work days. As examples, I will show three different weekly production plans, the first one with a single worker on a single trail (cf. Tables 8.6 to 8.6d for an actual example):

### THEME: WORK PLAN FOR ONE TRAIL, ONE WORKER

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail A</td>
<td></td>
<td></td>
<td></td>
<td>Trail A</td>
<td></td>
</tr>
</tbody>
</table>

**Days-year:** Days per week x Max. no. of weeks = 2 x 28 = 56

**Product-year:** Days-year x Prod.-day = 56 x 8 = 448 kgs.

Let us consider an annual tapping plan. A basic annual plan consists in divided the year into two "seasons": the "summer season" and the "winter season", separated by the driest summer months used for agricultural activities, and by the rainiest winter months. This division leaves a maximum of four months for the "summer season" (April-June) and three for the "winter season" (October-January), or 30 to 31 weeks for the total "harvest". Subtracting at least two weeks for the preparation of trails, there remain 28 or 29 weeks of tapping per year.

Based on these weekly and annual plans, we may reformulate the annual plan for houses under the basic theme of "two trails, one worker" as follows, allowing at most a productivity of eight kilograms of rubber per day on an ideal trail.

### THEME: WORK PLAN FOR TWO TRAILS, ONE WORKER

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
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<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail A</td>
<td>Trail B</td>
<td>Trail A</td>
<td></td>
<td>Trail B</td>
<td></td>
</tr>
</tbody>
</table>

**Days-year:** Days per week x weeks = 4 x 26 = 104 days

**Product-year:** Days-year x Prod.-day = 856 kgs.

The third basic plan is:

### THEME: WORK PLAN FOR THREE TRAILS, ONE WORKER

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail A</td>
<td>Trail B</td>
<td>Trail C</td>
<td>Trail A</td>
<td>Trail B</td>
<td></td>
</tr>
</tbody>
</table>

**Days-year:** Days per week x weeks = 6 x 24 = 144 days

**Product-year:** = 1,152 kgs. of rubber

The annual plan described above corresponds to thirty weeks, which, deducting six weeks of preparation activities per year, leaves 24 work weeks. Rounding the figures from this last theme we arrive at 150 days per year and 1,200 kilograms of rubber per year as the maximum use of trails and labour and as the maximum annual output.

The table below summarizes basic annual plans under the theme "one tapper, 1, 2, and 3 trails":

21. This is a norm. Real cases, for example, include that of a house tapping 105 days a year and yielding 890 kilograms of rubber (gross).
ANNUAL PLANS FOR RUBBER WORK

<table>
<thead>
<tr>
<th>Plan</th>
<th>Period</th>
<th>Trails Preparation</th>
<th>Tapping days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Season</td>
<td>Apr.-July</td>
<td>6 12 18</td>
<td>30 56 78</td>
</tr>
<tr>
<td>Rain</td>
<td>Oct.-Jan.</td>
<td>6 12 18</td>
<td>26 48 72</td>
</tr>
<tr>
<td>Labour Input</td>
<td>Apr.-Jan.</td>
<td>12 24 36</td>
<td>56 104 150</td>
</tr>
<tr>
<td>Rubber Output</td>
<td></td>
<td></td>
<td>448 856 1200 kgs*</td>
</tr>
</tbody>
</table>

*Rounded figures

Routines and constraints

Houses are independent in the organisation of economic activities: that is the argument of this chapter. Independence - the freedom to decide - is limited by constraints external to the productive arena, including especially prices, but also access to natural resources and known technology. Given these constraints, househeads make their decisions.

On the other hand, given the pre-determined plans, there is a self-imposed coercion to ensure the development of production plans in spite of daily, weekly and seasonal fluctuations brought on by uncertainties of various kinds. This self-imposed coercion adopts a special form in the case of rubber production: the demand that work routines be executed in a continuous and complete way (whatever the size of the routine). This distinguishes the style of the extractive rubber labour process from the style of the agricultural labour process, and from collecting and hunting, none of which possess the continuous, sustained and necessary character of the rubber trails - a necessity that is self-imposed. Once under way, the rubber work day should ideally follow a rigid progression. A trail with 120 trees would take about six hours to tap (20 trees per hour). This means an average of three minutes per tree. This time includes the time required to move from one tree to the next (about 100 metres distant, taking one minute) and two minutes to get the tins, go up a ladder when necessary, make the incision, insert the tin (repeating this operation according to the tree's capacity). When arriving at a tree, there are no choices to be made: the areas to be tapped already have been scraped in a number which depends on the tree's circumference, and the tins already have been placed on a tree fork nearby. Steps made of trunks already have been set, affording access to the several scraped areas of the tree. This activity should be initiated at night, sometime between one, and six A.M., though most plans got under way between three and five. Tapping was to be concluding during the early morning hours, before nine, after continuous activity. The use of more labour would reduce the total time of each phase.

The first rest came after the tapping. This pause could take place in the forest or at home, depending on the location of the "closing" of the trail where the loop is completed. This might be as far as half hour from home. A good tapper was measured by his ability to continue working after eating only jacuba (manioc flour with stream water) at the end of the trail, far from his house, before starting again to "gather the milk". This pause could last as much as an hour.

The second important phase was the gathering of latex deposited in the tins. Gathering on a 120-tree trail took around four hours, or thirty trees per hour, two minutes per tree, one to walk from one tree to the next, the other to scale the steps (if they exist), remove the tin, pour the latex into a pail, clear the remaining latex with a finger, and replace the tin on the tree fork (repeating this operation as many times as necessary). By the end of a work day, the product of 120 trees would fill a
sack with 20 to 30 litres of latex, carried on one's back. This output could vary from 16 litres in the summer time (dry season) to 24 litres in the winter (rainy season), or about 20 litres per trail on the average. Children and wives might participate at this stage to accelerate the gathering process, particularly under threat of rain - gathering, not only a faster activity, also was considered less intensive, except for the carrying of the heavy sack filled with latex.

At the end of the gathering stage, the tapper would return home. There followed another brief rest period during which he ate, and perhaps bathed; but he might have to look for food on rapid incursions into the forest (fish or nambu partridges, or tinamous), or gather fuel in the forest for the next phase of activity. By mid or late-afternoon, the next stage began with the smoking of latex, occupying two more hours. Around five in the afternoon, one who is on top of a cleared hill or travels on canoe will be able to pick out houses in the middle of the forest by the columns of smoke issuing from the smoke-houses.

Tappers considered activities in rubber production finished only after concluding the smoking process, when six, eight, ten, or twelve kilograms of rubber were added onto a rubber ball or bundle that was being developed; or this quantity was transformed into a plank. Tappers keep a specific volume in mind as a goal for the work day on one trail (a "volta" or "round").

There is more than one explanation for the necessary pace and consistency of the labour process in rubber production. One reason is of a technical nature: rubber tappers explained that the trees were "accustomed to certain schedules", and yielded far more during the night. Hence it was necessary to leave home early and at regular hours. In addition, according to the standard technique for elaborating smoked balls, the global sequence of activities including tapping, gathering and smoking had to be completed by the end of the day. Yet, why was it not possible to reduce arbitrarily the length of a given work day? Here we must return to the issue of self-discipline and to the role of the external constraints.

The rubber tapper is motivated by the final return of his labour, and does not consider a work day with only partial results as "lost". In some instances, when the rains come unexpectedly, instead of gathering from only part of the trail, the tapper leaves the latex in the forest to be gathered later as sernambi (an inferior grade of rubber); a delay in starting out may lead to the abandon of the entire day; a "crossed" trail (one in which gathering was interrupted in the middle due, for example, to the breaking of a cutting blade) is considered disgraceful by tappers who take pride in their work. Norms of the labour process - pace, productivity, extent of resources used - were transformed into self-imposed coercitive habits.

One woman expressed the compulsory character of labour thus: "The tapper is like a pupil in school: he can't make up for a lost day ... if he doesn't produce so much, he can't buy the merchandise." Another tapper explained that he had to work four days a week in tapping (two days for each trail) in order to complete the "120 days by law", where "law" should be understood as "duty" (a norm of what a tapper should do, but does not even on the average).

The tension increased towards the final months of the harvest - October, November and December - when the final volume produced would be determined before the final annual balance. Though houses remained independent in their use of resources and in the organization of production, debts and prices forced them to adopt work norms, which although flexible from house to house and subject to day-to-day uncertainties, held the force of an imperative.

The volume of debts to settle was calibrated not by the upper physical limit of potential labour, but by the production anticipated according to the house's
productive norm. Once a norm or estimate was established, it became an obligation, an internal production goal, but its actual application was a process necessarily subject to fluctuations. I emphasize that plans like "four days a week" and "120 days by law" were not targets enforced by trade-post personnel. They were house targets around which each house organized its members and its resources (taking under consideration the demands of other activities, such as hunting and agriculture). But it remains necessary to define more precisely within what interval of variations the freedom to establish amounts of consumption and production plans to pay for them was exercised. What follows is a discussion of this issue.

Uncertainty

In the case of rubber production, the accomplishment of goals is subject to the unexpected and is accompanied by anxiety and worry. While a tapper progresses in his annual production of rubber, he at the same time is accumulating debts whose exact value is the first source of uncertainty, since it is subject to manipulation by the trade post.

Another source of uncertainty emerges when annual production plans and consumption patterns fall out of step with one another. In April, debts are high and the house is still preparing its trails; in August the product is at a peak due to four months of work, but now commodities become scarce and extraction is about to be interrupted for two months, August and September, in order to take care of garden plots. In October, the second preparation of trails begins under the tensions of accumulated debts and of the need for a final effort to meet the year's goal: say, "two thousand pounds of rubber", but the January rains bring about yet another source of uncertainty. Thus, a first basic source of uncertainty is related to the mercantile arena of prices and time lags separating the production of rubber and access to goods, and thus it is related to the strategic interactions between tappers and patron-traders.

Uncertainty also arises with sickness, with the duration of flour since the last time it was prepared, and with the availability of meat, which depends on the success of the latest hunt. This means that what really is to be done remains a decision to be made each day and each week. In order to set out early to tap between three and six A.M. - the members of a tapper's house sleep little. During the rainy season, final decisions are made at the last possible minute. On occasions when the day's tasks are decided, the head often discusses the matter with his wife and children also voice their opinions; in addition, decisions involving work on the garden plots and in the processing of manioc flour, as well as those pertaining to hunting, illness, have to take into consideration the existence of a cooperation group in the neighbourhood.

For example, one house included a son who was a tapper, along with other younger children; in the neighbouring house lived a married brother, who also was a tapper. On the eve of the first cutting day, the single tapper of the first house became ill and asked his married brother to cut the trail. But the brother had planned to work on his own garden plot. The sick tapper's mother proposed that the members of her household "give an afternoon" of labour to the married son's house (for work on the garden plot) in exchange for "a day" on his brother's trail. This was how the work plan for the following day was traced, exemplifying the cooperative action of a macro-house.

During the "winter" months (from October to January) the toughest decision lay in the risk of losing a good part of the latex in case of rain. On the night before latex gathering, it is common for house members in their hammocks to discuss the probability of rain. Some tappers faced the risk ("The cabra [goat, generic term for
man] who is afraid does not make rubber”), while others proved more cautious. (“God does not wish for us to cut”).

The basic problem with house decisions concerning latex extraction lies in that they are all-or-nothing propositions - at three in the morning the decision is taken to risk a day’s work at tapping, and the crucial point is whether or not the rains will fall before the conclusion of the gathering period, lasting from nine to noon. The alternative of reducing the size of the work day in order to reduce the risk was not considered. This apparently rigid logic leads us to a discussion of workers self-control in the context of extractive activities plans.

Work Intensity

What was the standard domestic work week really like? We look at this issue having in mind a notion of work intensity. Suppose, one tapper covers a single trail.

Then the following basic possibilities may occur (cf. example in Tables 8.6 to 8.6c):

One worker, alternative daily intensities

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Trail</td>
<td>1 Trail</td>
<td>1 Trail</td>
<td>1 Trail</td>
<td>1 Trail</td>
<td>1 Trail</td>
</tr>
<tr>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>1/3</td>
<td>1/3</td>
<td>1/3</td>
<td>1/3</td>
<td>1/3</td>
<td>1/3</td>
</tr>
</tbody>
</table>

In all of these weekly plans, though the tapper might work on the trail during two, four or six days, the total number of trees tapped is the same. However, the daily intensity of labour is variable, ranging from over one (a standard trail per day) to one-third (40 trees per day).

The same reduction in daily intensity could be reached with the participation of a higher number of worker in the labour process. Thus, in a house with three mature tappers, the following schedule yield the same weekly yield as in the case above, now with a weekly work intensity of 1/3 for each worker (and not only a daily work intensity of 1/3 for each worker).

The combination of spreading work intensity over time (first case) and of spreading work intensity over individuals (second case) gives each house a great range of possibilities.

Between November 18 and December 30, I registered the use of 187 work days (excluding sundays) scattered in 32 tapper houses. In 187 work days, 77 (41%) were dedicated to rubber trail labour. In other words, houses worked two or three days a week on the trails at the beginning of the rainy season.

Each house had more than one tapper on the average. When multiplied by the number of "facas" or "blades", 187 work days in fact constituted 288 man-days (1.5 worker per house). Now considering the number of actual man-days used in

23. The total number of actual work days for the 32 houses in the period was 1,280. The sample of 187 corresponds to 15% of the universe.

24. Taking the total number of days available as 187 days and the total number of tapping days a 77 days, we can calculate a rate R of non-used rubber time (and therefore of potential increase in absolute surplus-value) as

\[
R = (187 - 77) / 77 - 1 = 0.43
\]

Presumably, houses could be forced to increase in 43% their output merely by working more days in each week.
rubber production during the period, we come up with only 94 (2.9 man-days per week per house).  

These two counts are summarized below as totals I and II.

<table>
<thead>
<tr>
<th>WORK INTENSITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week days</td>
</tr>
<tr>
<td>Tap days</td>
</tr>
<tr>
<td>Work days</td>
</tr>
</tbody>
</table>

The table above shows that when we consider not just the house days employed in rubber (Total I column), but also the house man-days employed in rubber (Total II column), the total house work does increase, although labour intensity declines per worker (per cent figures drop from 41 to 33). This may be illustrated by the following example. One house had five rubber tappers, including the head and four brothers, all over seventeen. Their father had the most productive house on the Riozinho Estate. Seeking to work less intensively and to enjoy a greater participation in the returns, these four sons moved together to the house of a newly married brother.

In the table below, we show: (I) the maximum amount of work that could be performed along the week by the four tappers (or 4x6=24 men-days) assuming there were enough trails available (or 24 trail-days), or the labour potential; (II) the maximum amount of work that could be performed along the week considering that five trails were rented (five rented trails amount to ten trails technically available per week), or the trail potential; (III) the weekly work plan adopted as a norm by the house; (IV and V) examples of actual work weeks.

The first figure indicates the number of tappers involved in rubber production during a given day, the figure under parentheses indicates the portion of a trail that is tapped by a house during that day. Hence, 4(0.8) in the Wednesday column means that four tappers worked on that day, each cutting an average of 0.8 trails; in other words, four tappers cut a total of approximately three trails that day. Each "trail" is taken as a standard trail with 120 trees.

| DOMESTIC WORK PLAN: 5 TRAILS, 4 TAPPERS |
|-------------------------------|-----|-----|-----|-----|-----|-----|--------|--------|
|                               | Mon | Tue | Wed | Thu | Fri | Sat | Total  |
| I                             | 4   | 4   | 4   | 4   | 4   | 4   | 24     |
| II                            | 4(0.41) | 4(0.41) | 4(0.41) | 4(0.41) | 4(0.41) | 4(0.41) | 10     |
| III                           | 4(0.7) | 4(0.8) | 4(0.9) | 4(0.5) | 4(0.8) | 0(0) | 11.7   |
| IV                            | 2(1.6) | 0   | 0   | 3(1.8) | 0   | 0   | 3.5    |
| V                             | 0   | 0   | 0   | 2(1.6) | 2(1.7) | 2(1.8) | 3.7    |

During the weeks under observation, the real labour undertaken (less than four days-trail per week) amounted to about one third of the projected goal (nearly than 12 days-trail per week); this goal, in turn, was half the labour potential (about 24 days-trail per week), being nearly equal to the trail potential (10 days per week).

Note that the idea behind the weekly work plan was that four brothers would work the trails, leaving the married brother free for agricultural tasks; Wednesdays would be set aside for hunting by a group of three brothers, while a fourth would work a

25. Since the total available man-days amounted to 288 man-days and the total used added up to 94 man-days, we may calculate the ration R' as

\[ R' = \frac{288-94}{94} - 1 = 1.06 \]

This means that direct labour control could force houses to increase in 106% their output by making them work more days in each week and by making each tapper work more in each day.

26. The number outside parentheses is the quantity of labourers working under a given intensity; the number under parentheses may be seen as the intensity of the work day for each labourer. The product of the two figures measures both the number of standard-trails tapped in a day, as well as the number of standard work days realized as a whole within a day.
trail; Saturday remained free for hunting or leisure. The work plan divided the trails (628 available trees, over five trails) in such a way that each tapper only had to tap an average of 3/4 trail per day on the average.

**Minimums and Maximums**

While averages may be the most important indicator for outside observers, individual houses pay more mind to the size of variations. If, over time, houses may be distributed among groups including one which produces around 400 kilograms of rubber per year, another producing around 800 kgs. and a third group around 1,200 kgs., although the average is 600 kgs., the important point is that an individual house can adjust its output within a margin of 800 kilograms. In terms of working days on the Riozinho Estate, variation ranged from 40 to 150 days per year per worker. According to the patron, a tapper who was not lazy should produce 1,000 kilograms of rubber. To be called a "1,000 kilogram rubber tapper" by the patron was a compliment, and this annual goal involved around 120 days of tapping per year (assuming a single worker). However, in particular houses the tapper's production standard was constrained by lower and upper limits.

Let us consider the lower limits. If a house rented a single trail (the minimum), it would have to turn over at least 30 kilograms of rubber (without the tare) per trail. If it rented two, it would have to pay 60 kgs., or 90 kgs. for three, and so on. Therefore these were variable costs, which depended on the house's production plan, and which grew with the projected amount of rubber production.

I calculated the average equipment cost per house at 140.2 kgs. of rubber per year (Table 9.2). Now, since we are interested in minimum levels, we may consider the case of a tapper who worked a single trail (and not two trails, as in the "average" tapper described before). With this distinction, a tapper would need an initial investment of around 105 kgs. of rubber, with an annual amortisation and replacement cost of 64 kilograms.

Adding 30 kilograms rent to 64 kilograms of annual equipment costs (assuming the utensils were purchased, and not home-made), a total of 94 kilograms of rubber would represent the minimum a house with a single tapper working one trail would have to produce only to meet rent and equipment expenses in the "rubber sector" of the domestic economy. This total could be produced in 11 work days by one man producing 8 kilograms per day. Adding another 12 days for the preparation of the trail, it would take 23 days (in seven work weeks).

These costs do not include the consumption of the house. As we have seen, a house consumes "basics", "luxuries" and "valuables". In a house with six persons, two adult and four children (each representing a half-consumer), the minimum annual "basics" of salt, soap, kerosene, ammunition, medicine and sugar, cost around 364 kilograms of rubber at 1983 trade post prices, after converted to rubber values. Now the list of necessary rubber expenses is complete, including rent and payment of tools and consumer goods. From the following tables, we may assess the minimum production required from houses with only one trail, and the maximum production of houses with only one trail (assuming one tapper only).

**Minimum Rubber and Work Costs - One Trail 1982**

<table>
<thead>
<tr>
<th>Costs</th>
<th>Prepar.</th>
<th>Rent</th>
<th>Equipment</th>
<th>Consumption</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Rubber</td>
<td>30</td>
<td>64</td>
<td>364</td>
<td>458 kgs.</td>
<td>58 days</td>
</tr>
<tr>
<td>Tap Days</td>
<td>4</td>
<td>8</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Days</td>
<td>12</td>
<td>4</td>
<td>8</td>
<td>46</td>
<td>70</td>
</tr>
</tbody>
</table>
MAXIMUM RUBBER AND LABOUR OUTPUT - ONE TRAIL, ONE WORKER

<table>
<thead>
<tr>
<th>Available Capacity</th>
<th>In Labour</th>
<th>In Rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>56 days</td>
<td>448 kgs. rubber</td>
</tr>
</tbody>
</table>

Potential Surplus \(56 - 58 = -2\) days \(448 - 458 = -10\) kgs

(Basic consumption for a house with 2 adults and 4 children under 10)

We conclude that, at the current trade post prices, a tapper renting only one trail and with a house to support would have to expend all his potential rubber labour just to pay rent, equipment and basic consumption costs, still coming up with a deficit. With each work week employing two days for work on rubber production, all the rubber produced would be used to pay for the house's expenses paid in rubber. Note, however, that there would be four work days left over for activities outside the rubber sector in the house economy.

Assume now that a house rented two trails at a time. Four work days of the house would be technically available for rubber production. Rent would rise to 60 kilograms per year; equipment costs would double as well to 128 kilograms a year. But the minimum consumption expenses would not rise in the same proportion, since we assume that the number of workers (one) is constant, and also that the number of consumers (two adults and four children under 10) is constant. Thus, the potential rubber surplus would grow more than proportionately.

27. From what we have seen before, this would also be the case of those houses that rented only one trail and had, say, three tappers each working at one third of the full potential intensity.

MINIMUM RUBBER AND WORK COSTS - TWO TRAILS 1982

<table>
<thead>
<tr>
<th>Costs</th>
<th>Prepar.</th>
<th>Rent</th>
<th>Equipment</th>
<th>Consumption</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Rubber</td>
<td>60</td>
<td>128</td>
<td>364</td>
<td>552 kgs.</td>
<td></td>
</tr>
<tr>
<td>Tap Days</td>
<td>8</td>
<td>16</td>
<td>45</td>
<td>69 days</td>
<td></td>
</tr>
<tr>
<td>Total Days</td>
<td>24</td>
<td>8</td>
<td>16</td>
<td>45</td>
<td>93</td>
</tr>
</tbody>
</table>

MAXIMUM RUBBER AND LABOUR OUTPUT - TWO TRAILS, ONE WORKER

<table>
<thead>
<tr>
<th>Available Capacity</th>
<th>In Labour</th>
<th>In Rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>108 days</td>
<td>864 kgs. rubber</td>
</tr>
</tbody>
</table>

Potential Surplus \(108 - 69 = 39\) days \(864 - 552 = 312\) kgs

(Basic consumption for a house with 2 adults and 4 children under 10)

A house with one tapper and two trails had a potential surplus of 312 kilograms. This house might, however, choose between (a) not occupying the total surplus time available, (b) employing it to increase the consumption of commodities (more "basics", or "luxuries" and "vices"). We note that the use of time to increase the rubber production (and thus the consumption of commodities) could be replacing the use of time to produce manioc-flour, game or the use of time as leisure.

Let us now consider a house with one tapper and three trails. Following the logic outlined above, we arrive at the following table:
MINIMUM RUBBER AND WORK COSTS - THREE TRAILS 1982

<table>
<thead>
<tr>
<th>Costs</th>
<th>Prepar.</th>
<th>Rent</th>
<th>Equipment</th>
<th>Consumption</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Rubber</td>
<td>90</td>
<td>191.85</td>
<td>364</td>
<td>646 kgs.</td>
<td></td>
</tr>
<tr>
<td>Tap Days</td>
<td>12</td>
<td>24</td>
<td>46</td>
<td>82 days</td>
<td></td>
</tr>
<tr>
<td>Total Days</td>
<td>36</td>
<td>12</td>
<td>24</td>
<td>46</td>
<td>118</td>
</tr>
</tbody>
</table>

MAXIMUM RUBBER AND LABOUR OUTPUT - THREE TRAILS, ONE WORKER

<table>
<thead>
<tr>
<th>Available Capacity</th>
<th>In Labour</th>
<th>In Rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 days</td>
<td>1200 kgs. rubber</td>
<td></td>
</tr>
</tbody>
</table>

Potential Surplus: 150 - 82 = 68 days, 1200 - 646 = 554 kgs

Now we may summarize the three situations described above.

MINIMUM AND MAXIMUM WORKING DAYS AND RUBBER PRODUCTION

<table>
<thead>
<tr>
<th>Technique</th>
<th>Minimum Days</th>
<th>Minimum Kgs</th>
<th>Minimum Surplus Days</th>
<th>Minimum Surplus Kgs</th>
<th>Maximum Days</th>
<th>Maximum Kgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Trail</td>
<td>58</td>
<td>458</td>
<td>-2</td>
<td>-10</td>
<td>56</td>
<td>448</td>
</tr>
<tr>
<td>2 Trails</td>
<td>69</td>
<td>552</td>
<td>39</td>
<td>312</td>
<td>108</td>
<td>864</td>
</tr>
<tr>
<td>3 Trails</td>
<td>82</td>
<td>646</td>
<td>68</td>
<td>554</td>
<td>150</td>
<td>1200</td>
</tr>
</tbody>
</table>

The column on the left indicates the minimum (in days and in kilograms of rubber) necessary for each house to produce with the corresponding number of trails. The column on the right indicates the maximum capacity (in days and in kilograms of rubber) that each house may attain with the corresponding number of trails. The column in the middle shows the surplus, expressed in the work days or in the product that each house could achieve over the amount found in a house operating on the minimum level.

These figures suggest that a house with one tapper could choose between three basic strategies for employing time during the week - all of them economically feasible, assuming the prices of the trade post in 1982.

We may also conclude that a house with the least intensive rubber strategy determines the prices of equipment and basic goods, in the following sense. How high may these prices rise and still allow for the reproduction of all houses? The answer lies in the first line of the table: to the point where the maximum output of the least productive houses meets their minimum expenses, that is, where it is only sufficient to pay for rent and imported goods.

In other words, now we may formulate with greater precision the idea that the trade post, in a conjuncture of high rubber prices, calibrated advances as a function of the productive potential of individual houses. For less productive houses, this calibration had to include at least the equipment and basic subsistence goods - and their prices, allowing for the free manipulation of the trade post, would be equal to the maximum amount produced by these houses and a small margin in rubber that would remain as debt.

It should be noted that we are assuming a fixed productivity of eight kilograms per day for all houses, and a fixed consumption for houses with six residents. But trail productivity could vary from settlement to settlement, as could the number of consumers per house. Hence, it is perfectly possible that some houses following the pattern of one tapper and one trail could have a greater total output and a lower volume of basic consumption, while others would invert this formula. The upshot is that houses with low productivity also would oscillate between net debts and net credits at the end of the year, though the total distribution was biased.
towards the debt side. This debt will appear as an average debt, because even in specific categories (such as one tapper with one trail) there remains an inevitable internal variation.

One consequence of setting prices for necessary consumption by the measure of the least productive houses is that houses with greater productivity - those which adopt strategies of tapping two or three trails - would benefit from surpluses in commodities above and beyond the minimum reproduction cost. They earned a surplus over necessary consumption. A patron had to purchase surplus rubber with surplus merchandise in order to expand the gross production of the rubber estate, and thus the gross profits - although at the cost of reducing his average rate of profits.

As a result, some houses consumed coffee and sugar, and had wrist-watches, motors and record players - just as other houses bore the appearance of the sheer poverty in imported consumption/equipment goods. This distinction was measured by the difference described above: tappers on the upper bound of domestic potential acquired as advances not only basic goods but also "luxuries", "vides" and "valuables".

Indeed, setting aside the simplified model of one worker per house and allowing for variations in the number of workers per house, the above margins become even wider, explaining why some houses turned over only 200 kilograms of rubber to the patron while other came close to 2,000. At the lower level, a poor house without mature workers could cut costs by refusing to pay rent (the case of houses headed by widows), by saving on fixed equipment costs (producing homemade tins from recycled metal) and by cutting back on basic consumption. In an economy with access to the forest and a simple technology, the notion of indispensable consumer goods becomes elastic. In other words, cutting back on costs with essential goods (which were paid for in rubber produced) did not mean absolute deprivation - although it did mean deprivation in terms of self-image, expressed by the idea that people in certain houses lived "like animals".

The substitution of techniques requiring expensive imported inputs (for intensive rubber production) by cheaper procedures also was possible. Part of the surplus of highly productive houses was invested in equipment for the capture, processing and storage of foodstuffs and for transport: in this category, one finds dogs, shotguns, the 3.5 HP gasoline engines used to power manioc graters in the flour houses; 9 to 16 HP engines to power canoes made from tree trunks; shotguns; nylon for fishing nets and metal containers. Hence, the total distribution of labour within each basic strategy was related both to the domestic consumption of imported goods as well as to the productive inputs used in the domestic economy as a whole. This range of substitutions only was possible because relevant technical decisions took place at the house level. This margin of technical freedom thus acted as a barrier to the power of the commercial monopoly. Monopoly increased gross output, but it could not maximise the rate of profits.

29. Manufactured soap could be substituted by domestic soap; coffee could be cultivated or substituted by avocado leaf tea or wild cinnamon; tobacco could be cultivated; imported vegetable oil could be substituted by excellent-quality palm oils; wild cocoa could substitute chocolate; homemade rubber shoes could substitute imported shoes; and children could play with balls or slingshots fashioned from wild rubber.

30. The point is that workers in the forest are scarce to meet the needs of expanded production during favourable periods. The prevailing price system at the same time allowed for the absorption of even the least productive workers while simultaneously extracting surplus production from the most productive - always measuring production in terms of rubber.
Chapter 10

HOUSE ACTION PLANS

Introduction

The goal of this chapter is to analyse house activities combinations of rubber-making, manioc cultivation and hunting. These activities, which together make up what we now call house action plans, constitute a simplification of the full array of houses' activities, which include both production and consumption according to gender and age, both hunting and fishing, and both cattle-raising and handicrafts. The analysis focuses on the freedom enjoyed by houses in establishing action plans, given the constraints imposed by the known technology, by the particular stage of a house's life-cycle, by the available natural resources and by the level of prices and forest-rent. In other words, I describe the place of houses within a range of action possibilities.

This approach builds upon a previous chapter, where the freedom available for different levels of production (and corresponding levels of surplus) in the rubber-sector of the house economy (given the number of tappers, the number of rented trails and the level of prices) was described. We can say that this freedom in the production of rubber by houses constitutes a "space" of one single dimension, and a step is now taken towards generalising this approach to a set of three house activities, which can be thought of as forming a space of three dimensions. This is not done with the intention of realism, but to suggest how a metaphor can convey a sense of variation under constraints. I propose moreover that the amount of

1. The terminology of "action plans", "production plans" and "consumption plans" comes from Debreu (1959:32,37,50). However, the distinction between "producers"(firms) and "consumers"(households) collapses in the case of peasant houses (Morishima 1976:125).
freedom expresses the resistance offered by the tappers' houses to monopolistic traders and abusive landowners.

Theories about Houses

It is useful to start by asking what feature distinguishes our approach from other analysis of peasant houses' economy. To answer this, we group theories of peasant economy in three groups, following Ellis (1988:63,80). A first group of theories sees houses as profit maximisers, concentrating production decisions on the use of "factors" to produce commodities, and often taking averages in order to test the hypothesis that houses allocate scarce factors so as to maximise profits. Such an approach is intended to demonstrate that peasants may be poor, but are nonetheless efficient in the pursuit of rational use of factors. In order to explain apparently non-maximising plans, a variant of this approach modifies the initial hypothesis by introducing modifying factors such as the aversion to risk (Hill 1970:16, 21-29; Lipton 1968; Ortiz 1973:240-69, 271; Cancian 1972:136-59).

Theories of domestic economy deal more realistically with both production and consumption as part of the house management, with greater emphasis on variation among houses, and they substitute the maximisation of well-being for the maximisation of profit as the goal of the houses. They belong to the group of maximising theories.

The main example is Chayanov's theory of peasant economic organisation, which considers houses as allocating time between effort and non-effort so as to attain an optimal combination of goods and leisure, thus replacing market efficiency by welfare efficiency. While the profit-maximising approach works best when there is a market for goods (although "peasant" means the absence of either a market for labour, or of a market for land, or of both), the domestic economy approach works best in an autarkical economy with no markets either for goods, land or labour (Chayanov 1986; Sahlins 1974[1972]).
A third approach is possible which, while considering peasant houses as producing/consumption units facing a market for goods, takes into the account class relations, exemplified by the existence of land monopoly and trade monopoly (Bhaduri 1983; cf. Ellis 1988:120; Sen 1984:37-72). A natural hypothesis on this last situation is that, where peasant units are forced to the payment of land rents and are part of advance systems, such as it is reportedly the case in India, the peasant houses are exploited to a maximum level, behaving thus to all purposes as if they were a proletariat (Bhaduri 1983). Thus, the mix of class structure and of domestic economies leads here to a maximisation-minimisation model: maximisation of landowners' and traders' rents and profits, and minimisation of houses' income. However, I have argued that this kind of maximisation does not hold necessarily in the extractive forest economy, where the "interlocking of factor and output markets" (the same patron "owns" the trails and buys the rubber) does not lead to a situation, where a patron controls "resource decisions including the number, size, and crop share of each tenancy" and "permits the extraction of every last ounce of surplus product above the bare survival needs of the tenant family" (Ellis 1988:157; cf. Badhuri 1983). The reason is, first, that forest houses oppose resistance against arbitrary rents and to monopoly, benefiting from the scarcity of labour and from the dispersive nature of the extractive technology. Also, the failure of patrons to enforce a maximum level of exploitation may be both cause and effect of the existence of some degree of freedom for the action plans of houses. My own approach is therefore a combination of the domestic economy approach (without the postulate of maximisation of welfare) and of the class relations approach (without the postulate of maximum exploitation).

**House Economies**

A peasant house develops action plans around the labour time of its members, using a stock of natural resources and a set of technical procedures, in relation to an anticipated image of consumption. Although full action plans involve both the use of time (thus, fishing and hunting may be valued and compared as such, and not only as means to an end) and of objects of consumption (not only produced goods, but also the forest environment itself), here the description of action plans will be specialised, in order to point out a further difference between the Chayanovian domestic economy Chayanov and a generalisation which I call the constrained production possibilities approach (CPP).

Chayanov's approach: deals with the allocation of total time between a variable $t$, which represents labour intensity per domestic worker (with a corresponding level of per capita consumption $w$), and leisure.

CPP approach: deals with the allocation of a vector of house labour $L$ on a vector of activities (with a corresponding vector of consumption items).

The second approach captures not only a choice between effort and consumption (which may then be reduced to a minimisation of effort or of consumption), but also a choice among different kinds of labour combinations and of consumption bundles, which may not be comparable.

I now go into the details of the Chayanov approach, so as to make clear what the basic ideas are. Each house has a number $a$ of workers (which is considered as given by the "domestic demography"), and a labour intensity $t$ (chosen, or observed ex-post), which represents how much each domestic labourer works (thus, in a rubber tapper's house, $a$ is the number of males over 10 years of age, and $t$ is the amount of days per year spent by each tapper on standard trails); $L$ is here a number which measures the total labour put to use by the house ($L = at$). The house product, $Q$, is obtained as a function of $L$ ($Q$ is a "production function" $Q(L)$ which depends only on $t$ since $a$ is given). How is consumption determined? The
product \( Q \), divided equally among the consuming members \( b \) gives the (average) per capita consumption \( w \); thus, production is immediately consumption. Alternatively, houses might first set the necessary level of per capita consumption \( w \); then, since the number \( b \) of consumers in the house is taken as given (the persons of the house, workers or not, weighed by age), the level of required consumption is determined as \( Q \) (where \( Q = bw \)). This total of domestic consumption takes a certain labour intensity \( t \) of each of the house labourers \( a \). Thus, consumption plans are immediately production plans. The idea behind these Chayanov-type models is that a house may choose either \( t \) (labour intensity) or \( w \) (level of consumption) while \( a \) (number of workers) and \( b \) (number of consumers) are given (Chayanov 1986:82-87), but it cannot choose freely both \( t \) and \( w \). There is then a single degree of freedom: when only one variable is fixed, it determines the other one.

While in Chayanov's theory houses choose an "optimum" with a degree of freedom, the above exposition was intended to suggest two ways of eliminating the Chayanovian degree of freedom, without appealing to factors external to the house: in the first, it is assumed that peasants minimise labour intensity per worker, and in the second, peasants are seen as minimising consumption. The first angle emphasises labour and is exemplified in "drudgery-averse peasant" models; the second emphasises consumption and leads to "thrifty peasant" models.\(^2\)

My own research did not support the hypothesis of a single peasant model. Thus, I explore further Chayanov's idea that there are choices to be made within certain bounds (Chayanov 1986:53). Given the number of house labourers \( a \), the upper limit \( L^* \) for house labour is the total labour expended when all \( a \) members are working at maximum intensity \( t^* \) (e.g., in the houses of tappers all males over 10 each tap three standard trails of 120 threes each, or six days a week). On the other hand, given a number \( b \) of consumers in a house, the lower limit \( Q^* \) of consumption is established by the requirement that each member has the indispensable consumption \( w^* \) (say, in a tapper's house, all persons have the minimum of manioc flour, game and clothes), and \( Q^* \) requires a minimum labour of \( L^* \). Thus, the condition of viability for a house economy is that \( L^* \) must be lower than \( L^* \), a condition which is also expressed as per worker intensities \( t^* \) and \( t^* \). If the difference \( L^* - L^* \) is negative, the house is not viable; if it is zero, the house barely survives and there is no question of alternative plans; if it is positive, the house has a surplus of its own.\(^3\) I suggest that in this last case the house plan remains undetermined.

This suggestion is better expressed when we generalise the Chayanov model, by introducing the constrained production possibilities approach (CPP).\(^4\) Here, total labour \( L \) of the house is distributed among a set of actions, resulting in a vector of final products.\(^5\) Now the feasibility condition for houses is that the maximum house labour (thus \( L^* \), when all \( a \) workers are employed at the intensity \( t^* \), summing up all kinds of labour) must be enough to obtain at least the indispensable house consumption at its lower limit (thus, \( Q^* \) distributed among \( b \) members consuming

\( ^2 \) Thus, "Chayanov's rule" (Sahlins 1974:102, Jorion 1984:74) sets the labour intensity \( t \) as a function of the consumption \( w \) of family members. But Chayanov himself assumes only that well-being is a function of labour utility \( U(w) \) and effort disutility \( V(t) \). Since \( w \) itself depends on \( t \), Chayanov's well-being function has only one independent variable which is \( t \) on which both \( U \) and \( P \) depend.

\( ^3 \) This concept of surplus is due to Gudeman (1978), following Sraffa's interpretation of Ricardo. Note that here both the house's structure \((a,b)\) and prices affect the existence of a surplus.

\( ^4 \) It will be noted that this is essentially a Leontief model of production possibilities. In contrast with 'linear programming' models, Leontief models do not assume that something is being maximised (as, e.g., Buchler et alii 1986; Johnson & Behrens 1982; but cf. Johnson 1980, 1983).

\( ^5 \) In a formal model we would write: \( L = (L_1, L_2, L_3) \). This formal notation will not be used here. Symbols are used only to make ideas more clear.
each $w^*$, where $Q^*$ is a vector). However, if there is a slack, then house plans may vary under the current prices and rent payments.\textsuperscript{6}

It should be noted that in Chayanov's formulation the emphasis is on the rate of house self-exploitation, and a capitalist wishing to maximise the rate or profit would be interested in rising $t$ and in lowering $w$, irrespective of house age or preferences; in the second formulation, once a rate is established, there is also the issue of distributing the work among several activities, some of which may be preferred for their own sake.

\textit{Forest House Models}

Employing the terms introduced above, let us now consider different cases. The most basic model (of the Chayanov type) has a single product (manioc, let us say), in terms of which we also expresses consumption (manioc per capita $w$). In this simple case, which we may call a "single-product, autarkic forest economy", a house chooses its level of labour use ($t$ per capita) and consumption ($w$ per capita) within a range of possibilities that is constrained only by technical factors, by nature, and by the availability of persons. In the more general formulation, the house economy produces a total "crop" $Q$ with the house labour $L$, where $Q$ is now a vector of garden produce, manioc cakes and meat, and $L$ is a vector of gardening, cake-making and hunting, distributed among men and women. Now house plans lie in points, which are qualitatively different. Instead of a single figure $t$ expressing a homogeneous labour, houses may choose a vector of heterogeneous labour ("hunting", "agriculture", "food processing") which do not add up to a number.

7. The comparability of activities as homogeneous "times" is the work of the market: only then beaver-hunting may be quantitatively compared with deer-hunting as in Adam Smith's example.

8. The autarkic model underlies the "affluence economy" framework (Bergman 1980:213; Johnson 1983); or the "oikos" model in which houses seek a "good life" and to which I am greatly indebted (Descola 1987). A "political economy" of autarkic economies (with accumulation of women-labour and manioc products in an "agonistic gift regime" without commodity exchange) was developed by Riviere 1984 for lowland South American Indians. The maximisation approach to these economies has been attempted through "linear programming" or "maximal foraging" (cf. Johnson 1980; cf. Hames and Vickers 1983).
for men and increased for women): the movement of $t$ depends on the rate of prices between the exported product and the imported items.9 This model also applies to the caboclo economy of detribalised Indians in the Amazon. When the indigenous (or caboclo) economies are subject to direct political control of colonisers, they are become enslaved economies. It is then in theory feasible to push $t$ to a maximum (or beyond) and reduce $w$ to a minimum (or even less), by ignoring the "subsistence" needs (reproduction included). This is the reported effect of economic booms on the periphery (Hardenberg 1912; Nordenskiold 1922; cf. Taussig 1987).10

The rubber tappers' forest house during the boom may be seen as convergent to the above model, although having a non-indigenous origin. They are forest peasants articulated to a market through monopoly patron-traders, and paying a rent. In one case (which we might call the single-product, dependent forest house model), a house produces a single export product (rubber), which is sold in order to pay for all consumer and production goods (flour, dried beef and iron tools). This presumably describes the boom years (1870-1912), where the "house" is reduced to a single working member, a rubber tapper without a family, controlling a single variable (his own labour intensity $t$). The rubber tapper sought only to survive (by obtaining at least the minimum consumption level $w$, after deducting equipment costs). The relation between the price of rubber (paid to the rubber tapper) and the total price of a package of imported commodities (paid by the rubber tapper, in kind) is a figure expressing the tapper's capacity to import. Under an absolute monopoly, this figure would be reduced to a minimum. At this minimum, the "house" is still economically viable (it may purchase equipment and minimum consumption goods), but it does not have any choices to make (the only alternative possible is to work at a maximum intensity).11

Even during the boom this case may not have been general, for two main reasons. First, itinerant traders competed with the patrons for the rubber, workers were scarce and fled with frequency (Chapters 1 and 2). The degree of the monopoly was not maximum, nor monopoly was homogeneous in all areas. Second, productivity varied according to micro-regions and even between individual producers within the same rubber estate; it might increase with distance while supervision costs also increased (the case of upper Tejo river), and local administration might not be capable of minimising the price ration down to the optimum.

In the forest house model which associate with the post-boom period (Chapter 2), the rubber tappers' house still purchases a bundle of commodities (as "debt-commodities") and sells rubber (under monopoly conditions while under debt). The house pays a rent (in kind and fixed) for the use of a number of rubber trails chosen by the house itself. The house has now a variable number of workers. Finally, the house runs three sectors - hunting, flour and rubber production. The rubber sector generates a final product that is converted (through the trade post) into imported commodities, which include both basic consumer goods ("estiva," including hunting, fishing and rubber-tapping equipment, along with salt, soap and

9. See Gross (1969), Sweet (1974) and Farage (1991) for the early trade across the frontier of "gift economy" and "commodity economy" in Amazonia; cf. Hugh-Jones 1989 for the contemporary scene. Thus, several "exchange regimes" may coexist within different "action regimes" (e.g. houses, firms). See Taussig (1980) and Chevalier (1982) for an analysis of the contact between different regimes.

10. Both in the slave and wage-labour cases, one finds what Marx called the "formal subsuming of labour under capital". We may further observe that what Marx considered the "real subsuming of labour by capital" represents technical and organisational changes: e.g., the substitution of house extraction of commodities by plantations (cf. Marx 1987, 1976(1933)).

11. This would be a case of maximum "absolute surplus-value" (in Marx's terms), without labourers being formally subsumed by capitalists (without slavery or wage labour). Marx mentioned this possibility when treating American farmers (Marx 1962/786). Note that here the reproductive needs are obviated by the continued importation of new workers.
kerosene) and non-basic goods ("valuables"). This model introduces two new features. One is the variable number of house members, which leads to a variable rate of consumers to workers (a Chayanovian kind of house). A house may now reduce labour intensity per worker $t$, while increasing total house labour $L$ and increasing per capita consumption $w$, if the number of hands increase in proportion to the number of mouths; or a house may increase labour intensity $t$ and thus total house labour $L$ merely to keep constant per capita consumption $w$, if the number of mouths is increasing in relation to the number of able hands. Thus, the trader may observe an increasing $L$ (and the resulting output $Q$) even though he is not able to control $t$ or $w$. The second new feature is that house labour (and, correspondingly, house product) no longer is a number measuring the work days spent in rubber production per year (or kgs. of rubber), but a vector of rubber, agricultural and hunting activities (a vector of game meat, agricultural products and rubber). An immediate consequence of this complexity is the increase in the degree of indeterminateness in the domestic economy. Suppose that the price rate for a given estate (for example, Riozinho) is set. Suppose that this estate operates with monopoly prices set in such a way as to maintain the total of houses as viable houses (leaving aside the fact that the degree of monopoly is not maximum; see Chapters 5 and 6). Then, after paying the rent for trails, those houses with a single labourer and a maximum number of dependents (otherwise, the hypothesis that all houses are viable would not be valid) must be able to purchase a "minimum subsistence" package with the maximum of a single worker (that is, all the time available during the year is dedicated to acquire only the "estiva"). However, those houses with more than one worker and with fewer dependents could now use less work per labourer and greater consumption for individual members of the house (Chapters 7 and 9), or could diversify the use of the forest economy sectors, using the surplus time could now be applied to different combinations along one vector of activities and of consumption.

It occurs that there are three notional plans which together delimited the set of possible house actions. One extreme plan concentrates on rubber production, renting many trails, purchasing equipment, and focusing on the upper limits of technical potential. This production plan affords a consumption plan including both basics and non-basic articles ("luxuries" such as coffee, cooking oil, perfume and shoes, or "valuables" such as an engine and others). Those houses which managed also to buy outside of the trade post could, under 1982 prices, accumulate "valuables" and invest in a small-scale commercial activity. A second extremal plan concentrates on the agricultural plots, reducing rubber activities to a minimum (including here the increased cost of inputs to flour making such as gasoline). This agricultural strategy afforded consumption plans based on extra flour reserves, sufficient to supply an expanded house with many dogs and backyard animals, and to entertain visitors and neighbours in week-end visits, parties or social meetings. A third extremal plan consisted of minimizing both rubber and manioc production, using the surplus time for extensive hunting, fishing and collecting activities. Houses actually identified with these plans were respectively houses of "rubber tappers", of "roça people", and "lazy people". Most houses lay somewhere in the middle. There could be paths leading from one extreme to another, reflecting age changes (since the ideal age for rubber collection was from 16 to 40, while a crop-tender's age could go well beyond 40), and expressed in spatial movements from hinterland areas rich in latex, to good hunting zones, or to river banks appropriate for annual planting activities.

12. We do not assume that houses actually set out to follow a plan. Plans may be the result of a sequence of actions which constrain later actions (cf. Barlett 1980), or may be accidental to a degree accidental (see later).
substitution of forests by plantations) is subordination" (wage labour) along these lines. Uncertainty (they protect themselves from price fluctuations in the "cash crop" sector), labour may only be used in the "cash crop" sector, while female labour may only be

A class model which ignores class struggle can be included under mechanical models, or maximising models, as we have seen above. Thus, a forest house specialised in a single product, confronting a patron which combines extraction of rents and advance of credit under monopoly clauses, is said to be forced to a unique state which maximises physical the level of labour and minimises the consumption, to their presumed physiological limits.13 Liberal maximisation models, in contrast to marxist maximisation models assume that houses are trying to maximise profits, although allowing for the fact that they not be able to accomplish this goal due to uncertainty (they protect themselves from price fluctuations in the "cash crop" sector), or due to the impossibility of freely allocating labour or land, since male labour may only be used in the "cash crop" sector, while female labour may only be

13. As it will be seen in more detail later on, this effect does not hold if houses have different demographic compositions. In Chapter 3, we suggest that in the case of the forest economy, the "real subsuming of labour under capital" (e.g. substitution of forests by plantations) is a previous condition for "formal subordination" (wage labour) along these lines.

used in the "subsistence" sector (Livingstone & Ord 1981:115-17). How about Chayanov's model? We stated above that it deals with production and with consumption, considering the welfare of the house as a goal. However, by substituting "happiness" for profit as the quantity which is supposed to be maximised14, this model falls again within the class of maximisation models.15 The degree of house happiness is expressed, by analogy with a profit formula, as the difference between "utility" U obtained from consumption (w in an egalitarian house), and "disutility" V imposed by the effort (t expended by the house's labourers). Thus, a house plan is the expression of rational choice.16 Operationally speaking, the plan amounts to the choice of labour intensity t.17 However, while

14. The house is approached as a firm in which the manager-owner takes into account the opportunity cost of his own labour

15. "The peasants are guided in their allocational efforts by the aim of maximizing the happiness of the family"(Sen 1984:38). Sen's article was published prior to the diffusion of Chayanov's ideas in the West (it responds to Lewis 1954 and Jorgenson 1961), but rediscovers and perfects Chayanov's model, Cf. with Sahlin's 'Chayanov's rule' which is a greatly simplified (labour) minimisation version of Chayanov's concept of utility.

16. The neo-classical Chayanovian house maximises utility U - V where U is a utility based on consumption and V a disutility based on labour. U is a function of per capita consumption w, which is equal to Q (the house's product) divided by the number of consumers b. U(w) = U(Q/b). On the other hand, V depends upon intensity t alone, V(t). The house head "assesses" this function, and comes to the following programme:

\[
\text{maximise satisfaction } U(w) - V(t),
\]

subject to:

\[
w \text{ is greater than the minimum consumption per capita}
\]

\[t \text{ is less than the maximum labour per worker}
\]

17. Observe that by choosing t the house produces Q with the labour L = th. This assumes a production function (and thus a technology). Houses do not make technical choices (but if a tapper has a pact with the mother of rubber trees Q will presumably rise). Observe also that a (consumers) and b (producers) are given: this house has no foster-children, and does not hire people. (Cf. Chapters 7 and 9). Finally, this model does not incorporate prices. All of these features, on the other hand, could be added to the maximising theory of the house.
profit (or surplus-value) maximisation is a clear concept, there exists no similarly clear measure of happiness. Anthropologists may of course postulate that houses have ordered all possible choices by increasing happiness, only in order to be able to "deduce" that what they observe (actual plans, either stated or actualised in acts) follows from the assumed effort to maximise happiness. This procedure is tantamount to postulating maximisation as a behavioural property of each house.\(^{18}\)

In simpler language, houses do what they like best. The proposition of treating a house as analogous to a firm, thus, faces a basic difficulty in that there lies a difference between a quantity of money and a complex state which presumably should correspond to well-being ("good life" in Aristotle's language).\(^{19}\)

We consider now alternatives to the mechanical model for houses. Should we adopt a cultural model for the house plans? Along this direction, one assumes a previously given image for the form of a house, extensive to a group of persons which share a cultural heritage. Notions such as "moral economy", but also the ideas of "drudgery-averse peasants", "risk-averse peasants", "thrifty peasants" and "profit-maximising peasants" (as a particular case), just as notions relating to the nature of forest (which may not be converted freely among uses or owners) and to the quality of persons (who may be essentially heterogeneous), as well as notions related to the

\(^{18}\) "...it requires something of an act of faith to assert that this [to construct 'curves' on the basis of a sample of individual, different houses] 'proves' that the peasant farmers in the sample are efficient. This act of faith is that all farmers in the sample are considered to have been striving, with varying degrees of success, to reach [the optimal] point A' (Ellis 1988:71). Compare with Durrenberger's approach (1984: 39-49) towards "operationalizing" Chayanov. Cf. also Ortiz (1973:271): "It is a tautological system, but a very useful tautology"; and Johnson 1980.

\(^{19}\) "Now it is clear that wealth-getting (krematistiké) is not the same art as household management (oikonomiké), for the function of the former is to provide and that of the latter to use..."(Aristotle, Politics, I, iii, 2). This distinction is paralleled by Max Weber's contrast between Erwerbswirtschaft, acquisitive management or 'profit-making', and Hushalt, "management of a household" (Weber 1947:187, 191). Cf. Gudeman and Rivera 1990.

nature of things (which may be non-comparable or non-interchangeable), instead of being taken as factors which distort rational choice, are together summed up as a culturally existent form. Although we incorporate this notion of a house image, we should observe that it alone does not provides an explanation (a kind of cultural mechanism) for actual house plans. This approach must be regarded with caution so as not to rely an ideal "house".\(^{20}\)

As opposed to the form as represented in images or descriptions of what a house should be (a form of the house as part of culture), there is the actualised form as it is seen in the real life of houses. Individual variability may be due both due to strategic action toward specific goals (for instance to acquire a new motor or increase a house's role in the union), and to chance, environmental and other sources of unpredictable change. These difficulties constitute the reason why I have used the notion of a form of the house always as part of a labour process. A "house form" comes in two ways. It is a component (as an 'image' or blueprint) of the labour process, which is imprinted through the human action onto nature and things. But a "house form" is also the actual result of the labour process. The form anticipated by the house group should not be mistaken by the final product which has form given to it by the labour process. If this identification were to be made, then house forms would perpetuate themselves as an unchanging essence. Labour, as an event, may follow unpredictable courses, as it faces natural and human constraints, and individual labour processes may result in fluctuations that can produce local expansion of one house or the impoverishment of another.

\(^{20}\) I have accepted this idealisation for expository purposes in Chapter 8. The reason for this was the impossibility (for space reasons) of giving to domestic consumption, agriculture and hunting the same detailed treatment given to rubber-labour in Chapter 9 (in which idealised plans and actual labour actions were compared).
Actual houses may suffer a degenerative process through demographic loss or decline in the quality of life; or they may be on their way to becoming converted to commercial enterprises run by marreteiros, regaños or even patrons. The components of a house (persons, territory, technical knowledge and objects), when forced to an extreme (untenable prices or rents, excessive population for extensive technology, epidemiological calamity) may lose its form. A house may die, or its form may be corrupted. It may change its form, as would occur with the elimination of game and primary forest as normal parts of the house's form. A very important issue is how individual houses and macro-houses make plans taking into account what they see as ethically correct (e.g. cooperative action to maintain natural funds), on the one hand, and as individually "rational" on the other hand (e.g. increase one's participation in the short-term benefits of converting natural funds into flows of commodities). Political institutions have an important role on this issue. Thus, as said above, the house form (as a blueprint for future action) is not taken as determining the actual action plans. But as blueprints, they are part of the actual house form: thus, just as the actual house form is the concrete use of forest, of persons, of things, in a certain proportion, this current form includes current ideas and knowledge which will be used in the current labour process. A house form contains, so to speak, a micro-model of itself, but this is itself subject to change and mutation. Individual houses are then constrained by previous models, just as they are constrained by the persons available, by natural productivity and by the stock of objects which can be obtained - without being determined in a unique way -, but previous models may be affected by the way they succeed or fail in orienting action towards an acceptable life.

House Plans in the Riozinho

We exemplify this constrained variability by means of the house plans. On Riozinho Estate, the output of houses with a single adult tapper varied from 300 to 1,200 kgs. of rubber. In houses with two adult tappers, rubber production varied from 500 to 1,400 kgs. In houses with five tappers, rubber production ranged from 600 to 1,800 kgs. This supports the idea that increases in the number of tappers allow for new options to come into existence, expanding the range of production possibilities available to a house. One frequently adopted option is to reduce labour intensity (and thus the rubber output per tapper), widening the variation in other sectors (hunting and flour production). Thus, a house with a single tapper might produce 600 kgs. of rubber (exploiting two trails four days a week, while also maintaining a small garden plot of 3,000 covas and hunting once or twice a week). But a house with three tappers could increase the volume of production to 1,200 kgs. of rubber - each tapper now producing 400 kgs. of rubber, thus reducing the labour intensity per tapper, while at the same time increasing the total rubber output, leaving aside time for greater garden plots (the house head might become specialised in increasing flour production) and for better game production (groups of brothers may chase deer on week-ends). Once the number of rubber tappers in a house is increased, the volume of rubber produced by each individual tapper is reduced.

A portrait of manioc production yields results analogous to the rubber sector. As in the case of rubber, manioc output increases in a linear fashion following the growth in the number of labourers. This occurs because neither rubber trails nor cultivable lands are scarce, and therefore income does not decrease with an increase in the scale of production. But both in the case of rubber and of manioc, output per cultivator decreases with the increase in the number of workers within a house. Manioc and rubber production plans reveal a tendency of sparing labour per worker
as the number of labourers increases: in economic jargon, both rubber and manioc labour are "inferior goods", since their use is decreased when the house can afford to do so as a consequence of more available labour, or, in other words, when it has a potentially higher real income (Diagrams 10.1 to 10.3).

There is a correlation between the number of consumer that each cultivator/tapper must support, on the one hand, and the increase in effort by each cultivator/tapper, on the other, apparently confirming Sahlins' version of "Chayanov rule" and various empirical studies. But the disperse pattern of houses along the hypothetical line correlating consumption per worker and labour per worker is great. The appropriate conclusion is that there are lower and upper limits to the efforts of cultivator-tappers in a given house, for each number of consumers that each of these workers must support. There were houses where a tapper and his wife produced as much as 1,800 kgs of rubber in a single year; and other with a tapper, his wife and several children who produced but 600 kgs of rubber (Diagram 10.4, 10.5).21

Forest houses are involved simultaneously in extraction, cultivation, hunting and foraging for local use. hence, for a given number of labourers, two houses may be employing all of them at a maximum intensity, while distributing the total output in different activity portfolios - a combination of kilograms of rubber, covas of manioc flour, units of deer hunted or fish caught. In this case, the hypothesis holding that labour intensity will increase with consumer demand does not lead to a predictable outcome because there are several options for consumption as one draws away from the hypothetical point of minimum consumption. Some houses

21. The house with the greatest ratio of consumers per labourers in the diagram included several persons over 10, but by some demographic accident all these people were women who did not tap rubber. Hence, even with a high consumer/worker ratio (seven to one), this house had only one rubber tapper, whose annual output stood around 500 to 600 kgs.
fuel), of tools for rubber extraction itself, as well as of guns and ammunition for hunting, at 1982/83 prices (cf. Chapter 9). At another extreme (in the upper corner), we find houses that may be producing much flour (8,000 covas), while also producing around 700 kgs. of rubber (when the size of garden plots is maximised, the minimum amount of labour in rubber also increases, in order to pay for more fuel to process more flour). At a third extreme (the lower right-hand corner), we find houses that employ "surplus" labour to increase rubber production (1,700 kgs.) and to acquire additional consumer goods, cattle or a second engine, while reducing their flour production to a minimum (2,000-3,000 covas). If we observe the empirical distribution of houses within this theoretical space, we also see that one group of houses appears only on the horizontal rubber axis, since they have no garden plots during the year under scrutiny. A second observation is that the houses tend to spread in a northwest direction, which means a simultaneous increase in rubber and flour production as a function of the increase in labour. We may also point out a "greater density of houses within the triangle formed by the ranges of 400 to 800 kgs. of rubber and 2,500 and 6,000 covas of manioc."

A house with a single worker covering a single trail (thus with a potential for two work days a week in the rubber sector) produced the lowest amount of rubber feasible; it would dedicate the remainder of its time to maintaining a garden plot (tended twice a week) and to hunting and collecting (once a week). In the patron's estimation, these were the "lazy" houses. They were chronic debtors. It should be noted, however, that houses producing between 500 and 1,000 kgs of rubber enjoyed the highest rate in deer hunting (over 14 per year), while the most productive houses (over one ton) on the average captured fewer than six deer per year. When houses begin to add on more labour, their field of options grows correspondingly. Now it is possible to occupy three rubber trails and maintain the ideal routine of six tapping days a week, though rarely observed in practice, and at the same time maintain large garden plots and hunting teams (Chapter 9). It is also possible to allocate one labourer for the crops alone, and use teams to increase hunting efficiency. The number of labourers may further be amplified by the formation of macro-houses, which act together at peak periods such as the preparation of trails or garden plots, and in the deer hunt; it also may be increased through adoption, or through the incorporation of hirings or client-houses. Furthermore, houses can choose more efficient technical procedures. The press technique both saves labour and allows for more free time either to produce more rubber, more game or more crops (thus it increases the range of production possibilities available to a house).

Prevailing agricultural, extractive and cynegetic techniques assume that there is a stock of at least 300 hectares of forest surrounding a house. Territorial use by hunting and collecting houses may be prolonged through the observation of balanced levels of predation and extraction. For example, this is the case when patao and bacaba palms are not stricken down during the collection of fruits, or when specialised "Paulista" hounds are not used in hunting. What one house practices affects the options available to neighbouring houses.

If drawn in a tree-dimensional form, the diagrams would appear as polyhedrons - something like a pyramid. At one of the vertices, we would find a zero point with houses at a "subsistence minimum", producing barely enough rubber, manioc and game to sustain not only house consumption, but also the basic needs of the other productive sectors, both direct and indirect. It is at this vertex that we find the possibility of a maximum use of time for leisure. At the other three vertices of the pyramid we would find production plans where leisure is reduced to a minimum: either to increase rubber production to a maximum level (including increases in manioc and game necessary to support the production of greater amounts of rubber); or to increase manioc production to a maximum level (including increases
in rubber and game necessary to support the production of greater amounts of manioc; or to increase game production to a maximum level (including increases in rubber and manioc necessary to support the production of greater amounts of game). In sum, there are four extremes: minimum use of labour at a minimum level of operation in the three activities; and maximum use of labour at maximum levels of operation of either activity.22

Is it possible to infer a generic house model from the foregoing? It seems plausible to admit that houses follow courses constrained by the viability of the house (some minimal notion of an acceptable standard of living), and then by the external constraints, social, ecological, technical. This hypothesis does not entail a common tendency among houses either to minimise labour or to maximise effort, or to minimise or maximise whatever else.

The Ergodic Hypothesis

This approach differs from mechanical models of maximisation (patrons do try to maximise profits or rather total produce, but may not quite succeed), and leaves the cultural form of houses open to a degree of variation. If one house has a higher consumer-producer ratio than another, it might do one of two things: increase the amount of labour per producer to maintain an equal level of consumption, or decrease per capita consumption to maintain an equal level of labour. To postulate that a peasant always behaves in the first fashion, or always in the second, is illusory. Instead, we postulate our ignorance of the state of one variable in the model. This is the same as postulating the existence of a degree of freedom in the agents' behaviour.

That which we call the ergodic hypothesis asserts that for a great number of houses, and given a range of possible actions (from e.g. minimum and maximum use of labour) all possible actions are equally probable.23 We might treat this hypothesis as an expression of our ignorance as to what really determines behaviour within the limits already known to us (there is determinism, but we ignore its mechanism), or as an expression of the unpredictable course of actions, as in the chaos metaphor (small changes lead to great effects). In the last alternative, we may reason that there are cumulative and unpredictable processes. Thus, it remains impossible to predict the evolution of any given house over the long run,24 although statistical averages for the whole set of houses may be amenable to prediction. Thus houses have a high information content (Shannon 1964:33,50).

Peasant houses in the forest are grouped in macro-houses, nuclei with an average of sixteen persons apiece. Instead of forming a homogeneous community, it makes more sense that the individual houses fluctuate along different points; that some capture others forming macro-houses, and these in turn are amplified into networks of macro-houses in a competitive and mutually divergent manner.25

22. This is a Leontief model developed during field research in 1983. Similar studies have been published (Buchler et al, Johnson 1982 e outros). These are constrained maximisation models: one may direct the same objections raised against simple maximisation models. The approach suggested here, by contrast, seeks only to identify ranges within which individual choices can be made (when prices, technology, resources and persons are given), and not to predict individual choices on the basis of simple or constrained maximisation hypotheses.

23. The 'ergodic hypothesis' (from the Greek ergon, translated as 'work') states that a system may adopt all states compatible with the constraints to which it is subject. Thus, in the long run it may go through all possible states (cf. Kemeny et alii 1959, chap. 6.2, Shannon 1964:45). See next footnote.

24. Teodor Shanin's analysis of social mobility among peasant houses (1972) may be considered from the point of view of the ergodic hypothesis.

25. A characteristic of complex phenomena is that they are non-linear. Non-linearity means that 'causes' interact in ways that make prediction intractable in individual cases (cf. Stein 1989).
Hence, we may explain how a single network of macro-houses dominated, so to speak, the forest space of the Riozinho Estate.

**Political economy**

We go back again to the role of the prices and rents paid by houses to a patron. Suppose there is a drop in rubber prices (or an increase of rents). In this new situation, the range of plans that may be adopted shrinks. Hence, the effect of exploitation by way of prices lies in the compression of the houses' range of freedom. Thus, the unpredictability of houses is decreased. An increase in external exploitation corresponds to a decrease in the information content of the houses' actions.

A fall in prices could result from monopoly price strategies on the part of the trade post (maximisation of monopoly mercantile profits), or from change in national price policies. In the first case, a maximum level of exploitation (and minimum informational content of house plans) can be theoretically obtained by a discriminatory monopoly (prices adjusted house by house), thus maximising both the total product while at the same time maximising profits. Not only discriminatory, the monopoly would have to be complete. We may now argue that as houses resist against monopoly they in fact retain a high degree of information in the forest economy, one implication being that they experiment with and discover species, techniques and uses and thus are able to evolve their technical knowledge. This knowledge of the forest increases the strength of houses to resist monopoly. When...

26. If we pause to examine the area of local political influence of a leader like Chico Gindo, we will find an extensive networks of interconnected macro-houses. A similar phenomenon may have occurred in the region where Chico Mendes led empates.

27. For the sake of simplicity, we do not pursue the distinction between a monopoly (a single seller of merchandise) and a monopsony (a single buyer of rubber).
exploitation determined by some natural law. In his own English prose, and with his own emphases,

...although we can fix the minimum of wages, we cannot fix their maximum. We can only say that, the limits of the working day being given, the maximum of profit corresponds to the physical minimum of wages; and that wages being given, the maximum of profit corresponds to such a prolongation of the working day as is compatible with the physical forces of the labourer. The maximum of profit is, therefore, limited by the physical minimum of wages and physical maximum of the working day. It is evident that between the two limits of this maximum rate of profit an immense scale of variations is possible. The fixation of its actual degree is only settled by the continuous struggle between capital and labour...The matter resolves itself into a question of the respective powers of the combatants (Marx 1974 (1989):101, author's emphasis).

Conclusion

This chapter had two objectives in mind. The first was to exhibit the range of variations within the micro-economy of the forest houses. In houses, the presence of the forest and of several technical procedures play a crucial role. They possess a thriving technology precisely as a consequence of the range of their technical niche, which in turn is related to their ability to oppose resistance to exploitation.

Chapter 11

CONCLUSION

The rubber estates of the Amazon apparently serve as an ideal example to illustrate a generic model for how the capitalist world system acts upon a periphery. In this model, the world system consists of a centre with a free labour market and a periphery with forced labour, as in the case of debt slavery; a centre with technological progress preying on prime-materials and information, and a periphery which loses resources and labour (Bunker 1985; Hornborg 1992; Alier & Schlupman 1991). In this world-system model, the periphery seeks to maximise capitalist accumulation - in the example of the Amazonian rubber estates, by reducing rubber tappers to a physical minimum consumption and a physical maximum labour. The Amazonian example also suggests a case of peripheralisation followed by a period of economic stagnation or involution. During the boom period (1870-1912), the rubber estates provide an example of how a periphery is formed, though leaving several questions that must be addressed through a more detailed analysis. Why have the rubber estates remained active during the eight decades ensuing the crisis? Why did the world system not 'transform this periphery? What local history remains hidden behind the simplified negative concept of


2. Rosa Luxemburg employed the rubber boom example and that of the "primitive systems of exploitation" used on the Putumayo (Luxemburg 1970 [1912]:chap. 23, footnote 5). Rudolf Hilferding emphasised the effects of the world market (Weltmarkt) as an economic arena (Wirtschaftsgebiet) that generates the coercion of labour in systems like that of the "contract labour" of coolies in the British colonies of Asia (1968 [1909]: chapter 22, pp. 421,431-34, 447-48).
"involution"? Is it merely a reflex of metropolitan history? Before considering the answer to these questions it is worthwhile recapitulating the transition described in this thesis.

Beginning with the end of the boom (1912), rubber tappers within the Amazonian extractive economy no longer were labourers recruited by commercial capitalists and with a status similar to that of indentured servants, instead becoming forest peasants. The extractive economy survived the onslaught of Asiatic plantation economies because of this peasantry (between 1912 and 1943), and was strengthened by government subsidies and protectionist tariffs (between 1943 and 1985). The extractive economy moved from a phase dominated by firms with a dynamic response to the world market and with investment of capital in the importation of migrant workers and of basic goods (1870-1912) to a phase dominated by firms with a reflexive response to bureaucratic government decisions and with forest peasant houses providing the local reproduction of labour and of basic goods (1912-1992). During the second phase, we find stagnated firms (which do not reinvest profits and do not act competitively) and peasant houses (which have social mobility). The dynamic of commodities, in this phase, comes to depend on decisions made by the national State.

This formulation calls for the need to refine concepts. Gregory applied Mauss's theory concerning regimes of circulation of goods (distinguishing a "gift regime" from a "commodities regime") to the study of the relation between an indigenous economy and the capitalist market. One of his conclusions is that this relation results in an "ambiguous economy", where objects "are now gifts, now commodities". Like Meillassoux and others, Gregory insists on the idea that a "gift circulation regime" subsidises a commodities production regime. Hence, his argument provides an example of the theory postulating the functional role of a presumably non-mercantile sector of the economy in capitalist growth (Gregory 1982:117). The post-boom Amazon example, however, demonstrates that this sort of analysis cannot be generalised to all local situations. There was no movement of labour from the forest peasant sector to the capitalist sector (with salaries subsidised by the "gift sector", or, to be more realistic, by a "subsistence sector"). Furthermore, industries were not subsidised by the exportation of goods produced below their value by a peasant sector of the economy.

This quick reference to Gregory suggests other considerations of interest to the detailed analysis of the post-boom Amazon economy. My analysis of the relations between a forest peasantry and forest patron-traders has not been formulated in terms of a dichotomy between exchange-value and use-value, or between a "gift circulation regime" and a "commodity circulation regime", or even between subsistence production and production for the market. Instead, I have focused upon the differences between economic actors -- the commercial firms of patrons and the houses of rubber tappers, which integrate the same economy --, who appropriate and produce goods within several regimes of circulation. Thus, forest houses operate under local gift regimes (between neighbours), simple commodities exchange regimes (exchanges "for their value" between houses) and debt-

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4. Furtado blames the Amazon boom for having misdirected an enormous mass of workers from the Northeast to the Amazonian dead-end, at a moment when there was a great need for labour in the industrialisation process of the centre-south (Furtado 1963 [1959]).

5. The neo-peasantry of rubber tappers formed during the inter-war period belongs to the wider Amazonian neo-peasantry, alongside the caboclos, of more remote origins (Parker 1985). This peasantry was free (squatters on abandoned forest lands) or paid rent in kind for use of the forest.

6. Brazilian rubber extraction reduced instead of increasing the profits of multi-national tyre industries implanted in Brazil (Pinto 1984; cf. Hilferding 1968 [1909]:425 passim).
commodities circulation regimes (between houses and patrons). Houses use means of production (which include commodities and non-commodities) to produce goods converted into objects of consumption (acquired as debt-commodities, received as gifts or obtained through simple exchange). Houses may make investments and grow, in the process increasing their prestige and influence, while accumulating some wealth. The patrons’ firms experience phases of growth and of crisis without any technical change, in effect simply reacting to external price fluctuations. The expansion and contraction of patrons’ firms also occurs as a reflex in relation to government policies. In short, this discussion leads to the causal role of the State in the economy.

There is an intimate relationship between the stability of rubber trading firms (without transformation) and the mobility of peasant houses (without destruction), on the one hand, and the role of State bureaucracy in regulating the regional market. Indeed, bureaucracy plays an essential role in the extractive economy formed by houses and firms. Hence, local history involves not only regimes of circulation of things such as debt-commodities, goods (simple commodity circulation) and gifts: there also are tax-objects. In the Amazonian example, taxes come in the form of subsidies transferred by the State to the patrons (thus “redistributing” industrial and consumer taxes), as well as in the form of rubber trail rents, paid by tappers to patrons.

7. According to Furtado (1963), the same mechanism that allows for growth (“vent for surplus”, Hart 1982:12) during market booms is also responsible for involution during market slumps. This mechanism is “structural dualism” where a non-export activity plays the role of labour storage. This is not the “two economies” kind of dualism found in Boeke (1953).

8. National states are not passive in the face of the world market (Cardoso, 1979; 1976:191-204), contrary to what Wallerstein’s and Frank’s approaches imply, with which Cardoso at times is mistaken (as in Hart 1983: 121-22).

9. During the industrialisation of Brazil (1930-1990), large landowners and rentier-capitalists from “involuted” regions (sugar plantation owners in the Northeast, and rubber estate patrons in the Amazon) aligned themselves with industry, under the aegis of the State, leading Brazil to a combination of industrial growth (for example, the production of automobiles and tyres for the domestic market), with subsidies for stagnated rural firms and the importation of agricultural inputs (e.g., extractive rubber is subsidised through import tariffs on plantation rubber). At the same time, the State impeded agrarian reform (Berno de Almeida 1991:239-41).

The role of the State thus leads to the role of politics and classes in the local economy. Merchant-businessmen (firms) and forest peasants (houses) are not only part of a market. In the Upper Jurú situation, they also constitute dominant and dominated classes, one subordinated to the other by virtue of the fact that the patron-traders monopolise the forest (there is no land market; and there is a monopoly over services of the forest trails) and they monopolise trade (debt-rubber is the counterpart of State loans). Neither of these monopolies is perfect: there is class struggle in the forest, and there is a middle class of small itinerant traders and of free cultivators.

Capitalism and Peasants

This analysis must be set against the theory according to which the patrons form a class of capitalist-producers, and the rubber tapper form a proletariat which, instead of selling its labour, is forced to a maximum degree of labour (that is, to a maximum rate of absolute surplus value) at a minimum level of consumption by the debt system. In assuming that “capital” thus astutely subordinates labour on the periphery, such an analysis forms part of a wider teleological theory of history of the periphery. Marx’s ideas on the “subsumption of labour under capital” are useful in explaining why the rubber tappers are not proletarians. Marx distinguished two forms of this process: formal and real. Formal subsumption involves the
transformation of workers into wage labourers: labour becomes part of "capital" and is placed at its command. This command allows the owner of capital (who is temporarily owner of the wage labourer) to control the labour process, to prolong the work period and, with the relative abundance of labour, to maintain wages at a fixed rate. Formal subordination thus permits the increase of surplus value in absolute terms. But with the formation of Asian rubber plantations, the capital employed in the introduction and supervision of labour disappeared from the Amazonian extractive economy, where the labour process is dispersed throughout three square kilometres. In an extractive economy, slavery, indentured servitude (temporary slavery legitimised by debts) and wage labour all have supervision costs, which, when adopted, are much greater than those of plantation economies with similar regimes. Indeed, I would argue that these systems never were established firmly and efficiently in the Amazon, even during the boom, because such costs face limits in a forest extraction economy.¹²

The method of real subsumption¹³ is based on technological change, which places the labour process out of reach for individual producers. This may be illustrated by the replacement of the forest with plantations, the adoption of new inputs (clones, pesticides and fertilizers) and administration. However, though attempted by Henry Ford, neither real nor formal subsumption occurred within the Amazon rubber economy.¹⁴ In explaining this, different authors have adopted distinct causal sequences: according to Warren Dean, there was a technical barrier (the domestication of the Amazonian seringueira tree) to that which I call here the "real subsumption", which impeded social transition ("formal subsumption"); for Barbara Weinstein, it was the social barrier (the resistance of local merchants, the resistance of peasants to wage labour) that blocked the subordination of the technical process by capitalists.¹⁵ In any case, in terms of the world market and in terms of capitalist accumulation at the beginning of the century, the real and formal subsumption of the rubber production process occurred in Asia and not in the Amazon.

Class Struggle in the Forest

A few comments should be added to the picture outlined above. I have asserted that forest peasant houses constitute a class (insofar as they are in opposition to a class of patrons who monopolise land or trade), but also that they have social mobility. One implication of this model lies in explaining how forest houses exist even in the absence of patrons; another holds that the advance trade/debt system is not synonymous to the trade post system. The trade-debt regime is one of demonetised commerce, with long intervals between the reception and supply of goods, dictated by the fractal dispersion of the extractive forest economy. In this commercial circuit, goods assume the form of debts. This form may be seen as a variant of commodities-form, demonetised and personalised through long-term diadic contracts. This form operates over great distances and time.

¹² "As to the limits of the value of labour, its actual settlement always depends upon supply and demand, I mean the demand for labour on the part of capital, and the supply of labour by the working men. In colonial countries the law of supply and demand favours the working man" (Marx 1950 [1898]:402).

¹³ "Reelle Subsumption der Arbeit unter das Kapital".

¹⁴ Peasants can be subordinated technically ("material subsumption") even when they possess their own land (without "formal subsumption"), where agriculture is integrated technically to industry (Amin and Vergopoulos 1974). Geffra (1991) asserts that rubber tappers are "formally subordinated" to traders, against Marx's use of the notion. Cf. Marx 1976 [1933]; 1969 [1872]:459; n.d.[1887]:510. The French edition of Capital (Marx 1969 [1872-75]) does not include the aforementioned passages.

¹⁵ The most direct form of developing a supply of labour, freeing up land and selling the product is to expel the rubber tappers and allow immigrants in - and not await their endogenous stratification. Thus the Brazilian counterpart of the Russian debates on the disintegration of peasantry as a condition for the emergency of an "internal market" for "national industry" is irrelevant for tappers (cf.Lenin 1979 [1899]).
intervals in the forest economy, alongside the gift-form that operates between neighbours. The debt-form of commerce may take place between equals (itinerant traders, small retailers in the forest) as well as between unequal parts (patron-traders and rubber tappers). In the latter case, violence (supported by the State) and monopoly play roles; thus, a debt may be collected through the use of violence by patrons, but not by regatoes or marreteiros. This distinction is necessary if we are to understand why the debt regime is so persistent in the Amazon, with or without patrons backed by forced monopoly or by violence. Debt is not the cause for labour's immobility; but the immobility of labour through coercion allows for debt-capital (that is, merchant capital that exists under the form of debt-rubber) to obtain extraordinary monopoly profits.

Perhaps it is necessary to justify both the idea that patrons and tappers constitute classes as well as the conflict model subordinated to this analysis. Patron-traders appropriate in a legal sense two components of the labour process (the forest and production or consumption inputs), which finds support in the State and which is legitimised by an ideology, and through these monopolies they obtain rents on natural resources (tribute-goods, rubber to pay rent) and extraordinary profits based on the commercial monopoly (debt-goods, rubber to pay debts). Control over the State (police, judges) ensures the flow of these returns. Forest peasants constitute a class because they are not only peasants but also "debtors" (of monopoly rubber) and tenants. Thus, the class conflict between patron-traders and peasant-debtors who owe rent and goods is expressed in the refusal to pay rent or to pay to

the monopoly (by turning over rubber to an itinerant trader). The patrons' hegemony is made up of two components: political force (control over State agencies) and ideological force (a measure of consensus). Peasants move from conflict within the hegemonic order to the contest over hegemony itself when they form alliances with other groups, altering the correlation of political forces (for example, in joining labour organisations, or civil associations that seek representation in the public sphere) as well as of ideological ones (through the dissemination of concepts on agrarian rights and citizenship). We have adopted John Roemer's formulation (1982), according to which under the current state of things, tappers are exploited by patrons so long as there exists a viable alternative where patrons lose and tappers gain in their respective well-being. The nature of exploitation is signalled by the changes in the rules of the game that would be necessary to permit the realisation of the alternative. In the tappers' case, the necessary change involves the end of the patrons' monopoly over rubber trails, of the patrons' monopoly profits and of usury profits (thus, one form of exploitation may cease to exist while another persists). For an alternative situation to develop, it is first necessary for those who had been exploited to overcome the problems of coordination communication and leadership involved in the change, and they must not be worse off as a consequence of expelling their former exploiters. In particular, the future of the forest, which constituted a fund that generated both commodity-goods (latex sold to patrons) and gift-goods (game circulating between neighbours), remains uncertain after the monopoly of patrons is eliminated: will the forest be
transformed into land and appropriated privately? We shall return to this point below.

Value, Labour and Political Economy

In these considerations concerning the dynamic of local history, one might question why labour-value is relegated to a secondary role, while the central subject of the present thesis is labour. In Marxist theory, the concept of labour in fact has two different roles, one quantitative and the other qualitative. The first is represented by the theory of labour-value, under which a theory of the exploitation of workers by capitalists is formulated. The so-called fundamental Marxist theorem (Roemer 1981) holds that profits exist only where there is exploitation (the net transfer of labour value from one class to another). But this theorem has met well-known obstacles in its application to a capitalist economy (Morishima 1973:12-13; Morishima and Catephores: 22-23; Roemer 1982), and in order for it to remain valid, it has been argued that it is necessary to abandon the notion that goods are traded "at their value", or even that micro-values can be attributed to individual commodities at all.\(^\text{19}\) Here labour-value comes to be a global resource that society allocates (as in Robinson Crusoe's economy, Marx n.d. [1887]: 76-79) among its members in different activities, such as fishing, hunting, cultivating, or building.

Another function of the theory of value was moral: that is, it serves as an ethical parameter for the existence of inequality. In exchange between non-neighbour houses (simple commodities exchange), rubber tappers frequently use the idea of labour-value to regulate, for example, the exchange of flour for rubber. But this procedure does not work when imported goods are traded for local products (between houses and patrons), where the notion of distributive injustice is formulated by tappers to explain one-sided enrichment; nor does it apply to hunting (gift exchange between neighbours), where injustice may take the abusive form of overconsumption by other houses.

Gudeman (1978) has revived the role of classical political economy in the study of peasants (supported by Sraffa's interpretation of Ricardo), while Sahlins disseminated a neo-classical style based on Chayanov for the same objective. Both approaches take labour as the base and measure for wealth. In the political economy focus, it is a matter of examining the distribution of wealth generated by labour through the exchanges between peasant houses and other social classes; in the domestic economy approach, it becomes a matter of studying the distribution of labour and leisure within the house in order to find the point of equilibrium between effort and satisfaction (Gudeman 1978; Sahlins 1974). To be sure, both approaches should be combined when studying houses that are related to a market. But while both Gudeman and Sahlins seem to converge on the matter of the existence of some sort of equilibrium (subsistence wages and the external appropriation of maximum surplus; reduction of labour to the minimum necessary to meet domestic subsistence), my suggestion points to an inherent disequilibrium. This disequilibrium appears in the relations between houses and merchants; it also shows up internally in house plans. In the first case, while patrons seek a monopoly, labour is scarce; there is an arena of violence and bargaining, instead of a balance between supply and demand of labour and goods. There is thus a distributive border between houses and patrons (or a Ricardian frontier). This border moves between extremes: minimum subsistence and maximum labour, zero profits and maximum profits. But it is not fixed, and it is up to class struggle in the forest to determine the exact level of exploitation (an idea consistent with Sraffa 1960).

\(^{19}\) "The concept of exploitation is defined only socially; we do not define social exploitation as the aggregation of many individual exploitations of workers, but only as an aggregate concept. In general models such as this one, the question does not even arise as to whether prices are proportional to labour values; labour values play no micro role" (Roemer 1981:60).
But there also is a Chayanovian frontier. Houses employ variable quantities of labour with different intensities and in different combinations, reaching distinct consuming patterns. Only a complete, discriminatory monopoly - where prices were adjusted house by house in accordance with the stock of workers and consumers within each, and where consumption was homogeneous and paid for - would allow maximum profits to be extracted uniformly from all houses. Only an average rate can be established, but individual houses can then move around the average.

Let us turn our focus to the inside of the domestic economy. Each house can make choices about labour use and consumption, within the limits imposed by price levels and by the payment of rent, which regulates the relations between houses and traders or patrons. This is the sphere of house production and consumption plans. We have shown that within this sphere houses are dispersed, much like particles occupying the volume within the walls of a cylinder. In this metaphor, the piston defines the borders of exploitation; the greater the resistance of the houses to the level of exploitation, the greater the dispersion of houses between different production plans. This point is at the root of my refusal to accept the approach based on optimisation for each individual house. The state of the houses as a whole is not the same as the sum of atomised actions of isolated houses: were this true, we would be able to predict the behaviour of individual houses through the application of micro-economic models. Instead, such behaviour first fluctuates and second is not individual. There are coalitions of houses forming macro-units of cooperation and distribution, there are local movements of accumulation and sub-exploitation between blocks of houses. Indeed, the piston metaphor makes sense because in the relations between houses (seen as a whole) and the trade post, the role of the trade post does not involve the control over individual labour and consumption processes (as would happen if there was the "formal subsumption of labour under capital"), but it does involve setting only global variables like prices and rents. There is thus a margin of freedom in the houses' economy that allows for the existence of pockets of "thrifty" houses, "labour averse" houses, "spendthrift" houses, and so on.

Houses

The notion of forest houses and their extension as macro-houses and macro-house networks provides a conceptual tool for understanding the political economy and the domestic economy of the rubber tappers. Houses control forest settlements (colocações), which they may lease from patrons or come to occupy as squatters (without individual property rights over the colocação, as in the Juruá of Acre), or they may have permanent rights over tapping areas, which in turn they may sub-let to other houses (as in Eastern Acre, under the influence of a market for land). In the Upper Juruá region, the control over resources was not associated to the permanent ownership of the forest; the forest was not a commodity. Houses manage domestic labour or that of hirelings or sharecroppers, choose production plans (combining hunting, commercial extraction and agricultural activities) and make budgets for the acquisition of goods (including "valuables" and goods for resale). In their relationship to the market, houses focus on the collection of extractive products in upland zones and on the cultivation of agricultural products in riverside areas. Houses can accumulate a certain wealth (people, things), which I have not described as capital accumulation but as the accumulation of a patrimony. They occupy varied positions in the realm of production possibilities (constrained by prices and given technical possibilities).

20. Gudeman and Rivera (1990) describe in detail a "house form" as part of a cultural tradition. A terminological note: these authors employ the term house instead of household to express that which Weber called Haushalt and Aristotle oikonomia. Cf. Goody's (1990:21) "house" (between quotation marks) with an essentially similar connotation. Cf. French maison (Descola, 1978), and Portuguese casa (Pina Cabral, 1983). Unfortunately, the concept of household has become specialised in the literature as meaning the domestic group, as in the French maisonée (Netting et al. 1984: xiv; xx).
A community of tapper houses does not exist. Houses become associated with one another in flexible extensions that I call macro-houses\(^1\), which exploit a contiguous territory under a common leadership and articulate their production and consumption plans. Coalitions or macro-house networks may be formed, acting in solidarity in squabbles between neighbours, in commercial cooperatives and labour unions, during elections, in marriages, in religion and in business, and they may compete with one another. Since houses do not need to have a property stake in the forest (as in the case of the highly mobile upper Jurua tappers), the continuity of houses essentially resides in the unit of labour processes over time. People grow, a territory may undergo changes or be substituted for another when a house moves, objects are used up and replaced, and ideas are transmitted, invented and abandoned. A form persists, embodied in real houses that emerge, expand into macro-houses and die, through repeated acts of labour.\(^2\) In the tappers’ case, the house’s form includes a forest with a stock of niches and living things; a group of people with a social composition of women, children and men; things like flour, game meat and imported objects, necessary not only for the technical functioning of the house but also to guarantee a decent life for each category of persons (Gow 1979:1-22, 27-50, 80, 153-193; Murphy & Murphy 1974:179-203; Steward & Murphy 1977(1956). Cf. Wagley 1964:90-102.


\(^{22}\) The following concepts may be traced to Aristotle: the distinction between use and exchange values, the theory of status-regulated exchange (not market-regulated), the distinction between management aimed at providing and profit-oriented management aimed at profit (Aristotle 1977a:39, 1982:267-71, 1977a:33). These distinctions are known more widely because of their modern versions (with the due acknowledgements) by Marx, Polanyi and Weber, respectively. It should come as no surprise, then, that the theory of labour processes also belongs to Aristotle (see Giannotti 1983). His theory on the origins and preservation of a substance was formulated in the language of production actions exemplified in the construction of a house (Aristotle 1980:105), the making of a statue or in the actions of a doctor (1980:211-15). An anthropological focus on the labour process originates with Malinowski 1978 [1935]; cf. Richards 1960 [1939], Firth 1966 [1946], Salisbury 1962, Gudeman 1978, Wallman 1979 and Lee 1979.

\(^{23}\) Note that in Aristotle’s description of house management, the house head must manage “instruments” (slaves and inanimate tools, Aristotle 1977:17), in two senses: in organising the labour and consumption process, and in acquiring goods through exchange, necessary (and sufficient) for a “good life” (Aristotle 1977:39).
prices, interfaces with the recognition of a human order that treats these as meaningful components of acts directed towards an end.

In contrast to the Aristotelian cosmos, the sublunar world produced by human labour faces the action of time in the form of corruption. Just as buildings crumble while memory distorts the purity of old ways, the very form of forest houses may cease to exist. The rupture in form may result from the excessive use of material resources, from natural disaster, from death or ruin, or from inevitable increase in entropy (Georgescu-Roegen 1971). A social catastrophe and that which Lenin called the "disintegration of the peasantry" (Lenin 1979 [1899]) may come to pass with expulsion from the land. Where there were forest houses, plantations and ranches then would sprout up, or maybe they would give way to wasteland. But another metamorphosis is possible, where forest houses cross a technological border (gaining access to new production sets), becoming agricultural houses, or firms. What future do they have, though, as forest houses?

**Extractive Reserves and Land Markets**

In the Xapuri and Brasilia region, a peasantry without patrons occupied forest areas that had been sold to buyers from the South. Since these land titles were precarious and in conflict with squatter's rights guaranteed by law, the first task facing the new "owners" was to expel its inhabitants. The only sure method for this sort of primitive accumulation was to strike down the forest, thus destroying the houses’ material base, literally uprooting the forest peasantry itself. The occupants, with support from the recently formed rural unions, began to develop a strategy of empates. In principle, Brazilian legislation for the agrarian sphere recognises that a peasant gains squatter's rights over land by proving agricultural activity, while it establishes an upper limit of 100 hectares (for the Amazon) for titles thus acquired. Therefore, there is no way to recognise the legal rights of rubber tappers over the forest settlements (colocações), which include 400 hectares of forest per house, used for extraction and hunting. Around 1984, some rural unions in the Amazon involving rubber tappers began to push for lots ranging from 300 to 500 hectares. But there was another problem involved, different from the one represented by the dispute between land buyers and occupants. All it took was for one house to agree to sell its rights to a fazendeiro - betraying the neighbourhood coalition - in order to affect the economic viability of neighbouring houses, stimulating further defections. The reason was that the buyer immediately would obtain legal permission to strike down the area acquired, affecting both hunting and extraction in neighbouring areas. No pre-existing moral economy would be sufficient to overcome this free-rider problem (Popkin 1986:199), a version of the "prisoners' dilemma" (Sen 1987:80-88) that here emerges in the form of a "tragedy of privatisation". Thus in 1985, a meeting of tapper union leaders in Brasilia proposed the creation of Extractive Reserves, characterised in terms of the recognition of rubber tappers' rights over forest settlements, "without dividing the land in lots" (Allegretti 1990). In 1986, another meeting (now of the National Council of Rubber Tappers) discussed three institutionalisation strategies: individual property holdings in the forest settlements, allowing individual land sales, property in condominium, allowing land sales by way of the dictionary meaning, which is "to even a match, to obtain a draw" (a common mistake committed by non-Amazonian authors).

24. An empate consists of (a) avoiding the act of striking down the forest by peons, (b) protesting against a rubber tapper who sold his colocação to a rancher. Linguistic note: empatar means to prevent (someone) (from doing something), to block. Empate is the action of preventing another action. It is not to be confused with the term "empate" as used in Brazilian football, which means "to even a match, to obtain a draw". 25. The economist Peter May has coined the term "tragedy of non-commons" to illustrate a similar effect in Babassu palm areas. Unfortunately, I could not obtain his Ph.D. thesis on the subject.

26. Silberling (1991) forcefully defends the argument that social movements constitute an important factor in the success of commons management. Here I lend support to this view.
majority decision, and public property conceded to peasants, blocking land sales (cf. Bromley 1991:22). The final decision was reached after a morning-long session in the absence of advisers (who recommended the second alternative): the extractive reserves were to turn the forest into public property to be exploited exclusively by resident rubber tappers. In 1977, a group within the National Agrarian Reform Agency (INCRA) developed a proposal to create reserves in the form of extractive settlement projects, prescribing use concession contracts to be made with “families” and limiting the area of forest that could be struck down. In 1989, a task force of tappers and advisers (within IBAMA) introduced in law a formal definition, which allowed concessions of public domain or expropriated areas classified as a national heritage (such as forests, fisheries etc.) to associations of traditional dwellers (and not only to individuals), subject to a use plan. Local regimes (“traditional” or not) were to enforce rules of access to, exit from and transmission of forest, at the same time blocking the commoditisation of the forest and hence the effects of the market over this peculiarly indivisible good (Dasgupta and Heal 1979:3-8, 472-73). The concept resulted from the objective of blocking the privatisation tragedy. In its institutional dimension, the concept of extractive reserves thus provided the response of rubber tappers’ political organisation to the prisoner’s dilemma (in the form of the privatisation tragedy), rather than representing a mere case of the survival of a traditional system of access to commons.

27. The Instituto de Estudos Amazônicos played an advisory role in this project. The Institute’s head, Mary Allegretti, pioneered the anthropological study of rubber tappers and championed the concept of Extractive Reserves.

28. Between 1985 and 1989, the CNS had as leaders Jaime Araújo (Novo Aripuanã), Osmarino Rodrigues (Brasiléia), Raimundo de Barros (Xapuri) and Chico Mendes (Xapuri). After Chico Mendes’ murder, Julio Barbosa was elected president.

It should be noted that the institution of public property with individual concessions made through a local association also blocked another effect of the “prisoner’s dilemma” (cf. Dasgupta and Heal 1979:18). One resident (or even a minority network of houses) could become specialised in hunting for commercial purposes, making other houses face hunger. In this case too, the Extractive Reserve restricts individuals from disposing privately of a public good (which means the integrity of the forest), thus distinguishing the sum of individual interests recognised through the practice of concessions, from collective interests, which must be established by means of a social pact. Hence, the rubber tappers formulated a solution of general interest, neither for altruistic reasons nor because of environmentalists’ influence, but because in this case their interests as forest peasants coincided with more general collective interests.

Extractive Reserves and Technological Change

Technological change represents an important new component in the rubber tappers’ social movement. One kind of proposed technical change does not require changes in the form of forest houses: this is the local processing of products already known or yet to be experimented with, obtained through the use of well-known extractive procedures (rubber, brazil nuts, andiroba oil, copalba, and palm fruits). The effect lies in the increase of gross local value. Initial costs (personnel organisation and training, acquisition of plants and equipment, commercialisation) are high, and cooperatives or associations provide means to introduce these processes. A related strategy involves the domestication of plant species exploited in

29. This mechanism is being applied recently to traditional fishing areas (on the Atlantic coast) and in babassu palm areas in Maranhão.

30. Tariff protection and subsidies for rubber production continue to be demanded (similar to the protection of small farmers in the EEC). This defence is corporativist and not universalist, using the terms of the foregoing discussion.
the above processes (agro-forestry). Palms, brazil nut trees, rubber trees, *cupuassu* (a wild species similar to cocoa) and others are planted during part of the agricultural cycle of houses (on abandoned plots), constituting patches of domesticated forest with a high flow value. This strategy requires time spans of up to ten years to be tested. Agro-forestry patches included within (macro) house territories coexist with hunting and extraction zones, and with agro-pastoral patches (as in the current pattern), under conditions of low population density. A third strategy is to expand agro-forestry areas, substituting extractive forest areas, and increasing population density significantly, say from 1-2 inhabitants per square kilometre to 10-20 inhabitants (Anderson 1990, 1989). While in the transition to agro-forestry without significant growth in population density the houses’ form essentially is not altered in terms of natural resources and persons (though consumption increases as does the technical fund), forest houses in the second case become converted into agro-forest houses that exploit a domesticated oligarchical forest, with a significant weight on agriculture and stockraising, while hunting becomes a secondary economic niche. The number of inhabitants increases and the forest gives way to an agro-forest. The three strategies described above do not represent phases. Global and local political factors, as in the past, can alter the operation of supposedly inevitable laws of technical evolution and of demographic growth.

Markets, Forest Value Flows and Forest as a Fund

In order to explain the interaction of local and global politics, I argue now that the action of markets for forest products (just as in the case of a land market), acting spontaneously, may lead to the script of a privatisation tragedy. First let us consider a short-term strategy in which forest houses maintain their prior niche diversity (they hunt, cultivate and extract commercially), while at the same time integrating themselves into a variety of new markets for extractive products. These markets exert different effects over different products. Predation techniques possess an equilibrium level (when tapirs are preyed on too much, they disappear locally), just as extractive techniques do (if *copaiba* oil is overexploited, individual trees die). The system of extracting latex is sustainable, for instance, because it combines an institutional mechanism (individual houses appropriate resources grouped along trails, subject to the supervision of *mateiros*; the forest’s character as service fund is preserved) as well as a cultural one (there are consensus norms concerning the beneficial character of the institution). Hunting remains at sustainable levels (with a population affected by human presence) by combining institutional mechanisms (federal legislation prohibiting hunting and inhibiting commercialisation) and circulation regimes (circulation of game as gifts, taboos and *panema*). Now let us imagine unrestricted markets for *copaiba* oil and wild game. Supervision may certify the preservation of a forest fund (for example the state of trees tapped for latex or *copaiba*), but the supervision of game reserves is much more difficult, and the effects are different according to species. The Rubber Tappers’ Association of the Upper Juruá Extractive Reserve opposed the commercial exploitation of timber, prohibited commercial game hunting as well as non-commercial hunting with special hounds, and restricted the extraction of palm fruits (Almeida 1992b). All of these strategies apparently come into conflict with the idea that the best way to "preserve" the forest is to value the economic flow withdrawn from the forest, that is, commoditise a fund (Robinson and Redford 1993).

31. Below, I return to the distinction between forest use as a flow and as a stock.
32. Using the language introduced in Chapter 9, predatory techniques withdraw part of the stock (hunting, fishing and lumber removal); extractive techniques withdraw a flow without altering the stock (latex, *copaiba*, *açaí* fruits).
Rubber tappers are not moved by their love of animals and the environment, but they are defending a majority against the action of "free riders". For example, hunting with Paulista hounds (of high value) in order to commercialise game meat was begun on the edge of the reserve by a small group that neither cultivated garden plots nor produced rubber; the effect was to ruin the neighbourhood as a hunting area. The effect of a market for game meat is comparable to the introduction of a land market, and the solution here also involves a struggle to limit the market's action.

We may now turn to the transition to local intensification (that is, the introduction of domesticated forests within the settlements). Here the main problem is whether or not there is an inevitable transition from extensive use of forests (with patches of agroforest, forest and intensive agriculture) to a regime of intensive use of land and corresponding high demographic density. Lower prices for extractive products and higher prices for agricultural products will be a stimulus to replace extensive-use forests (generating a flow of copalba, rubber and oils, along with sustainable predation upon animals) with domesticated oligarchical forests or intensive agriculture. Will institutions or social movements fight against market signals in the direction of a metamorphosis from forest (extensive) use to homogeneous agricultural (intensive) use of territory?

Perhaps such a transition is recommendable. But is it inevitable everywhere? An argument in its favour is the pressure of rising numbers. It is important to note that the mechanism leading to demographic growth involves the competitive interest of individual houses in always increasing their piece of the forest flow value pie (either by seeking to enter in the area, or by increasing the number of houses in a

33. A blacksmith whose shop is in the forest was be affected in the same way as a tapper's house (precisely because if he moved to town, he would have to give up the niche diversity that subsidises him).

macro-house to increase participation in agro-forestry projects, for example). Indeed, over the long run, this scenario may lead to a prisoner's dilemma syndrome. There is no guarantee that the forest will ensure a stable pattern of livelihood for peasant units following a significant demographic transition. Demographic growth accompanied by the homogenisation of the forest and by vertical industrial integration in fact could result in the future impoverishment and expropriation of individual forest houses, aggravated by environmental degradation. The market mechanism can lead into a long-term "tragedy of commons", putting a premium on intensive agro-forestry (and later on intensive agro-ranching), and in the short run putting a premium on depletion-oriented extraction and predation.

Two arguments may be presented in defence of the transition from forests to domesticated landscapes: first, it includes more land to be distributed among the poor (Anderson, 1989; Browder 1992), and second, it is the only scenario that is economically competitive without depending upon state subsidies. As for the first point, I argue that there is no absolute scarcity of land in the Brazilian Amazon, and no famine problem either that can be attributed to overpopulation or to land scarcity. The land problem in Brazil is a case of "entitlement failure" (Schwartzman 1989; cf. Lipton 1990; McNicoll 1990); it is a case of the defeat of the agrarian reform movement (Berno de Almeida 1991). The poor are blocked from access to land or to food, which nonetheless exist in abundance. Rather than preventing land

34. The Malthusian cycle: population growth, pressure upon resources, increased surplus and further population growth. The attractor for this cycle is a maximum population under subsistence levels ("misery checks"). The Boserupian cycle: population growth, pressure upon resources, technological intensification, increased surplus, demographic growth, having as attractor subsistence levels and maximum sustainable populations at a higher level than before. A Chayanovian cycle: family growth, increase in resource use, labour intensification, increased surplus per labourer, balance in family income at subsistence levels (McNicoll 1990). In all three cases, the attractor is a minimum of subsistence, a maximum of labour intensity, a maximum of environmental degradation. Such deterministic scenarios hinge, therefore, upon the inevitability of Hardin-type or demographic "tragedy of commons".
redistribution, Extractive Reserves have managed to grant land rights on an unprecedented scale (10% of the total area of Acre); with low demographic density they will also keep stocks of public resources for present use (as flows) as well as for future social uses as a fund.35 Tappers are successful forest peasants, and not a group opposed to the Amazonian peasantry. Another demographic argument holds that the population will rise endogenously in the future, even though today it is distributed with a low density. This scenario may be avoided. Under current conditions, it is avoided because children in excess leave the settlements, either spontaneously or moved by paternal authority. Systems of access and transmission control the proportion of persons to resources; thus the essential variable is not the absolute population, but the parcel of which enjoys land rights (received through use concessions) according to rules in force. In the absence of such systems, which along with the formal mechanism of use concession guarantee the stability of resource exploitation, each house becomes economically unfeasible, whatever the technical procedure in use, and whatever the initial density. Indeed, each house has a stake in maintaining resources indivisible, thus blocking this variant of the "prisoner's dilemma".

In assuming (erroneously) that extractive reserves are "specialised" in extraction (within the first of three scenarios outlined above), critics argue extractive economies inherently are doomed to be replaced by domesticated economies and later by industrial economies (Homma, 1989; Torres and Martine 1991). Thus, if a vegetable oil is first extracted and there is a growing market for it, prices will rise and signal to investment in the cultivation of the wild plant (usually in a region where it is not native); the next step is to produce it synthetically. This argument may or not work in particular cases (the fishing industry is a case in point); also, the point has been made that while in the short-term agricultural products may be of high value, in the long-term extraction may yield a sustainable income at constant costs while agricultural or ranching uses involve rising costs to keep fertility (Hecht and Schwartzman 1988). I will not pursue this line of reasoning which assume constant relative prices, because, due to technical change in the overall economy, relative prices change. In the future, the price of any product which is extracted today may decline relative to the price of products that the extractive economy imports (just as happened to rubber). In fact, this argument applies not only to extractive, but also to any agroforestry or agricultural product. Thus, the intensification of population growth in such areas, even with a transition from extensive forest use to intensive agriculture, only increases the chances that such peripheries will assume the role of "poverty reserves", with degraded areas and surplus population.

One primary error in diagnoses of the efficiency of forest economies lies in that these diagnoses consider public intervention in the price system as subsidies granted to a social group. But there is another way of looking at this situation. A forest economy generates present flows in the form of materials extracted from or preyed upon in the forest, which then cross economic borders in the form of commodities and become value flows through a price system. (Of course, there are also flows which do not cross the borders of the forest economy, such as game used as food, palms used as raw material for housing, land used for agriculture, commercial or not). Whether transformed into commodities and crossing the border of the local economy, or maintained within the system, the flows originate from a forest stock, the value of which then may be calculated in terms of the capitalisation of the flows' value. The stock may be converted into flows at greater or lesser rates, and it is possible to calculate the "optimum rate of depletion" of the forest stock in
terms of market prices; hence, at one extreme there is a flow level that preserves the forest indefinitely, while at the other there is a level at which the forest will be used up in a single year, after which land (and not forest) will be available for other uses (which is the case of the immediate conversion of all the timber and animals into commodities). Is this an appropriate way of assessing a forest's value? The forest may be seen as a fund which generates services (just as living persons do), and which as such is not assessed by market values. There is no futures market for the forest as a fund; nor is there for the services it affords in the present and which do not take the form of commodity-flows (or local use-value flows). Can the value of a forest such as that of the Upper Jurua be assessed correctly in market terms through a method of capitalising product flows and then estimating the optimum rate of stock depletion? This method can lead us to consider as efficient the use of 1,000 hectares of degraded pasture by a rancher (or by twenty impoverished families who cultivate beans), while considering as inefficient the use of the same area by a group of three houses generating a flow and, in addition, maintaining 955 hectares of forest with a high degree of biological diversity (Wilson 1988:193-226). This diversity involves "materials" (such as latex, or a slain animal), but also includes information, such as the chemical processes associated with biological systems (Brown 1989; 1982; 1991). The limitations of the market in adequately signalling what natural resources are to be used from a service fund (such as the air, water and, in this case, the natural forest) have been pointed out by mainstream modern economic theory (Dasgupta and Heal 1979; Pearce 1976), and include in particular the absence of future, unborn participants from current market transactions (cf. also Alier & Schlumpmann 1991). Extractive reserves, which represent an institutional innovation insofar as they block the prisoner's dilemma in its form as the tragedy of land privatisation, also may check the same dilemma as it appears in the form of a demographic rush, as in the rush to maximise present value flows in response to market signs. With reference to the economic value of the forests, a non-mercantile assessment of the social value of the forest as a service fund for society as a whole is necessary. That which appears to be a "subsidy" bestowed upon forest-dwellers areas by global society (via the State) in fact is by far overshadowed by the subsidy that the forest economy offers society as a whole, in reproducing a service fund without payment. What can be concluded is that development scenarios for the forest economy should include social pacts not only with respect to the land market issue, but also to the market of objects and information issued from forests.

A further note is in order. In earlier regimes, forest peasants sometimes lived in areas separate from the extractive zones (Amapá); in others, they resided within the extractive areas themselves (Acre). In some areas, they maintained varied portfolios of commercial extractive products (Amazonas), while in others they specialised in the commercial extraction of a single product (Upper Jurua) or two products (Upper Purus). Demographic densities also varied. These characteristics are reflected in the composition of the National Council of Rubber Tappers, which is by no means a grass-roots organisation. More appropriately it may be viewed as an umbrella organisation formed by leaders coming from different union traditions within the Amazon, all facing the problem of emerging from a defensive position in their struggle against classes of patrons or against expulsion by ranchers or agrobusiness. To imagine that the Council developed from a harmonious local community is to promote an illusion. It was precisely the national character of the Council and the universality of its program that allowed for the mobilisation of very different local movements, on the one hand, while on the other, catalising external support for these local struggles. In the Upper Juruá, forest peasants initially fought for the right to become free of rubber trail rents and for the right to sell their product free of debt (Macedo & Almeida 1988; O'Dwyer 1989; Brown & Cardoso 1989, 1991; Embrapa 1989; Ministério Público 1989). Hence, contrary to the theory
which predicted that Western Acre possessed only debt slaves incapable of
mobilisation since they were subjected to all-powerful patrons, the effect of the
Council was to catalyse existing struggles directed against rent payments and the
commercial monopoly. In Eastern Acre, the forest peasants' social movement
fought the invasion of lands by ranchers from the south; in Amapá, they mustered
forces against the Jari project empire, while in Rondonia they challenged the wave
of immigrants that pushed them into marginal areas. Analogously, in different
locations and under different political circumstances, different scenarios of technical
change and of social pacts emerge to control components of the labour process of
the houses: the forest, the information, the persons, the objects.

A Maxwell Demon

I have argued that forest-houses reproduce a form of articulation between
nature, persons and things by means of a technique and aiming towards an end. This
image could be extended to a forest territory as a whole, which is under the
management of a body politic, and seen as a system, which involves flows that cross
borders. Objects (consumer goods and equipment), information (new techniques
and ideas), persons (migrants), and commodities that arrive; things (forest and
agricultural products, manufactured goods) that leave, information (application of
chemical substances and other procedures) and persons -- all this crosses the
boundary. In a market economy such flows constitute the commerce of goods
regulated by a price system. Houses and their coalitions form decision units (atoms
so to speak) within the system. On the other hand, above the individual houses at
the system's border, there are associations, bills of rights and responsibilities,
supervision institutions, leaders and ideologies.

Forms are created and reproduced. They also die. Under human use, there is
no inertia of forms: a forest is not perpetuated by custom, information is not
crystallized permanently in culture, persons do not endure. There is a production
and reproduction process that reconstructs forms. Applied to the forest economy
seen as a whole, the forest (a component of the labour process), people (the
population of a territory) and things (modes of consumption) change together with
alterations in the use of information (technical change). These changes are affected
by flows regulated by the market, in which individual houses make choices. The sum
of individual choices regulated by price signals have a global effect that can be
harmful to each individual house under consideration. This sort of perverse effect
occurs particularly in the case of service funds, such as a forest. Hence, a form may
become degraded and worsen conditions for all.

A metaphor comes to mind, that of the "Maxwell demon". This
anthropomorphic being was conceived as a notional means to overcome entropy.
What is of interest is the way he acts. The stage set for this metaphor is a system (a
box) linked to the rest of the world by a door. At the beginning, there are green
things inside the box (the box has colour, so to speak). Outside the box, there are
mostly grey things (many different colours mixed together perhaps). Things flow in
both directions. It is enough that some randomness exists in the movement of things
to and fro. Each thing moves on its own, as individuals. Then, in the long term, there
is a final homogeneity between the interior of the box and the rest of the world, both
equally grey - maximum entropy.

The Maxwell demon places himself at a door - the boundary between a
system and the rest of the world. He receives information on a flow of things in
either direction. On the basis of the information gathered, the Maxwell demon
sometimes can close the door. Merely by favouring the entry of green things (there
are a few outside, some escaped previously) and favouring the exit of grey things
(those which entered the box), a distinctive green hue is maintained inside the box.
In this way a demon is able to arrest the increase in entropy locally.
This brings to mind the role of norms, institutions and other mechanisms - means to use information on flows of things and ideas to make a form endure and as a means to fight against corruption of differences. But the original metaphor also leads to another conclusion. The Maxwell demon cannot exist forever. His existence is of a local nature. Like a modern Nemi priest-king mounting guard at the doors of the temple of Diana, he is subject himself to death, threatened by the continued onslaught of objects and ideas that in the end affect his own ability to discern and to take decisions, and degrade his own form. The metaphor asserts that such a demon may only overcome the increase of entropy locally as long as he is fed from without with a subsidy of energy and information, so to speak. Thus, a dialectic of local permanence and global processes emerges, combined with the possibility that local history may develop its own course as the result of fluctuations that are amplified but which cannot be foreseen as the inevitable outcome of determinism.
### Table 1.1: Brazilian Rubber Exports 1827-1940: Amount and Value

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount in tons</th>
<th>Yearly Average</th>
<th>Amount (Index)</th>
<th>Value in Gold St. aver. (Index)</th>
<th>Price in $1,000</th>
<th>Price Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1827-30</td>
<td>329</td>
<td>82</td>
<td>4</td>
<td>17</td>
<td>0.05</td>
<td>42</td>
</tr>
<tr>
<td>1831-40</td>
<td>2,314</td>
<td>231</td>
<td>12</td>
<td>168</td>
<td>0.07</td>
<td>58</td>
</tr>
<tr>
<td>1841-50</td>
<td>4,693</td>
<td>460</td>
<td>24</td>
<td>214</td>
<td>0.05</td>
<td>42</td>
</tr>
<tr>
<td>1851-60</td>
<td>19,383</td>
<td>1,938</td>
<td>100</td>
<td>2,282</td>
<td>0.12</td>
<td>100</td>
</tr>
<tr>
<td>1861-70</td>
<td>37,166</td>
<td>3,717</td>
<td>192</td>
<td>4,649</td>
<td>0.13</td>
<td>108</td>
</tr>
<tr>
<td>1871-80</td>
<td>60,225</td>
<td>6,022</td>
<td>311</td>
<td>10,957</td>
<td>0.18</td>
<td>150</td>
</tr>
<tr>
<td>1880-90*</td>
<td>110,048</td>
<td>10,004</td>
<td>518</td>
<td>16,519</td>
<td>0.16</td>
<td>133</td>
</tr>
<tr>
<td>1891-00</td>
<td>213,755</td>
<td>21,376</td>
<td>180</td>
<td>43,666</td>
<td>0.20</td>
<td>167</td>
</tr>
<tr>
<td>1901-10</td>
<td>345,070</td>
<td>34,507</td>
<td>1,780</td>
<td>134,394</td>
<td>0.39</td>
<td>325</td>
</tr>
<tr>
<td>1911-20</td>
<td>328,754</td>
<td>32,875</td>
<td>1,696</td>
<td>83,036</td>
<td>0.25</td>
<td>208</td>
</tr>
<tr>
<td>1921-30</td>
<td>185,222</td>
<td>18,522</td>
<td>956</td>
<td>22,631</td>
<td>0.12</td>
<td>100</td>
</tr>
<tr>
<td>1932-39*</td>
<td>103,722</td>
<td>11,524</td>
<td>595</td>
<td>3,306</td>
<td>0.03</td>
<td>25</td>
</tr>
<tr>
<td>1941-47</td>
<td>15,753</td>
<td>15,753</td>
<td>800</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1948-50</td>
<td>4,393</td>
<td>4,393</td>
<td>227</td>
<td></td>
<td>U$</td>
<td>---</td>
</tr>
<tr>
<td>1951-60</td>
<td>3,542</td>
<td>3,542</td>
<td>182</td>
<td></td>
<td>0.53</td>
<td>---</td>
</tr>
<tr>
<td>1961-70</td>
<td>5,374</td>
<td>5,374</td>
<td>277</td>
<td></td>
<td>0.72</td>
<td>---</td>
</tr>
<tr>
<td>1971-80</td>
<td>2,647</td>
<td>2,647</td>
<td>136</td>
<td></td>
<td>0.80</td>
<td>---</td>
</tr>
<tr>
<td>1981-87</td>
<td>29</td>
<td>2</td>
<td>2</td>
<td></td>
<td>1.30</td>
<td>---</td>
</tr>
</tbody>
</table>

Peak year: 1912, 42,286 tons of rubber, value index (100=1850s) 0.38 317

*Data for 11 years. #Data for 9 years.

Value: in 1,000 sterling pounds. Weight in metric tons.

Source: Calculated from IBGE 1990:347.

### Table 2.1: A Decade of Crisis: Output and Prices 1911-1921

<table>
<thead>
<tr>
<th>Decade</th>
<th>Rubber Index</th>
<th>Value 1,000 St./ton</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1911-20</td>
<td>32,875</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1921-30</td>
<td>18,522</td>
<td>56</td>
<td>48</td>
</tr>
<tr>
<td>1932-39</td>
<td>11,524</td>
<td>35</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: Table 1.1. Values are averages over decades.
TABLE 2.2 ACRE POPULATION AND RUBBER OUTPUT 1909-1940

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td>1908</td>
<td>65,000</td>
<td></td>
</tr>
<tr>
<td>1910</td>
<td>69,487</td>
<td></td>
</tr>
<tr>
<td>1911</td>
<td>80,175</td>
<td>10.466</td>
</tr>
<tr>
<td>1912</td>
<td>86,638</td>
<td>11.544</td>
</tr>
<tr>
<td>1920</td>
<td>92,374</td>
<td>5.711</td>
</tr>
<tr>
<td>1940</td>
<td>79,768</td>
<td>5.179</td>
</tr>
</tbody>
</table>


TABLE 5.1 THE STRUCTURE OF THE TEJO RIVER ESTATES

<table>
<thead>
<tr>
<th>Major Estate</th>
<th>Middle Estate</th>
<th>Minor Estate</th>
<th>Localization</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEJO ESTATES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BOCA DO TEJO</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HORIZONTE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FORTALEZA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BAGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RESTAURACAO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| | (mouth) | (low course) | (middle) | (affluent) | (mouth) | (middle) | (headwaters) | (upper course) |
| |         |              |         |           |         |         |              |               |
| BAGUE       | SERINGUIRINHA| DIVISAO   | RESTAURACAO|           | MANTEIGA | (headwaters) | CAMALEAO     | MACHADINHO    |
|            |              |           |           | (headwaters) |         |         |              |               |
|            |              |           |           |              |         |         |              |               |

OTHER ESTATES

| | IRACEMA       | MARANHUAPAE  |              |              |              |              |              |              |
| | (low course)  | (middle)     |              |              |              |              |              |              |

Source: field research 1982/83

TABLE 5.2 TEJO RIVER, 1981/82

<table>
<thead>
<tr>
<th>Estate</th>
<th>km²</th>
<th>Houses</th>
<th>Settl.</th>
<th>Trails total</th>
<th>Rented</th>
<th>Pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tejo Estates</td>
<td>1,987</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boca do Tejo</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hor/Fort/Bag</td>
<td>738</td>
<td>205</td>
<td>105</td>
<td>657</td>
<td>451</td>
<td>1,195</td>
</tr>
<tr>
<td>Restauração</td>
<td>1,156</td>
<td>31</td>
<td>8</td>
<td>60</td>
<td>147</td>
<td></td>
</tr>
<tr>
<td>Maranguape</td>
<td>200</td>
<td>25</td>
<td>8</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tracema</td>
<td>175</td>
<td>31</td>
<td>11</td>
<td>60</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>2,362</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indigenous Area</td>
<td>282</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>Total</td>
<td>2,644</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,632</td>
</tr>
</tbody>
</table>


TABLE 5.2A RUBBER TRAILS: RESTAURAÇÃO ESTATE 1981

<table>
<thead>
<tr>
<th>Estates</th>
<th>Settlements</th>
<th>Houses</th>
<th>Trails Rented</th>
<th>Trails Idle</th>
<th>Trails Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restauração (Hdqrts)</td>
<td>4</td>
<td>14</td>
<td>25</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Dourado</td>
<td>17</td>
<td>41</td>
<td>91</td>
<td>39</td>
<td>130</td>
</tr>
<tr>
<td>Riozinho</td>
<td>27</td>
<td>60</td>
<td>130</td>
<td>59</td>
<td>189</td>
</tr>
<tr>
<td>Manteiga</td>
<td>21</td>
<td>21</td>
<td>62</td>
<td>50</td>
<td>112</td>
</tr>
<tr>
<td>Camaleao</td>
<td>8</td>
<td>16</td>
<td>37</td>
<td>13</td>
<td>50</td>
</tr>
<tr>
<td>Boa Hora</td>
<td>14</td>
<td>36</td>
<td>71</td>
<td>16</td>
<td>87</td>
</tr>
<tr>
<td>Machadinho</td>
<td>14</td>
<td>17</td>
<td>35</td>
<td>24</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>205</td>
<td>451</td>
<td>206</td>
<td>657</td>
</tr>
</tbody>
</table>

### TABLE 5.3 TEJO RIVER, 1991

<table>
<thead>
<tr>
<th>Estate</th>
<th>km²</th>
<th>Houses</th>
<th>Settl.</th>
<th>Trails total rented</th>
<th>Pop. total</th>
<th>1,414</th>
<th>982</th>
<th>3,432</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2,362</td>
<td>491</td>
<td>166</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tejo Estates</td>
<td>1,987</td>
<td>396</td>
<td>145</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boca do Tejo</td>
<td>93</td>
<td>23</td>
<td>7</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hor/Port/Bage</td>
<td>738</td>
<td>157</td>
<td>63</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restauração</td>
<td>1,156</td>
<td>216</td>
<td>75</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maranguape</td>
<td>200</td>
<td>54</td>
<td>12</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iracema</td>
<td>175</td>
<td>41</td>
<td>9</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,362</td>
<td>491</td>
<td>166</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indigenous Area</td>
<td>282</td>
<td>1,156</td>
<td>216</td>
<td>738</td>
<td>157</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Tejo River</strong></td>
<td>2,644</td>
<td>1,156</td>
<td>216</td>
<td>738</td>
<td>157</td>
<td>63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### TABLE 5.4 POPULATION AND TERRITORY

<table>
<thead>
<tr>
<th>Estate</th>
<th>Area in sq km</th>
<th>Population</th>
<th>Persons/sq km</th>
<th>1.18</th>
<th>1.45</th>
<th>1.12</th>
<th>1.03</th>
<th>1.7</th>
<th>1.39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thaumaturgo</td>
<td>5,983</td>
<td>1,292</td>
<td>1,956</td>
<td>2.362</td>
<td>491</td>
<td>166</td>
<td>1,414</td>
<td>982</td>
<td>3,432</td>
</tr>
<tr>
<td>Tejo River</td>
<td>2,362</td>
<td>1,195</td>
<td>75</td>
<td>205</td>
<td>216</td>
<td>105</td>
<td>5.64</td>
<td>5.35</td>
<td></td>
</tr>
<tr>
<td>Restauração</td>
<td>1,156</td>
<td>216</td>
<td>75</td>
<td>5.062</td>
<td>2,362</td>
<td>1,156</td>
<td>230</td>
<td>390</td>
<td>320</td>
</tr>
<tr>
<td>Riozinho</td>
<td>1,156</td>
<td>1,156</td>
<td>230</td>
<td>1.18</td>
<td>1.45</td>
<td>1.12</td>
<td>1.03</td>
<td>1.7</td>
<td>1.39</td>
</tr>
<tr>
<td><strong>Total Tejo River</strong></td>
<td>2,644</td>
<td>1,156</td>
<td>230</td>
<td>5.062</td>
<td>2,362</td>
<td>1,156</td>
<td>230</td>
<td>390</td>
<td>320</td>
</tr>
</tbody>
</table>

Source: (1) 1982 census; (2) 1991 census.

### TABLE 5.5 HOUSES, SETTLEMENTS AND TERRITORY: RESTAURAÇÃO

<table>
<thead>
<tr>
<th>Estate</th>
<th>Houses</th>
<th>Settlements</th>
<th>Population</th>
<th>Area per house</th>
<th>Area per settlement</th>
<th>Area per settlement</th>
<th>1981</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tejo Estates</td>
<td>205</td>
<td>105</td>
<td>1,195</td>
<td>5.64 km²</td>
<td>11.01 km²</td>
<td>1.95 km²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boca do Tejo</td>
<td>216</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hor/Port/Bage</td>
<td>216</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restauração</td>
<td>1,156</td>
<td></td>
<td>75</td>
<td>5.64 km²</td>
<td>11.01 km²</td>
<td>1.95 km²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maranguape</td>
<td>216</td>
<td></td>
<td>75</td>
<td>5.64 km²</td>
<td>11.01 km²</td>
<td>1.95 km²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iracema</td>
<td>41</td>
<td></td>
<td>9</td>
<td>5.64 km²</td>
<td>11.01 km²</td>
<td>1.95 km²</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,362</td>
<td>166</td>
<td>1,414</td>
<td>5.64 km²</td>
<td>11.01 km²</td>
<td>1.95 km²</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Tables 5.2 and 5.3 above. The 1991 census had the house as its unit and settlement names (recorded at the trade-post in 1982) may have been dropped in 1991 when trade-post did not exist anymore.

### TABLE 5.6 RENT PAYMENT, RIOZINHO AND MANTEIGA, 1981-1983

<table>
<thead>
<tr>
<th>Estate</th>
<th>Houses</th>
<th>Trails</th>
<th>Rent Received</th>
<th>Rent Due</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-81 Harvest</td>
<td>59</td>
<td>130</td>
<td>1,243</td>
<td>3,905</td>
<td>2,190</td>
</tr>
<tr>
<td>Valdemar Furtado</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>after Armando Geraldo's death</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riozinho</td>
<td>63</td>
<td>140.5</td>
<td>2,662</td>
<td>1,408</td>
<td>782</td>
</tr>
<tr>
<td>Manteiga</td>
<td>30</td>
<td>76.5</td>
<td>1,408</td>
<td>782</td>
<td>2,190</td>
</tr>
</tbody>
</table>

Source: Field research (Trade Post Data).

### TABLE 5.7 TEJO RIVER ESTATES: TITLES

<table>
<thead>
<tr>
<th>Estate</th>
<th>Area Claimed (km²)</th>
<th>Families</th>
<th>Titles Recognized</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRACEMA</td>
<td>218.0</td>
<td>34</td>
<td>0.0</td>
</tr>
<tr>
<td>MARANGUAPE</td>
<td>89.2</td>
<td>36</td>
<td>89.2</td>
</tr>
<tr>
<td>SUB-TOTAL</td>
<td>307.2</td>
<td></td>
<td>89.2</td>
</tr>
<tr>
<td>Tejo Estates</td>
<td>1,052.96</td>
<td>561.90</td>
<td></td>
</tr>
<tr>
<td>FOZ DO TEJO</td>
<td>67.0</td>
<td>50</td>
<td>43.0</td>
</tr>
<tr>
<td>HORIZONTE</td>
<td>74.0</td>
<td>15</td>
<td>74.0</td>
</tr>
<tr>
<td>PORTALEZA</td>
<td>252.1</td>
<td>37</td>
<td>84.0</td>
</tr>
<tr>
<td>BAGE</td>
<td>171.0</td>
<td>15</td>
<td>137.0</td>
</tr>
<tr>
<td>RESTAURAÇÃO(sede)</td>
<td>179.3</td>
<td>21</td>
<td>179.0</td>
</tr>
<tr>
<td>DOURADO(S.Franc.)</td>
<td>309.5</td>
<td>32</td>
<td>44.9</td>
</tr>
<tr>
<td>MACHADINHO(B.Vista)</td>
<td>179.0</td>
<td>21</td>
<td>179.0</td>
</tr>
<tr>
<td>BOA HORA(Aracati)</td>
<td>309.5</td>
<td>32</td>
<td>44.9</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,360.12</td>
<td>240</td>
<td>651.06</td>
</tr>
</tbody>
</table>


### TABLE 5.8 WEIGHING OF RUBBER, RIOZINHO, 1983

<table>
<thead>
<tr>
<th>Date</th>
<th>Houses</th>
<th>Output (kgs)</th>
<th>Average p/house</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 June</td>
<td>36</td>
<td>5,399</td>
<td>149.97</td>
</tr>
<tr>
<td>5 July</td>
<td>53</td>
<td>9,742</td>
<td>183.81</td>
</tr>
<tr>
<td>26 July</td>
<td>60</td>
<td>14,894</td>
<td>248.22</td>
</tr>
<tr>
<td>31 Augt</td>
<td>68</td>
<td>20,423</td>
<td>294.56</td>
</tr>
</tbody>
</table>

Source: Field research (Trade Post Data).
### Table 5.8a: Weighted Rubber (Dry Season) per House, Riozinho

<table>
<thead>
<tr>
<th>Output Range (kgs)</th>
<th>Number of Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 100</td>
<td>10</td>
</tr>
<tr>
<td>100 - 200</td>
<td>19</td>
</tr>
<tr>
<td>200 - 300</td>
<td>13</td>
</tr>
<tr>
<td>300 - 400</td>
<td>12</td>
</tr>
<tr>
<td>400 - 500</td>
<td>5</td>
</tr>
<tr>
<td>500 - 600</td>
<td>3</td>
</tr>
<tr>
<td>600 - 700</td>
<td>4</td>
</tr>
<tr>
<td>700 - 800</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Field Research (Trad Post Data)

### Table 5.9: House Budget: Unmarried Tappers' House

<table>
<thead>
<tr>
<th>Item</th>
<th>Monthly Consumption</th>
<th>Yearly Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount</td>
<td>Value in Rubber</td>
</tr>
<tr>
<td>cooking oil</td>
<td>1 liter</td>
<td>1.6 kg</td>
</tr>
<tr>
<td>sugar</td>
<td>0.8 kg</td>
<td>1.3 kg</td>
</tr>
<tr>
<td>rice</td>
<td>1.3 kg</td>
<td>1.0 kg</td>
</tr>
<tr>
<td>salt</td>
<td>1.3 kg</td>
<td>0.9</td>
</tr>
<tr>
<td>soap</td>
<td>0.5 kg</td>
<td>0.7</td>
</tr>
<tr>
<td>nescafe</td>
<td>0.25 unit</td>
<td>0.4</td>
</tr>
<tr>
<td>medicine</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>kerosene</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>shotgun</td>
<td>0.12 kg</td>
<td>1.3</td>
</tr>
<tr>
<td>gunpowder</td>
<td>0.12 kg</td>
<td>2.6</td>
</tr>
<tr>
<td>Sub-Total</td>
<td></td>
<td>10.6 kg</td>
</tr>
</tbody>
</table>

**Utensilios (Durable)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Duration (Wear)</th>
<th>Value in Rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td>axe (blade)</td>
<td>7.8 kg 10 years</td>
<td>0.8</td>
</tr>
<tr>
<td>machetes(*)</td>
<td>9.2 2 years</td>
<td>4.6 kg rubber</td>
</tr>
<tr>
<td>shotgun</td>
<td>131.0 4 years</td>
<td>33.0</td>
</tr>
<tr>
<td>palis</td>
<td>3.9 1-2 years</td>
<td>2.6</td>
</tr>
<tr>
<td>knives</td>
<td>6.6 1-2 years</td>
<td>4.4</td>
</tr>
<tr>
<td>sack</td>
<td>5.3 1-2 years</td>
<td>3.5</td>
</tr>
<tr>
<td>small sacks</td>
<td>6.6 1-2 years</td>
<td>4.4</td>
</tr>
<tr>
<td>tin cups</td>
<td>600 10 years</td>
<td></td>
</tr>
<tr>
<td>Sub-Total</td>
<td>52.7</td>
<td></td>
</tr>
</tbody>
</table>

**Farinha**

- Amount Monthly Value
  - 0.8 paneiros: 5.3 kg rubber: 63.6 kgs
  - (1 paneiro = 30 kgs)

**Total Basics**: 243.5 kgs

**Non-basics (luxury, miudezas, vices, cloth, valuables)**: 97 kgs

**Rent**: 60 kgs

**Total rubber**: 400 kgs

Source: Field research, 1982/83.

### Table 5.10: Main Itinerant Traders - Restauração Estate (1982)

<table>
<thead>
<tr>
<th>Trader</th>
<th>Value US$</th>
<th>Rubber kgs</th>
<th>Number Houses</th>
<th>Average Rubber/House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribeiro</td>
<td>2,681</td>
<td>1,190</td>
<td>23</td>
<td>92</td>
</tr>
<tr>
<td>Silveira</td>
<td>2,329</td>
<td>1,034</td>
<td>15</td>
<td>68</td>
</tr>
<tr>
<td>Praxedes</td>
<td>1,465</td>
<td>650</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>Silva</td>
<td>2,136</td>
<td>1,037</td>
<td>27</td>
<td>47</td>
</tr>
<tr>
<td>Castelo</td>
<td>361</td>
<td>160</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>TOTALS</td>
<td>13,949</td>
<td>6,190</td>
<td>10</td>
<td>620</td>
</tr>
</tbody>
</table>

* At Riozinho Estate ** At Restauração Estate less Riozinho

US$1.00 = 222 cruzeiros (end of 1982)

Rubber prices = 500 cruzeiros/kg = US$2.25/kg

Source: Field Research

### Table 5.11: An Example: Ferreira's Purchases at Riozinho

<table>
<thead>
<tr>
<th>Delivered to</th>
<th>Based in</th>
<th>Role</th>
<th>Rubber (kgs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faria</td>
<td>Town</td>
<td>Marreiro/tapper</td>
<td>35</td>
</tr>
<tr>
<td>Magalhaes</td>
<td>Town</td>
<td>Regateo</td>
<td>68</td>
</tr>
<tr>
<td>Timóteo</td>
<td>Town</td>
<td>Regateo</td>
<td>20</td>
</tr>
<tr>
<td>Pomplio</td>
<td>Manteiga</td>
<td>Marreiro</td>
<td>35</td>
</tr>
<tr>
<td>Gina</td>
<td>Manteiga</td>
<td>Trade-union/tapper</td>
<td>12</td>
</tr>
<tr>
<td>Faria</td>
<td>Riozinho</td>
<td>Marreiro/tapper</td>
<td>65</td>
</tr>
<tr>
<td>Sub-total to regateos/marreiteiros</td>
<td></td>
<td></td>
<td>297 (60%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correia</th>
<th>Restauração</th>
<th>Patron/accounts</th>
<th>169</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-total to patron</td>
<td>Patron/rent</td>
<td>202 (40%)</td>
<td></td>
</tr>
</tbody>
</table>

**Total rubber**: 499 kgs

Source: Field research, 1982/83. Cf. Table 6.3, Account II.
**TABLE 5.12 MAIN MARRETEIROS, RESTAURAÇÃO (1982-1992)**

<table>
<thead>
<tr>
<th>Estate</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riozinho</td>
<td>Timoteo</td>
<td>Rubber-Tapper; sometimes &quot;manager&quot;</td>
</tr>
<tr>
<td>Manteiga</td>
<td>E. Ribeiro</td>
<td>Marreteiro</td>
</tr>
<tr>
<td>Camaleão</td>
<td>?</td>
<td>Marreteiro</td>
</tr>
<tr>
<td>Boa Hora</td>
<td>Z. Ribeiro</td>
<td>Marreteiro</td>
</tr>
<tr>
<td>Machadinho</td>
<td>Ze de Luna</td>
<td>Marreteiro</td>
</tr>
</tbody>
</table>

Source: Field research

**TABLE 6.1 COMPOSITION OF ANNUAL ACCOUNTS**

<table>
<thead>
<tr>
<th>Item</th>
<th>Currency</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Balance (previous)</td>
<td>Goods</td>
<td>Rubber (kgs)</td>
</tr>
<tr>
<td>Positive Balance (previous)</td>
<td>Cr$</td>
<td>*1</td>
</tr>
<tr>
<td>Negative Balance (previous)</td>
<td>*1</td>
<td>0</td>
</tr>
<tr>
<td>Valuables (ordered)</td>
<td>*1</td>
<td>*2</td>
</tr>
<tr>
<td>Merchandise (advanced, a)</td>
<td>*1</td>
<td>*3</td>
</tr>
<tr>
<td>Merchandise (advanced, b)</td>
<td>*1</td>
<td>*2</td>
</tr>
<tr>
<td>Payments to tappers</td>
<td>*1</td>
<td>*2</td>
</tr>
<tr>
<td>Money (advanced)</td>
<td>*1</td>
<td>*2</td>
</tr>
<tr>
<td>Payments to Boat-traders</td>
<td>*1</td>
<td>*2</td>
</tr>
<tr>
<td>Credit for rubber delivered</td>
<td>*2</td>
<td>*1, *3</td>
</tr>
<tr>
<td>Credit for other products</td>
<td>*1</td>
<td>*2</td>
</tr>
<tr>
<td>Payments tapper/tappers</td>
<td>*1</td>
<td>*2</td>
</tr>
<tr>
<td>Positive Balance (current)</td>
<td>*(2)</td>
<td>*1</td>
</tr>
<tr>
<td>Negative Balance (current)</td>
<td>*1</td>
<td>*2</td>
</tr>
</tbody>
</table>

Obs.: The numbers show the order in which currencies are entered and converted into another. A *comissão* is charged for merchandise advanced when rubber is paid "at final price".

Source: Field research, 1982/83.

**TABLE 6.2A AN EXAMPLE OF ANNUAL BALANCE: CHAGAS (SUMMARY A)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Date</th>
<th>Value</th>
<th>Value %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bills 82 june-aug.</td>
<td>49,925</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Commission&quot; on goods</td>
<td>14,977</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bills 82 aug-dec.</td>
<td>111,305</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenal's bill to patron</td>
<td>3,815</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bills 83 purchases at trade-post</td>
<td>13,974</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment orders</td>
<td>3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It. peddlers/Chagas</td>
<td>12,666</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It. Peddlers to Juvenal</td>
<td>80,415</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest for the above</td>
<td>55,848</td>
<td></td>
<td></td>
</tr>
<tr>
<td>purchases not at trade post</td>
<td>151,929</td>
<td></td>
<td>44%</td>
</tr>
<tr>
<td>Total</td>
<td>345,925</td>
<td>345,925</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Field Research, 1982/83

**TABLE 6.2B AN EXAMPLE OF ANNUAL BALANCE: CHAGAS (SUMMARY B)**

<table>
<thead>
<tr>
<th>Rubbers delivered to trade-post (total)</th>
<th>1,061 kgs</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent for Trails</td>
<td>90 kgs</td>
<td>8%</td>
</tr>
<tr>
<td>&quot;Debt-free&quot; rubber, exchanged for cash</td>
<td>360 kgs</td>
<td>34%</td>
</tr>
<tr>
<td>Rubber to pay the house's account</td>
<td>480 kgs</td>
<td>38%</td>
</tr>
<tr>
<td>Rubber to pay the own client's account</td>
<td>272 kgs</td>
<td>26%</td>
</tr>
<tr>
<td>Error etc.</td>
<td>30 kgs</td>
<td>3%</td>
</tr>
<tr>
<td>Debt</td>
<td>-100 kgs</td>
<td>109%</td>
</tr>
</tbody>
</table>

Source: Field Research, 1982-3
**TABLE 6.3 THREE BALANCES: SERINGAL RIOZINHO (COLOCAÇÃO TACARATU)**

<table>
<thead>
<tr>
<th>Account I: Chagas Rubber output</th>
<th>rent traders &quot;surplus&quot;</th>
<th>debt net</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,061</td>
<td>408</td>
<td>90</td>
</tr>
<tr>
<td>100%</td>
<td>38%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>26%</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>9% over output</td>
</tr>
<tr>
<td>* Chagas’ client’s debt to itinerant traders, paid by the trade-post with 102 kgs charged as interest.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Account II: Ferreira, 1982/83 (summary) Rubber output</th>
<th>rent traders &quot;surplus&quot;</th>
<th>debt net</th>
</tr>
</thead>
<tbody>
<tr>
<td>499 kgs</td>
<td>177</td>
<td>33</td>
</tr>
<tr>
<td>100%</td>
<td>35%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>56%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>55% over output</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Account III: Assis, 1982/83 (summary) Rubber output</th>
<th>rent traders &quot;surplus&quot;</th>
<th>debt net</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>340</td>
<td>60</td>
</tr>
<tr>
<td>100%</td>
<td>49%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>43%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>43% over output</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field research, 1982-83

--

**TABLE 6.4 DEBTS IN RIOZINHO ESTATE PER HOUSE June 1982/January of 1983, Dry Season of 1983**

<table>
<thead>
<tr>
<th>Heads</th>
<th>Balance Aug-83</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rubber Debt V</td>
</tr>
<tr>
<td></td>
<td>Balance VI</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>R. Farias(Nabe)</td>
<td>151</td>
</tr>
<tr>
<td>Rui Santana</td>
<td>175</td>
</tr>
<tr>
<td>Altevir Vitorino</td>
<td>180</td>
</tr>
<tr>
<td>Osmarino Cunha</td>
<td>213</td>
</tr>
<tr>
<td>Jose Sabino</td>
<td>391</td>
</tr>
<tr>
<td>Alfredo Avelino 1.5</td>
<td>606</td>
</tr>
<tr>
<td>Joao Cunha Filho</td>
<td>662</td>
</tr>
<tr>
<td>Hilario Benevenu</td>
<td>748</td>
</tr>
<tr>
<td>Aldenizio Loureiro 2</td>
<td>60</td>
</tr>
<tr>
<td>Jose Candido</td>
<td>60</td>
</tr>
<tr>
<td>Manuel Vitorino</td>
<td>110</td>
</tr>
<tr>
<td>Simeao Apolonio</td>
<td>122</td>
</tr>
<tr>
<td>Cario e Sansao</td>
<td>145</td>
</tr>
<tr>
<td>Francisco Roberto 6</td>
<td>160</td>
</tr>
<tr>
<td>Ferreira Freitas 1</td>
<td>203</td>
</tr>
<tr>
<td>Valdeir Vitorino</td>
<td>165</td>
</tr>
<tr>
<td>Esterlito Cunha</td>
<td>160</td>
</tr>
<tr>
<td>Claudio Elias</td>
<td>230</td>
</tr>
<tr>
<td>Alberci Alves 1.2</td>
<td>270</td>
</tr>
<tr>
<td>Franc. Teodoro 1.5</td>
<td>326</td>
</tr>
<tr>
<td>Evilasio Santana 2</td>
<td>326</td>
</tr>
<tr>
<td>Assis Farias</td>
<td>326</td>
</tr>
<tr>
<td>Raizundo Insura 2</td>
<td>350</td>
</tr>
<tr>
<td>Joao Nascimento</td>
<td>395</td>
</tr>
<tr>
<td>Aurino Batista</td>
<td>454</td>
</tr>
<tr>
<td>Chagas Farias</td>
<td>519</td>
</tr>
<tr>
<td>Adelino Leao</td>
<td>543</td>
</tr>
<tr>
<td>Manuel Apolonio 2.1</td>
<td>618</td>
</tr>
<tr>
<td>Joao Cunha pai</td>
<td>28</td>
</tr>
<tr>
<td>Narciso Lima</td>
<td>31</td>
</tr>
<tr>
<td>Joao Telheira</td>
<td>31</td>
</tr>
</tbody>
</table>

**Source:** Trade post; interviews marked with ('). 1982/83
### TABLE 6.4b SUMMARY OF DEBTS 1982-83, RIOZINHO ESTATE.

<table>
<thead>
<tr>
<th>Cases</th>
<th>Average Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>a net debt:</td>
<td>20 65%</td>
</tr>
<tr>
<td></td>
<td>-273.65 kgs</td>
</tr>
<tr>
<td>a net credit:</td>
<td>11 35%</td>
</tr>
<tr>
<td></td>
<td>+73.00 kgs</td>
</tr>
<tr>
<td>total sample</td>
<td>31 100%</td>
</tr>
<tr>
<td></td>
<td>-150.65 kgs</td>
</tr>
</tbody>
</table>

Source: Table 6.4

### TABLE 6.5 ACCOUNTS, SERINGAL RIOZINHO, 1983-4

<table>
<thead>
<tr>
<th>Balance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>-437</td>
</tr>
<tr>
<td>Average</td>
<td>-68</td>
</tr>
<tr>
<td>Max</td>
<td>1,180</td>
</tr>
</tbody>
</table>

Value in Cr$l,000.00, Rubber in kgs; January 1984.

Source: trade post books for 1983/84

### TABLE 7.1 POPULATION, RIOZINHO ESTATE

<table>
<thead>
<tr>
<th>Category</th>
<th>Men</th>
<th>Women</th>
<th>Boys</th>
<th>Girls</th>
<th>Hired</th>
<th>Total</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census</td>
<td>85</td>
<td>74</td>
<td>70</td>
<td>69</td>
<td>6</td>
<td>304</td>
<td>53</td>
</tr>
<tr>
<td>Averages/house</td>
<td>1.6</td>
<td>1.4</td>
<td>1.32</td>
<td>1.32</td>
<td>0.11</td>
<td>5.74</td>
<td></td>
</tr>
<tr>
<td>Averages/settl</td>
<td>4.47</td>
<td>3.89</td>
<td>3.68</td>
<td>3.63</td>
<td>0.32</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Estimates</td>
<td>109</td>
<td>95</td>
<td>90</td>
<td>88</td>
<td>8</td>
<td>390</td>
<td>68</td>
</tr>
</tbody>
</table>

Source: field research, 1982. Census of 53 houses in 19 settlements (from a total of 68 houses in 26 settlements, one of them empty) in 1982.

### TABLE 7.2 SETTLEMENTS, HOUSES, TERRITORY, RIOZINHO ESTATE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Census</td>
<td>304</td>
<td>230</td>
<td>16</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>390</td>
<td>230</td>
<td>15</td>
<td>3.38</td>
<td></td>
</tr>
</tbody>
</table>

Source: field research 1982. Areas in square kilometres

### TABLE 7.3 DISTRIBUTION OF RIOZINHO HOUSES AMONG SETTLEMENTS

<table>
<thead>
<tr>
<th>Number of Settlements</th>
<th>Number of Houses</th>
<th>Number of Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>31%</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>19%</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>19%</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>19%</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>Totals</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Field research, 1982.

### TABLE 7.4 INTERNAL COMPOSITION OF HOUSES

- E = Ego
- W = Wife
- S = Son(s)
- D = Daughter(s)
- O = Other kin
- h = hired

<table>
<thead>
<tr>
<th>House patterns</th>
<th>cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear Family:</td>
<td>30</td>
<td>50%</td>
</tr>
<tr>
<td>(E, W, S, O) or (E, W, D, O)</td>
<td>15</td>
<td>25%</td>
</tr>
<tr>
<td>Extended Nuclear Family:</td>
<td>8</td>
<td>13%</td>
</tr>
<tr>
<td>(E, W, Ego'Son), (E, W, Wife's daughter)</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>Others (E)</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>Working-teams (E, B) or E, e</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Field research; 1982 census (total 68 houses).
### TABLE 7.5

INTERNAL COMPOSITION OF SETTLEMENTS: MACRO-HOUSES

<table>
<thead>
<tr>
<th>Patterns</th>
<th>houses settlel.</th>
<th>h/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>One macro-house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>((x+S+S+DH+Z), (X+S+S+DH=BS), (X+S+S), (X+WS+WS))</td>
<td>25</td>
<td>8.31</td>
</tr>
<tr>
<td>((X+B+2ZH), (X+B), (X+B))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One macro-house and isolated houses</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>((X+S+S+V) / (X+WDH+WDH / Y))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>((X+DH / Y / Z))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>((X+ZH / Y / Z))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>((X+ZH=WB / Y))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>((X+WB / Y))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two macro-houses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>((X+DH / Y+DH))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settlements with isolated houses only</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>((X / Y))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>68</td>
<td>26</td>
</tr>
</tbody>
</table>

Each parenthesis represents a type of settlement. \(x\) = female head. \(X\) = male head. \((X+WDH+WDH / Y)\) designates a settlement occupied by the houses of Ego \(X\) and by the houses of two of his wife’s son-in-laws, and by a separate house of \(Y\). Source: Field research.

### TABLE 7.6

NEIGHBOURHOOD OF SETTLEMENTS, NETWORKS OF MACRO-HOUSES

<table>
<thead>
<tr>
<th>Settlement</th>
<th>family</th>
<th>link</th>
<th>Settlement</th>
<th>Linked family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tacaratu</td>
<td>Farias</td>
<td>HB</td>
<td>Maloca</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bananal</td>
<td>Castelo</td>
<td>DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S, DH</td>
<td>Bom Jardim</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S, S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DH</td>
<td>V. Q. Quer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bom Jardim</td>
<td>Cunha</td>
<td>DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S, DH</td>
<td>S, Q. Quer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S, S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barraquinha</td>
<td>Santana</td>
<td>S, DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S, S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cachoeirinha</td>
<td>Nascimento</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patoa</td>
<td>Carmina</td>
<td>GH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inferno</td>
<td>Feitosa</td>
<td>GH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GH</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 7.7

MARRIAGES

<table>
<thead>
<tr>
<th>Houses</th>
<th>Number of marriages in Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castelo</td>
<td>I 1</td>
</tr>
<tr>
<td>Cassiano</td>
<td>II 2 (1)</td>
</tr>
<tr>
<td>Santana</td>
<td>III 3 (1)</td>
</tr>
<tr>
<td>Santana Nascimento</td>
<td>3</td>
</tr>
<tr>
<td>Ginu Nascimento</td>
<td>2</td>
</tr>
<tr>
<td>Farias Nascimento</td>
<td>2</td>
</tr>
<tr>
<td>Farias Fontenele</td>
<td>3</td>
</tr>
<tr>
<td>Farias Val</td>
<td>3</td>
</tr>
<tr>
<td>Farias Leao</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Field research, 1982/83
## TABLE 7.7a SUMMARY OF MARRIAGES: COUSINS, NIECES

<table>
<thead>
<tr>
<th>Name</th>
<th>Marriage Partner</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santana</td>
<td>Santana</td>
<td>(FBD)</td>
</tr>
<tr>
<td>Isaura</td>
<td>Zulmira</td>
<td>(MZSD)</td>
</tr>
<tr>
<td>Peba</td>
<td>Maria</td>
<td>(MZSD)</td>
</tr>
<tr>
<td>Valdeci</td>
<td>Maria</td>
<td>(MZSD)</td>
</tr>
<tr>
<td>Castelo</td>
<td>Cunha</td>
<td>(BD)</td>
</tr>
</tbody>
</table>

Source: Field research

## TABLE 7.8 SETTLEMENTS AND HOUSES IN THE RIOZINHO 1981-1982

<table>
<thead>
<tr>
<th>Name of Settlement</th>
<th>Data per settlement</th>
<th>Hous. M F m f h Tot.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposito</td>
<td></td>
<td>4 7 7 4 1 1 20</td>
</tr>
<tr>
<td>Tacaratu</td>
<td></td>
<td>4 7 4 2 6 0 19</td>
</tr>
<tr>
<td>C. Jarana</td>
<td></td>
<td>1 3 2 2 3 0 10</td>
</tr>
<tr>
<td>Cacheirinha</td>
<td></td>
<td>3 3 5 1 2 0 11</td>
</tr>
<tr>
<td>Bom Jardim</td>
<td></td>
<td>3 4 5 1 4 0 14</td>
</tr>
<tr>
<td>Inferno</td>
<td></td>
<td>3 5 6 11 5 0 27</td>
</tr>
<tr>
<td>V.Q. Quer</td>
<td></td>
<td>2 3 3 6 4 0 16</td>
</tr>
<tr>
<td>Degredo</td>
<td></td>
<td>4 9 5 1 2 0 17</td>
</tr>
<tr>
<td>Os Piqui</td>
<td></td>
<td>4 5 5 4 3 0 17</td>
</tr>
<tr>
<td>Cocal</td>
<td></td>
<td>1 1 2 2 2 0 7</td>
</tr>
<tr>
<td>Divisao</td>
<td></td>
<td>3 5 3 6 3 3 20</td>
</tr>
<tr>
<td>Guariba</td>
<td></td>
<td>1 2 1 2 4 0 9</td>
</tr>
<tr>
<td>Cafe Xique</td>
<td></td>
<td>2 3 3 2 4 0 12</td>
</tr>
<tr>
<td>Padario</td>
<td></td>
<td>4 6 3 3 4 0 16</td>
</tr>
<tr>
<td>Os Pires</td>
<td></td>
<td>2 4 2 6 0 0 12</td>
</tr>
<tr>
<td>Morada Nova</td>
<td></td>
<td>2 2 2 4 4 0 12</td>
</tr>
<tr>
<td>Duas Bocas</td>
<td></td>
<td>2 1 2 2 2 2 9</td>
</tr>
<tr>
<td>Floresta</td>
<td></td>
<td>4 10 10 6 6 0 32</td>
</tr>
<tr>
<td>Barraquinha</td>
<td></td>
<td>4 4 5 5 10 0 24</td>
</tr>
</tbody>
</table>

Source: Field research, 1982/84

## TABLE 7.9 MOVEMENT OF HOUSES IN RIOZINHO 1982-83

| Settlements with no houses moving | 7 | 33% |
| Settlements with at least one move | 14 | 67% |
| with houses moving in only | 2 |   |
| with houses moving out only | 6 | 16 |
| Total of settlements checked | 21 | 100% |

Data from 45 houses and 21 settlements from a population of 68 houses and 26 settlements. Source: field research, 1982/83

## TABLE 8.1 THE MEMBERS OF THE HOUSE: SETTLEMENT FLORESTA

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 60</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>17 to 48</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15 to 18</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>10 to 14</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Children</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 to 5</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>under 1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
</tbody>
</table>


## TABLE 8.1B THE MEMBERS OF A HOUSE, SET.FLORESTA (HOUSE OF SON-IN-LAW)

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Children (under 10)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 8.2 BUILDING THE HOUSE

<table>
<thead>
<tr>
<th>Activity</th>
<th>Days</th>
<th>Team</th>
<th>Man Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fell trees</td>
<td>2</td>
<td>head, mature son A</td>
<td>4</td>
</tr>
<tr>
<td>Gather the palm</td>
<td>1</td>
<td>head, A, sons</td>
<td>2</td>
</tr>
<tr>
<td>Raise the structure</td>
<td>2</td>
<td>head, son B</td>
<td>4</td>
</tr>
<tr>
<td>Cover with palm</td>
<td>1</td>
<td>head, A,B,C</td>
<td>4</td>
</tr>
<tr>
<td>Place the walls</td>
<td>1</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>a team of four</td>
<td>18</td>
</tr>
</tbody>
</table>

Walls, floor and ceiling materials are made from the paxiuba palm-tree; piles and the house framework are made from different hard woods; strong tree-barks (enviras such as "iron envira") or vines (cipós) replace nails to fix together the structure. Poles and framework last 10 years; roof, floor and walls last half this time.

Table 8.3 WORK ON MANIOC GARDEN I, CURRENT YEAR (ROÇADO NOVO).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Month</th>
<th>Working team</th>
<th>Days</th>
<th>Man Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden of current year (roçado I)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boccar</td>
<td>August</td>
<td>Head, 3 sons+son-in-law</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Derrubar</td>
<td>August</td>
<td>Head, 1 mature son</td>
<td>1.5</td>
<td>6</td>
</tr>
<tr>
<td>Queimar</td>
<td>September</td>
<td>Whole macro-house</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Coivarar</td>
<td>September</td>
<td>Head, 3 daughters</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Plantar</td>
<td>September</td>
<td>Head, wife</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>Aug.-Sep.</td>
<td>9 persons</td>
<td>14.0</td>
<td>41</td>
</tr>
</tbody>
</table>

Source: field research. Figures for days were given by the house head, who usually omit women’s and small children’s work, particularly in the garden crops (weeding), but also in helping in the rubber making (gathering and repairing the smoker-house) and in hunting (casual fishing, traps, kills of deer pursued to the river).

Table 8.3 GARDEN PLOT WITH 1,000 COVAS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Man-Days</th>
<th>Area</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden Plot</td>
<td>42</td>
<td>0.3 ha</td>
<td>3000 covas</td>
</tr>
<tr>
<td>Preparation</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-total</td>
<td>69</td>
<td>0.3</td>
<td>1800 kgs. flour</td>
</tr>
<tr>
<td>Flour making</td>
<td>48</td>
<td></td>
<td>60 paneiros</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>0.3</td>
<td></td>
</tr>
</tbody>
</table>

Source: field research.

Table 8.3A MAIN CROPS IN MANIOC GARDEN I

<table>
<thead>
<tr>
<th>Crops</th>
<th>Soil</th>
<th>Area</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manioc</td>
<td>1,000</td>
<td>pits (stems)</td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>1.5</td>
<td>litres (seeds)</td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>6</td>
<td>litres (seeds)</td>
<td></td>
</tr>
<tr>
<td>Banana</td>
<td>25</td>
<td>bushes</td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td>100</td>
<td>plants (lost to pigs)</td>
<td></td>
</tr>
</tbody>
</table>


Table 8.3B WORK AND MAIN CROPS, MANIOC GARDEN II, CURRENT YEAR

<table>
<thead>
<tr>
<th>Crops</th>
<th>Soil</th>
<th>Area</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manioc</td>
<td>2,000</td>
<td>pits (stems)</td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>2.5</td>
<td>litres (seeds)</td>
<td></td>
</tr>
<tr>
<td>Banana</td>
<td>10</td>
<td>bushes</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 8.3C WORK ON MANIOC GARDEN III, BEING HARVESTED (ARRANCADOR).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Month</th>
<th>Working team</th>
<th>Days</th>
<th>Man days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limpa</td>
<td>?</td>
<td>Head, 3 sons, son-in-law</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Limpa</td>
<td>?</td>
<td>Head, wife, 1 son</td>
<td>5</td>
<td>6.5</td>
</tr>
<tr>
<td>Total</td>
<td>?</td>
<td>5 persons</td>
<td>7</td>
<td>16.5</td>
</tr>
</tbody>
</table>

Source: field research. Riozinho, settlement Floresta, 1982

### TABLE 8.3D MAIN CROPS IN MANIOC GARDEN III (BEING HARVESTED)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Soil</th>
<th>Current</th>
<th>Unit</th>
<th>Left from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandioca</td>
<td>mata bruta</td>
<td>500 pits</td>
<td>(stems)</td>
<td>3,100 pits</td>
</tr>
<tr>
<td>Milho</td>
<td></td>
<td>0 litres</td>
<td>(seeds)</td>
<td>4 litres</td>
</tr>
<tr>
<td>Banana</td>
<td></td>
<td>Many</td>
<td>(bushes)</td>
<td>60 bushes</td>
</tr>
</tbody>
</table>


### TABLE 8.4 CONSUMPTION OF MANIOC FLOUR (FARINHA) PER MONTH

<table>
<thead>
<tr>
<th>Consuming unit</th>
<th>Persons</th>
<th>Amount</th>
<th>kgs/month</th>
<th>p/person</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adults</td>
<td>Children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>House</td>
<td>9</td>
<td>4</td>
<td>225.0 kgs/month 13.24* 16**</td>
<td></td>
</tr>
<tr>
<td>House</td>
<td>2</td>
<td>2</td>
<td>225.0 kgs/month 13.24* 16**</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>6</td>
<td>225.0 kgs/month 13.24* 16**</td>
<td></td>
</tr>
</tbody>
</table>

* Observed consumption in 10 days. Heads or the two houses quoted 7 paneiros (210 kgs) and 10 paneiros (300 kgs) respectively. Some say that one adult eats 12 paneiros/year. *17 persons. **14 persons (children counted as 1/2 adult).


### TABLE 8.5 HUNTING IN ONE WEEK (A MACRO-HOUSE, TWO HOUSES)

<table>
<thead>
<tr>
<th>Day</th>
<th>team days</th>
<th>catch</th>
<th>mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday</td>
<td>A,H,B,C,D</td>
<td>2 armadillos</td>
<td>7</td>
</tr>
<tr>
<td>Saturday</td>
<td>H</td>
<td>nothing</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td>A,H,B,C,D</td>
<td>2 peccaries (T.tajacu)</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>3 days</td>
<td>4 individuals</td>
<td>42 kgs 2.47* 3.0**</td>
</tr>
</tbody>
</table>

Source: field research. Riozinho, settlement Floresta.

*House compositions as in Table 8.1 and 8.1b. Note: use of timber as fuel was around 3 cubic metres (monthly); cacao nuts were collected regularly three times a week.

### TABLE 8.6 PATTERNS OF WORK IN RUBBER

<table>
<thead>
<tr>
<th>Trail Names</th>
<th>Rubber trees</th>
<th>Latex*</th>
<th>Knives per trail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>H</td>
<td>C</td>
</tr>
<tr>
<td>Pão</td>
<td>225</td>
<td>18</td>
<td>1/2</td>
</tr>
<tr>
<td>Braba</td>
<td>130</td>
<td>12</td>
<td>1/2</td>
</tr>
<tr>
<td>Estradinha</td>
<td>114</td>
<td>8</td>
<td>1/2</td>
</tr>
<tr>
<td>De Baixo</td>
<td>111</td>
<td>12</td>
<td>1/2</td>
</tr>
</tbody>
</table>

Average: 580 (4.83) 50 3/2 3/4 3/4 1
Average**: 145 12.5 0.5 0.75 0.14 0.6

*latex yield per day, measured in latas (one lata=2 liters=1 kg smoked rubber, not dry).

** trails converted in standard sizes of 120 trees.

H=head, A,B,C male sons, ages given in parentheses.


### TABLE 8.6B PATTERNS OF WORK IN RUBBER: WEEKLY PLAN

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pão</td>
<td>H+C(1/2)</td>
<td>A+B</td>
<td>A+H+C</td>
<td>B(1/2)</td>
</tr>
<tr>
<td>Braba</td>
<td>H+C</td>
<td>A+B</td>
<td>H+C</td>
<td>A+B</td>
</tr>
</tbody>
</table>

### TABLE 8.6C PATTERNS OF WORK IN RUBBER: AN ACTUAL WEEK

<table>
<thead>
<tr>
<th>Day</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Sat</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pão</td>
<td>A+C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braba</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estradinha</td>
<td>A+C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>De Baixo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing/leisure</td>
<td>A+H</td>
<td>A+H</td>
<td>A+B</td>
<td>A+B+C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### TABLE 8.6D WORK DAYS (DRY SEASON HARVEST ONLY; 25 MAY/AUGUST)

<table>
<thead>
<tr>
<th>Trail</th>
<th>Work team</th>
<th>Days</th>
<th>Man-days</th>
<th>Work team</th>
<th>Days</th>
<th>Man-days</th>
<th>Days#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pão</td>
<td>A,C,D</td>
<td>4</td>
<td>12</td>
<td>H+C</td>
<td>2</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Braba</td>
<td>A,C,D</td>
<td>2</td>
<td>6</td>
<td>H+C</td>
<td>1</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Estradinha</td>
<td>A,C,D</td>
<td>4</td>
<td>12</td>
<td>H+C</td>
<td>1</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>De Baixo</td>
<td>A,C,D</td>
<td>5</td>
<td>15</td>
<td>H+C</td>
<td>1</td>
<td>2</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>15</td>
<td>45</td>
<td></td>
<td>5</td>
<td>10</td>
<td>164</td>
</tr>
</tbody>
</table>

Source: field research. Riozinho, settlement Floresta, 1982. Note that "man-days" are here the product of tappers by tapping days. More correctly, each tapping day should count as 1.2 of a standard man-day (cf. Table 8.6).

### TABLE 8.6E RUBBER PRODUCTION (DRY SEASON HARVEST ONLY; 4 MONTHS)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>To itinerant traders and marreteiros</td>
<td>254 kgs</td>
<td></td>
</tr>
<tr>
<td>Liquidated (paid to the trade-post)</td>
<td>1,130 kgs</td>
<td></td>
</tr>
<tr>
<td>Stored in the smoking-house</td>
<td>50 kgs</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,434 kgs</td>
<td></td>
</tr>
</tbody>
</table>


### TABLE 8.7 PURCHASES (DRY SEASON HARVEST ONLY; TO AUGUST)

<table>
<thead>
<tr>
<th></th>
<th>Cruzeiros</th>
<th>Rubber kgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total at the trade-post</td>
<td>784,349</td>
<td>1,404 1,658</td>
</tr>
<tr>
<td>Purchases at itinerant traders and marreteiros</td>
<td>335,000</td>
<td>600</td>
</tr>
</tbody>
</table>


### TABLE 8.7A BASIC CONSUMPTION, PURCHASED (ESTIVAS)

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>4 caixas</td>
</tr>
<tr>
<td>Kerosene</td>
<td>3 lata</td>
</tr>
<tr>
<td>Salt</td>
<td>1 saca</td>
</tr>
<tr>
<td>Soap</td>
<td>2 caixas</td>
</tr>
<tr>
<td>Sugar</td>
<td>2 sacas</td>
</tr>
<tr>
<td>Coffee</td>
<td>3 kgs</td>
</tr>
<tr>
<td>Powder milk</td>
<td>3 caixas</td>
</tr>
<tr>
<td>Ammunition</td>
<td></td>
</tr>
<tr>
<td>Gunpowder</td>
<td>1.5 kgs</td>
</tr>
<tr>
<td>Gun shot</td>
<td>4 kgs</td>
</tr>
<tr>
<td>Detonator</td>
<td>3 boxes</td>
</tr>
<tr>
<td>Metal caps</td>
<td>10</td>
</tr>
</tbody>
</table>

TABLE 8.7B HOUSE POSSESSIONS (DURABLE GOODS AND DOGS)

<table>
<thead>
<tr>
<th>Owner</th>
<th>Item Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, C</td>
<td>dogs (good for armadillos and paca)</td>
<td>3</td>
</tr>
<tr>
<td>A, H</td>
<td>old shotguns</td>
<td>1 fish net</td>
</tr>
<tr>
<td>A</td>
<td>motors (16HP, 14HP)</td>
<td>2</td>
</tr>
<tr>
<td>A</td>
<td>Singer machine</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>radio</td>
<td>1</td>
</tr>
<tr>
<td>A, H</td>
<td>disc-player</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>long-plays</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>canoe (1 ton of capacity)</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>wrist-watches (Citizen, Orient)</td>
<td>2</td>
</tr>
<tr>
<td>H</td>
<td>broken wrist-watch (Seyko)</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>ax</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>machetes</td>
<td>2</td>
</tr>
<tr>
<td>A</td>
<td>hoes</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>knives (forest knives, not rubber knives)</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>hammer</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>saw</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>pliers</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>battery-powered torchs</td>
<td>4</td>
</tr>
</tbody>
</table>


TABLE 8.7C PRODUCTION PLAN

<table>
<thead>
<tr>
<th>Sector</th>
<th>Days</th>
<th>Man-days</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber</td>
<td>184</td>
<td>184*</td>
<td>1,434 kgs</td>
</tr>
<tr>
<td>Manioc-flour</td>
<td>28</td>
<td>56</td>
<td>1,260 kgs</td>
</tr>
<tr>
<td>Gardens</td>
<td>21</td>
<td>58.5</td>
<td>1,170 kgs</td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>547.5</td>
<td>4,864 kgs</td>
</tr>
</tbody>
</table>

*Note that teams shared a single trail. Thus, two or three men would contribute together with one man-day. Source: field work, 1982. Not

TABLE 8.8A ANTHROPIC AREAS

**HOUSE CORE**

**QUINTAL** (backyard) Coité (Calabash) and 20 other plants (non-fruit) and herbs, mainly medicinal.

**HORTA** (vegetables) Onions (3 kinds), pepper (two kinds), garlic, squash, lettuce, kale.

**CAMPO** (field) Over 22 kinds of domesticated fruit-trees recorded in different gardens, Riozinho.

**PRAIA** (Beach) Watermelon, squash (beans in lower course)

**ROCADO**

**Batata** (Roots)
- Manioc Yellow (4 named kinds)
- White (5 named kinds)
- Other (5 named kinds)
- Braba ("wild", slightly poisonous)
- Sweet Potato, Inhame
- Maize (2 main kinds)
- Beans (3 kinds as bush, 2 kinds as creeper)
- Sugar-cane, bananas (several kinds), pineapple, Papaya, avocado, oaca), banana (several kinds), Pineapple, papaya, avocado, Oaca (lingui fishing)

**CAPOEIRA** (Second-growth)

**PLANTAS** (plants) At least 12 herbs (medicine, wrapping manioc, tea)

**PRAGAS** (pests) At least 15 different common pests in first year.

### TABLE 8.8b THE FOREST (MATA BRUTA) ENVIRONMENTS AND MAIN USES

<table>
<thead>
<tr>
<th>Environments</th>
<th>Main Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARGEM</td>
<td>dry season crops</td>
</tr>
<tr>
<td>MARGEM varzea</td>
<td>fishing</td>
</tr>
<tr>
<td>PRAIA</td>
<td>fishing</td>
</tr>
<tr>
<td>LOMBO</td>
<td>fishing</td>
</tr>
<tr>
<td>PRACA</td>
<td>water sources</td>
</tr>
<tr>
<td>IGARAPES</td>
<td>fishing</td>
</tr>
<tr>
<td>IGAPOS</td>
<td>water sources</td>
</tr>
<tr>
<td>CACIMBA</td>
<td>fishing</td>
</tr>
<tr>
<td>RIO</td>
<td>CACHOEIRA (rapids)</td>
</tr>
<tr>
<td>LAGO</td>
<td>SANGRADURO (lake channel to river)</td>
</tr>
<tr>
<td>TERRA FIRME</td>
<td>manioc and other crops</td>
</tr>
<tr>
<td>TABOCAL</td>
<td>hunting</td>
</tr>
<tr>
<td>MATA BRUTA</td>
<td>gathering</td>
</tr>
<tr>
<td>RESTINGAS</td>
<td></td>
</tr>
<tr>
<td>TERRAS</td>
<td></td>
</tr>
</tbody>
</table>

**Main environments, vegetation, soils**

<table>
<thead>
<tr>
<th>System</th>
<th>Vegetation</th>
<th>Soil</th>
<th>Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRAIA</td>
<td>White sand</td>
<td>Beans</td>
<td>(beach type)</td>
</tr>
<tr>
<td>LOMBO</td>
<td>Dark sand</td>
<td>Maize</td>
<td>Potatoes</td>
</tr>
<tr>
<td>VARZEA</td>
<td>Black clay</td>
<td>Weak Tobacco</td>
<td></td>
</tr>
<tr>
<td>TERRA FIRME</td>
<td>Sandy clay</td>
<td>Strong Tobacco, manioc</td>
<td>Peanuts, Squash, Potatoes, Rice, Maize, beans</td>
</tr>
<tr>
<td>MATA BRUTA</td>
<td>Red clay</td>
<td>Peanuts</td>
<td>Squash, Potatoes, Rice, Maize, beans</td>
</tr>
<tr>
<td>CARANAI</td>
<td>Dark sand</td>
<td>Pineapple</td>
<td>Sugar-cane, bananas</td>
</tr>
</tbody>
</table>

**Source:** field research. Riozinho, 1987.
Entauba (inferior latex), Sorva (Couma guianensis), Seringa (Nevea brasiliensis), Caacho (Castilloa elastica) (used for coating sacks), Ofe (Ficus insipida) (rubber coagulant), Copaiba (Copaifera duckei) (medicinal oil), Louro (Ocotea sp), Oil, Assacu (Nura creptans) (fish poison)

TABOCA (Bamboo)
Taboca (Guaua superba) No apparent

Wild plants mentioned by Riozinho inhabitants are listed in capitals. Terms in upper-case are broad categories used by the seringueiros in everyday language. Botanical terms are merely suggestive, based on: RADAMBRASIL 1975; ESTADO DO ACRE 1988; CAVALCANTE 1988; EMPEIRAIRE 1992.

TABLE 8.8b RICHOS DA MATA, wild animals

<table>
<thead>
<tr>
<th>Animal</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEADO</td>
<td>Deer</td>
<td>Mazama americana</td>
</tr>
<tr>
<td>VEADO vermelho/capoeiro</td>
<td>Mazama gouazoubira</td>
<td></td>
</tr>
<tr>
<td>VEADO roxo</td>
<td>Semina americana</td>
<td></td>
</tr>
<tr>
<td>PORCO DO MATO</td>
<td>Peccaries</td>
<td></td>
</tr>
<tr>
<td>Porquinho, ca itu</td>
<td>Tayassu tajacu</td>
<td></td>
</tr>
<tr>
<td>Queixada</td>
<td>Tayassu pecari</td>
<td></td>
</tr>
<tr>
<td>PACA</td>
<td>Paca</td>
<td>Agouti paca</td>
</tr>
<tr>
<td>Paca-moça (small)</td>
<td>Dinomys branickii</td>
<td></td>
</tr>
<tr>
<td>Paca-concha (big)</td>
<td>not eaten</td>
<td></td>
</tr>
<tr>
<td>PACA - de-rabo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTA</td>
<td>Tapir</td>
<td>Tapirus terrestris</td>
</tr>
<tr>
<td>ANTAPIVARA</td>
<td>Capybara</td>
<td>H. hydrochaeris</td>
</tr>
<tr>
<td>EMBAARA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUATIPURU</td>
<td>Squirrels</td>
<td>Sciuridae</td>
</tr>
<tr>
<td>Q.-mandigueiro (edible), Q.-roxo (brings panema), Q.-vermelho</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COTIA</td>
<td>Agouti</td>
<td>Dasyproctidae</td>
</tr>
<tr>
<td>Cotia-preta, c.-rosia(D. fuligiosa), Cotiara(Myoprocta pratii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MACACO*</td>
<td>Monkeys</td>
<td>Cebidae</td>
</tr>
<tr>
<td>Macaco-prego (Cebus apella), Cairara (Cebus albifrons), Guariba-vermelha (Capelão) (Allouata seniculus), Guariba-preta (Allouata caraya?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paruacú (Pithecia monachus), Zogue-zogue (Callicebus moloch), Macaco-de-cheiro (Saimiri sciureus), Macaco-da-noite (Aotus sp.), Macaco-barrigudo(Lagotrix Lagothricha), Mucari or Cara-de-sola (Cacajao calvus rubicundus, only left bank of Jurua river), Macaco-preto (Ateles paniscus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOIM</td>
<td>Tamarins</td>
<td>Callitrichidae</td>
</tr>
<tr>
<td>S.-Bigodeiro (Saguinus imperator, pet), S.-branco, S.-preto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TATUS</td>
<td>Armadillos</td>
<td>Dasypodidae</td>
</tr>
<tr>
<td>T.-verdadeiro (Dasypus septemcinctus), T.-china (Dasypus sp ?), T.-açu (Dasypus kappleri, panema), T.-rabo-de-couro (Euphractus sexcinctus), T.-da-grota (Dasypus novemcinctus), T.-canastra (Prionotes maximus, tabu)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUANDU</td>
<td>Porcupines</td>
<td>Coendou prehensilis</td>
</tr>
<tr>
<td>Rarely eaten</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUATI</td>
<td></td>
<td>Nasua nasua</td>
</tr>
<tr>
<td>Rarely eaten</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EMBIARAS (birds)  
NAMBUS (Tinamous)  
- Tinamidae edible  
  - N.-galinha (Tinamus sp), Sulurinda (Crypturellus soui?), N.-preta (Crypturellus cinereus), N.-ralógio (Crypturellus variegatus), N.-papo-de-fora (?), N.-azul (Tinamus tao?), N.-serra (?),  
  - Macucau (Tinamus solitarius?), Nambuzinha-vermelha (Crypturellus erythropus?).

JURITI (Doves)  
- Columbidae  
  - Leptotila verreaux

BICHOS-DE-PENA ("Plumed Animals")  
- Jacu (Penelope jacquacu, edible, pet*), Aracuã (Chachalaca, Ortilis guittata?), Jacamin (Trumpeter) (Crax fasciata, pet*), Mutum (Curassow) (Mitu mitu, pet, edible*), Cujubim (Piping guan) (Pipile pipile, pet, edible*)

PARROTS  
- Psychotidae rarely eaten  
  - P.-estrêla (Amazona sp.), P.-uru (Pionopsita vulturina?)

TOUCANS and Macaws appreciated for beaks and plumage (meat too hard)  
- (TUCANOS) (Toucans)  
  - T.-grande (Ramphastus toco), T.-miúdo (Ramphastus tucanus), Aracari (Pteroglossus sp), Macário (?)

ARARA (Macaws)  
- Psyttaidae rarely eaten  
  - Jandaia (Aratinga guarouba), Pedres (Ara manilata), Arara (Ara chloroptera), Canindé (Ara sp), Maracana (Ara sp)

(Too small and have a hard meat)  
- PERIQUITOS (Parakeet)  
  - Aratinga aurea etc. not eaten  

CURICAS (small Parrots)  
- Curica (Amazona vinaca), Curica-de-barreiro (Touitie surda?), C.Marianita (Pionites 1.7)

EMBIARAS (reptiles)  
- Bichos de Casco ("Shelled Animals") edible, eggs  
  - Tartaruga (river turtle), Tracaja (river turtle, male:Capitari), Iaça (small river turtle, male:Zé Prego)

JABOTIS  
- J saboti comum, Jaboti-açu (land turtle) edible

TEIJU-ACU  
- Tupinambis teguixin Rarely eaten

FISH  
- Fish is secondary as food in the Tejo headwaters. Fish is classified in reimoso and not reimoso. The most common fish is the bottom-feeder bode. Sample kinds of fish are grouped according to the main fishing techniques used. The tarrafa is the cast net. The bicheiro is a hook which a diver inserts in a fish under fallen trees. Tingui may be made with the cultivated oaca and put in shallow streams to catch small fish. Harpoons and bow-and-arrow used.

JANDAIRA, ARAPUA, URUCU (three kinds), others  
- TANAJURA (a flying ant, eaten roasted), TAPURU DO COCOA (Cocoa nut worm, eaten roasted)

(Controversial animals)  
Controversial animals. Some will eat them when find them and there is no other food. Caymans, ray-fish, eels and frogs (white meat) are often despised as Caboclo -- i.e. Indian.

FERAS ("Beasts") (killed as predators).  
- (Mammals)  
  - ONÇA  
    - Onça-pintada (Panthera onca), Onça-preta (Panthera onca), Suçurana, maçaroca (Felis concolor)  
  - GATOS  
    - Maracajá, G.-de-gapó (Felis pardalis), G.-peludo (Felis wiedii), G.-preto (Felis yagouaroundi), G.-açu (Felis tigrina)  
  - BULE-BULE, QUINCAU  
    - Potus flavus

(Dolphins) (Inia geoffrensis, Sotalia fluviatilis) are abundant on the Jurua, and are not killed or eaten.

GALÇA (snowy egret), CIGANA ("gypsy woman") (Opisthocomus hoazin), JABURU (Jabiru stork), URUBU (Vultures).
Small birds are only hunted by children. Some are protected, as the JAP (the yellow-rumped cacique, Cacicus c. cela), MARIA-DE-BARRO (oven-bird, Furnarius r. rufus), BACURAU (Night-hawk), UIRAPURU (hunting charm)

(Repulsive animals)

The animals below are repulsive to seringueiros as food. They are consensually inedible in the Riozinho, although easily found. The mambira, while not eaten, is sometimes beaten and killed when found.

(Tamanduaas, Anteaters)
BANDEIRA (Myrmecophaga tridactyla), TAMANDUAI (Cyclopes didactylus), MAMBIRA (Tamandua tetradactyla)
PREGUIÇA Siolths
IRARA Tayra
RATO-CORO (Bamboo rat)
MUCURA (Opossums)
MUCURA (Large Opossum), MUCURA XIXICA (Mouse Opossum)
COELHO (Rabbit)
PREGUIÇA Sloths
BRADYPODIDAE
IRARA Tayra
RATO-CORO (Bamboo rat)
MUCURA (Opossums)
MUCURA (Large Opossum), MUCURA XIXICA (Mouse Opossum)
COELHO (Rabbit)

INSETOS (bitting, poisonous beasts)

COBRAS (Some avoid killing snakes. Healers of snakebites need the snakes alive in order to heal. They are themselves said to be immune to snake poison)

(Poisonous snakes)
Pico-de-jaca (the bushmaster)(Lachesis muta), Surucucu-de-barranca (Lachesis), Jaraaraca (lance-head)(Bothrops), Coral (Micrurus sp), Papagali, Caninana, Cobra-preta, Piriquita-bóia, Salamanta, Jibóia (Boa; head used as charm), several other named kinds.

LACRAUS (Scorpions, 2 named kinds), CASAS (Wasps, 8 eight named kinds), FORMIGAS (Ants, 13 main kinds, four of them subdivided in sub-kinds),

PRAGAS ("Plagues"
CARAPANAS (Mosquitoes, several kinds), PIUM (a gnat)(Simulium pertinax?), MUTUCA (mutuca fly)(Tabanidae?), MERUIM (a biting midge)(Chironomidae?), CATUQUIN (a biting midge).

Capital words are categories used by tappers, followed by translation into English. Possible implicit categories are within parentheses. Scientific names are merely suggestive. They are based on consultation with tappers on plates in SICK 1984 (birds) and EMMONS 1991 (mammals).
TABLE 9.3 RUBBER MAKING PROCESSES

PROCESS I: RUBBER IN SMOKED BALLS (60 KG UNITS)

Phase IA: FIRST BATCH (10-30 kgs in 1 to 3 days)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>tapping</td>
<td>6 hrs.</td>
<td>5 am</td>
</tr>
<tr>
<td>collection</td>
<td>4 hrs.</td>
<td>11 am</td>
</tr>
<tr>
<td>pause</td>
<td>1 hr.</td>
<td>12 pm</td>
</tr>
<tr>
<td>preparation</td>
<td>1/2 hr.</td>
<td>4 pm</td>
</tr>
<tr>
<td>Total</td>
<td>11 hrs</td>
<td>4:30 pm</td>
</tr>
</tbody>
</table>

Phase IB: FINAL BALL (60 kgs in 5 to 7 days)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>tapping</td>
<td>6 hrs.</td>
<td>5 am</td>
</tr>
<tr>
<td>collection</td>
<td>4 hrs.</td>
<td>1 pm</td>
</tr>
<tr>
<td>pause</td>
<td>1 hr.</td>
<td>2 pm</td>
</tr>
<tr>
<td>smoking</td>
<td>2 hrs.</td>
<td>2:30 pm</td>
</tr>
<tr>
<td>Total</td>
<td>14 hrs</td>
<td></td>
</tr>
</tbody>
</table>

PROCESS II: RUBBER IN PLANKS (10-20 KG UNITS)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>tapping/collection</td>
<td>7 hrs.</td>
<td>5 am</td>
</tr>
<tr>
<td>pressing</td>
<td>1/2 hr.</td>
<td>1 pm</td>
</tr>
<tr>
<td>Total</td>
<td>8.5 hrs</td>
<td>2 pm</td>
</tr>
</tbody>
</table>

Source: field research, Riozinho, 1982/83.

---

TABLE 10.1 House age and workforce, rubber

<table>
<thead>
<tr>
<th>Age of Head</th>
<th>No. houses</th>
<th>Heads</th>
<th>Sons</th>
<th>Brothers</th>
<th>Hired</th>
<th>Tot</th>
<th>W/cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-19</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>20-29</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>41</td>
<td>1.37</td>
</tr>
<tr>
<td>30-39</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>40-49</td>
<td>7</td>
<td>7</td>
<td>13</td>
<td>0</td>
<td>1</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>50-59</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>1.25</td>
</tr>
<tr>
<td>60-69</td>
<td>1</td>
<td>1</td>
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<td>0</td>
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Source: field research, Riozinho, 1982. Only male persons over 10 years old included. 51 houses surveyed in 68.
Diagram 5.1
SERINGAL STRUCTURE: THE FLOW OF RENT

SÃO PAULO

TITLE-OWNER COMPANY

SUBSIDIARY

CRUZEIRO DO SUL

$ 30,000 (10% OUTPUT)

RUBBER TRADE COMPANY

IN RUBBER

TEJO RIVER

IN RUBBER
(10% AVERAGE TOTAL OUTPUT)

IN RUBBER

66 kgs average per house

IN RUBBER

66 kgs per house

IRACEMA MARIANGUAPE

IN RUBBER
Diagram 5.2
SERINGAL STRUCTURE: THE FLOW OF MERCHANDISES

- Natural Rubber Imports (Asia)
- Natural Rubber (Non-Amazon) Plantations
- Pirelli Goodyear Etc.
- Synthetic Rubber (Brazil)
- Natural Rubber, Amazon Wild
- Natural Rubber, Amazon Wild
- Natural Rubber, Amazon Wild

Diagram 6.1
YEARLY ACCOUNTS (DEBTS TO BE PAID)
Diagram 6.2
RUBBER DELIVERED TO PAY FOR ACCOUNTS

Diagram 6.3
FINAL DEBTS
Diagram 9.1

HOUSE ACTIVITIES IN THE YEAR

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Diagram 10.1a
RUBBER AND MANIOC OUTPUTS PER HOUSE

Diagram 10.1b
HUNTING YIELDS PER HOUSE (DEER KILLS)
Diagram 10.2
WORKERS AND RUBBER OUTPUT PER HOUSE

Diagram 10.3a
WORKERS PER HOUSE AND WORK INTENSITY (IN KGS RUBBER)
Diagram 10.3b
WORKERS PER HOUSE AND WORK INTENSITY (IN MANIOC PITS)

Diagram 10.4
CONSUMER PER HOUSE AND OUTPUT PER HOUSE (IN KGS RUBBER)
Diagram 10.5a
CONSUMERS PER WORKER AND OUTPUT PER WORKER (IN KGS RUBBER)

Diagram 10.5b
CONSUMERS PER WORKER AND OUTPUT PER WORKER (IN MANIOC PITS)
Diagram 10.6a

HOUSE PLANS (RUBBER AND MANIOC)

Diagram 10.6b

HOUSE PLANS, PER WORKER (RUBBER AND MANIOC)
Diagram 10.6c

HOUSE PRODUCTION PLANS (RUBBER, DEER KILLS)
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Average: -675 493.082 59 564 -103 -135.09 -12.3 -47672
Stddev: 419 316.559 148 455 399 292.151 45.03 15809
Cases: 48 47 48 48 48 48 48 48
Min: -2035 65 0 52 -656 -367 -260 -60
Max: -100 1295 847 2109 1682 1109 0 0
### TABLE
GLOBAL DATA ON LAND USE AND LABOUR USE - STATE OF ACRE, 1982

**A. Size of Extractive Holdings and Land Status**

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**Source:** Censo Agropecuário 1980-Acre, T.3

**B. Size of Extractive Holdings and Holder Status**

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**Source:** Censo Agropecuário 1980-Acre, T.4

**C. Size of Extractive Holdings (in ha)**

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**Source:** Censo Agropecuário 1980-Acre, T.4

**D. Working Hours in Extractive Holdings (hours per week)**

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| Source: Censo Demográfico (Mao de Obra)-Acre, 1982

**E. Labourers in Extractive Holdings**

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<td></td>
</tr>
<tr>
<td>Number</td>
<td>30366</td>
<td>24793</td>
<td>14099</td>
<td>10820</td>
<td>10132</td>
</tr>
</tbody>
</table>
| Source: Censo Agropecuário 1980-Acre, T.20

**Source:**
F. Income of Extractive Workers (in number of official minimum wages)

<table>
<thead>
<tr>
<th></th>
<th>0-1/4</th>
<th>1/4-1/2</th>
<th>1/2-1</th>
<th>1-3/2</th>
<th>3/2-2</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers</td>
<td>112</td>
<td>931</td>
<td>5033</td>
<td>5810</td>
<td>3474</td>
<td>2819</td>
</tr>
</tbody>
</table>

Total: 19230 workers with an income. Workers without income: 4145.

TABLE LAND AND LABOUR IN EXTRACTION ACRE 1982

A. Size of Extractive Holdings and Land Status

<table>
<thead>
<tr>
<th>State of Acre, 1980</th>
<th>Own</th>
<th>Rented</th>
<th>Occup.</th>
<th>Mixed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>km²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>7888</td>
<td>7278</td>
<td>12095</td>
<td>132</td>
<td>27371</td>
</tr>
<tr>
<td>Area</td>
<td>20933</td>
<td>20806</td>
<td>14904</td>
<td>150</td>
<td>56795</td>
</tr>
<tr>
<td>Avg.Area</td>
<td>2.7</td>
<td>2.9</td>
<td>1.2</td>
<td>1.1</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Source: Censo Agropecuário 1980-Acre, T.3

B. Size of Extractive Holdings and Holder Status

<table>
<thead>
<tr>
<th></th>
<th>Own</th>
<th>Rents</th>
<th>Sharecr.</th>
<th>Occup.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>km²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>1147</td>
<td>6152</td>
<td>3</td>
<td>5055</td>
<td>13360</td>
</tr>
<tr>
<td>Area</td>
<td>1930</td>
<td>17027</td>
<td>2</td>
<td>10201</td>
<td>29100</td>
</tr>
<tr>
<td>Avg.Area</td>
<td>1.7</td>
<td>2.8</td>
<td>0.7</td>
<td>1.7</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: Censo Agropecuário 1980-Acre, T.4

C. Size of Extractive Holdings (in ha)

<table>
<thead>
<tr>
<th>Area</th>
<th>0-50</th>
<th>50-100</th>
<th>100-200</th>
<th>200-500</th>
<th>500-1000</th>
<th>+1000</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>955</td>
<td>2219</td>
<td>5213</td>
<td>4139</td>
<td>736</td>
<td>98</td>
<td>13262</td>
</tr>
<tr>
<td>Area</td>
<td>25906</td>
<td>148338</td>
<td>671588</td>
<td>1371090</td>
<td>400355</td>
<td>219455</td>
<td>2897275</td>
</tr>
<tr>
<td>Avg.Area</td>
<td>27.1</td>
<td>86.8</td>
<td>128.8</td>
<td>331.3</td>
<td>862.7</td>
<td>2239.3</td>
<td>203.4</td>
</tr>
</tbody>
</table>

| Number   | 7%   | 17%    | 39%     | 31%     | 8%       | 1%    | 100%  |
| Area     | 1%   | 5%     | 25%     | 51%     | 18%      | 8%    | 100%  |

Source: Censo Agropecuário 1980-Acre T.19

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