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Transformation of the landscape and the hunter

The inseparability of society-nature begins with the presumption that humans not only need nature to survive, that they not only transform it and reproduce it, but are transformed by it and are part and product of nature.

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4.1. Introduction

The previous chapter demonstrated the important role hunting played in hunters' lives. However, through interviews with these hunters, their wives and their daughters, it is clear that they no longer hold hunting in the same regard. In fact, a common comment was that the hunters of yesterday much prefer to see the toucans flying through the forest, the occasional hedgehog scurrying along, and even understand that with nature flourishing unchecked around them, snakes will sometimes invade their homes. Therefore, the objective of this chapter is to describe how hunting has been perceived globally and locally and then discuss how this perception becomes a representation within the landscape of the Pedra Branca Massif. Recognizable effects (past, present and possible) on the natural landscape of the Pedra Branca Massif must also be presented. Specifically, it is discussed how failure to manage available resources can lead to a forest suffering significant biodiversity loss. Then, understanding that the landscape is a social product, the cultural landscape of the 1970s will be compared to current socio-economic realities to understand hunting's place in the past compared to how it is practiced today. Finally, an important discovery is how societal values (the ever-changing cultural landscape) have transformed hunter attitudes and actions over the years.

Ideally, this research could present to the reader data collected by infra-red, motion-activated cameras describing the current fauna roaming the hills of the Pedra Branca State Park. Unfortunately, the collection of this data was beyond the scope of this research. In addition, it would be impossible to compare this data to conditions in the decades surrounding the 1970s. Due to the limitations of this research, the methodological path chosen was to utilize the oral histories and

perceptions of the residents interviewed to identify landscape transformation processes from the 1970s to today. Therefore, this chapter discusses diversity degradation theoretically and then thoroughly analyzes the conversations with hunters and residents in and around the PEPB to understand how the landscape has changed according to their perceptions. This view will provide rough data points on faunal and vegetation transformations. Yet more importantly, it will paint a picture of interviewees' perceptions and opinions about their surroundings. Landscape is more than the presence of animals, plants, structures, and human populations. According to Corrêa & Rosendahl (1998), landscape is also the realization of the relationships between those elements, yet far from set in stone as they continuously vary with time.

4.2. Trophic cascades and loss of biodiversity

There are many points that link society's forest resource use to its relative biodiversity. Hunting is one such relevant point in forest landscape transformation. Historically, the beasts in these forests represented a source of protein, medicine, and raw materials for daily goods to traditional populations and before them, indigenous cultures. However, some animal species have been over-hunted, resulting in local or permanent extinction. The affect on forest diversity can have a magnified effect as many tropical plant species are dependent on fauna, especially large birds and terrestrial mammals, for seed dispersal (Janzen, 1971).

In addition, Redford (1992) states that many mammal-dispersed, neotropical tree species are often regionally localized further linking their fates to the fate of the fauna they depend on, resulting in a greater loss of biodiversity than anticipated with the extinction of just a few faunal species. Yet, allowing first order consumers, primarily herbivores, unfettered access without control from a top-level vertebrate predator is also potentially damaging to an ecosystem (Terborgh & Estes 2010). In eliminating predators, whether panthers or human hunters, the ecosystem can be destabilized and result in chain reactions which "eventually cascade down the trophic ladder to the lowest rung" (Terborgh & Estes 2010, p.2). For example, a *trophic cascade* can result in a dominant consumer, medium sized mammalian herbivore, whose population increases to a point that other consumers are unable to compete for limited resources and the resulting

heavy grazing from the dominant consumer places pressure on specific producers, resulting in scarcity or even extinction of some species. The result, again, is a simpler, less diverse ecosystem (Redford 1992 & Terborgh & Estes 2010). Therefore, in any ecosystem, balanced, dynamic relationships must be sustained between predator and prey to regulate food webs and *regulated* hunting is one form, among many, that can fulfill the role of a top predator.

However, the comments by Redford (1992) and Terborgh and Estes (2010) are quite possibly incompatible with the reality of an urban forest surrounded by over six million people. First, the forested hills of Rio de Janeiro are far from virgin. The timber from these hillsides have fueled sugar plantation boilers, built ox-carts, been transformed into charcoal, and been reduced to ashes to clear and fertilize the land for farming (Corrêa 1936 & Oliveira 2005). More recently, as Rio de Janeiro continued to grow, human settlement fragmented faunal habits resulting in further trophic cascades as predators were evicted from the landscape either by force or choice or through complete habitat destruction. Therefore, human activity has already altered the landscape in numerous ways and therefore the secondary forests covering the Pedra Branca Massif have already lost some faunal and vegetal diversity (Oliveira 2005). However, in addition to species reduction, vegetation and fauna have been introduced that have at times competed with endemic vegetation. Changes in the forest composition can then affect faunal composition as interviews revealed regarding the rabbit (*Syvilagus brasiliensis*).

4.3.

Identifying faunal and floral links through hunter perceptions

In fact, the rabbit provides an excellent example for observing the society-nature relationship as it is displayed in the landscape. Interviews during fieldwork revealed a common notion; there is much more forest today than in the 1970s. In addition, many stated that there is a good deal of prey in the forest, yet none could remember seeing a rabbit for many years. Is it possible that hunters decimated the rabbit population? It is far more likely that the fate of the rabbits changed with the socio-economic reality of the landscape. Indeed, the rabbit still exists, although in small, isolated populations. What changed was the composition of the vegetation surrounding the neighborhoods where interviews took place.

The hunters interviewed told stories that included tails about deer hunts and rabbits in addition to the more commonly thought of Atlantic Coastal fauna such as the paca, the capybara, or the armadillo. Yet, no one interviewed could remember seeing a deer or a rabbit for decades. Furthermore, they had seen a noticeable increase in number of capybaras, hedgehogs, and toucans within the park. Not only have the interviewees seen these animals, but the sightings have become quite frequent. At first glance, it would appear that the illegalization and overall anti-hunter sentiment has had its desired effect of bringing back the wild fauna of the Atlantic Coastal Forest. However, hunting has not ceased, it is only “underground” as hunters hide their activities from authorities. What changed in the landscape of Rio de Janeiro is the socio-economic activity of farming and the increased regulation of national and state parks.

Every interviewee who was asked if there is more or less forest today than in the era they hunted, answered that there is “much more forest today”. This response should not be a surprise. First, the many uses for forest resources by a growing city combined with the near “invisibility” of the social group of poor living in this rural-urban boundary meant frequent clearing of the forest in the middle of the 20th century (Fraga & Oliveira 2011 in press). In addition, these resources were then protected by the establishment of the PEPB, although to varying degrees of success. This eliminated the ability to use timber as a source of charcoal, yet mineral coal and petroleum had already invaded this market. Only small-scale farmers were “grandfathered” property rights and allowed to maintain their small subsistence plots. In fact, land use and property rights have been a major challenge in Brazil since colonial times as Beghin (2008) reports;

The conservative approach [conservative modernisation]¹ can also be felt in rural areas through agribusiness, which strengthens the economic power of large landowners and neglects the unskilled wage-earning labour force and the mass of small farmers that are not linked to the prevailing agricultural model. In this process, the peasantry is reduced to a huge subsistence sector (Beghin, 2008, p.2).

And prior to 1970, this region was rural. Quickly, the city of Rio de Janeiro grew up around it. The continued emergence of agribusiness (always migrating to rural areas), combined with urbanization drastically reduced the number of small-scale

¹ Conservative modernisation is a term used to describe Brazil’s development process, which ‘manages poverty’. Significant changes in the economy are produced without breaking the established economic-social order or by breaking it only very slowly (Beghin, 2008, p.2).

farms, whether for personal or commercial use. They have not all been eliminated, there are still small scale farmers living within the state park and maintaining banana orchards and small plots of land for growing manioc, yams, peppers, cucumbers, and some endemic fruits like cambucá (*Plinia edulis*), and cabeludinha (*Myrciaria glazioviana*). A survey (Magalhães et al. 2011) done in the backyards of residents and/or in areas of cultivation revealed the presence of 221 species, 172 genera and 71 botanical families. The categories that stood out in number of species were medicinal (122), food (71), ornamental (34), condiments (16), ritual (15), and miscellaneous (10). Indeed, many of these farmers were interviewed as they used to hunt and inherited their land from fathers who were also farmers and hunters. Yet, very few of their neighbors have continued to farm. The result is a more dense forest within the park boundaries and fewer resources for mammals like the rabbit (tapití, *Sylvilagus brasiliensis*).

Descriptions by Corrêa (1936) and comparisons of sketches and photos from previous time periods to the present day forest provide additional evidence of forest regeneration. For example, the sketch from Corrêa's 1936 book, *O Sertão Carioca*, presented in figure 19 shows degraded hillsides, nearly bare, and banana orchards which contrast to the apparently "healthy" hillsides seen in the photograph shown in figure 20 taken in April 2010.

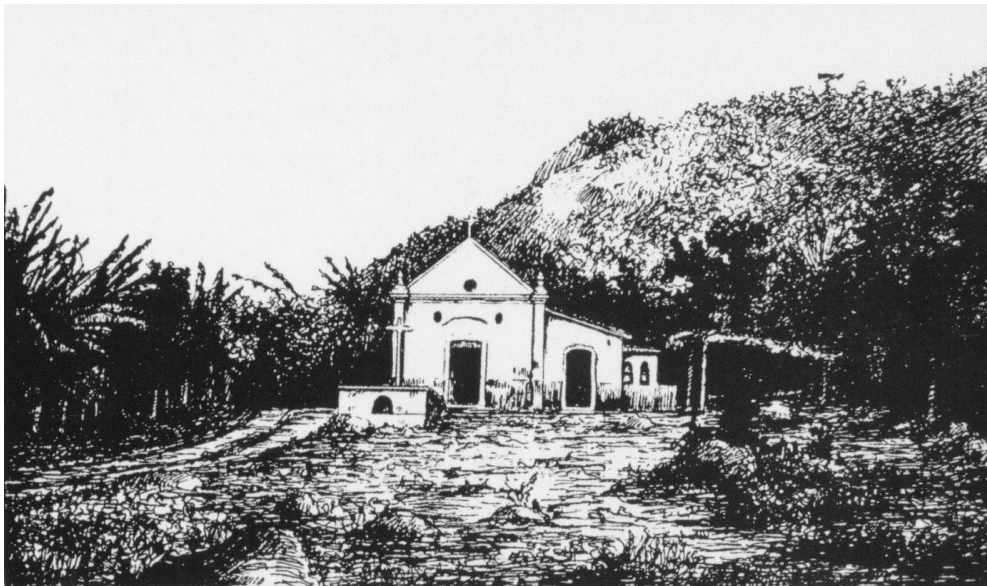


Figure 19: São Gonçalo do Amarante Chapel (Corrêa, 1936).



Figure 20: São Gonçalo do Amarante Chapel in 2010

Therefore, in Brazil, as in much of the world, farming is being concentrated into larger and larger farms that are well outside the urban boundary to increase efficiency and reduce labor and production costs. Recently, the “green movement” has turned some consumers back towards local and organically grown products allowing small scale farmers some capability to compete with the behemoth farm institutions who in the past could simply price the competition out of business. Therefore, today there are fewer farmers cultivating the hillsides of the PEPB and the result is greater forest regeneration.

Along with the farms and gardens went the primary producers with which rabbits had thrived. Indeed, the Atlantic Coastal Forests provides very little energetic punch in its offerings. Fruits and leaves offer relatively low energetic value compared to grains (Bakker & Kelt, 2000). Howler monkeys are able to digest toxic leaves and many small mammals, the agouti family of rodents for example, are adapted to forage for small nuts and fruits within the forest. However, rabbits and deer likely found forest resources scarce in caloric value and migrated along with the agriculture. On the other hand, the howler monkey, seemingly well adapted for life in this forest, fails to thrive. No one interviewed had seen a howler monkey in many decades. Many interviewed had never seen or heard one in the hills of the PEPB. Also, the animal was not observed over repeated trips to the park during fieldwork. Is it possible that this species was hunted to extinction?

Despite Redford's (1992) daunting warning about an empty forest, who's to say that 12,500 hectares is simply too small of an area for a colony of howler monkeys to flourish. Again, political decisions about the size and shape of this urban forest are as likely a cause to the monkey's absence as hunter activities.

The unanswerable question then becomes, what caused landscape transformation? Was it the hunter, the small-scale farmer, urbanization, agribusiness, or state and federal policies? In addition to all these likely culprits, consumer demand must be added into the mix. Truly, the revealing aspect of attempting to understand a singular activity such as hunting is that it results in an amazingly complex web of relationships.

However, the knowledge and perceptions captured in these interviews provide clues to understanding many of the links within the landscape. For example, interviewees confirmed seed dispersal, similar to the discussions by Janzen and Redford (1992), of the "cotieira" (*Johanesia princeps*) by pacas and agoutis. According to the hunters the cotieira and even cotieira groves are most frequently found on boulder-filled hillsides where the animals most often establish their dens. Oliveira et al. (1985) demonstrated the need for an animal vector for seed dispersal and survival of this species. The authors showed that fruits isolated from rodents quickly rotted – seed and fruit. However, fruits opened by the paca or agouti allowed the embryonic seeds not eaten by the animals to germinate. Providing further evidence to the hunters' first-hand knowledge, the cotieira is common in the secondary forest regions of the Pedra Branca Massif. According to a vegetation survey by Freire (2010) in the Camorim river basin region of the massif, the cotieira was shown to have the greatest value in terms of dominance and density over a 1,0 ha area spread across multiple geographically distinct sites. The research confirmed many of the hunters' perceptions and shows that they have a pretty clear idea about the relationship between population dynamics of wild fauna and flora.

4.4. The hunter has a change of heart

One of the amazing observations noted during this research was the changing attitudes among hunters and their families regarding hunting. All but two interviewed made comments at some point about the value of nature or how hunting no longer held any interest for them. This section will explore possible reasons for this change in landscape perception.

The simplest answer perhaps is the most obvious. The interviewees believe that the “right” (or desired) answer to give to these geographers asking them questions about hunting and forest resources was that they truly valued nature and wanted to live peacefully alongside it. I do not believe this to be the case. While listening to their stories, it became evident that these people had very little economic spending power in the years before Rio de Janeiro grew to engulf them. As presented by Schwartzman (1997) at the Seminar on Poverty Statistics in Santiago, populations living in the periphery of large metropolitan areas, in traditional social conditions have been known to be at greater risk of falling into poverty.

As the city grew, wage-earning jobs along with access to affordable consumer goods became a reality. Indeed, all of Brazil has experienced a rise in economic might over the past decade, to include finally seeing the poverty levels drop. According to Beghin (2008, p.4), the income of the poorest 70 percent of the population in Brazil has steadily increased since 2001. In addition, the *Economist* reports that according to the Fundação Getulio Vargas (FGV), the middle class has risen from 44% to 52% in all of Brazil since 2002 (Economist, 2008). Richard Wallace (2011), researcher for the Institute of Grocery Distribution (IGD), states that there are now 101.7 million Brazilians in Brazil’s middle “C” class. Half of those interviewed could be considered middle class by FGV standards¹, however the rest were poor and one appeared to be below the poverty line. Regardless, it will be assumed then that with the arrival of the city and the marketplace at their doorsteps, most of the hunters and their families have experienced greater purchasing power as it was evident that there had been a greater diffusion of urban habits into their daily lives. Candido (1971, p.142) saw this

¹ Monthly income of R\$1,115 – R\$4,806

phenomenon beginning forty years ago in the small farming communities in rural São Paulo stating that “O homem rural depende, portanto, cada vez mais da vila e das cidades, não só para a adquirir bens manufaturados, mas para adquirir e manipular os próprios alimentos . [Translation... “The rural man, therefore, depends more and more on the village and cities, not only to acquire manufactured goods, but to acquire and manipulate their own food.”]¹. In that era, this resulted in, according to Candido (1971), further marginalization as the rural farmer’s needs outpaced his available resources. As social programs and a booming Brazilian economy have altered many (clearly not all) socio-economic realities, newly discovered purchasing power brought a desire for a different social group and a different type of prestige.

Now instead of providing a paca for a wedding it is much more important to demonstrate wealth. The Economist article touches on this subject, although perhaps in an exaggerated way;

Entering the middle class brings a predictable taste for yogurt and other luxuries. But when shopping, middle-class Brazilians are more conscious of status than middle-class North Americans or Europeans. “These are people who may ordinarily serve others,” says Nicola Calicchio from McKinsey, a consultancy, “so being attended to by someone is very important to them.” Middle-class Brazilians may avoid the glitzy stores that cater to the rich, but they do not want their surroundings to look cut-price either. That may be true elsewhere, too, but a sensitivity to surroundings – not wanting to be made to feel cheap – is particularly marked in Brazil. (Economist, 2008).

Although the Economist appears overly opinionated, Wallace (2011), a reporter for the Institute of Grocery Distribution, agrees about Brazil’s rising middle class and their rising consumer tastes, stating; “From the bustle of São Paulo, where modern skyscrapers spring up everywhere, to the vast farmlands in the south and central-western regions, Brazilian optimism is on the rise and so is its growing consumer class. Brazilians are consuming everything from luxury imported goods and mobiles to Coca-Cola”. In other words, it is quite possible that the rising middle class no longer perceives hunting as an acceptable activity in their new found place in consumer society and therefore pressure has increased on the hunter to let go of this activity in search for socially acceptable alternatives; a true change in the socio-economic reality of the hunter.

¹ Translated by author.

Chapter three was devoted to discussing the importance of status in society and the role of providing for the family. The connection within the current environment cannot be ignored. Of course, there are numerous other variables that could account for the change in attitude beyond economics, just as there were many factors affecting “natural” landscape transformation. For example, other socio-economic factors include the increased emphasis on schooling, a formal workforce, and government programs and policies like the *Bolsa Familia* which enable these changes (Economist, 2008). From a landscape ecology viewpoint, Metzger (2001) describes an equally complex web of interactions and spatial interdependence as key to understanding landscape form and function. The point to take away from this discussion on landscape transformation is that society and nature cannot be separated or isolated from the other. Also, the relationship is truly dynamic and the transition from rural to urban in and around the Pedra Branca State Park has demonstrated this symbiotic transformative affect in great detail. In this way, Fraga and Oliveira (2011 in press) ring true when they state that the existing biodiversity inherited by the city of Rio de Janeiro is a social construction “shaped by a history of human management and natural disturbances”.

4.5. Summary

Hunting, as well as other activities, has been shown to alter the landscape over time. It has provided “potentialities” to impoverished sections of society who are willing or able to exercise themselves within this space. Likewise, over time, perceptions of changing landscapes, such as local, national and global concerns over shrinking forest resources, uncontrolled urbanization and scarcity of future resources have had a transformative affect on the cultural landscape in which hunting exists. This transformation has not rid the Pedra Branca Massif of hunting, but instead caused those hunters seeking power to further conceal their actions, placing themselves squarely in the realm of criminality. This criminality carries with it a risk-reward values system far different, and likely more destructive, from the potential conservation-based values that a hunter, operating within the bounds set forth by society, might exist. This paper does not argue that hunting should be legal or illegal as there is ample evidence available that underscores the importance of citizen participation in forming policies that alter the landscape

in which they live. However there could be forms in which hunting could be “socially legitimized” through an acceptable compromise between hunters and the greater society (Peterson 2004). Understanding what transformations have already taken place in the landscape is an important step in determining where future actions may lead.