CHAPTER I

Plant Opulence, Insatiable Greed and the Enthronement of Entropy: A View of the Socio-Environmental History of the Atlantic Rainforest

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This Chapter offers an overview of the social and environmental history of the destruction of the Atlantic forest, highlighting some striking characteristics while also addressing the economic aspects of this problem. But just which Atlantic forest is this? The geographical area covered by the ecosystem described here basically consists of its Northeast section, located north of the Rio São Francisco river (11º South at its mouth). In fact, the original Atlantic forest stretching south of this river was already thinning in Sergipe State by 1500, expanding and filling out substantially towards Southern Bahia State (Dean, 2004). The segment of this forest north of the São Francisco river is where much of Brazil's sugar boom flourished during a period that played a decisive role in forming the nation. On this aspect, Freyre (1985) recalls that: "The first great blossoming of Brazilian civilization – based on sugar – was specific to the Northeast, meaning agrarian Brazil, which stretched from the Recôncavo area of Bahia State to Maranhão." The history of Brazil is thus closely entwined with the history of sugar itself (Freyre, 1985). It is this segment of the Atlantic forest that blanketed almost the entire coastlines of Alagoas and Pernambuco States (which were a single Captaincy in the XVI century), larger in the former than in the latter, which is of interest here. On the other hand, the presence of this biome in Paraíba and Rio Grande do Norte States was far less significant than even in Sergipe. It was this lush blanket of forest vegetation that gave the narrow strip of land running along the Eastern coast

Opposite page:
In the past, the exuberance of the fauna and flora of the São Francisco River charmed travelers and naturalists. Carl Friedrich Phillip von Martius (atr.) *Vögelteich am Rio São Francisco*, 1823. Itaú Cultural Institute, São Paulo.

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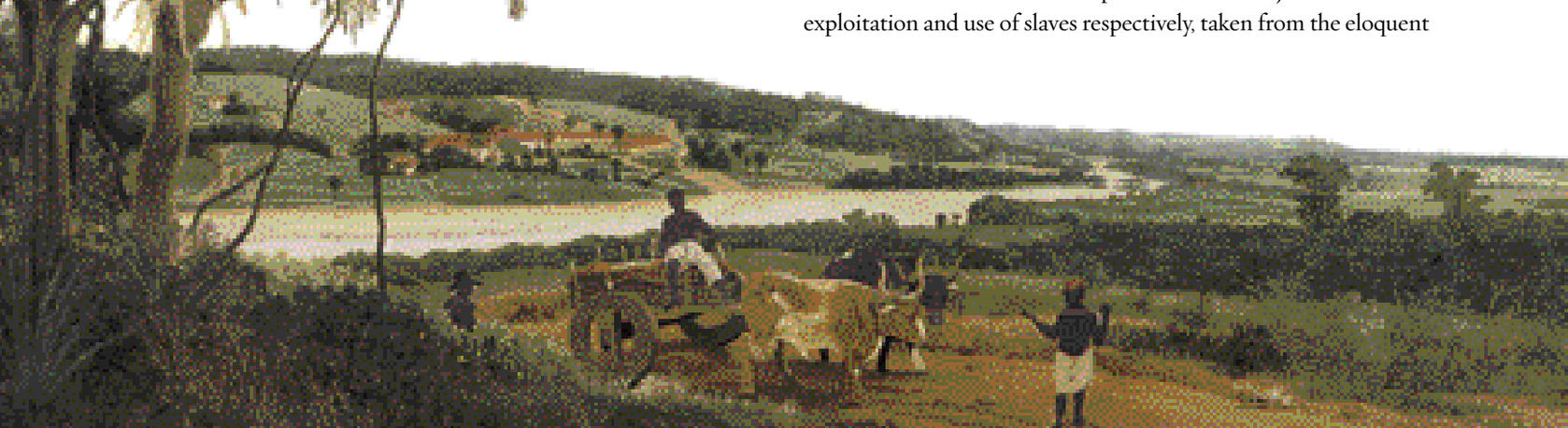
The gradual elimination of forests in Pernambuco in the XVII century simplified the rural landscape. Only a few generalist epiphytes, resistant to habitat change, remained in the remnant forest trees.
The oxcart, 15.8.1638. Louvre Museum, Paris.



of Northeast Brazil its name: *Zona da Mata* or forest zone. This was where local economic activities were clustered, together with much of its population, even today, although to a relatively lesser extent than in the past. This name is clearly linked to the "lush vegetation" that once reigned in the Atlantic Rainforest of Northeast Brazil, particularly in Pernambuco State (Silva, 1993). Lavish opulence once reigned here, but this natural wealth has vanished. It no longer reigns, because what still survives today are merely the remnants left by destructive activities that have lasted five hundred years, leaving scant traces of this unparalleled natural wealth. This endows the name of the *Zona da Mata* forest zone with connotations of cruel irony today, recalling the long-vanished natural grandeur of these forestlands (Freyre, 1985).

This study makes no attempt to be exhaustive or even original, in terms of the facts presented. If there is any originality here, it lies in the interpretation of certain phenomena. Much of what is said about the Atlantic forest has in fact been researched and analyzed competently by many authors, including Gilberto Freyre (1985) and Warren Dean (2004). The latter certainly focuses on the area below the 13º parallel South and above the Araucarian forest. However, Dean (2004) quite correctly notes that the section of the Atlantic Rainforest that he investigated forms its central portion, accounting for 70% of the entire area, and is the region where almost all the aspects of human settlement history in this biome will be typical, for this and other areas as well. Following in the footsteps of Paulo Prado in *Retrato do Brasil* (1931), the intention here is to offer a portrait of Brazil by probing the essence of things, presenting typical situations and aspects representing reality and events, "resulting more from speculated deduction than from the concatenate sequence of facts" (Prado, 1931). It is worthwhile noting that historian John L. Myers recalls that "Vast tracts of the planet have no historical literature", meaning that there are no detailed descriptions of the biogeographical environments determining the evolution and existence of human beings there. This is the situation of the Atlantic forest, of which something is known from the XVI century onwards through sparse documentation and the reports of the early chroniclers such as Antonil (1997) and Gandavo (1980). This aspect will be covered in the Second Section of this work.

The Third, Fourth and Fifth Sections of this Chapter offer an idea of the destructive processes that swept through the Atlantic forest, in terms of colonial conquests and their objectives, and the exploitation and use of slaves respectively, taken from the eloquent

conclusion of Freyre (1985) that what remains of this biome are "forest fragments", "leftover forest litter". It was taken over by the sugar cane plantations and mills "with no consideration other than that of space driving this brutal way of exploiting the virgin land" (Freyre, 1985), simply devastating the forest by fire. As noted by Dean (2004) even "that which remains is in practical terms indescribable. It is immensely complex" allowing an assessment of the scope of the impact caused by five hundred years of progress by the modern world on the biological legacy found in the complexity and beauty of the Atlantic Rainforest that flourished in Brazil in 1500.

There is no doubt that all types of agriculture – including that established in the Atlantic forest – disturb natural ecosystems. Through removing natural resources and using the surrounding area as dumping grounds for degraded energy sources and materials, human activities have and will always cause negative impacts on the environment. On the other hand, as noted by Pádua (2002) alluding to Simon Schama, the work of natural historians tends to underscore destructive interventions in the relationships between human beings and ecosystems. This does not mean that humankind has only destroyed. The problem is that the processes of natural annihilation – such as those in the history of Brazil – stand out so strongly over the centuries that the possibly beneficial actions of these colonizers are dimmed. This is certainly the saga of the Atlantic forest – and also other biomes that have become symbols over recent years: the *Caatinga* drylands, the *Cerrado* savannas and Amazonia itself. It is interesting that civilization is accompanied by devastation – ushered in by Portuguese colonization in Brazil – while the actions of the "savages" who lived here apparently caused only minor damage, as is shown in the next Section (Brunhes, 1955).

The records of the destruction of natural systems such as the Atlantic forest certainly include some shameful episodes. This cannot and should not be ignored. It might be useful (Dean, 2004) to highlight the level of madness or ignorance of the human species. On this aspect, what appears in the case of Northeast Brazil is a situation based on an "economy of plunder", pillaging Nature itself. More than a simple economy based on exploitation and trade – which extracts its wares without intending to destroy the environment or cause permanent damage – the economy of plunder is based on the idea of exploitation through destruction or permanent damage (Castro Herrera, 1996). This expression was used in 1910 by French geographer Jean Brunhes (1955). It "designates a specific type of 'destructive settlement' of areas by part of the human species that 'tends to rip out its mineral, vegetable or animal raw materials with no idea or means of replenishment'" (Castro Herrera, 1996). These activities resemble wildcat mining, such as the operations at Serra Pelada in Pará State, or manganese mining in the Serra do Navio range in Amapá State (Brito, 1994) or even the physical destruction of Nauru, a small island state in the Pacific with 80% of its surface area quite literally devastated by phosphate mining from 1920 through 2000. This model defines one of the most characteristic traits of the relationship between society and the environment in Latin America from the XVI century onwards. This is a particularly aggressive type of collecting that is extremely violent towards nature. As conceptualized by Brunhes, this violent attack may "cause utter poverty" and "widespread devastation" (Castro Herrera, 1996). The type of economy based on destructive settlement with a "normal, methodical character" (exploitive colonies) cannot be compared to the economy of plunder. The latter is distinguished by its untrammeled intensity, endowing it with the well-deserved name of economic pillaging or merely devastation.

The groups of humans living in Brazil prior to the arrival of the Europeans were closed societies (Castro Herrera, 1996) that were self-sustained and self-sufficient. They had no understanding of trade, and did not exchange or barter with outside societies. Their main purpose was reproduction: meeting their own needs with no attempt at accumulation. Their relationships with the environment were diversified and, once the livelihood of the group was assured, this allowed cultural development which included intimate familiarity with the ecosystems around them. This inevitably led to harmonious (and reverent) relations with their surroundings, working with Nature rather than against it. The arrival of European colonizers shattered this model and eliminated this closed-circuit system. Societies based on open circuits, no longer self-sufficient and lacking the capacity of self-determination in terms of the purposes and terms of their existence, were to appear. New relationships based on exchanges with the outside world were established in ways that were not advantageous for the indigenous inhabitants and natural environments of the colony, introducing the paradigm of exogenous development, with a specialized, simplificatory and above all predatory character. Simultaneously, the new agents in this process were completely unaware of the original ecosystems in the new lands and, driven by their own ignorance, they were determined to squeeze the highest possible returns from the new ventures, even to the point of utter devastation. This involved the violent inclusion of these newfound lands in the global economy, at extremely high cost to societies that had been closed within their own cycles until then. These aspects are analyzed in Sections Six and Seven of this study, respectively offering an assessment of the process and characteristics of the European model for occupying and settling the Atlantic forest. This study ends with some conclusions in Section Eight.

I think it is important to state that I come from the *Zona da Mata* forest zone in Pernambuco State. I was born between sugar cane plantations at a sugar mill (Frei Caneca, today Colônia) in what was then the Maraial municipality, currently part of the Jaqueira district. My father was a company bookkeeper from 1934 to 1990. There are links to rural properties on both sides of my family, where my forebears grew sugar cane and produced demerara sugar,

molasses candy and Brazil's fiery cane-spirit: *cachaça*. The paternal grandmother of my father, whom I knew, Maria Luíza Bandeira de Melo Cavalcanti (1862-1947) owned the Taquarinha sugar mill at Maraial. My great-grandfather João Brigues Pereira (1865-1932) who was my mother's maternal grandfather, also owned a sugar mill and supplied sugar cane to the Catende plant, which was the largest in Brazil at that time. I grew up with these stories from my earliest childhood, some sad, such as tales of slavery, and others more edifying such as the history of the sugar cane plantations of Pernambuco State, which my father used to criticize severely, particularly with regard to forest devastation. During my childhood and school holidays as a teenager, I would gaze at significant tracts of magnificent Atlantic forest along the 1940s and 1950s from my home, not just "leftover forest litter" in the words of Gilberto Freyre (1985). One of them, the lovely Serra do Espelho range is still today a magnificent remnant of the original forest, although cropped to 630 hectares, sheltering endemic species such as bromeliads, for example. The rocky massif of this range always interested me greatly. With my brothers, sisters, cousins and friends, I would explore its slopes on outings, with picnics and hikes, initially with my parents when I was only six years old.

The Atlantic forest dominated the landscape when traveling by train, which was the means of transportation at that time for covering long distances in the *Zona da Mata* forest zone of Pernambuco and Alagoas States, sometimes on the little passenger car known as the *bondezinho* of the Frei Caneca plant – one of whose heirs, Gustavo Duarte da Silveira Barros, is admirably preserving the remnants of the Serra do Espelho range. Back then, sugar cane had not yet taken over the region entirely. The slopes of the hills in the southern section of the *Zona da Mata* forest zone in Pernambuco State were covered by sugar cane, with precious and reasonably large patches of forest conserved on their tops. In some of these areas, coffee was planted. They sheltered armadillos, monkeys, marmosets, agoutis, anteaters, wildcats, capybaras, sloths, snakes and a wide variety of birdlife. The great poet – in the physical sense as well – Ascenso Ferreira (1895-1965) – who was a childhood friend of my maternal grandmother (born in 1894) and like her a native of Palmares in the Southern section of the *Zona da Mata* forest zone in Pernambuco State – often visited my home and recited some of his delightful poems in his wonderful voice. He described the forest seen from the Great Western train in his inspired canto entitled *Trem de Alagoas*, which is also known by its first line: *Vou danado pra Catende...* (I am madly going to Catende...).

This entire introduction is to show that I have links to the Atlantic forest that are both ancestral and visceral, with some of its biological opulence imprinted indelibly in my memory, based on what I have seen with my own eyes. This link is still apparent today in my private world, as the owner of 23 hectares of high-altitude marshlands in the Gravatá district of Pernambuco State, where parts of the forest are conserved by my efforts. I belong to the Cavalcanti clan – which appeared in Olinda in the XVI century, very close to my home today – and that helped perpetrate the looting and degradation of the Atlantic forest. But I am also a child of the Tabajara tribe, enemies of the Caeté who were living on the lands that today house Olinda, when the Portuguese arrived in the New World. After some battles, the Portuguese and the Tabajara entered into an alliance and vanquished the Caeté. The first Cavalcanti was Filippo, from Florence in Italy, who was in fact the only man to arrive in these new lands with this surname. He married Catarina de Albuquerque Arcoverde, the half-caste daughter of Jerônimo de Albuquerque, a Portuguese settler known as the Adam of Pernambuco and Muira Ubi, a Tabajara woman who was baptized a Christian and quite unnecessarily renamed Maria do Espírito Santo Arcoverde.

For some reason that I cannot explain, and that I have mentioned previously (Cavalcanti, 1992) I feel more Amerindian than European or African. This means that I tend to construe the phenomena constituting the brutal destruction – with "iron and brand" [Couto, 1849; Dean, 2004], "iron and fire" (Freyre, 1980), "broadaxe and firebrand" (Dean, 2004) – of the Atlantic forest, more from the standpoint of the peoples who had lived there for ten or twelve thousand years before the arrival of the Europeans. It is from this standpoint that I offer the observations, remarks and conclusions in this Section, and in fact in the rest of the Chapter. Nevertheless, I feel no less faithful or less objective in my condition as a researcher, in my construal and speculations, than if I were to adopt the standpoint of the European colonizer or the African slave.

Plant opulence: Glimpses of the Atlantic Forest Ecosystem on the Arrival of the Portuguese

Among the earliest Europeans to see the Atlantic forest and describe his view of this biome in 1500, was Pero Vaz de Caminha, the chronicler of the fleet captained by Pedro Álvares Cabral, in his famous letter to King Emanuel I of Portugal. This missive obviously offers an impressionistic report, with no details or any attempt at scientific records. But the prevailing tone of the description is suggestive, particularly the wealth of plant life found, with phrases such as: "there are very many trees and large, of infinite species, and I do not doubt that there are many birds in this land" or also: "these trees are so large and so thick with such a vast quality of foliage that it cannot be calculated." The same impression was also recorded centuries later in 1817 by Casal (1996) when admiring the "land covered by trees". By its appearance, according to Casal (1996) this land prompted the admission that there was no country that could "compete with Brazil in its multiplicity of plants." Today, the

In the background, surviving mangroves and lowland forests in the neighborhood of Recife, Pernambuco, in the first half of the XVII century. Gillis Peters, *View of Recife*, 1637. Mario and Beatriz Pimenta Camargo Collection, São Paulo.

word would be biodiversity. In the Atlantic forest, according to the same author, there was an abundant variety of "excellent building timbers, dyewoods and medicinal plants" (Casal, 1996). Consequently, there is nothing more natural that Caminha should have been astounded, stressing: "This land (...) from end to end is all beach, (...) with vast flatlands and very beautiful. Through the forestlands that appear to us, seen from the sea, it is very large, as it extends as far as the eye can reach, as we can see nothing but land and trees." As suggested by Prado (1931), although of an "idyllic ingenuity", the letter written by Caminha "is the first hymn praising the splendor, power and mystery of Brazilian nature." This topic was raised again by Pero de Magalhães Gandavo in 1576, describing what he saw: "This land is very fertile and grassy, all covered by very high and very leafy trees, remaining green always, in winter and summer" (Gandavo, 1980); the land "is seen as being very delightful and fresh on a large scale": "Everything is blanketed by very high and thick trees" (Gandavo, 1980). These are descriptions, impressions and landscape sketches that refer us back to speculations on what this setting might conceal.

Rural landscape in Alagoas changed by man.
Frans Post, *Alagoa ad Austrum*. From the book Rerum per Octennium in Brasilien, by Gaspar Barléu, 1647. Ricardo Brennand Institute Collection, Recife, Pernambuco.

Below:
Giant anteater. From the book *Historiae Rerum Naturalium Brasiliae*, by Georg Marcgraf, 1648. National Library, Rio de Janeiro.

Gandavo also commented on other things that impressed him: "Under these huge trees there is heavy and very dense undergrowth, so that it is dark and heavily blanketed in parts where the ground never sees the warmth or light of the sun, so that it is always dank and dripping with water" (Gandavo, 1980). His attention was caught by the existence of "much brazilwood in these Captaincies [Bahia and Pernambuco] so that even the local residents can make good use of it" (Gandavo, 1980). It was interesting to note that there is a certain genus of tree that is also found in the forest of the Pernambuco Captaincy, that they call *copaíbas*" (Gandavo, 1980). This was during the XVI century, as by the XXI century this species – also known as oilwood – was practically extinct throughout Pernambuco State. In the new world of the Portuguese discovery plant opulence caused a deep impression. Similarly, the wealth of its waters was equally impressive, as noted, for example, by French Huguenot Jean de Léry (1972), who lived on the banks of the Guanabara Bay for almost a year with the Tamoyo tribe in 1557-1558. In his own words: "With regard to the water of the springs and rivers, incomparably better and more wholesome than our own, we drank it without mixing" (Léry, 1972). Gandavo

also commented on this: "The waters in this land are drunk, they are very wholesome and delicious, and however much is taken do not harm a person's health, as the person soon begins to sweat leaving the body cleansed and healthy" (Gandavo, 1980); the land is "watered by many very precious streams that flow abundantly" (Gandavo, 1980). In his view, their sources would be infinite and their waters "feed into many large rivers (...) that run to the Ocean" (Gandavo, 1980). Additionally, Gandavo also noted abundant supplies of fish and shellfish in the Atlantic forest, which "nourished the dwellers in Brazil without requiring expenditures or reducing their estates to any extent" (Gandavo, 1980). He also alluded to "plentiful game", according to him, "one of the things that supports and provides ample food for the dwellers in this land of Brazil" – "game of many different types, hunted in several different ways, which these same local tribespeople kill" (Gandavo, 1980).

Having studied the environmental history of the Atlantic forest in such detail – although with some interpretations that are open to discussion – Warren Dean wonders whether "when it was first descried by European navigators, [was the forest] entirely what it would have been had they come upon an unpeopled shore, or was it already transformed by the first wave of human invasion?" (Dean, 2004). A definitive reply cannot be given to such a broad-ranging question, particularly because human settlement had never reached many parts of the forest. It obviously existed at Porto Seguro – and many other places – when the Portuguese anchored there on April 22, 1500, and, despite the significant population found there, consisted of dense forest blanketing the entire coastline, offering a "formidable obstacle" to anyone wishing to "penetrate and cross it, as though expressing the oppressive tyranny of Nature" (Prado, 1931). The Portuguese called it a "green rampart", offering a clear indication of the vitality of its ecosystems. The hypothesis was raised by Dean (2004) that the trails that existed in the forest, some of which were followed by the sailors in the fleet headed by Cabral that arrived here in 1500, guided along them by the indigenous tribes, were in fact "passages through a countryside already much modified". However, the records left by Europeans such as Caminha, Gandavo and Léry, do not lead to the conclusion that the natural landscape had been subject to any sweeping interventions. As stressed by Gandavo (1980) attention was drawn to the "fertility and abundance of the land", which would have been noteworthy only if its natural resources had been used in a very non-aggressive way by the original inhabitants of this land. After noting that "the European reports on the relationship of the Tupi with the environment are scattered, imprecise, and prejudiced", Dean (2004) agreed with experts such as Ruttan (1998) and Burke (2001), stating that the indigenous peoples "were not conservationist in the sense of sparing natural resources for coming generations" – not through a lack of care, but rather due to the "reasonable certainty of the adequacy of their resources and their ability to defend them against rivals" that they would have (Dean, 2004) or due to a fatalistic approach, believing that a divine will determine what will exist and what will vanish from the ecosystem. Following another line of thought, Caminha had already said: "I deduce that (the Amerindians are) bestial people with little wisdom, which is why they are so shifty and defensive. But despite all this, they are very sound and very clean". A people whose healthy appearance impressed the Portuguese – to the point that Caminha underscored that "their bodies are so clean and so fat and so beautiful that they could be no more!" – should also know how to look after the basic resources that provide their livelihood and ensure their health: their ecosystem. Reproducing a piece of information from cultural anthropology, Dean himself (2004) notes that the peoples of the Atlantic Rainforest "thought of the forests as belonging to the spirits and animals that inhabited them, or at least as belonging as much to those beings as to them." Consequently, they had sufficient good reason to care for this natural wealth, even due to fear of these deities.

Consequently, it might well be imagined that the original Atlantic forest ecosystem during the early days of the Portuguese colonization, shimmered like a complex structure that was respected as a complete organization by its indigenous dwellers. Consequently, it might well be accepted that human interventions had taken place, some on a larger scale, particularly because, in order to live in the depths of the forest, these tribespeople had to fell some trees, modifying the environment. On the other hand, the indigenous tribes were familiar with agriculture, which was "much more viable" for them, as noted by Dean (2004) on the forest soils, with their crop-growing activities always carried out through the use of fire. The general condition of their health offers an indication of the health of their surrounding environment – as a healthy organism cannot exist in a sick environment – suggesting good management of the natural resources offered by the Atlantic forest prior to 1500. Bearing eye-witness testimony to his comments, Jean de Léry is emphatic on this matter: "The savages of Brazil, living in America, called the Tupinambá, among whom I resided for almost a year, and with whom I dealt familiarly, are no larger or fatter than the Europeans, but they are stronger and more robust, with sturdier trunks, better-tempered and less subject to diseases, with very little lameness, illnesses or deformities and few cripples among them. Although many of them reach 120 years old (they know how to tell their ages by the phases of the moon) only a few of them have grey or white hair in old age, which demonstrates not only the good climate of this land, with no frosts or excessive chills that disturb the permanent greenery of the fields and the plants, but is also because they are little concerned with the matters of this world" (Léry, 1972).

In fact, Caminha had already noted that the savages "ate only this yam, which is plentiful here, and these seeds and fruits that the land and the trees offer them, and with this they are so firm and

plump as we are not to such an extent, no matter how much wheat and vegetables we eat". It is clear that the chronicler of Cabral was not offering a detailed assessment of any specific aspects. But these are two statements that coincide, written by Caminha and de Léry at different times and different places. They also have much in common, for example, with the descriptive treatise written by Gabriel Soares de Souza (2001) in 1572, that portrays the exuberance of Nature, the quality of the timbers, the purity of the waters, and the biodiversity of the Atlantic forest in its pristine state.

With no specialized commercial economy, the subsistence activities of the indigenous peoples in the Atlantic forest inevitably caused far milder impacts on the environment than those of the colonizers. Without the slightest hesitation, Dean (2004) insists that it is quite improbable that any part of the Atlantic forest lowlands escaped from clear-cutting at least once during the cultural development phase of slash-and-burn agriculture, at sites appropriate for growing crops. In fact, this type of cropping imposed pressures on the ecosystem. Nevertheless, due to the vast tracts of land and relatively minor human presence, there is no way of assuming that the peoples of the Atlantic forest caused sweeping and irreversible environmental impacts – far less over all the vast area of the low-lying forestlands. In 10,000 years of settlement in these forests, its inhabitants might have altered it here and there, as the indigenous tribes always did. Nevertheless, the environmental balance was maintained. Dean himself (2004) acknowledges that in 1500 the Tupi were able to expand more "and had not yet exhausted the productive potential of their habitat". To the contrary, they were still far from reaching this stage.

Living at subsistence levels, but without being poor in the modern socio-economic sense (Cavalcanti, 1992), the indigenous tribes were unaware of the concept of saving or accumulation. They planted, harvested, fished and hunted according to their needs, as can be observed even today in the villages on the outskirts of mainstream civilization that can be found in the heart of Amazonia (Reichel-Dolmatoff, 1976). This endowed them with free time. Léry (1972) notes that "they drink little or much, but do not suffer from melancholy, gathering together every day to dance and enjoy themselves in their village". This is a portrait of a healthy, happy people, which must to some extent be attributed to a relatively harmonious insertion within an apparently healthy Nature. On this topic, Caminha offers a report that is in fact truer than this chronicler himself perceived: "They seem to me to be people of such innocence that, if we could understand their speech and they ours, they would soon be Christians". With time available to them, the indigenous peoples naturally extended their communications with the ecosystem, including at the supernatural level. They assigned "names to hundreds of species for which they had found some use and in regard to which they had learned habitats, seasons, habits, and relations with still other species" (Dean, 2004). Consequently, due to the wide diversity of peoples living in the Atlantic forest, thousands of forest species were catalogued in the memory of its dwellers. The complexity of the forest as an ecosystem was certainly not unperceived by its earliest residents. With all this wealth of information, these indigenous tribes built up considerable amounts of knowledge into a unique heritage that was tragically not used properly at the right time by the Portuguese colonizers, but instead faded away forever, lost in the mists of time.

This leads to the conclusion that as the cultural activities before the arrival of the Portuguese managed to sustain a society that depended on them, with no significant alterations to the environment, despite certain problems that must have been faced. The landscape found by the Portuguese in the New World was undoubtedly a luxuriant jungle with an impressive diversity of plants and wildlife, and a handsome human population. If this was not the case – but the evidence indicates that it certainly was – Pero Vaz de Caminha would at the very least have been mistaken to an unfortunate extent. This same process would have affected Jean de Léry (a strict missionary following the democratic theocracy of Calvin), Gabriel Soares de Souza and other chroniclers of the earliest days of Brazil, like Cardim (1939). There is no doubt that there are some, like geographer William M. Denevan (1992) who suggested something different, a landscape with more significant alterations. However, this seems more likely in areas where the presence of the Aztec and Inca peoples prevailed; it apparently loses ground as an argument when related to the native peoples of the Atlantic forest. At least, this is what seems to have been believed by visitors to the New World during the XVI century. However, this does not mean that if the indigenous population of Brazil had been ten times larger in 1500, for example, the destruction of the biophysical base on which this society reposed would not have been eroded away to a dangerous extent. But this is pure speculation. There might even have been a large population in parts of Brazilian territory, with no significant environmental devastation of the terrain (see, for example, Roosevelt *et al.*, 1996).

Insatiable Greed: the Purposes of the 'Conquest' and the Interests of the Colonizers

In order to understand what happened in the Atlantic forest after the fatal episode that became known as the 'Discovery of Brazil', an analysis is required of what prompted a huge and heavily-armed Portuguese fleet to face up to all the hazards of crossing the ocean towards the end of the XV century, finally anchoring in Porto Seguro. This topic has been amply discussed and explored, and this is not the place to review all this information. However, the permanent (and increasingly intensive) battle in society should be recalled at that time, over the use and control of natural resources

(Castro Herrera, 1996; Crosby, 1993), at the national and global scales. As the Portuguese empire expanded in its quest for wealth, it was driven to add new lands to its limited geographical size. The fleet headed by Cabral reached the Land of the True Cross, confident that Portugal would find here far more than the portion assigned to it under the territorial share-out of the New World agreed with Spain through the Treaty of Tordesillas (1494). In fact, the Portuguese Crown was not interested in archeological treasures or biodiversity. What it had in mind was precious metals and other mineral resources. This was disclosed by chronicler Pero Vaz Caminha, who noted in his letter written ten days after landfall: "So far we have not been able to discover whether there is gold or silver (in the New World) or other metal stuff or iron". Previously, mentioning one of the spokespersons that the Portuguese sought out to learn what there was in the Land of the True Cross, he wrote: "no one understood him, and he did not understand us, no matter how much we asked him about gold, because we wanted to know if there was any in this land". The fleet headed by Cabral left with no news of this aspect, although Caminha mentions that during the first contact with the indigenous tribes on the flagship, one of them pointed to the (gold) collar of the Captain, and began to wave his hand towards the land and then point at the collar, as though wishing to tell us that there was gold on the land. He also looked at a silver candlestick and once again pointed to the land and back to the candlestick, as though there were silver there as well!" Seventy years later, with the same hopes of enriching Portugal, Gandavo (1980) was still speculating: "it is certain that this is a very rich land with many metals in it". This same Gandavo also said: "in addition to being as fertile as I said and supplied with all the staples required to support the life of man, it (the land) is certainly also very rich with much gold and stones in it, of which we have high hopes" (Gandavo, 1980).

Based on this drive, an analyst of the psychology of the 'discovery' of the New World stressed that there were two main forces behind the idea that the Portuguese had of Brazil: "the ambition for gold and free, untrammeled sensuality" (Prado, 1931). But, according to the same author, it was the "insatiable greed, the mad rush for rapid enrichment" (Prado, 1931) that drove the colonizers after the 'Conquest'. On the other hand, there was a practical need for Portugal to ensure the feasible settlement of such a vast land, striving to endow it with economic use before the precious metals were actually found. After all, as noted by Furtado (1967), the Portuguese Crown had "to cover the costs of defending" the lands. If it did not have a source that provided the financing for this enterprise, the burden of protecting this newly-conquered territory would exceed Portugal's ability to do so. Without finding the gold of its dreams, and without attempting to exploit the natural capital of the Atlantic forest, it is unlikely that Portugal would have long remained a major colonial power in the Americas" (Furtado, 1967).

Frontispiece of the book *Historiae Naturalis Brasiliae* by W. Piso, G. Marcgraf and I. de Laet, 1648, that depicted novel aspects of the fauna and flora of the Brazilian territory dominated by the Dutch. Ricardo Brennand Institute Collection, Recife, Pernambuco.

In the detailed interpretation by Sérgio Buarque de Holanda, who distinguished between the two principles that were to guide human activities, symbolized by the "adventurer" and the "worker" (Holanda, 1976), the Brazilian colonizer tended more towards the former category. The ventures undertaken by these adventurers were surely not well-thought out and systematized enterprises. "His idea (was) to harvest the fruit without planting the tree" (Holanda, 1976), with efforts focused not on building up a strong society, but rather on immediate rewards for little effort. Finding abundant gold was only one expression of this venturesome spirit. Others were far more closely related to what has remained as a legacy in the Brazilian character: an anti-ecological spirit, the urge for prosperity at all costs (for society, rather than the individual), the empty quest for honorific titles, positions and easy wealth. This topic has already been addressed by Paulo Prado, stressing the lack of love for the land that characterized these Portuguese adventurers with what he called an "overseas mindset": "the wish to make a fortune as quickly as possible, to be enjoyed on the other side of the ocean" (Prado, 1931). The Dutch invasion in fact strengthened this adventurous spirit, as the type of settlers that it brought to Pernambuco State in Northeast Brazil were recruited from adventurers all over Europe "normally men weary of persecution (who) came merely to seek impossible fortunes, with no thought of putting down strong roots in the land" (Holanda, 1976).

In 1552, Father Manuel da Nóbrega stressed, in one of the countless letters that he wrote from Brazil: "among all those who come from there, none have any love for this land (...) they all want to take advantage, even at the cost of the land, because they expect to leave". Something similar is noted in another letter by this Priest: "they do not want the best for the land, because their affections lie in Portugal; neither do they work to benefit the land, but rather take advantage of it in any way that they can". Friar Vicente do Salvador (1918) even jokingly notes, in 1627, this same characteristic among the colonizers: "the settlers, no matter how strongly rooted they are to the land and how rich they may be, all intend to return to Portugal and if the ranches and goods that they own could speak, they would also have taught them to say like parrots to which the first thing taught is: a royal parrot to Portugal, because they all want to go there, not only those who came from there, but also those who were born here, with some of them making use of the land not as its lords, but rather as usufructuaries, merely taking advantage of it and leaving it despoiled".

Within this context, it was consequently "normal" that, with the purposes of colonization, the Atlantic forest with all its lush indications of fertility should be viewed as nothing more than a huge green wall, a vast stumbling-block hampering the progress of the insatiable greed of the Portuguese (Freyre, 1985; Dean, 2004), and the colonizers soon realized this. They would have to satisfy their desires for prosperity at no cost, their quest for easy riches through the direct exploitation of nature. Breaking through the wall of plant life that blocked their path was the major challenge to be dealt with (Pádua, 2002), and the most obvious step for the expansion of the 'Conquest'. Agronomist Miguel Antônio da Silva, mentioned by Pádua (2002), bears eloquent witness to this aspect: "The first Portuguese settlers who landed in this blessed turf of America found incredibly fertile forests, real treasure troves built up over centuries and more centuries on virgin soils; this fertility fascinated them, as they felt it was inexhaustible, which was the prime cause of the deadly system of pillaging the land that they launched, a true theft; this was the system that has been deeply rooted in our agricultural practices since colonial times".

On the other hand, it should be recalled that the 'Conquest' or the invasion with no resistance from the indigenous peoples, endowed the Europeans and their insatiable appetites with what they assumed to be absolute rights over the conquered. From this standpoint, the forest was merely another plundered trophy (Dean, 2004). Ambition, the desire for immoderate enrichment, the thirst for precious metals: all this triggered the quest for gold which, not showing up due to the apparent absence of this metal in the New Land, prompted the Europeans to expropriate the precious capital in the lush forests. Their early experience with Nature mastered rather than in the wild led to the alternative of deadly attacks designed to bring the Atlantic forest into submission for the purposes of colonization. In these efforts, the virulent appetites of the conquerors were to be greater than the power of their weapons, as recalled by Dean (2004). In his letter, Caminha ingenuously indicated to King Emanuel I of Portugal that: "the best fruit that (the New Land) may offer seems to me that it will save these people". Save them how, if they did not seem to be threatened by a disaster (other than that ushered in by the Portuguese)? In the words of the scrivener of Cabral's fleet: "in order to comply and follow the wishes of Your Highness here, namely conversion to our faith!" Faith yes, but in enrichment driven by unfettered concupiscence.

Exploitation of the Atlantic Forest

There is not slightest doubt that the exploitation of the Atlantic forest between Alagoas and Pernambuco States (and at the same scale as the rest of the country) recounts a tale of unmistakable barbarism: a process of confiscation implemented by representatives of the ecological imperialism of Europe. This process began with felling brazilwood – also initially known as "Pernambuco wood". During the XVI century, an estimated 8,000 tons of timber were shipped from Brazil to Portugal, equivalent to around two million trees (Dean, 2004). This shocking figure may even be corrected upwards. Little by little, this formula for pillaging Brazil's

Frans Post, Georg Marcgraf and Albert Eckhout, members of the of Maurice of Nassau's retinue, recorded in detail elements and natural landscapes of Pernambuco. Frans Post, *Brazilian landscape with armadillo*, 1649. Alte Pinakotheke, Munich, Germany.

Following page:
Frans Post. *Waterfall in the forest*, 1657. Ricardo Brennand Institute Collection, Recife, Pernambuco.

biota continued through its expanding sugar cane plantations. Sugar cane was expanding quite normally under the circumstances, following a standard that was "horizontal and predatory, adapted to the specific reality of each region" (Pádua, 2002). Fire was an inseparable aspect of this standard, deliberately reproducing a phenomenon that was deployed as a way of shaping and controlling the natural environment and that was and continued to be used similarly by the earliest peoples of the Americas. The portuguese followed the same techniques as used by the indigenous tribes, although on a far greater scale and more mercilessly, preferring the slash-and-burn method to any other solution (Dean, 2004). Doing so in their eagerness for rapid enrichment, as already explained, they committed "all the crimes that the men of this time practiced in order to satisfy their passions" (Prado, 1931).

Crimes are clearly not innocent actions. They were perpetrated widely in the Land of the True Cross, starting with the fact that, as recalled by Furtado (1967), "the first commercial activity to which the settlers devoted themselves was hunting the indigenous peoples". Hunting human beings or capturing them, as noted by Andrade (1998), is the most painful and inhumane type of business. But during the early XVI century, this was encouraged by the Roman Catholic Church itself, which felt that the indigenous peoples had no rights (and did not even have souls). This was remedied, and even so reluctantly, by Pope Paul III in 1537, who altered the official position of the Church through the encyclical entitled *Sublimis Deus*. It is worthwhile recalling that the groups of adventurers known as *bandeiras* that, from São Paulo State, explored the hinterlands of Brazil, sought mainly glory "in the battle against nature, of which the defenseless tribespeople were a part" (Prado, 1931). On the other hand, as shown by Crosby (1993), the history of the forest is a planet-wide narrative of exploitation and destruction (see also Dean, 2004). The capture of the indigenous peoples was all to the advantage of the settlers. The newcomers had firearms, experience of war and were organized for conquest. Completely unarmed except for their bows and arrows designed to hunt game, the indigenous peoples had no solid defense system, with their sacred traditions, families and complex lifestyles to protect (Crosby, 1993). Additionally, the completely unequal exchange of pathogenic elements between Europeans and indigenous Brazilians stepped up the power of domination of the former, as the outcome of biogeographical factors that adversely affected the latter.

As described by Couto (1849), in their drive for conquest that met no solid resistance, Portuguese settlers approached the environment "with a broadaxe in one hand and a firebrand in the other". They thus implemented "a barbarous agriculture", like someone who "looks at two or more leagues of forests as though they were nothing, and barely reduces them to ashes before looking even further ahead in order to bring destruction to other areas" (Couto, 1849). This was the way in which "sugar cane began to reign alone over leagues and leagues of earth reddened by leftover forest litter. Devastated by fire" (Freyre, 1985). The way in which this was undertaken had already been recorded by Antonil (1997), this fashion: "after selecting the best land for the sugar cane, it was hoed, burned and cleared, removing from it everything that might serve as a stumbling-block". Removing everything that might serve as a stumbling block, meaning destruction, was the undoubted hallmark of the first century of colonization, which has continued to be reproduced symptomatically through to our own days. During the early XVII century, the Governor of the Northern Brazil, Diogo de Menezes, wrote to the King of Portugal: "Your Majesty may believe that the true mines of Brazil are sugar and brazilwood, from which Your Majesty has benefited so greatly, without costing a single penny to your Treasury" (*apud* Prado, 1931). This heritage that was being decimated was free of charge, and cost the Portuguese Crown nothing. From then on, the Atlantic forest was to continue to offer easy profits, gains at no cost, and a real transfer of wealth to Metropolitan Portugal – closely aligned with the spirit or principle of the adventurer.

Through ravaging and burning the forest, there remained "an immensely fertile layer of ashes that made possible an effortless, mindless, and unsustainable agriculture" (Dean, 2004). As recalled by Buarque de Holanda (1976), the option for slash-and-burn agriculture probably "seemed to the settlers in the virgin forest to be so clearly necessary that they did not even consider any other types of exploring the land. It seemed to them that the productivity of the cleared soils whose tree stumps were removed without the help of fire is not sufficient to compensate the work required to clear these lands, particularly as the prospects for a nearby market for this cut timber are almost always minimal".

In parallel to the expansion of land-clearing through burn-offs, the population expanded steadily in this region, capital built up to opulent levels, and the Atlantic forest succumbed to the greed of the colonizers. No constraints were imposed on this process, which was to become a constant, as noted by Dean (2004), during half a millennium of greed.

During the late XVI century, according to the estimates of Furtado (1967), sugar production in this colony probably topped the appreciable figure of two million *arrobas,* equivalent to 13,300 tons. However, this might have been less, as Antonil (1997) suggests a total of 1.3 million *arrobas* in 1710, although he may well have lacked full data for the sugar-based economy of that time. Nevertheless, at that time there were 246 sugar mills in Pernambuco, indicating broad-ranging and widely-disseminated activities. In fact, the available information shows that sugar had become the only economic activity of any significance, establishing a strong link between the Atlantic forest and Metropolitan Portugal. Brazilwood also appeared, but was less important. On

the other hand, the exclusive dominion of sugar cane meant that many other forest products, such as indigo dyes, that could have been collected if the settlers had sought to know them, were edged out of this process. Indigo dye was a domesticated indigenous resource, as the tribespeople were familiar with this blue coloring and extracted it from countless native species of *indigofera*. Offering advantages over other ways of using the forest, this approach was easier to exploit and far less destructive to the environment than sugar cane. This was analyzed by Conceição Velloso, who stressed "the great advantage of the indigo trade, compared to the plantation crops such as sugar".

However, among all the products planted to produce exportable surpluses to Portugal, sugar cane reigned supreme, which is why the history of Brazil during the early centuries of colonization is also the history of sugar. As a result, the expansion of the sugar plantations "took the virginity" in the phrase of Gilberto Freyre (1985), of these great forestlands, and "in the crudest way: through burn-offs. Fire was used to open clearings in the virgin forest that extended the sugar plantations that brought civilization and devastation" (Freyre, 1985). Although on a lesser scale, devastation was also caused by the use of hand-tools that enchanted the indigenous tribespeople, particularly the axe and its symbolism further ahead. Through bartering with the Europeans, the indigenous tribes began to use iron tools that were formerly unknown to them. On this matter, Dean (2004) recalls: "It is hard to imagine how gratifying their sudden entry into the iron age must have been, how transformative of their culture, and how disruptive of the forest".

Grown through fertilization on Madeira and San Tome Islands, sugar cane needed no manuring in Brazil. And, in some cases, it could be cut year after year with no need for replanting. The rainfall system along the coast of Northeast Brazil boosted the profitability of this business, as no irrigation was required. Added to this was the encouraging fact that the species of sugar cane introduced into Northeast were "free of the diseases and parasites that plagued them in the places whence they had been transported" (Dean, 2004). Although irrigation was not needed during the early days of colonization, it has today become necessary on many sugar cane plantations in Pernambuco and Alagoas States. Changing environmental conditions?

In the view of Antonil (1997), the sugar mill *compradores* or overseers should use "all diligence to defend the markers and waters needed to crush cane in the mill". He also noted that, in order to sustain its business, a sugar mill initially required good lands. "Good or bad lands are the crucial factor for a sugar mill producing a good or bad yield, in real terms" (Antonil, 1997; Freyre, 1985). In this case, these were the famous *massapê* lands with their "rich clay earth", "fertile sugar cane lands" [Freyre, 1985]. Second, sufficient water for the mills: "on the sugar cane plantations of Northeast Brazil, water was and is almost everything", and third, forests close to the sugar mill that provided fuelwood, "having the fuelwood as close as possible" as Freyre remarked (1985). It was noted by Antonil (1997) that many sugar mill owners sold off their lands once they were depleted, or due to the lack of fuelwood to fire their furnaces and shortages of timber for building purposes. Fourth on the list of factors underpinning the sugar cane plantations was the need for plenty of good slaves and several yokes of oxen with their carts. "Land, water, forests, negroes and oxen", concluded Freyre (1985). From the forest, in lesser but not negligible quantities, the sugar mill also needed wood to produce ash (used to purify the sugar) as well as to produce the sugar crates containing 35 *arrobas* (around 566 kilograms) in which it was exported, as well as for making barrels to hold *cachaça,* Brazil's fiery cane spirit.

Antonil also stressed that the grinding houses at the sugar mills had a "roof covered with tiles laid on planks, joists and beams made from what they call hardwood, which is the strongest found in Brazil, and not bettered by any other land" [Antonil, 1997], adding: "it seems to be necessary to give news of the woods and timbers used to make the crusher and all the other woodwork of the sugar mill, which in Brazil is open to choice, as there is no other part of the world so rich in strong good woods, not accepting any timber in this mill other than hardwoods, because experience has shown that this is necessary".

The Atlantic forest fragmentation process in Pernambuco and Alagoas began in the first centuries of European occupation, as recorded by Frans Post. *Brazilian landscape*, 1657. Mauritshuis, The Hague, Holland.

Bromeliads in a northeastern landscape,
in the foreground. Frans Post. *Franciscan cloister*, XVII century.
Historisches Museum, Frankfurt, Germany.

Opposite page:
Jerônimo José Teles Júnior. *Landscape – Madalena*, 1895.
Pernambuco State Museum.

This was an unlimited natural asset that allowed such demanding choices. This situation was possible due to the Portuguese system of awarding vast tracts of land called *sesmarías* whose size was quite astounding. This meant that the lords of these lands had no need to worry about making parsimonious use of their main resource – Nature itself – which was underpinned by the Portuguese "willingness to connive in their private expropriation at no cost to the expropriators" (Dean, 2004). The technique of exploiting the forest and its soils could have been destructive, as seen by the colonizers, because this ecosystem seemed an unending cornucopia. It was not even necessary to leave the land lying fallow, as the soils proved immensely fertile after the burn-offs (Dean, 2004).

Along the same line of belief in a prodigious Nature, the plow was almost unknown in this colony. The soil needed no elaborate plowing to yield even more. All that was needed was to clear the land through burn-offs, which made crop-growing easier, after which it was abandoned as soon as it showed signs of depletion. This resulted in massive savings on labor. Portuguese settlers with no slaves could still plant their crops and harvest them, on land grants awarded at no charge. This meant that there was no incentive to protect it, particularly because as the system allowed fresh grants of *sesmarías* whenever required. In fact, having "consumed all the most promising primary forest in a given *sesmaría*, a grantee commonly sold it off for a trifle and asked for another, which he normally experienced no difficulty in obtaining" (Dean, 2004). This simplified way of obtaining land, possible only through appropriation of the assets of others, resulted in the best forests being burned, as well as those closest to the settlements. Although surrounded by the abundant natural resources of this colony, these settlements began to feel "the lack of timber, fuelwood and grasses". On this aspect, José Gregório M. Navarro (*apud* Pádua, 2002) noted that in 1799, the settlements, towns and cities founded by the Portuguese colonizers were in a situation of: "inanimate bodies. Because the neighboring laborers who supplied them with staples through farming, reduced all the trees to ashes and then deprived the earth of its most vigorous substance, leaving it covered by crabgrass and ferns (...) abandoning their homes with all their sugar mills, workshops and corrals and tools, moving on to other lands".

Abundant land, nomadic burn-offs, irresponsible consumption of fuelwood. Unprotected forests. Destruction of the Atlantic forest. Agriculture lacking any environmental responsibility. This offers a good idea of the drama of the *Zona da Mata* forest zone of Pernambuco and Alagoas States.

It is worthwhile recalling here, with Pádua (2002), that through the logic of venture-based development, according to the rationale of Sérgio Buarque de Holanda (1976) and faced with this lush biomass, burn-offs would have been the cheapest and most effective way to grow sugar cane. The cheapest, because the land factor

had a zero cost for the entrepreneur. In fact, setting fire to the forest required less labor than removing the trees by hand, and was also far quicker, as a man could set fire to the forest and complete some other task as it burned. This led to the inevitability of environmental destruction, with the mindset prevailing here of the economy of plunder, more certainly than the logic of the exploitive colony. In turn, the indigenous peoples put up no resistance to the arrival of these colonists. To the contrary, they were easy prey, hunted like tapirs, wildcats or alligators. The rich forestlands that were blithely taken over by the Europeans and turned into croplands soon reverted to crabgrass. Simplified through commercial ambitions, their original ecosystems altered irreparably, and when the forest returned as secondary growth, this phenomenon produced what Janzen (1971) called "the living dead". This is a biological process in secondary forests whose trees still stand but are not feasible in biological terms, not reproducing as they lack pollinators or agents to scatter their seeds. They merely wait for death. This resulted in pillage and devastation. Irreversible simplification of ecosystems. Irreparable loss of natural capital. Definitive losses for future generations of Brazilians.

Moreover, Baltazar da Silva Lisboa commented that agriculture was implemented in Brazil "as badly as can be imagined" and mentioned the poor construction of the furnaces at the sugar mills, which consumed huge amounts of fuelwood with no constraints on internalized environmental costs, to the point that by the late XVIII century a load of sugar cane required a similar load of fuelwood. Somewhat surprisingly, Dean (2004) assumes that the environmental degradation caused by this would have been "modest". However, the report by Antonil (1997) does not support this opinion, stating that the furnaces were "huge" on which the sugar syrup cauldrons stood, turning them into "maws that swallowed the forests" and resulting in the "appalling expenditure of fuelwoods" in the words of Bittencourt e Sá. This is also

Profile of a newly cut Atlantic forest.
Auguste Stahl. *Stretch of the Recife–São Francisco Railroad between the cities of Recife and Cabo. Pernambuco Province*, 1858. Dona Thereza Christina Maria Collection, National Library, Rio de Janeiro.

the opinion of José Bonifácio de Andrada e Silva. However, Antonil (1997), naively and with the view of a superabundant ecosystem, saw no problem there, as: "only Brazil, with its vast forests, could have supplied so many furnaces so generously for so many years in the past and for so many years to come, found at the sugar mills of Bahia, Pernambuco, Rio de Janeiro States, that commonly crush day and night for six, seven, eight and nine months of the year".

The use of heat generated by fuelwood was also a destructive factor prompted by brickworks and tileworks, as well as the preparation of the lime used in mortar and whitewashing walls. The cities and towns also required high consumption of wood and charcoal (Dean, 2004), which resulted in the destruction of even more trees. Brick kilns are mentioned by Antonil (1997) as mechanisms wasting "much fuelwood in the building, and much for firing, and for firing there must be mangrove swamps which, once removed, destroy the shellfish that are the remedy of the negroes". There is no way avoiding an awareness that this was a voraciously predatory model that devoured Nature. As a result, by the XVIII century, the Atlantic forest had already shrunk considerably (Dean, 2004). Nevertheless, efforts were implemented, particularly from the end of this century onwards, to use cane bagasse for boiling the sugar, sparing the forests (Maia, 1985). But this was not very significant, despite the efforts of the authorities, including the President of the Province of Pernambuco in 1857 (Maia, 1985).

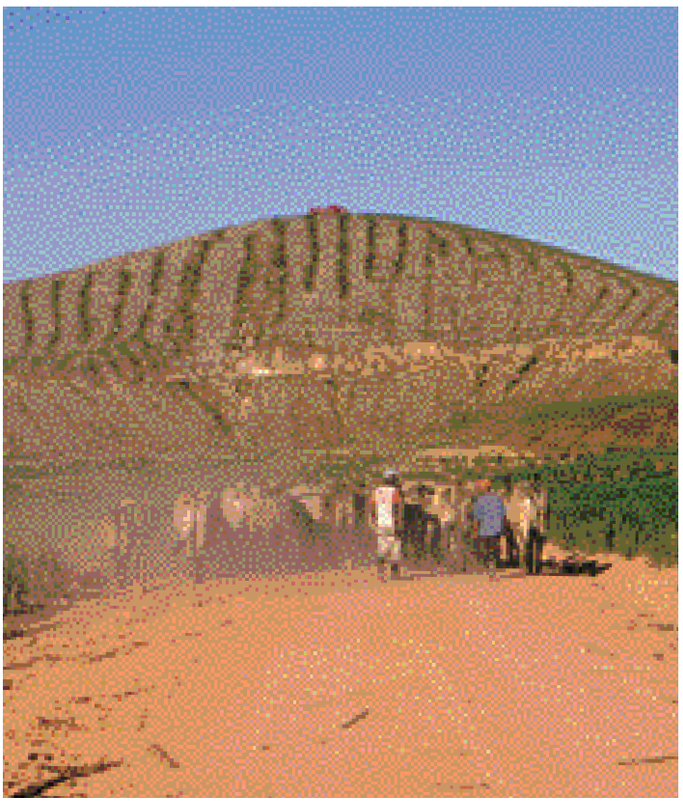
It was only in 1810 that someone appeared who was really concerned with the possibility of the extinction of the plants and wild life of this ecosystem. According to Dean (2004), Manuel Arruda da Câmara, who even described bromeliad species endemic to Pernambuco and Alagoas States, such as *Aechmea muricata*, and other magnificent examples such as *Pseudananas sagenarius* (see Chapter 7), was the first visionary with this awareness. According to Pádua (2002), the same stance was adopted in 1875 by Nicolau Joaquim Moreira, who complained in his agricultural guidebook for immigrants to Brazil (*Indicações Agrícolas para os Imigrantes que se Dirigem ao Brasil*): "for 375 years a routine depletive culture, based on the broadaxe and the firebrand, has felled trees and shattered branches, uprooting from the fertile soils of Brazil the elements of grandeur and prosperity of future generations". This feeling was to grow steadily, in parallel to the various ways of using the Atlantic forest lands in the course of Brazil's economic history. The introduction of coffee in the Center-South was to devastate the primary forestlands that still remained standing, with the same occurring in high-altitude marshes in Pernambuco and Alagoas States. Similarly, the development of rail transportation also stepped up logging activities, particularly to meet demands for large numbers of wooden sleepers. In Pernambuco and Alagoas States, dense forestlands were cut down to feed the trains with fuelwood for their boilers, which were certainly more efficient than those of the sugar mills in the report by Antonil. Until the 1940s, when I was a child, as I saw for myself, on the Great Western Railroad running through the *Zona da Mata* forest zone of Pernambuco and Alagoas States, there were only locomotives driven by fuelwood. Their diesel-driven counterparts appeared only later as a great novelty during the late 1950s, when this British railway company was nationalized and renamed the *Rede Ferroviária do Nordeste* (RFN). Economic growth and an expanding population with no interest in environmental preservation resulted in the rapid loss of the lush vegetation that remained of the Atlantic forest during the Republican period (Dean, 2004). Strengthening this trend, Brazil's fuel alcohol program (Pró-Álcool) stepped up logging activities during the 1970s. It was through this initiative, rated as environmentally sound – replacing fossil fuels with ethanol distilled from sugar cane – that almost all the last patches of forest (mentioned previously) covering the tops of the hills in the *Zona da Mata* forest zone of Pernambuco State vanished completely.

Appropriately Dean mentions "a terrible new threat" that appeared with the launch of the developmentalist ideology of the post-war world, which was to loom over the Atlantic forest: "This was an idea, an obsession in fact, called 'economic development'" (Dean, 2004). In fact, it was even more, it was *growthmania* in the words of Mishan (1993). But development and growth are not the same thing, as the former may contain growth, but it is essentially evolution and change. In contrast, the latter necessarily means expansion and increase. All of this was to be closely linked to the extinction of the biodiversity of the Atlantic forest, because this was where much of the intervention took place, through initiatives such as setting up industrial districts in Pernambuco and Alagoas States, and building the Port of Suape, hotels and coastal highways, and even an oil refinery. All these were justified as factors for economic growth, generating jobs and income. A lovely forest reserve less than fifty kilometers south of Recife covering some two hundred hectares that was uninhabited, and the unspoilt beach of Muro Alto in the Ipojuca district made way for beach resorts attracting tourists. The craving for land and the destructive exploitation of the forest, bringing it to the status of a non-renewable resource, will sweep away successive patches of Atlantic forest that have survived relatively intact, meaning that economic growth is being imposed with no further argument and in an opportunistic manner, whose outcome is always unknown, destroying age-old forests that are unparalleled and extremely rich in biodiversity. This is the legacy of a history of constant violence, with touches of anti-environmental furor and senseless hate for wildlife: the social and environmental history of the transformation of the Atlantic forest during the past five hundred years.

Slavery and the Destruction of the Atlantic Forest

One of the weightier elements in the tragic and violent exploitation of natural resources during the colonization of the Atlantic forest is related to the indiscriminate use of slave labor. This worsened the spendthrift approach adopted when clearing these lands to grow sugar cane. This is not the place for a detailed examination of the structure of slavery in Brazil, as this topic has been covered by many valuable studies at different times. According to Sérgio Buarque de Holanda, without slave labor, the "vast tracts of bountiful land open to exploitation and ruin" available to the colonizers would not have been enough (Holanda, 1976). Initially, the Europeans tried to enslave the indigenous peoples, hunting, capturing and imprisoning them. However, the tribespeople were not used to manual labor, as Andrade (1998) explained, because their cultural development had not yet reached the "sedentary agriculture phase". They were not prepared for the Portuguese venture. In order to extend the sugar cane plantations, abundant labor was required, needed to prepare and care for these vast tracts of land. There was no issue related to the racial superiority of the Portuguese, which was mentioned by Sérgio Buarque de Holanda when noting that: "the other very typical face (of) the extraordinary social plasticity (of the Portuguese was) the complete or almost complete absence of any racial pride among them" (Holanda, 1976). The factor driving this process was in fact the measureless thirst for wealth. This meant that the main problem facing the colonizers was a shortage of labor, needed to plant sugar cane, as well as producing and shipping sugar, in addition to caring for the homes of these lords of the land and even growing food crops (Andrade, 1998).

For the European, the tropical rainforest appeared inimical to his dreams of rapid enrichment, and this adversary had to be overcome through agrarian settlement. The colonizers achieved this through "destroying it", as stressed by Gilberto Freyre (1985). The Europeans made no attempt to adapt to the forest, with their slaves carrying out the orders of their masters. Orders for destruction. In contrast, negro slaves knew how to live with these natural surroundings, which is why they adapted to the forest, to some extent reshaping their needs when they "escaped from the slavocracy of the plantations and vast estates" (Freyre, 1985). Consequently, sugar cane raised the white man to the aristocratic status of the lord and downgraded "the tribespeople and particularly the negroes, initially to slaves, and then to pariahs" (Freyre, 1985). This is the same process that made the sugar plantation the king, assigning negligible value to the forest. The commoditization of Africans that underpinned colonization in parallel to the commoditization of unspoilt Nature, a treasure trove that seemed inexhaustible, coarsened the system, stamping it with the devastation of human beings and the resources sheltered in its ecosystem.



Oxen toil during the sugar-cane harvest,
at the height of summer in the Northeast. The vehicle
at the top of the hill is ready for the next burn-off.
Usina Trapiche, Ipojuca, Pernambuco.

Opposite page:
View of one of the many secondary roads
that run through the cane fields in the Northeast.
Usina Paísa, Penedo, Alagoas.

The sugar-cane fields in full bloom in the lowlands with Atlantic forest fragments on the hillsides.

This stamp reflects economic exploitation stigmatized by plunder and the degradation of human beings, tinged with the colors of single-crop plantations, vast estates, slavery, shattered branches left behind after clearing the forest, with the land reduced to "a rubbish dump worked with disgust" (Freyre, 1985).

With slavery and "intensely exploitative colonialism" it was impossible to develop a pastoral economy in Brazil, similar to that in the Iberian Peninsula, worsened by the fact that "a society based on forced labor was heedless of its environment" (Dean, 2004). In this society, where the value assigned to human life is negligible, conserving natural resources was also irrelevant. Consequently, Brazil's sugar boom flourished within a system that sacrificed human lives (indigenous and African) at a very high cost, in terms of destroying the original rainforest. Was this worthwhile, in terms of the outcome? Dean feels that it was not, noting that the costs were appallingly disproportionate to the results, and that the Portuguese with their "extraordinarily wasteful forms of natural resource exploitation [obtained benefits] as exiguous as the waste had been immense" (Dean, 2004). These devastating practices served only as sources of income for a land-owning elite endowed with countless privileges, as well as the State machine (Pádua, 2002).

By the end of the XVIII century and the early XIX century, this led to an awareness among the critics of environmental destruction (such as Antônio Veloso de Oliveira, Baltazar Lisboa and José Severiano Maciel da Costa), for example, that there seemed to be a link between the end of slavery and a slowdown in this destruction

(Pádua, 2002). As noted in the perceptive analysis by Pádua (2002): "the prevalence of slave labor [was indicated] as one of the main causes of the crudeness and inefficiency of Brazilian agriculture, preventing the appearance of a class of hard-working farmers, aware and directly involved with the technological and administrative enhancement of their activities".

This topic was addressed by Joaquim Nabuco, showing that the link between man and the land under the slavery was not a "consortium of them both" nor a "permanent habitation" of the land; it was not even "definitive possession of the soil". It was a "gloomy spectacle" of the "struggle of man against the land through slave labor", which prevented the soil from coming to life. With slavery abolished, the same destructive practices based on fire and single-crop plantations continued, actually expanding their range towards other forest reserves. But this recalls the saying of Nabuco that it was not enough to put an end to slavery: it was also necessary to "destroy the work of slavery" (also Pádua, 2002). And this task did not give rise only to a perverse society that lacked humanism. It also fulfilled its destiny of devastating the environment.

Outcome of the Process: The Enthronement of Entropy

In his study of "ecological imperialism", Alfred Crosby (1993) discusses what he calls the "Neo-Europes" – regions colonized by mass immigration from Europe, such as Argentina, Uruguay, Australia, New Zealand, the USA, and Canada. In these areas, the type of colonist known as a "worker", in the suggestive dichotomy of Sérgio Buarque de Holanda (1976), clearly prevails. The spirit of this type of immigrant is nurtured by an ethic that "initially sees the difficulties to be overcome rather than the triumph to be attained" (Holanda, 1976). In contrast, the tropics – like the Atlantic forest – were explored by "adventurers" who had a more "spacious" concept of the world, focusing their energies on fast exploitation of natural resources. Acting "carelessly and with a certain neglect" [Holanda, 1976], lacking the will to construct, the adventurer did not follow the rules for methodical, rational enterprises. As noted by Friar Vicente do Salvador (1918), everything found here was shipped to the Metropolis which used its colony solely for the purpose of greed, and left it destroyed. There was no thought of sacrifice, but rather a single-minded focus on excessive benefits. Even the earliest type of agriculture established by Duarte Coelho Pereira, the first recipient of one of Brazil's vast land grants known as capitancies (*capitanias*), the Pernambuco one – ranging from the Campina dos Marcos in the historic town of Igarassu, north of Recife, to the São Francisco River – only "with some reserve" could be called thus (Holanda, 1976). Here, "European techniques served only to make even more devastating the rudimentary methods used by the tribespeople on their plantations." (Holanda, 1976).

Guided by Portugal's greed-driven quest for profits, the steady spread of sugar cane plantations was also fueled by the outstanding quality of the rich dark *massapê* soils underlying the Atlantic forest that carpeted Northeast Brazil. This extremely fertile blend of clay and humus was supplemented perfectly by the local climate. Perhaps more than any other element, this led to the regional specialization in sugar cane that spurred the colonization of the Americas by the Portuguese. "Once [the forest] had been stripped of its bulkiest trees (...) it became a pleasure to plant cane at will. It was these outstanding spots that underpinned the civilization based on sugar cane that developed here" (Freyre, 1985). This resulted in the depredation of the natural heritage by the monoculture system that impoverished and distorted landscapes, their forests devastated, and their waters also degraded, constituting what Freyre (1985) appropriately called the "social pathology of agricultural monoculture". The process of devastation was quite overwhelming, with the "largest and most noble trees of these lands (...) being destroyed not little by little, but in vast quantities" (Freyre, 1985). Worse still: much of the felled timber was not used to good purpose. "Much of it was chopped down and left lying on the ground, later swallowed by the sugar mill kilns" (Freyre, 1985). Other timbers were used to build ships and convent doors across the seas: "The amount of timber that Portugal removed from Northeast Brazil – fat hardwoods, for the other types caused repugnance to the Portuguese – for (...) all its voluptuous architecture (...) forms a chapter in the history of economic exploitation of Brazil by the Metropolis during its parasite phase, that should one day be written in detail" (Freyre, 1985).

It is worthwhile stressing that the documents in the Pernambuco State Public Library include a letter from the Marquis de Pombal dated December 6, 1775, "demanding that Brazil should ship only top grade brazilwood 'in thick trunks', with no 'skinny' or 'bastard' trees'" (Freyre, 1985). As an indication of untrammeled luxury and waste, the sugar mills were fenced with hardwoods, described by Antonil (1997) so enthusiastically. This was symptomatic of a wasteful model that disposed of the forest open-handedly, with the forest providing "too much, too easily" (Stuart B. Schwartz, in the Preface, Dean, 2004).

Stealing land, single-crop plantation owners not only did away with the lush plant life of the forest. They also impoverished the soil, encouraging erosion through rainfall run-off once the forest had been cleared, removing the rich layer of top soil from the land. Once the forest had been cleared and as these single-crop plantations spread, other natural treasures were also swept away into the rivers. "This resulted in the disappearance of the plants protecting the riverbanks that would withstand the waters during the rainy season, preventing them from leaching away the marrow of the land, conserving the humus and sap of the soil" (Freyre, 1985). With their imperial expansion, the cane

Interior of a working sugar mill where sugar is processed. Usina Frei Caneca, Jaqueira, Pernambuco.

Opposite page:
Sugar cane in bloom viewed from an Atlantic forest fragment in the Igarassu region, Pernambuco.

fields that made the landscapes uniform also weakened the ecosystem, simplified to the extreme through single-crop agriculture. Biodiversity was eliminated, soil fertility lost, the rivers silted up, and their waters grew murky. However, these vast plantations formed a landscape that was not unpleasant, but rather pleasing and seeming to have always been part of Brazil. Already quoted, Ascenso Ferreira suggested in his poem entitled *Trem de Alagoas*: "My God! We have already left / the beach so far behind ... / Then we see, really close another... / Heavens! It moves, it bends, it waves.../ No way! This is a section / now already ripe for cutting..." The essence of this history is that sugar cane: "entered here like a conqueror in enemy lands: killing the trees, drying out the forest, destroying and scaring away the animals and even the natives, wanting to take over the entire power of the land for itself. Only the sugar cane should grow lush and triumphant from the midst of all this ruined virgin vegetation and indigenous life crushed by the monoculturalist" (Freyre, 1985).

Once the forest had been swept away by sugar cane, Nature in Northeast Brazil – and the wealth of life that it sheltered – lost the harmony of everything that had constituted the most complex links of its components. What remained was, in the unparalleled and masterful words of Gilberto Freyre (1985), "relations of extreme or exaggerated subordination: of people to other people, of plants to other plants, of animals to other animals; the entire mass of plant life to the empire of the all-powerful sugar cane; the entire variety of human and animal life to a small group of white men – or officially white men – who owned the sugar plantations, the rich lands, the beautiful women and the thoroughbred horses".

Compared to temperate forests, the destruction of the tropical forests with their "living dead" (Janzen, 1971), is far more irreversible on any historical scale, allowing an assessment of the losses caused by the system that colonized the Atlantic forest, in terms of the loss of diversity, complexity and originality. As stressed by Dean (2004), the disappearance of a tropical forest means a tragedy whose proportions are beyond any human comprehension or conception. This is a tragedy whose brutality is worsened by the lack of interest of the European colonizers in any preservationist practices, with great trees used as fencing stakes for sugar mills, for doors and even as fuelwood for boilers, as beams for houses and shipbuilding. Simultaneously, by hunting the land's indigenous peoples, the Portuguese "improvidently destroyed the capacity of its native inhabitants to survive in its midst", something which constituted a vast cultural accomplishment (based on twelve thousand years of stored information), of which they had not the slightest awareness and "failed almost entirely to appreciate" (Dean, 2004).

Quoted by Dean (2004), Thomas Lindley commented in his *Narrative of a Voyage to Brazil*, when visiting Porto Seguro in 1802: "in a country which, with cultivation and industry would abound with

the blessings of nature to excess, the greater part of the people exist in want and poverty, while even the small remainder know not those enjoyments which make life desirable". By the start of this century of Brazil's independence of colonial rule, deforestation had already impoverished the ecosystem and pauperized to an even greater extent the underprivileged classes. As a result, Brazil had a "nameless population, exhausted by worms, malaria and syphilis, with each smallholder working two or three square kilometers with no or little affection for the nurturing soil; a poor country with no human assistance, or ruined by the hurried, disorderly and incompetent exploitation of its mineral wealth; backward and limited farming and grazing activities, not even suspecting the amazing possibilities offered by its waters, forests, fields and beaches" (Prado, 1931).

Alfred Crosby (1993) demonstrated that colonization is an essentially ecological phenomenon. In the case of Brazil, the environmental impact of its conquest by the Europeans: "is only now starting to be assessed in full" (Pádua, 2002), and this leads to the conclusion that the natural history of the process constitutes what might well be called the "biotic conquest of Brazil" (Dean, 2004). This biotic conquest implies the annihilation of the rich biophysical basis of the Atlantic forest ecosystem, leading to the painful perception, in the accurate words of Dean (2004), that "the ignorant armies have defeated the sway of evolution, enthroning, in its place, entropy".

It is worthwhile stressing that what happened in the Atlantic forest was not only environmental degradation, but also a "demographic catastrophe" particularly from the XVI century through to the first half of the XVII century. In parallel, this same phenomenon was taking place throughout the Americas, which was perhaps the greatest population disaster that has even taken place on the planet (Denevan, 1992). This offers an eloquent indication that the process of colonization was in fact a matter of human and ecological destruction of the lands dominated by the Iberian Peninsula. In fact, Denevan even comments that the decimation of the indigenous peoples through illnesses introduced by the Europeans meant that the environment would be emptier and, where some deterioration might have taken place in pre-Colombian times, this would have recovered in many areas. But this refers more to lands with denser populations, such as Mexico, Peru and Guatemala, and even perhaps parts of North America. However, this author also stresses that the indigenous peoples did not alter the original landscape "to the extent of post-Colonial Europeans" (Denevan, 1992). According to his calculations, the population of the Americas would have hovered between 43 to 65 million people in 1492, with some eight million living in the non-Andean areas of South America (more than seventeen million in Mexico and fifteen million in the Andes). These data might well justify the assumption that the environment had been slightly modified in the lower parts

Bromeliads and orchids are targeted by extractivists, even those on high branches of large remnant trees such as this huge "munguba" (*Eriotecha crenulaticalyx*, Bombacaceae). Children and adolescents are often pressed into service for the risky task of climbing up the straight trunks.

Opposite page:
This small forest fragment on sandy soil near the sea is home to the last populations of several endemic and critically endangered species such as the bromeliad, *Aechmea lactifera*, newly described in Chapter 7. Forest understory, Mata do Cupe, Ipojuca, Pernambuco.

of South America, which included Brazil (and the Atlantic forest). It was in this ecosystem – still quite pristine in 1500 – that the forces of the evolution of life were tragically swept away, being replaced by entropic disorder.

Some Characteristics of the Prevailing Exploitation Model Used in the Atlantic Forest

If there is one thing that can be stressed immediately in the exploitation system used in the Atlantic forest by the Portuguese, this is the "intrusion of man in the mechanism of Nature" (Freyre, 1985). This was a brutal intrusion that rapidly imposed the civilization based on sugar and its single-crop plantations at overwhelming speed, with no fetters curtailing the crime being committed. It morbidly breached the principles of biological evolution, stripped and simplified the original ecosystem, removing its extraordinary diversity and originality. As noted, always brilliantly by Freyre (1985) "The drama that took place (...) was not prompted by the introduction of sugar cane, but rather by the brutal exclusivist system" that was introduced. This exclusivism was imposed by the spirit of the adventurer that guided the conquest of Brazil, establishing an economy of pillage that benefited a single caste. The hallmark of this economy is that it worked against Nature, rather than in harmony with the living world, like in the case of Tupi tribes that lived in the Atlantic forest, with their rules pasted to its complexity and rhythms, and even resulting from their supernatural beliefs. The characteristic of a faster economic pace that drove the Portuguese venture, in contrast to the leisurely pace of Nature and the lifestyles of the indigenous peoples, triggered massive ecological conflicts and loses that proved quite irreparable for future generations, apparent in the mismatched relations between sugar cane and Nature "which it degraded to the utmost extreme" (Freyre, 1985).

Another aspect of this system was that the colony represented for Portugal "a mere place of passage, for the government as well as its subjects" (Holanda, 1976). The task of colonizing the Brazilian tropics by Portugal in fact tended to the establishment of trading posts, far more than the creation of settlement colonies (Holanda, 1976). Within this scenario, the Atlantic forest offered the means for enriching the invaders. In order to take it over, it cost nothing in terms of the style of acquisition adopted that is completely contrary to modern juridical concepts. Compared to the conquests of the Spanish, which were also conducted with extreme brutality, the efforts of the Portuguese were distinguished mainly by the predominance of their characteristics of exploitation and plunder. In contrast, the Spanish wished "to turn the occupied country into an organic extension of their homeland. If it is not as true to say that Castile followed a similar path right to the end, there can be no doubt that this was the initial direction and intent" (Holanda, 1976). The colonies of exploitation – with their extreme of an economy of plunder – share the common characteristic of the cruel and sweeping pillage of the natural resources found in these lands. Devastation accompanied this process, causing alterations to the natural environment. As warned by Pádua (2002): "Initially, this was caused by the direct impact of colonial activities on pre-existing ecosystems through movements that were either disturbing or frankly destructive. Second, through the introduction of exotic species (larger plants and animals, weeds, pathological micro-organisms disseminated voluntarily or not) that reproduced intensely and to an uncontrolled extent within the context of these disturbed environments".

If the Atlantic forest was not the only case of environmental destruction in the complex history of the European colonization of the tropics – and it is not – it is without doubt a conspicuous example of a highly predatory model.

Another characteristic of the system used to exploit the Atlantic forest is that the adaptation of the colonizer to the regional

Environmental degradation like that of the polluted and totally transformed Pirangi River with its treeless banks, in southern Pernambuco, is the end product of the nonsustainable practices of sugar cane mills.

Opposite page:
Mata do Cupê, Ipojuca, on the southern coast of Pernambuco. Although this is one of the last forested areas in the region and holds relict populations of several species of the local flora, land speculation and the expansion of urban areas are a real threat to survival.

surroundings and his mastery of this environment: "took place (...) through adjustments (and violence) not always fruitful, based on transitory values, and even so to the benefit of just a few individuals, some families, or at most, a class or a gender, almost exclusively belonging to a single race, interested in growing a single plant: sugar cane" (Freyre, 1985).

In other words, an exclusivistic structure was built up based on a single activity: sugar cane plantations, where nothing was of interest other than the gains that this brought to a single class, the lords of the land, and the Portuguese Crown. Here the exclusivism of the aristocracy and patriarchate prevailed as well. No telluric links were established between the white colonizer and the Nature found here, to the extent that, as stressed by Freyre (1985), "The Brazilian of the sugar lands barely (knows) the names of the trees (...) The sugar cane separated him from the forest even to this extreme of shameful ignorance". The situation of the forest peoples was very different, reflected in their deep-rooted intimacy with the ecosystem. The "distance between the white settler and the forest, between the land-owner and the forest, explains why Brazilians have almost no love for local trees or plants" (Freyre, 1985). Our anti-ecologism.

The question arises here, posed by Dean (2004) on the rationality of destroying these forest resources, particularly in view of the very mediocre results posted by these ventures. The problem is that the system used to exploit the Atlantic forest that resulted in its destruction meant the accumulation of capital in the remote Metropolis rather than in the colony itself, reflecting the effects

of the incipient mercantile capitalism in Portugal and Portuguese colonialism based on plunder. According to the beliefs of those days, the resources of Nature were not valued as natural capital from which only a flow of income should be drawn, conserving and replenishing the principal for future use. In actual fact, it seems that the forest peoples followed this approach as they were aware of the importance of the ecological resources that they enjoyed and on which their livelihoods depended. This is why they respected them. Today, a widespread perception of the environment as capital to be preserved is still lacking, warranting the respect and admiration of society. This is quite clear in Brazil, except among small groups such as some environmental movements that, like André Rebouças, believe that "each tree felled is a growing 'capital' that is destroyed". In Brazil, the mindset still prevails that is reflected in the statement by the Senator for Maranhão State at that time, José Sarney, who noted in 1975: "Let pollution come, as long as the factories come with it" (Dean, 2004). The elites of Brazil and the shapers of its policies opted for the arrogant view that man is the lord and master of Nature. This approach is shared by a director in the National Sanitation Works Department (DNOS), Acir Campos, who in 1976, reflecting the Cartesian thought in fashion at the time, disclosed all his scorn for the biomes of the lagoons along the Northern coast of Rio de Janeiro State (framed by the Atlantic forest, although not as lushly as in Pernambuco and Alagoas States): "Following the sanitation ideal, overcoming and correcting the aberrations of Nature, the Sanitation Commission (for the Baixada Fluminense lowlands) created a soul (...) That ecological chaos, those unhealthy swamps, that biological imbalance have been reclaimed thanks only to the works of the DNOS". It thus seems quite logical that, centuries before, people should view the Atlantic forest as an enemy to be overcome, an obstacle to conquest and pillage, a wall to be broken down.

There has certainly been much apprehension about the environment in Brazil since the XVIII century – and for millennia before this, among the indigenous tribes, although possibly not following the ecological reflections of modern times. In his elaborate book, José Augusto de Pádua describes the existence of an "intellectual concern with environmental degradation" (Pádua, 2002) during the period prior to the XX century. The reason: Brazil was being "reduced to the dry plains and arid deserts of Libya", in the words of José Bonifácio de Andrada e Silva, in a speech made to the Constituent and Legislative Assembly of the Brazilian Empire in 1823 (Pádua, 2002). The Italian botanist of the Enlightenment, Domenico Vandelli (1735-1816), who settled in Coimbra (Portugal) during the Pombal Administration, for example, published from the 1780s onwards: "several texts in which he criticized the sweeping environmental destruction taking place in Portugal and its colonies" (Pádua, 2002). Influencing the generation of Brazilians who were being educated in Coimbra, including José Bonifácio, Vandelli was deeply distressed by the fact that clear-cutting vast tracts of forest lands in Brazil was destroying many plant species that were still unknown to science (Pádua, 2002). This was a concern of the Enlightenment, similar to today's concerns over not knowing the scientific losses caused to Brazil by the devastation of its forests. At the start of the XIX century, it is worthwhile noting an awareness that the destruction of the natural environment was not the "price of progress", as widely discussed today, but rather the "price of backwardness" (Pádua, 2002). The destruction of the Atlantic forest was the price of backwardness and ignorance.

In Conclusion

The outcome of a society lacking the mental sophistication to conceive ideas – seemingly more motivated by what Paulo Prado called "the ambition for gold" and "free and untrammeled sensuality" (Prado, 1931) – the colonization process would have to result in some form of what the Brazilian intellectuals of the Enlightenment classified as "the price of backwardness". This was – and still is – the reality of a "crude country" (Prado, 1931), where the "ability to learn by rote and overweening loquacity simulating culture" (Prado, 1931) replace intelligence and organized reflection. Similarly, what might be expected of a situation of social thinking in Brazil that, as in Latin America, assigns little or no importance to the history of the relationship between society and its natural surroundings (Castro Herrera, 1996)? Extremely few experts have had the lucidity of Gilberto Freyre, for example, who in his lovely book on the humid section of Northeast Brazil entitled *Nordeste* (1985), presented an analysis based on the "ecological criterion". This was back in 1937, when few people were dealing with such an up-to-minute subject; perhaps no one at all in the social sciences, because still today there is a serious gap in terms of the environment in studies of the Brazilian reality (with the usual exceptions, including those related to the National Association for Research and Graduate Studies in the Environment and Society, and the Brazilian Society for Ecological Economics). It is interesting to see how Freyre explains the idea of the ecological criterion that he introduced: "broad-ranging general criterion, not only scientific but also philosophical and even esthetic and poetic, for studying and construing a region; and not a rigid geometrical ecologism following a sociological or geographic sect, confident that it will be able to reduce the problems of human facts and culture to the facts of physics and natural history, or the problems of geometry" (Freyre, 1985).

Not without reason, a communications professor at the University of Austin (USA), Brazilian Rosenthal Calmon Alves noted in 1977: "I hope that Brazil does not continue to persecute its wise men and celebrate its mediocrities. The mediocrities detest science and economic interests are destroying the value and worth

of Brazil". Just as they have destroyed the Atlantic forest in half a millennium of brutal exploitation.

A topic that requires study in greater depth is the answer to the question: who did the forest belong to when the first colonial "owners" arrived? Who did the lands of the Northeast belong to, with their rich massapê soils? Without this sticky clay, without the rich humus of the forest, "the landscape of the Northeast (...) would not have altered so decisively in the way that it has changed (...), driven by sugar cane" (Freyre, 1985). It was the indigenous tribes (with or without a preservationist awareness) that bequeathed this fecund soil, letting agrarian roots reach down from the Atlantic forest that allowed first a trading post, and then a plantation colony to be turned into the seigniorial empire of sugar cane growers. The colony engendered an economy of pillage, where burn-offs and clear-cutting allied with hunting, where "everything became scarce, as the dense forest vanished, making way for cane to reign alone" (Freyre, 1985). This consisted of swapping collective assets and the public good for short-term private gains garnered by the lords of the land and the Portuguese Crown. The reality of this observation overlays the fact that the topic of the private expropriation of common assets will be "a constantly repeated theme in Brazilian history" (Dean, 2004). Surviving tragically through to our own times, it allows the same path of environmental devastation to be pursued now in the Atlantic forest itself, today reduced to melancholy patches threatened by the blind obsession for economic growth at all costs.

It is surprising that the saga of a disaster such as that portrayed in this book is unfamiliar to much of society. At the same time, it is quite unbelievable that a chain of connivance allows "the neo-Europeans to claim the inheritance of an empty land, a boundless 'frontier'" (Dean, 2004), when none of this is true. The frontier did exist here, and was in fact finite, inhabited by the peoples adapted to the New World. Brazil – and the Atlantic forest – also had owners: owners who were careful of their assets, not as selfish proprietors, as the indigenous tribes did not have the concept of private property, but rather as the heirs to what is known in English as "commons", the common weal. These people culturally mastered the ecosystem, intimately familiar with its paces, learning how to use its plants, animals and resources. Knowing how to identify them, to the extent that, as noted by Dean (2004): "The first generation or two of Portuguese invaders had depended entirely upon indigenous understandings of the Atlantic forest". This indigenous wisdom was shattered by the colonizing drive of the Portuguese, impoverishing the world just like as a *tsunami* would have done if it swept away all the copies of *Don Quixote*, *Grande Sertão: Veredas* and *Os Lusíadas*, all the works of Michelangelo, Da Vinci and Picasso, all the collections of biology periodicals on the planet. Ecological destruction; demographic destruction; cultural destruction: the triumph and enthronement of entropy.

A representative of the Pipipã ethnic group performing a ritual in one of the largest forested areas at the Serra Negra Biological Reserve, in Floresta, Pernambuco. Despite centuries of occupation, the way of life of pre-colonial peoples in the Northeast did not impair the Atlantic forest as did the entropic disarray created by the colonizers.

In the Zona da Mata of Pernambuco, as in other regions of the Northeast, the habitual extraction of firewood contributes to the impoverishment of forest fragments. Besides domestic use, firewood is a source of income for unskilled workers who supply brickyards and bakeries in the region.

Opposite page:
As of the 1970s, tablelands such as those of the Penedo region in Alagoas were completely taken over by sugar cane fields, with the help of government incentives through the Pro-alcohol program, thus eliminating the last well-preserved remnants of Atlantic forest.

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