Chapter Ten

Living in Abundance

The Forest of the Wayampi (Amerindians from French Guiana)

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The theme of "abundance and harmony with nature", which is applied to populations in tropical forests, has become a symbol widely used by environmentalist groups. An amazing feature of this appropriation is that it emanates from groups advocating the protection of the environment and, in particular, of animal species.

Amerindians from the Amazon basin are no protectors of nature, in the sense understood today, because the concept itself is completely foreign to them. Moreover, by listening to their daily conversations, we can deduce that they are passionate hunters and fishermen. Paradoxically, the fact is that the Amazonian environment, where they still live in the wealth of their traditional culture, is in a healthy state. For this reason they have been considered "forest conservationists" (Posey 1982).

If one takes the trouble (and the pleasure) to share for a while the subsistence practices of some of these societies, it is not the notion of protection in itself (nature as conceived from the perspective of animals and plants) as much as the notion of abundance and thus renewal of the species (nature as conceived from a human viewpoint), that is apparent. To quote Robinson and Redford (1991), it seems we are dealing here with a real *sustainable* harvest of natural resources.

We have chosen the Wayampi to illustrate the theme of adaptation to an environment. We shall see how practices and representations have helped to maintain, even to restore, this abundance at critical times in their history. First we shall present the dominant adaptive features of Amazonian societies.

This region of the globe has not witnessed any Neolithic revolution similar to that of the Old World. The first tools might have been similar,

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but the adaptive choices have been dramatically different. In a universe dominated by hunter-gatherers, an agriculture based on tubers, in particular on bitter manioc, seems to have appeared in the region over 3000 years ago, but an external influence cannot be excluded (Roosevelt 1989).

A unique aspect is that, in parallel to this slash-and-burn agriculture with its long-cycle, long-fallow periods, so-called activities of predation have survived and even developed; hunting, fishing and foraging. In comparison to the effort involved in those activities necessary to provide the protein indispensable to survival, the cultivation of manioc, even more than sweet potato or various American yams, offered definite advantages; high productivity, hardiness, limited pest susceptibility and especially the possibility of spreading the harvest over one or two years – the cost of natural storage in the soil is much lower than artificial storage. This system combining hunting, fishing and agriculture with long fallow periods still dominates most little or not deculturised societies from the Amazon basin.

Before the Christian era, riparian societies along large rivers and predominantly sedentary savanna societies appeared, practising a permanent agriculture based on vegetable protein-rich maize (Roosevelt 1989). It was planted on lands fertilised yearly by the rising waters or on artificial hilltops with elaborate drainage systems (Denevan 1970). There was no animal husbandry, however the first European chroniclers observed protodomestication of some animals (turtles, ducks) in these societies. Because these stratified societies were eradicated in the course of the 16th and 17th centuries, they have no relevance to the present study.

In all other forest societies, the varied and clearly bi-polar activities have corresponded to, and still do, a unique pattern of sexual division of tasks; a female-dominated agriculture as compared to male-dominated predation activities.

Nevertheless this over-riding view should be tempered because the Amazon and its surrounding areas enclose societies which ideologically stress, and even base their representation of the world on, one subsistence activity. However none of these activities are completely rejected, even the Palaeolithic activity of gathering. We therefore are presented with a true balance, widely agreed upon in the societies experiencing it, and without any indication of a real evolutionary tendency. And this, in spite of the wide possible debate on the differentiation between certain Amazonian civilisations which have or are believed to have domesticated nature (Descola 1986) and other civilisations, such as Tupi societies which in permanence fight a threatening nature on the verge of annihilating them. In any case, these societies present characteristics closer to the hunter-gatherers described by Sahlins (1972) than to the European agricultural societies which started a slow but definite evolution from the Neolithic.

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The Wayampi: History and Environment

The Wayampi society is a perfect example of the Amazonian model because all subsistence activities practised in this vast region are well represented in this society. In 1990 it had a small population of 835 members of the Tupi-Guarani language group, further divided into three regional subgroups localised in the basin of the Oyapock river in French Guiana and in that of the Amapari river in Amapa (Brazil).

Before reaching their present situation, they have experienced a troubled history (P. Grenand 1982; Tilkin-Gallois 1986) which should be summarised from the point of view of adaptation to the environment. It is often forgotten that small societies have, like any other population, their own history which is significant as much for their vision of the world as for their symbolic or religious representations.

The emergence of the Wayampi environment as it is today is based on the conflict between two colonial powers, France and Portugal, as well as on favourable natural conditions; a region whose waters drain into both the Guianas' rivers and the northern tributaries of the Amazon, with an uneven relief and streams interrupted by rapids and waterfalls. The history of the Wayampi, significant in its shortness, represents a real alternative lesson to development.

1690 : The Wayampi occupy the Lower-Xingu, south of the Amazon. The population forms a network of several Tupi-Guarani ethnic groups most likely making up a coherent cultural cosmos of tens of thousands of people (Betendorf 1909).

The Wayampi, as well as the other populations of the region, are riparian. They practise slash-and-burn agriculture, and constitute large communities along big rivers with ample fishing resources, especially in the rapids of the Volta Grande. Traces of this period in their history can be found in oral tradition with invocations for fishing dams and dances of appeasement, still executed today, which refer symbolically to the fishing of the enormous pirarucu (*Arapaima gigas*) and piraiba (*Brachyplastystoma filamentosum*). It is also during this period that they discover metal tools.

Following several clashes linked to the competition between Flemish, English and Irish on one side, and Portuguese on the other, the hegemony of the latter materialises mostly through the activities of Jesuits who establish four missions in the region to gather the Amerindians (Hemming, 1978).

The main sociological constraint of the missions is the compulsory interethnic acculturation, not to mention religious pressure, of which present-day Wayampi do not have a clear memory, but which is reflected in their extreme suspicion of any missionary indoctrination.

1736 : By this date, the Wayampi have crossed the Amazon and have settled on the left bank, on the lower Jari and its eastern tributary, the Rio Iratapuru, occupying a territory of roughly 12 000 km^2. Population is still significant even though a diminution is possible as compared to the last period.

This migration movement through a region controlled by forts and missions was probably induced by the Portuguese who then practised a policy of desertification between their possessions and those of the French in Guiana. Both Portuguese and French sources detail the use of the Wayampi for warfare. During this period, the Wayampi have hostile encounters with the still relatively numerous native populations, mostly Karib but also some Tupi-Guarani.

Their mode of subsistence is most likely still very similar to that of the previous period, since the lower Jari and the nearby Amazon offer similar possibilities. However, through their raids into the northern parts they visit small streams and the inner forests of the Amapa, thus becoming familiar with the characteristic flora and fauna of the Guianas Plateau

They are credited by French sources with firearms which were more probably used for war and dissuasion rather than for hunting. Even though the Wayampi are still very much dependent on the Portuguese for their supply of metal objects, and are still under the influence of the missionaries, their warfare activities provide them with a greater autonomy as the missionary power loses its grip.

1770 : The Wayampi population can be estimated plausibly at about 6 000 individuals. They occupy a vast territory, covering roughly 15 000 km^2, from a central point which all present-day subgroups locate at the Kumakakwa Fall on the upper Jari. These territories unfold as far as the Araguari to the east, and up to the sources of the Oyapock to the north.

This period is marked by an increasing distance from the Portuguese, major warfare (in particular against the Wayanas) and by an intense assimilation process of remaining ethnic groups.

The Wayampi gradually move from a riparian to a forest habitat, most villages being built along tiny streams, oddly keeping their pile dwellings, a relic of their adaptation to the floodable banks of the large rivers. It is most probably at this time that they adopt the archery of the regional Karib groups (especially the Apalai and Wayana), including the use of curare. Basket weaving is strongly influenced by the Karib. Pottery, fabric weaving and agriculture, especially with the importance of maize and peach-palm (*Bactris gassipaes*) keep their specific Tupi-Guarani characteristics.

Political autonomy is regained. The clan system is flourishing as well as vendetta and factionalism around strong men, the two major characteristics of Tupi-Guarani societies.

1815-1830 : The Wayampi have broken off contacts with the Portuguese and the Brazilian doctrine of submission fails by 1840. Consequently the Wayampi lose access to firearms and metal tools. They thus start to approach the French peacefully. It is during this period that the thriving population, already well-adapted to the forested environment of the Guianas, will lose three-quarters of its members in fifteen years of devastating epidemics.

Paradoxically this is also the period of maximum territorial expansion; without abandoning the regions occupied in the last period, they enter the basin of the upper Oyapock to its confluent with the Camopi river. They now occupy an area of 19 000 km^2. Village communities react to epidemics by dispersing; they are divided between riparian and forest habitats. Communications are still by canoe for some, but the network of walking paths develops dramatically.

From now most communities will depend more on hunting than on fishing for their subsistence. Axes and metal blades, even though in small quantities, have revolutionised agricultural techniques; it is now possible to select plots of land based not only on the low density of big trees to cut down, but also according to the qualities of the soil. Time spent on clearing is reduced; small trees are no longer barked to wait until they die where they stand, and big trees are not carved out in order to keep a fire for months in the hollows.

The vastness of the territory furthers the emergence of limited groups of communities with preferential relationships, encouraging only irregular contacts with other sub-groups organised on similar bases. On the other hand, they will be under various influences based on their nature of contacts. This phenomenon will further contribute to each sub-group's specific identity markers which are still recognisable today.

1880 : The area occupied by the Wayampi still covers about the same territory with the exception of whole areas which had to be abandoned due to epidemics. Habitat is henceforward characterised by pockets of dwellings far from each other, the surface actually occupied is therefore no greater than 7 000 km^2. Population numbers are between 700 and 800 individuals. Complete separation between southern and northern sub-groups occurs by 1895. Except for the furthest north sub-group, which actually has closer contact with the Creoles than with the French, contacts with the outside world are so rare that the Whites will remain unknown for four generations, except in recollections from the past, to communities located between the Inipuku and the Amapari.

Despite sporadic contact, the weight of epidemics will remain heavy on communities, with relatively significant repercussions on the capacity for production of numerous villages; even though the potential for hunting and fishing remains intact, oral tradition recalls starvation. The most-isolated

groups thus become a model for resistance. The alternative is tragic; contact simultaneously brings metal tools, disease and death, isolation cuts off epidemics while dismantling networks for supply of manufactured items. Moving further back into the forest, a process which had already started in the previous period, becomes the rule. Isolation is such that most communities forget the use and manufacturing techniques of the dugout canoe; only the temporary canoe made out of fresh bark is now used.

The Wayana benefit from this situation; from enemies they become the only link with the western world, especially for the northern Wayampi sub-groups. They thus gain considerable political and social importance, especially through matrimonial unions. It is also the period of linguistic and cultural influences which are still evident today.

1940 : Northern Wayampi
All communities, except one, are isolated in the hills of the watershed between the Oyapock and the Kouc. A population of 230 individuals occupies an area of around 3 000 km^2. From this date and during the years to come, contacts with the French will be renewed. Strangely enough the wish for contact is mutual. For the Wayampi it is motivated by the desire to be rid of the suffocating domination of the Wayana (Hurault and Fribourg-Blanc, 1949).

Subsistence activities remain the same as those of the previous period. The reappearance of the rifle in its modern form and the discovery of medical care are revolutionary; the Whites always considered as death carriers, now appear to be able to triumph over it.

The occupation of the territory remains an uneven distribution of sub-groups. Contact with the French is still considered positive and their domination, discrete at first, is perceived more as an alliance and accepted.

1968 : Southern Wayampi
The population of these communities is made up of 300 individuals scattered over a territory of 6 000 km^2. Contacts with FUNAI, the Brazilian organisation for the protection of the Amerindians, are accepted but not welcomed. For the Wayampi, it is linked with serious threats to their territory, in the form of the construction of the nowadays-abandoned Perimetral-North road and sporadic intrusions of gold washers and trappers (Campbell, 1989). Contacts with these people, as well as with collectors of balata gum, although rare, started at the beginning of the 20th century. The aggressive character of these contacts, especially the abduction of women, nurture traditions of fighting among the southern Wayampi with direct links to their heroic past.

It is among these sub-groups, with the exception of the furthest south communities currently extinct, that the highest degree of isolation can be found. Communications are strictly by foot. Their subsistence relies only

on the forested environment; hunting is dominant. Fishing is practised in small streams with bows or traps. Besides slash-and-burn agriculture, they have significantly developed arboriculture inside and around their villages.

Today : The Wayampi, all sub-groups included, unevenly occupy an area of 9 000 km^2, and travel over a territory of 7 400 km^2, not including the area covered by the small neighbouring ethnic group of the Emerillons, also of Tupi-Guarani language, located north-west of the territory. Population is increasing rapidly by natural population growth from 490 inhabitants in 1970 to 850 in 1992.

In the course of the last thirty years, contact with the Wayana has decreased while contact with the French or the Brazilians has correspondingly increased. For the furthest north communities, their hunting and fishing territories are shared with the Emerillon. Most recently, all Wayampi groups have progressively joined Panamerindian movements linked to the COICA, through regional federations. Their commitment is still limited.

Meanwhile their mode of subsistence, somewhat modified by new techniques, the widespread use of rifles, the introduction of the outboard motor, the fishing net, etc., remains extremely stable in its practice while avoiding intensification. The widespread use of metal tools in particular contributes to changing the Wayampi into a society of abundance. The forced settlement may have been more or less accepted, but it is nevertheless counter-balanced by high temporary mobility, and the development of double and even triple seasonal dwellings can be observed.

Contemporary concern centres on the problem of land. The notion of demarcated territory, which so far had been extremely vague, acquires meaning with threats of intrusion and external political control, whether it is the indigenous territory of the Wayampi in Brazil or the extended territory covered by the Wayampi of Guiana which is at stake. Whether it is the Wayampi from the south who set up vigils to prevent gold washers or whether it is the Wayampi from the north who threaten to move their villages into the midst of the forest in case of tourist invasion (in relation to the project of the National Park of South French Guiana), we are undoubtedly seeing genuine historical behaviour, reviewed and modified to adjust to modern times.

As for the upper Oyapock, ongoing research reveals particularly interesting results. Due to high demographic growth, large numbers of teenagers with high productivity enter the market. The increasing use of outboard motors has given rise to a lengthening by at least one-third of the communal territory along the river, with its depth remaining unchanged. Because of this carefully managed expansion of territory, firstly neither the number of hours spent nor the exhaustion felt by the men have increased, and secondly hunting and fishing pressures on the territory have not risen.

Therefore, as we shall discuss further, production per inhabitant shows remarkable stability between 1974 and 1994. The main conclusion which could be drawn is that the communities of Wayampi in the upper Oyapock have not changed their dietary habits and that their production is mostly directed to satisfy self consumption needs.

At the end of the 20th century, following the acceptance of several external contributions and undergoing strong pressures for assimilation, their lifestyle as well as its founding representations, remain largely unchanged. The second part of our overview, which represents the synthesis of observations spanning thirty years, will show, from contrasting angles, how the concept of abundance is lived and thought. It is meant to be a case analysis, with no reference, for the time being, to theoretical debates on Amazonian cultures which stimulate cultural ecology.

The Reality of Abundance

The economy of abundance of the Wayampi can be characterised by three criteria :

- an excellent knowledge of their environment, which governs a wide-scale utilisation of the diversity of life;
- high yield in all areas related to subsistence;
- relatively short working hours.

The first criterion is linked to a true sociology of knowledge which warrants discussion. The other two criteria, more specifically ecological, will allow us to appreciate the effectiveness of knowledge.

The nature of knowledge

Emphasis has often been placed on the fact that among the Wayampi an excellent knowledge of the environment coincides with the exceptional diversity of the resources exploited (P. Grenand 1980, 1992, 1993). It can be shown that they name most animal and vegetable species of their actual territory. There are of course exceptions to this rule, e.g., insects are seldom named; the nomenclature for small rodents is also limited. This restriction does not mean that the cognitive approach is not useful. The behaviour of the Wayampi towards identification of new species has allowed us to verify that it is the "intellectual necessity" put forward by Levi-Strauss (1962) which is the dominant feature; it has also allowed us to understand the universality of the approach which drives Man to isolate then aggregate every single living form encountered (Berlin 1992). However even if recognition, definition and then denomination does not necessarily imply utilisation, they are surely non-exclusive approaches; it can be considered, and the following supports it, that knowing lots of species in order to use some

and to select the most interesting is a prerequisite. This process is just an extension of the cognitive approach, and in this case cannot be separated from cultural choices, which themselves imply prior relevant knowledge. It is not out of context to recall the observation made by Brown (1986) based on a currently most complete ethno-scientific literature; those who practise an agriculture of subsistence name five times more plants and twice as many animals than hunter-gatherers. Knowledge of nature thus might not be related to maximum dependence.

The example of wild vegetables in the Wayampi universe is particularly relevant to illustrate the fact that cognitive and utility approaches do not exclude each other. The Wayampi of the Oyapock valley differentiate and name 1 152 living forms or types in the vegetable kingdom. Of course, every individual does not possess the whole of this knowledge, but the cohesion of the community makes it possible for each to access this cognitive store of knowledge. In this group, 673 species (58 per cent of the whole) show direct *primary* utility for Man. This observation can be complemented by a second assertion; it has been shown (P. Grenand 1993) that the Wayampi show interest in the vegetable world in a *secondary* manner, in relation to their hunting and fishing activities. Simply, a good knowledge of the vegetable world is a prerequisite, to know what animals eat, in which environment and in which season. Out of the 1 152 living forms known to the Wayampi, 424 (36 per cent of the total) are known to be food for animals, some of which may also be of direct utility. This shows the importance of the knowledge about animal consumption of vegetable matter for hunters who wish to optimise catches. Finally we have identified 279 vegetable types (24 per cent of the total) bearing names but with no utility value, even secondary, to the Wayampi man or woman; in this sense we shall call them not useful.

Let us examine now additional information provided by the nomenclature of plants (F. Grenand 1989). The Wayampi possess two categories of terms to define flora. The first are terms that cannot be broken down by the speaker: "their meaning is not apparent because they are indivisible" (Haudricourt 1987: 150). For example, the words **asemã** (*Ocotea rubra*) and **takalawelu** (*Bellucia cacatin, Henrietta succosa* and *Miconia punctata*). The second category includes terms which are "composite words, syntagms or synthemes" (Haudricourt, 1987: 150), which can be semantically divided, such as **wïla-mununwi** "peanut tree" (*Heisteria microcalyx*) or the **takalawelu-lã** "false takalawelu" (*Miconia serrulata*). Both can in turn become the base for composites by adding one or, more rarely, two elements, e.g., **takalawelulã-sili** or "false takalawelu, fine variety". If we compare these basic rules of word formation to utility criteria, it can be seen that both types of words, as well as some of their composites, are used to designate plants of primary or secondary utility.

The opposite is not true; "not useful" types are hardly ever named by indivisible terms. The 279 types included in this last group have names

Table 1. Relation between nomination and utilisation

Wayampi term	Translation	Utilisation
takalawalu	indivisible term	primary and secondary
takalawelu-kï	takalawelu-'clear'	primary and secondary
takalawelu-ïpo	takalawelu-'liana'	secondary
takalawelu-ka'a	takalawelu-'herb'	secondary
takalawelu-ka'alulu	takalawelu-'other plant sp.'	secondary
takalawelu-lã	takalawelu-'false'	secondary
takalawelu-pilã	takalawelu-'red'	secondary
takalawelu-sili	takalawelu-'fine'	secondary
takalawelu-si	takalawelu-'white'	secondary
takalawelu-sõwï	takalawelu-'blue'	secondary
takalawelu-u	takalawelu-'big'	secondary
takalawelu-yowa	takalawelu-'hairy'	none
takalawelulã-sili	takalawelu-'false'-'fine'	none
takalawelulã-yowa	takalawelu-'false'-'hairy'	none

formed by adding one or two elements to a basic term describing a "useful" type according to the two criteria of primary and secondary utility. Rare exceptions correspond probably to species known to other ethnic groups but of which the Wayampi have lost the knowledge. The table above illustrates this cognitive process. Such certainty leads us to go beyond the distinction between intellectualisation and utilisation, to suggest that maximum knowledge of an environment makes it possible to make choices of widest possible use. It can therefore be put forward that it is essential for the Amerindians to differentiate between plants which are useful and those which are not – a differentiation strictly linked to cultural choices. In fact, a complete knowledge of the environment proves essential to make full use of its diversity.

Acquisition and variability of knowledge

The perception and identification of the world are prerequisite conditions to understanding and exploitation. Knowledge is necessary for everyone and no Wayampi escapes the need to learn. To be able to identify and name a huge number of animal and vegetable species is considered prestigious. The cognitive approach is of course not limited to acquisition of knowledge, for it is also the basis for explanation (the location of a species, its role in mythology or in history, even in personal anecdotes), or for practices related to the use of these species in Wayampi culture.

Learning about nature is for the whole population. However specialisation of knowledge will develop in line with the distribution of tasks

Example of a comprehensive learning approach based on observation

A father and his son have gone into the forest to hunt, and come to a Guarea kunthiana tree bearing fruit.

The father: "This is a ya t oa'ï, my son."
The son: "Yes, it is an old ya t oa'ï plant."
The father: "There are two young ones next to it, and germination clusters too."
The son: "The biggest is covered with ripe fruits".
The father: "Its fruiting is late this year. Toucans love these fruits, you know. Since the other fruits liked by the toucans ..."
The son: "Like for example the kwa po'i fruit, the kunawalu'ï fruit, or the wasey (1) palm fruit ..."
The father: "Yes, because those have already fallen, it is this tree we have to look for at the end of the season; we can be sure to find groups of toucans there. We shall have good toucan hunts."

The father looks for a fruit on the ground, gives it to his son who takes it in his hand, looks at it for a while, then throws it away: the lesson is over.

(1) kwa po'i: *Ficus trigona* and *F. clusiaefolia*; kunawalu'ï: *Prunus myrtifolia*; wasey: *Eulerpe oleracea*.

between men and women. In a survey on production, it has been observed that, over a period of one year, for the same number of men and women, men went into the primary forest 1 751 times, as compared to 95 trips by women. Such evidence implies huge differences in levels of knowledge.

Learning methods are the same for everyone; the key word being observation. As far as observation of nature is concerned, the technique consists of isolating before aggregating. A father will thus show his son a particular type of tree, often in a precise context of direct or indirect use, and his comments on it will re-integrate this type into a relevant group.

Such an approach in learning applies to all fields of knowledge and starts as soon as a child is able to speak. From the canoe seat, mothers identify edible fruits growing on the river banks or name the different species of swallows skimming over the river. Undoubtedly the child's understanding will be long lasting. From a very early age, he or she will be able to distinguish thousands of life forms and subtle differences in the

surrounding plant world, while an ordinary Westerner will only see an indistinct vegetation mass. In a myth telling the story of the wife of the Creator gone to look for her husband, the twins in her womb, already endowed with the ability to speak, notice the surrounding environment: "Let us find papa. This is the way he took." And while she was walking, the children saw something red and pretty. They told their mother, "Pick some for us to play with". These were balisier fruits, pretty dead leaves of **waapitã**, wild pineapples, and canne-congo fruits.

In the comprehensive view of the universe characteristic of the Wayampi, there are no restrictions. From their first excursion, the young members of the community are shown the main edible fruits, animal tracks and waste, and their habitats, thorny and prickly plants, those with burning sap, insects and dangerous snakes. They are also told *in situ* the most informative stories and legends, and the anecdotal origins of localities. In a relative short time they know the basics, in an essentially repetitive way.

The inescapable consequence of *knowledge* is the capacity to *recognise* an object among a group. In order to recognise what is essential, it is necessary to know all. This expanding process of knowledge moves from the isolation of each new discovery to its aggregation with what is already known, following the rule "it looks like...", "it is different from...". This simple method makes it possible for a child to create his or her own cognitive knowledge which he or she will keep comparing to that of the adults. This represents in reality a never-ending process for every Wayampi, even adults. Each unknown species, each fruit thought to be rare, each unusual flower, to mention only the plant world, is brought back to the village to be submitted to the wisdom of the collectivity. Lengthy discussions follow in the course of which all knowledge is examined to classify and identify the unknown species.

Practical life is also the source of particular forms of knowledge. Women, for example, by daily cleaning game and fish, know trees and their fruiting period, through the seeds and the pulp found in stomachs, even though they have hardly ever seen the live species.

There is no "final examination" of this learning process except the ability to move and to flourish in the expanse of the forest. Even though there is no specialisation of knowledge in the Wayampi society other than that of the shaman, members like to identify experts or simply highly motivated people among them. Women are thus known for their knowledge of medicinal plants, even though it is not their exclusive domain.

On good use of the Wayampi universe

We now examine the second element in understanding the economy of abundance of the Wayampi, the criterion of high yield, which is mostly due to the large number of species which are exploited. However, exploited species and useful species are not the same and it is even less the case for

exploited species and known species, even though the utilisation rate can be considered high for both animals and plants (Boom 1987; Redford and Robinson 1987).

The example of fishing and fish can help to highlight the complexity of the question. Even though the size of streams and rivers and the number of species vary according to the basins, and thus influence the time spent and the catch for each of the three modern sub-groups, fishing is of major importance in the life of all Wayampi. For the communities from upper Oyapock, it comes second after hunting, with an annual production of 4 tons gross, or 28 per cent of the protein of the community.

Inventories established by the National Museum of Natural History in 1976 confirmed that the knowledge about fish of the two Wayampi sub-groups of Guiana is nearly exhaustive, since they identify 100 scientific species with a total of 102 names. Still, names do not strictly match species, since certain species have several names (nine names for four Latin species), and others have no name at all (three names for six Latin species). There are only three unknown species. Lastly, seven species living in river basins which they do not visit any more are still named and remain in the memory of the community.

A survey of the fishing production of adult males conducted by us in 1976-77 for all producers in the community, found that nine species, or groups of related species, constitute the bulk of the annual production. In decreasing order:

Hoplias macrophtalmus	1817.50 kg
Myleus pacu	496.25 kg
Pseudoplatystoma fasciatum	225.25 kg
Ageneiosus brevifilis	191.86 kg
Leporinus frederici	141.70 kg
Myleus ternetzi	140.34 kg
Myleus rubripinnis	132.30 kg
Prochilodus rubrotaeniatus	124.70 kg
Leporinus despaxi, *L. granti* and *L. melanostictus*	121.24 kg

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This is a total of 3 391 kg, i.e. 85.6 per cent of the weight of fish caught. The most important species are either big or gregarious, sometimes both, thus making catches large at the various favourable periods of the year. With these results, one may challenge the use of such refined ichtyologic knowledge. Different answers, classified as environmental, are given by the Amerindians, e.g., the knowledge of food chains of carnivorous or omnivorous fish; we think there is another answer.

If we compare our 1976-77 survey to the detailed survey we carried out in 1979-80 which recorded the production and consumption of two families every hour, we note that big fish are not caught daily (just like big birds and game). Such catches, which are strictly a male responsibility, are attributable to important fishing ventures in terms of time and distance.

On the other hand, small fish (and to a lesser extent small birds) are part of the daily consumption of families. They are not only easy to catch (in the immediate vicinity of the village), but also no longer the exclusive responsibility of men; women and especially children catch them. A survey of production by children has been made separately on a sample of individuals aged 8 to 15 and reveals an important contribution of small species. Only teenagers are an exception; their interest resolutely turned towards bigger species as proof of their budding capacities as hunter-gatherers on the path of adulthood. This tendency results in lower total production and bigger hunting and fishing efforts.

It can be said that a complete knowledge of living species undoubtedly plays its role in the economy of subsistence in terms of complementarity, and could be expressed by the following statement: "I eat a lot thanks to big species; I eat every day thanks to small species". Exploitation of small species close to the settlement, not only leaves more time for other activities but reduces the burden of fishing pressure on big species. As evidence that this complementary representation of nature has been internalised by the Wayapi people, none of the small species (with the exception of the piranha, *Serrasalmus eigenmanni*) are subject to any types of taboo on their capture or their consumption (F. Grenand 1985).

The time element

The last aspect of abundance to be considered is the small amount of time dedicated to the supply of animal protein. The survey carried out in 1976-77 over a period of one year, records the number of times and the time spent on hunting and fishing activities for a representative sample of the community. Results show that in 61 days of an average of 6.30 hours spent outside the village, a man has a gross production of 493 kg, including mammals, fish, birds and reptiles, i.e. an average of 8 kg gross per day. These figures, even though they do not take into account all parameters, are indicative of abundance. A similar abundance is shown in a survey conducted using the same procedure by Ouhoud-Renoux (1994) in 1993-94. For an identical population surveyed, annual production amounted to 551 kg per person. According to this researcher, "the positive difference is negligible, given seasonal differences from one year to another".

Agricultural activities are heavier. They require around 40 work days of 6 hours per person for cultivation of an average area of 0.51 ha (Grenand and Haxaire 1977). Clearing is a male responsibility, but women dominate all other activities. The average area has sharply increased since it was estimated at 0.34 ha in 1950-55 (P. Grenand 1981). To this 40 days, we add for women only, 42 times 5 hours on average to collect firewood. For manioc

only, production per week and per woman reaches 57.1 kg, yield per hectare reaching 18.4 tons (F. Grenand 1993).

In contrast to the 396 hours per year necessary by each producer for the collection of animal protein, 450 hours are required per year for the management of agricultural land. If we add the time spent for gathering, we get a more balanced picture. Following the examination of the criteria necessary to understand the various facets of abundance, let us now take a closer look at the actual experience.

Why Abundance?: the Wayampi Discourse

For all Wayampi, success in life is expressed by a basic dual principle; "with my game animals and my fish, my wife can offer my friends and relatives collective meals; with the manioc beer from my wife, I can offer the community a feast." Under its pragmatic shell, this concept rests on the basic beliefs of the society.

Contrary to widespread belief, Amerindians consider themselves as individuals, rarely equal. A strong competitive climate and rivalry, both qualitative and quantitative, are constantly present. For men it translates into terms of hunting and fishing success; big catches, high tonnage; for women it is in terms of culinary art; profusion as well as diversity of culinary preparations.

Equality rules on two major points: a complete sharing about the presence or the profusion of a species, to give everyone a fair opportunity; catches have to be carefully distributed and shared either as gifts or as collective meals. To eat or drink by oneself is in the utmost bad taste and quite uneducated to the Wayampi! The subtle game of kinship relations, but also the weight of tensions between families, also arise here and there. The sharing of knowledge and of production is compulsory not only because it triggers strong social cohesion but also because, when it is not respected, it will be seen as a desire to put oneself on the fringe. A certain vision of the world thus becomes apparent as a basis for social ethics and production modes. The question is, what type of vision of the world is it?

The Wayampi universe comprises several super-imposed flat worlds. In the centre lies the Earth, "as flat as a manioc pancake", built by "architects" preceding the Creator of humanity. According to Wayampi beliefs a second team of "architects in a dance" moored the first sky to its present position. This is the kingdom of the vultures, masters of decomposition and rot. Another higher sky is the home of the Creator of the world and of the purified souls of the dead (**t a ï w e**). At the lower level lies an underworld, also flat, where life is dominated by humanised giant sloths, the **w o' o**, perfect mirrors of our animality. The forest covering Earth is said to be "increate" or existing without having been created, beyond the constraints of time, and encompassing all natural forces. Humanity, as it is, is the work of the Creator **Y a n e y a**, but it has been destroyed twice, by fire then by flood, before taking this imperfect, tangible shape.

On Earth groups of concentric circles are organised around villages and reaching to the forest. Men are located in the centre of these circles; the further away from the centre, the deeper into a space ruled by supernatural entities. The battle for life is thus super-imposed on a metaphysical struggle. Why this double battle? Each species in nature belongs to a "master" called **-y a**. Ultimately, each animal species is dominated by a specific master in a hierarchical system extending from the most important species to the smallest, where all members of one species flock around its master, who like a magician can move them, disperse or consolidate them as he likes. All these masters are dependent on a supreme master called **K u lu pi** . Scarcity or abundance of game or fish depends on this fixed system of domination of nature, and the subsistence activities also fit into this spatial structure, with female agriculture related to close-by circles and male activities of predation related to faraway circles. More tolerated than accepted, men have to behave and take care to act within them. Their intimate knowledge of species helps them feed their families in the village but also helps them detect omens, **m o l ã w ã**, and identify with certainty taboo game animals during forbidden periods, **m a nï w o n a y k o y** (F. Grenand 1985). Most of all, they have to learn to limit their catch and this is the greatest temptation. The problem can be expressed this way; in a system based on wild resources, with abundant game and fish easy to catch, why and then how to control one's greed? The equilibrium of the system lies in the delicate interpretation of the limits of what is acceptable. From there comes the link with supernatural entities experienced through a subtle system of aggressions, **y a pi si**, and of alliances, **y e k w a y**, both being a reflection of the relations between the Wayampi and the neighbouring ethnic groups.

This relation translates into the emergence of an *ethos* in perfect harmony with practices which can be summarised by a simple but strong statement: "masters of nature let me take some of their subjects, without any unexpected evil return; if I take too many, my society will be threatened with ill-being first, then with biological death". Common forms of revenge from the masters affect the child, a fragile member of the community, or the hunter and fisherman with a psycho-pathological syndrome of inability to produce, called **p a n e** (P. Grenand *et al.* 1987).

A fundamental theme of thought can be seen, not only for the Wayampi but also for all Tupi-Guarani (Viveiros De Castro 1992); the theme of animality as opposed to divinity. The principle of human life is made up of an animal component (**t eã ng e**), master of all desires and considered immoderate, and a spiritual component, which we shall call soul (**l a ïw e**), bearer of the best in us, in particular of the altruist character which prompts us to generosity through sharing and giving. It is this same component

which brings us nearer to the Creator, whom humans have not forgiven for having abandoned them in their imperfection. Humans have in a way moved away from the divine state by not having been able to, or known how to, maintain their share of their primordial immortality, and are therefore under the constant threat of a third destruction. Wayampi ethics evolve in this relation to the conflicting and distressed world.

There seems to be a paradox in this; on one hand, society feels threatened by the principle of animality, and on the other hand, it embodies this same animality as prey. Our perishable body, **i e t eke**, is nourished by meaty prey, considered "real food". Without it our body would separate from our soul.

Solution to this paradox is found in the subtle equilibrium between divinities (including humanity) and animality. This equilibrium lies in balanced behaviour, **wo t e ekoy**. Its opposite is excess, **ei te pï a s o**, translated by conflicts between the a yã, a generic term used to describe the masters of the animals, -ya, the shadows of the dead turned into our reincarnate animal double, **t ea nge** after death, and the cannibal monsters of the forest and the waters, **a yã po l o s u'u** and **ïpo**. This conflict results in disease, even death, unless the shaman, **p a y e**, the only link between humanity and supernatural forces, or chtonian or celestial worlds, succeeds in restoring the lost equilibrium. Occasionally, but still significant, this shift towards animality results in metamorphosis, **inu**, an often recurring character of Wayampi mythology (F. Grenand 1982).

This division of the universe between inaccessible divinity and animality is the delicate conflicting element of the daily life of the Wayampi. Attempting to control destructive excesses, it provides an ethical framework which results in sustainable exploitation of resources within their ecosystem.

Conclusion

The comprehensive view of the methods of exploitation and understanding of the environment that we have reached, suggest that the Wayampi society is definitely a permanent society which, in spite of perturbations caused by repeated colonial aggression, has kept mostly pre-Columbian practices. We have demonstrated that (Grenand and Grenand, to be published) the Wayampi have a dramatic vision of alliance with our world, however they know how to integrate technology while minimising its risks. This has been verified (P. Grenand 1995) for the transition from the bow to the rifle; the introduction of other objects, now seen as essential, such as the outboard motor or the nylon casting net, deserve a detailed study.

Supported by the information at our disposal, we can assert that the Wayampi communities, whether from Brazil or from French Guiana,

presently reject all forms of development offered. It was clear that, during the preliminary discussions on the creation of the National Park of South Guiana which would include three ethnic groups in October 1994, suspicion astonishingly surrounded job proposals, such as those for keepers and eco-tourist guides. Without further analysis, this suspicion could be well illustrated by a statement by a Wayampi friend who, for 25 years, has maintained a personal interest in all development projects concerning his ethnic group: "Shall we have to become policemen on our own land?" This remark represents the expression of an anomaly: how can defensive and coercive regulations on the environment, generated by foreigners, strangers to the forest and its holistic operating mode, properly apply to an environment already under the complete control of the Wayampi who act with the consciousness and aim of perennial abundance?

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The book contains a number of commissioned background papers presented at the workshop on 'Research on non-timber forest products' (Hot Springs, Zimbabwe, 28 August - 2 September 1995). Bringing together the experience from different regions and professional backgrounds, the book attempts to analyse the complexity of multiple use of forests from a multi-dimensional perspective that incorporates environmental, social, economic, technological, political, historical and cultural factors.

Current topics of discussion are reviewed. These include the possibility of matching the conservation and development agendas through promoting NTFP as proposed by a number of initiatives, the uni-directional path of development from extraction to intensive agricultural production, the roles of NTFP on people's livelihood strategies, the internal differentiation amongst communities, the different forms adopted by actions meant to secure tenure and their diverging effects, as well as the meaning and convenience of using NTFP as an analytical category.

A general conclusion to be drawn from the book is the need to build up an inter-disciplinary research agenda, as well as the need to employ more than one approach or method in addressing the complex situations that characterise the multiple use of forests.

The Center for International Forestry Research (CIFOR) was established in 1993 under the Consultative Group on International Agricultural Research (CGIAR) system in response to global concerns about the social, environmental, and economic consequences of loss and degradation of forests. CIFOR's mission is to contribute to the sustained well-being of people in developing countries, particularly in the tropics, through collaborative strategic and applied research and related activities in forest systems and forestry, and by promoting the transfer of appropriate new technologies and the adoption of new methods of social organization, for national development.

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