Amazonia: the nature of the problems and the problems of the nature

Marcílio de Freitas, Universidade Federal do Amazonas, Depto. de Física, Campus Univ., Aleixo, CEP: 69077-000; Manaus, AM, Brasil. Fone: +55 92 9136-1313; freitasufam@gmail.com

Article published in the "International Review of Sociology, Revue Internationale de Sociologie, vol. 13, N. 1, march 2003, pp.183-198, ISSN: 0390-6701, England."

(...) In global reality the processes subvert the concepts and the specific manifestations of the cultures reappear with other meanings and horizons. Marilene Corrêa da Silva Freitas

Abstract

In this article are made theoretical explorations about the modern world environmental conception and it is presented a program of perspectives of dialectics understandings of amazon contexts, basing in 'nature x culture' confrontation. Special attention is dedicated to the exhibition of the theoretical and empiric elements of the systematized knowledge that contributed to the current world social configuration. We also presented a study on the nature of the problems and the problems of the nature that connect the Amazonia with the world political, economic and scientific processes in course. Special emphasis is dedicated to the unmasking of various articulations that connect the Amazonia with the processes of globalization and mondialisation. The current world social indicators are also shown while unfolding of the process of hegemony of western civilization. It is shown the insert of Amazonia in the political processes in course in the contemporary world and the projection of several environmental sceneries from the Amazonia with regional and global impacts. It is made an exploratory study that emphasizes the relevance of the amazon ecosystems in the mechanics, chemistry, thermodynamics and world climatic stabilities, and the incommensurable intrinsic wealth to the wisdom of its native people and the biodiversity built by the same ones. In that theoretical study its are prioritized the fundamental elements that anchor the incorporation of Amazonia to the transnational economic megaprojects in course, reinforcing its necessary insert in the global geopolitics.

Keywords: Amazonia-World; Multilateral institutions-world processes; Amazonia-globalization and mondialisation processes; world social indicators-environmental subject; complexity and diversity; nature science and political sciences; greenhouse gases

1. Pertinent subjects

Why do the scientific processes tend to reinforce the individual's, transnational conglomerates', multilateral institutions', religions', hegemonic nations' private property on the right of inhabiting the Earth and of users of the accumulated knowledge? How to avoid the appropriation of the scientific knowledge of public nature and generated in the institutions of researches, for the private groups? How to guarantee that the production and the use of the scientific knowledge is a collective conquest, within reach of all the world people? What are the structural modifications will have to be printed to the foundations of the natural sciences and of the societies in function of the new scientific, economic and politics world calendar? Or, in another way: What are the new scientific and philosophical problems what the new process of capitalist hyper-accumulation has incrusted in the world scientific calendars? What are the sceneries due to new alignment of science with the economy and with the politics that are projected for the future? How does Amazonia interfere in that new world order?

These are important subjects and of great reach intellectual that they permeate the globalization processes in course and for which we don't still have definitive answers. In this article we will make a brief exploratory study on the elements that contributed to the complexity of this historical panel.

Considered as one of the main socio-environmental subjects of the contemporary world, Amazonia puts countless speculations on a planetary scale. The part Amazonia plays in the world processes can be estimated from the characteristics of the area: it represents

... 3/5 of the brazilian territory; 4/10 of the south american continent; 1/20 of the terrestrial surface; 3/1000 of the world population; 1/5 of the world readiness of fresh water; 1/3 of the world latifoliada forest; 1/10 of the universal biota; 163 indigenous people that correspond to 204 thousand people (60% of the brazilian Indians); and the largest world genetic bank (Silva, 1999).

Amazonia is also very important in the mechanical, thermodynamic and chemistry stabilities of the atmospheric processes on a global scale. These projections reinforce the geopolitical importance of Amazonia.

2. Amazonia and the nature of the problems

The construction and consistency of the scientific theories, especially those developed in the exact sciences, are anchored in methods that facilitate the quantification and the mensuration of the properties of natural phenomena, by means of calculations systematized in physical mathematical models. The search of unit and of simplicity starting from generalizations continues to be a universal principle of these sciences. On the other hand, the foundations of the human sciences, including philosophy, that has as sceneries, in order, the studies of the formation and dynamics of societies, and the research about the knowledge essence, are anchored in categories, articulated to each other through dialectic conceptions (Alloufa and Silva, 2000). The borders among those two knowledge fields are still rigid, polemics and not well delineated.

Although it pretends to exist a rupture among these areas of knowing, – and the contemporary Western thought wombs are also unfoldings of rupture and of critical interlacing of different scientific and philosophical theories guided by important thinkers' conceptions, of the which stand out: Descartes and Pitágoras, Galileo and Ptolomeu, Kant and Newton, São Tomás de Aquino and Darwin, Marx and Einstein, Hegel and Planck, Aristóteles and Kepler, Weber and Heisenberg, Bachelard and Maxwell, Freud and Maquiavel, Platão and Rutherford,[1] and others – several categories and metric that connect these thinkers have in common a marked important of the civilization process: the articulation of the singular with the universal with intercessions and unfoldings, with differentiated reaches, that its embrace since the particularities of the phenomena, apprehending its own dynamics until its totalities and permeating its relationships and its existences with the different philosophical conceptions, known at that time. We didn't intend with this focus, to reduce and to simplify the history of occidental thought to the individual actions of people, of groups of people or countries. Nor to make inference that removes of the social processes and its wombs, the priority in the pattern worldwide politics. The one that we propose is to show the intellectual importance of these thinkers in the construction of the systemize knowledge, main guide of the world contemporary.[2]

The central problem between the natural sciences and the human sciences is that their intrinsic methodological procedures, hide, simultaneously, the physical reality of the second and the social reality of the first (Morin, 1977, p. 15), but the possibility of the fusion of the method with the object, in the foundations of the language of atomic physics and chemistry, has created new perspectives for the construction of integrated and holistic scientific conceptions.

Especially, the articulations of the “singular and the universal” category with another type: open and closed systems, stationary and transient states, order and disorder, discreet and continuous, organization and differentiation, stability and unstability, ideology and utopia, complexity and diversity, in all the temporary and space scales, become as fundamental to build theoretical structures that articulate to each other, will facilitate the formulation of the metatheories, fusing, creating and recriating new cultural conceptions.

The improvement of the economic and political subjects, in the 21th century, also brings technological and marketing demands that require fast diffusion and scattering of the systematized knowledge, in all the directions and in different rhythms and temporal, spatial, literary, artistic and numeric scales; creating and destroying, putting and homogenizing problems, pressing and harmonizing, legitimating and disqualifying, ordering and disordering new sceneries and real and virtual images, that configure and reconfigure the world cultural processes in course.

The incorporations of the possible discreet and asymmetric character of the ‘time’ category and of the thesis of non need of the “space” concept in the foundations of the exact sciences and mathematics and philosophy theories,[3] imposes new methodological and ontological perpectives, tuning in all the fields of systematized knowledge, in particular in the technological areas. Several theoretical and empiric indications exist in quantum mechanics - branch of physics that studies the phenomena of nature at the atomic scale - showing that probable revolutions in those foundations of the scientific knowledge will result in radical alterations in the current political conceptions.

The researche on the interactive processes concerning the nature phenomena, in different temporal scales, constitute complex scientific subjects with impacts in several knowledge fields, in particular in ecological problems. In recent studies, Mota (1998, pp. 34-45) proposed a computational computacional to

represent variations and flows in differentiated temporary scales, contributing to the improvement of mathematical structures denominated “Cyclic-Lineal Hierarchy of the Time”.

Physical-mathematical studies, especially starting from the 1970s, referring to the theory of chaos, indicate the existence of forms and patterns, seemingly without connections to each other. These studies establish that the current effects of small variations in the initial conditions of a physical system result in unexpected sceneries and configurations. A peculiar and important aspect of this study type is that the very simple deterministic systems can generate information about their evolution, and to result in complex chaotic systems. The connection of these studies with the evolution theory meets in course (Packard, 1995). The unfoldings of this research in environmental, economic and politics subjects are optimistic.

The flowing and global characteristics of the current economic and political processes, hostages of the market, tend to print and to reinforce to the science a restrictives and utilitarian character with the political nature of the problems being put upon to the problems of scientific nature. The need to isolate the system under study doesn't imply the need to undress it, during and/or after the research, of its historical elements. The world scientific and technological projects, in continuous form, have been articulated with the economic nets reinforcing and enlarging the privatization and the ‘dollarization’ of the planet.

Marx affirms that:

(...) Of the point of view of a superior economic formation of the society, the private property of the certain individuals on the terrestrial globe will seem as absurd as the private property of the human on other human. Even a whole society, a nation, same all the societies united together are not proprietor of the Earth. They are just possessors, users of her, and as *boni patres families*[4] they should delegate it improved to the posterior generations (Marx, 1985, p. 239).

In the wide sense, continental Amazonias, while a ‘world laboratory’, constitutes an emblematic example of the research of the nature of the problems which are sent to the solution of the problems of the nature in integrated and systemic form, the ones which simultaneously are metamorphosed in scientific, economic and political subjects.

Prigogine (1996, p. 191) emphasizes that the construction of a unified theory, that unmasks the basic phenomenona of nature, should necessarily be anchored in a ‘dialectic’ conception. Continuing, Prigogine (idem, p. 192) affirms:

(...) As Einstein could have suspected that his theory implied subjects that would take for besides a geometric vision and to end in the conception of an universe guided in the time? Doesn't the universe make to remember those Arab stories in what each history it is inserted in another histories? The matter history is inserted in the cosmological history, the life history in the matter history. And, finally, our own lives are dived in the society history.

An enterprise of great intellectual relevance is what intends to build a program of perspectives of dialectics understandings of Amazon contexts, basing in confront: nature versus culture (Carvalho, 2000).

Silva’s studies (Freitas and Silva, 2000, pp. 63-64) indicate that:

(...) the proposition of to study the Amazonia in the optics of the culture mondialisation and of the society global it has constituted in a theoretical-methodological challenge that result in some choices, here delineated in topics, as references for an investigation program, such as:

1. Realities and potentialities in construction in the globalization processes of Amazonia. The imperialistic geopolitical puts in cause or submitted by the strategy of transnationalization of the world political economy. The Zona Franca of Manaus as expression of the technical and social division of the labor non-territorial, promoted and/or disabled by the transnational economic forces.

2. The mondialisation of Amazonia as perspective of construction of a level above of the initiatives of its formal nationalization. The search of accomplishment of the world citizenship for the amazon populations that, on a side, its reopen thematic inaugurated by the Iberian colonialism reinvented with the imperialist Pax American, never summed up, and, on the other hand, re-intensify the asymmetry of the participation in an emergent global order, for the ressurgency of the tribal actions and regional conflicts.

3. New powers regulators of the social relationships in Amazonia. The ONG's and the ethnic-social subjects of Amazonia: the renaissance of the confrontation between nature and culture in the parameters of the world society. A conflicting re-encounter of economic, scientific and religious re-colonization proposals of the Amazonia, in the world economy and universal religions and global science perspectives.

4. Forms of the legitimate of the institucionalization processes and structures of homogeneities and of differences: the ressurgencies of the visions of ficcional imaginary as ‘understanding’ and ‘explanatory’ element of scientific suppositions and of ecological ideologies. The set of ‘voices’ that compose the theories on Amazonia that surpass the nationalist speech.

5. Nation, Continent and Place: the redefinitions of references of Amazonia conceptions as signs of the constitution of a world order with traverse powers that its restore problems for brazilian Amazonia and the continental Amazonias, as unequal and different configurations from emergent world Amazonia.

6. The world Amazonia represented in the facts of the brief time and in the elaborations of long duration of the historical time that the encounter between the Old and the New World produced: the westernization and the re-westernization of the Amazonia 'versus' the nativization and the re-nativization of its groups and social relationships.

Continuing, Silva affirms:

(...) In the picture of the globalization theories and of mondialisation of the culture, the structural changes in Amazonia can be indicative of the manners and of shades in that the world order has been traverselised on people, states, continents, sovereignties, accomplishing the global-local connection of the world in Amazonia and of Amazonia in the world, and, still, its unmasks the senses of the resettling of this area for the world forces, for a supranational historical configuration that the Amazonia can come to constitute same (Freitas and Silva, 2000).

The interlacing and the confront of the theories with different philosophical conceptions, of the classic to contemporaries authors, puts new conceptual perspectives on the critical reading of the political, economic and scientific subjects, own of the Amazonias.

In intermittent and ondulatory form, the classic processes associated with the mode of capitalist accumulation and its corresponding production and circulation relationships, are disconnected from each other, being coupled not lineally with the new senses and diffuse tendencies of the world political configurations of the Territory-State-Nation. The structures of the economic and political theories, in the whole ideological spectra and Western thought wombs, have been shown to be fragile, without previsible capacity to model and to unmask that new world theoretical and empiric configuration. The crisis is systemic and global, with the local subjects unchaining unexpected political sceneries.

Meanwhile, the economic megaprocesses move forward with the capitalist 'wanting to gobble' all us, the individual, the communities, everyone of the world's people.

2. Amazonia and the problems of the nature

The presentation of the theoretical and empiric foundations, explanatory of the new world order, demands a brief revision of the main scientific subjects, in particular of the nature sciences, that disturbed and instigated the specialists at the start of the 20th century, and that would constitute the guide to what is denominated modern physics and chemistry, with impacts in all the knowledge fields, in particular in the emergent technologies and in the organization and production processes of the capitalist world in that century. Although the subject still raises polemics, what we want is that the reader has more theoretical elements for an including and based understanding on some structural aspects of the current world political-economic-scientific picture.

The central subject can be put in the following form: Which is the main historical fact happened on this century? Which is the decisive factor that impelled the process of civilization in course? In our understanding, the full fusion of the political subjects with the economic ones and the scientific ones.

This fusion not only accelerated the emergency of a set of processes, with impacts in all sections, in all aspects, in 'essence' of contemporary life, as well as it molded new dimensions and structures and thought systems.

The emergency of that new Age is based in scientific, technological and marketing axes that constitute the main sustentation of the economic processes, in all the scales, and the material base of the globalization and of a new world order. Anchored in a complex systems of nets, the global interests move, in several space scales, dividing and fusing territories, recreating and presssuring the world market of labor, redefining the nature of the conceptions than it is public and/or private, subverting the places, the regions, os States, the continents, the planet, and all the connections that join and guide the social processes in course (Silva, 1999).

The identification of the theoretical and empiric elements, known of the natural sciences, in particular, of physics and chemistry, that justify and illuminate the insert of these two knowledge fields in that new planetary formatting, it can be put in the following form: what are the fundamental elements of the physical and chemical sciences, at the start of this century, that contributed to the theoretical and empiric sustentation of the configuration exposed?

Besides the contribution due to the formal and rigorous refinement of mathematics, these elements can be systematized in four axes:

· The unfoldings of the physical mathematics theory built by Planck to unmask the processes related to the phenomena of transport of luminous radiation, that unlike the existing theories until then, it contains a constant mathematical, denominated 'constant of Planck', that doesn't represent a property of the object and yes of nature. This conception collaborated so that, later, Einstein postulated that the electromagnetic radiation is formed by particles without mass and without electric charge, denominated photons. Unlike the theory mechanic's foundations, reference at that time, this conception establishes that the correct reading of the natural phenomena has to be done by scales, that is, a same phenomenon can show in different forms according to the sceneries and the intensities of the constituent elements of the process under analysis. In his studies about radiation, Planck re-introduces, in creative and contusing form, the category 'discontinuity of the matter' while unfolding of mathematical structures designated 'symmetries', rescuing the Platonica's vision, in solid and consistent theoretical bases. The sophisticated atomic model proposed by Rutherford and the joining of part of the results foreseen by Planck's theory with the posterior theory built by Bohr that emphasized the discreet character of the electronic orbits and of other fundamental physical entities for the description of the microscopic properties of matter, it stimulated, at that time, plans of theoretical and empiric studies, more advanced and sophisticated in atomic scale.

· The following steps, not necessarily in order, were built by Heisenberg, Schrödinger, De Broglie, Compton, Born, Gibbs, Dirac, Pauli, Landau, Fermi and others.[5] The first, of the several contributions, established the physical mathematical limits of the classic theories in physics and chemistry, known at that time. By means of the physical relationships denominated 'Relationships of Uncertainties', for him proposals, it was possible to project the real and virtual sceneries, that can be built with the classic concepts, establishing when the physical theories are applied for the processes in atomic scale and when the same ones are applied for the world accessible to our senses. Using the foundations of a non-comutative algebra and representing the physical entities for womb structures, Heisenberg substituted the classic concept of the orbit for that of the 'quantum state', associating it with the experimental, object of the measures, results. In a different formulation from Heisenberg, Schrödinger, using the self-function and self-value representations used by mathematicians and physicists during the 18th and 19th centuries, developed an analytic, physical mathematics, proposition and explanatory theory for the denominated 'electronic waves'. Special interest should be attributed to the contribution of De Broglie, second which: 'in the same form that to the existence of any particle is associated a wave, to every wave it is associated to the existence of a particle'. The other specialists assumed the difficult task of building the solid bases of the knowledge field that later on would become known as quantum mechanics, applied in valid problems at the atomic scale. The introduction of the concept of 'probability' in the descriptive language of quantum mechanics, sophisticated the reading of the current effects of the natural phenomena as these pass to have probabilities of occurrence, and therefore of experimental verification, eliminating definitively the causal character and deterministic nature, at least at the atomic scale. It is also intriguing to see the unfoldings of the researches developed by Compton, that confirmed the dual behavior of matter, that establishes that, matter, in appropriate conditions, can be presented in undulatory or corpuscular form, depending on the scales involving the dynamics of the physical process in subject. Several physical properties of the materials were unmasked. The foundations that guide the interaction of light, electromagnetic radiation, with matter, the conduction of electricity and of heat, the elasticity, the magnetism and other known aspects of the atomic/molecular structure of matter were explained, creating possibilities for technological innovation, in particular, in the electric-electronics industry that would become the main anchor of the globalization processes in course. The semiconductor industry has expanded in exponential scale. Advances in optic lithography have made possible the manufacture of transistorized circuits with greater performance and facilitated the miniaturization of electronic devices. The amplification of the power of the microprocessors has greatly impacted some technological sectors, especially the technologies related to the acquisition, storage, processing and transmission of information. The projection of a promising future for microelectronics has a great impact in the macro worldwide economy.

· Another fundamental contribution is that due to Einstein's theory, in which the speed of the light also represents a property of the nature. And still, that the apparent non-joining of the space and time concepts for all us admitted, is due to very specific and known conditions of space and temporary scales that we are submitted to in our daily lives. In atomic and/or cosmological conditions, the degree of joining can be quantified for these two concepts, that are articulated to each other by means of the speed of light, which constitutes a structure space-temporal, that in the presence of the matter it provokes the curvature of space, demanding the use and the incorporation of a new geometric language, a different Euclidean metric in the

physical reading of the fundamental laws of nature. A metric characteristic of the hyper-spaces conceived by Riemann; dynamics and multi-dimensional structures, characterized by norms and space-temporal curvatures. Through the theory of relativity, Einstein also showed that energy can be transformed into matter and vice versa, indicating that the same is the 'fundamental unit of the universe' (Born, 1990; Auger, 1990; Schrödinger, 1990; Heisenberg, 1990).

· Last, we mention a group of contributions, that we highlighted as the greatest conquest of cosmology: the 'Big Bang Theory' or 'Great Explosion', proposed by Aleksandr Alexandrovich Friedmann and Georges Edonard Lemaitre, in the 1920s. It was built and later it was confronted with the observations of the astronomer Edwin Hubble, also in that decade, confirming that the light emitted by galaxies is deviated in direction to the energy spectrum of the red color. This phenomenon, called the 'Doppler Effect', already known by physicists at that time, mentions the change of the frequency of a wave emitted for a source in movement. In the same way, as the sound of a car horn is each time lower the measure that the same is moved away from an observer, the light is each time redder when its emitting source moves away from the person who observes it (Hurwic, 1990, p. 13). That theory foresees that the origin, the beginning of the universe, was through a great explosion, which happened about 15 billion years ago. Ever since the universe has been continuously expanding, in all directions, with its average temperature decreasing continually. In spite of the polemics raised by this theory, it has been strengthening with countless discoveries and astronomical observations. The possibility of the 'whole' to emerge of the 'anything', of the unmasking of dynamics of the creation of universe, close to the singularity, being projected real and virtual sceneries of the whole system starting from a part of the same, are emergent problems and of great significance in the current studies in cosmology (Silk, 1988).

The main theories of physical sciences in the 20th century, quantum mechanics, quantum field theory and general and special relativity are not independent. Despite the restrictive nature of the structure of these theories, their great accuracy and their capacity of prediction, project a promising future for natural sciences. Invented little more than the 100 years, they have as obligatory presence in all the contemporary thought systems.

These presupposed, together with the research on genetic code, after the pioneering work of the discovery of DNA, by Watson and Crick in 1953, constitute the primordial problems that commonly have been denominated as modern physics, chemistry and biology. The article 'The Struture for Deoxyribose Nucleic Acid' that was published by James Dewey Watson (1928-?) and Francis Harry Compton Crick (1916-?) in volume 171, page 737, of Nature, on 2 April 1953, introduced revolutionary advances in the understanding of the structure and cellular functioning. They identified the core of the cells as the 'residence' of the genetic material (DNA) of living organisms. They characterized this entity [the DNA], as 'guardian' of the responsible information for all our biological features, creating connections between the past, the present and the biological future, known as the 'entity alive', constructing universal possibilities of obtaining safe information and inferences of the whole, from a part of the same. It made possible the theoretical and empirical development of innumerable new arrays and patterns of organizations of "biological life", with the emergency of genetic engineering. This article introduced also new relations and historical senses between politics-science-economy-religion.

In irreversible form, these three knowledge fields were separate, among the old and the new, the past and the future. The consolidation of algebra, differential geometry and of topology in mathematics and biochemistry was basic for the emergency of this new worldwide scientific scene.

Its also changed the actors, the sceneries, the rules, the structures, the senses, the interpretations and the meanings, the conceptions and the systems of thoughts. It enlarged the reaches of the scientific and technological projects: of plane space to curved space; of classic sceneries where prevail the absolute structures space-temporary to the space-temporary metric, the known material content of the universe; of the studies of a chemical element to the recherch of structure and of essence of the periodic table; of the understanding of movement of an object around a center of force to the waves of probability associated with the electronic configurations known for a certain atom or molecule; of the research involving the processes of change of heat in domiciliary ambit to the research that facilitate the 'freezing' and the 'heating' in atomic, planetary and cosmic scales; of works on changes of phase of the substances in alimentary level for speculations and theoretical and empiric introspections concerning the microscopic behavior of matter and on the physical and chemical aspects that guide the process and the energy availability from atomic fusion; of the study of processes of burning of fossil fuel to the understanding of the mechanisms that maintain the stability and the possibility of the division of the atomic nucleus and the corresponding use of the immense liberated energy; of the Age of the lamppost for the generation processes, transport and distribution of electromagnetic

energy; of the regional transports of vapors to the intercontinental cruises of transatlantic ones; of the displacements of locomotives to space trips; of the logical processes of mathematics to the sophisticated theories and computational methods; of cathode ray tubes to transistorized circuits; of vinyl disks to laser technology. They intensified the studies on the mosaic of the real and virtual materials, obtained with different atomic combinations and arrangements; sweet and bitter, hard and soft, multicolored and multifaceted, conductors and insulators, semiconductors and superconductors, resistant and disposable, therapeutic and soothing, opaque and transparent products. A new Age was inaugurated for the extensive agriculture, for the physics and the chemistry of new materials, for the personal computer-electronics, for the biological, for the health and the agronomic sciences, for the technologies, in particular for the molecular, civil, electric-electronics, aeronautics and naval engineerings, and for the meteorology sciences.

New demanded were imposed, the sciences of computation were created, and also the food, genetics and forest engineerings, the courses on ecology and environment, and many other professions related with the uses of the soil, of water and of air. Complex communication nets were wrought with the code and the digital recording of the information, impacting the cultural industries and engendering new virtual conceptions.

Very auspiciously the experimental techniques have self-multiplied and self-improved quickly, the 20th century is deeply dependent on the theoretical studies of physical mathematics of nature that molded its technological womb. This shade involves everybody, it involves the individual and collective apparels, the domestic enclosures, the labor and leisure places, the community relationships, the processes of sociabilities, the religions, the political parties, the economic partnerships, and even the conceptions and prevalent mental conformation.

At the same speed that the science was reinvented, the new emergent technologies generated productions on greater scale, with impacts in all sections of human sociability. But the 1940s showed the impossibility of the poor countries having access to point technologies, of political-military use. The project to construct the atomic bomb cost the USA US$2 billion (in values of that period), an inaccessible budget for most of the countries at that time, especially the peripheral countries. Just to illustrate, in the 1970s, the American government financed two thirds of the budget of the basic research of that country, equivalent to US$5 billion a year, using a total of 1 million cientists and engineers (Hobsbawm, 1995).

The finance market is revigorated, it is multiplied, it is broken up and it is continually recomposed, acquiring forms and multiple features, it is non-territorial, it is overflown on the places, on the regions, on the countries, on the continents, on the planet, and it gets ready for the sidereal trips. It is flluid, it is introduced as a type of apparent reality, with several intermediary layers, that ‘attracts’ or ‘repels’ the consumer, the other, the different, in agreement with the historically conditions created by market.

Everything is plastic, disforme, and it is moved in all the directions interconnected by nets of information, with the audiovisual systems being put upon to the verbal communication, and the ethics codes and the Freud’s logical being substituted by the materialistic reason.

The economic processes amplify its production and performance scales, its self-fragment for best to expand, composing new partnerships and reaching new consumers. The essential becomes the exception, and the superfluous is definitively incorporated in the new world structures economic politics. The production manners were sophisticated, excluding, pressuring, rejuvenating and rearticulating themselves with the trade and with the marketing.

The process of capitalist hyper-accumulation is extented welding in the scientific calendars the control about the process of cloning of life and the speculations about the ecological depreciation of the Earth. The techniques of atomic and molecular spectroscopy have been disseminated, have been adapted and have become the substratum of the methodologies of the applied sciences, enlarging the heuristic reach of the different technologies and of the sciences of health. The sociology and the anthropology are fortified with the emergency of new civilization contradictions and with the recreations and the metamorphoses of humanity's old problems. The paradigm of ‘Equality, Freedom and Fraternity’ is again polemized with new social subjects. The isolated studies and in groups are founded through nets and they are enlarged for thematic research, involving institutes, public and private universities, national and international conglomerate. The reflexive nature of the scientific speculations is completely replaced by science operational, more identified with the propositive and pragmatic character of the market.

The hegemonic religions, ‘haunted’ by Galileu Galilei's ghost, have curved before the full joining of science with the economy. Strategically also they have been expanded and spread reaching new territories and followers, weaving new alliances and ethnic and ethical commitments, and being adjusted to the new world socio-geographical configurations.

The economic nets unchain a new planetary division of the labor market, in particular, of scientific womb, with the environmental subject assuming a world relevance that it transcends, and most of the time, it is put upon to the interests and the national projects in local, regional and national ambit.

It is in that complex context that the Amazonias are reaffirmed as the main environmental ethos of the contemporary world.

4. Amazonia and the World sceneries and Perspective

But the 20th century was also the scenery of the nationalisms and of imperialisms, of the democracies and of dictatorships, of the socialisms and of nazism, of the liberalism and of fascism, of the social-democracy and of stalinism, of the planetary des-europeanization and americanization, of original hiper-accumulation and of exacerbated social inequality, of the wars and peaces, of the implantation of fundamentalist governments and of the creation of world governments, and, mainly of the planetary politicalization.

And in a certain mode, with its contradictions, the greco-roman culture weaved, in full form, the essence of all the scientific theories that gave historical existence to the 20th century, assuring a 'special status' for the research in the developed countries, and projecting tragic sceneries for the nations that didn't foment its educational processes appropriately. The public financing of the basic research and the universal access to the use of the scientific knowledge and of the new emergent technologies of the national politics, continues to constitute a challenge and a duty of the modern state. The agreements and scientific and technological exchanges and the intensification of the partnerships among the countries are put as indispensable political mechanisms for the extermination of the scientific and technological paralysis of the underdeveloped countries, accelerating the entrance of the same ones to a new degree of civilization.

The fast dissemination and the ease of access to the accumulated scientific knowledge, has impelled and has accelerated the need of technological innovations, demanding the constant intellectual improvement of individuals, of communities and of people. The private economic institution has recreated its own nets of formation of intellectual wombs, fully coupled with its interests. The total controls on the producing apparel and on the processes of transfer of capital turned flexible the salary politics and the specialized worker's purchasing power was enlarged reinforcing the consumption and the private property, in differentiated form and adapted to the places, to the regions and to the nations. As the public deficits of developing countries grow, the economic conglomerate it spreads privatizing the social politics of attendance publics in local, national and world scales. The growing institucionalization of the norms and protection of the intellectual rights, brake but doesn't stop the expropriation of the public scientific knowledge for those private groups; to the opposite, the economic conglomerate impose investigation themes and problems to the scientific calendars and agglutinate world research groups in the solution of its technical problems. The scientific and technological dependence of the underdeveloped countries reinforces that picture, that for its time, it corroborates the crystallization of a growing gap between the knowledge generation and the users of new technologies for its populations. What contributes to the validity of an asymmetric and deformed globalization.

The mondialisation of the hegemonic western culture and of the great capital forged the crystallization of the emergent international division of labor and of the trade, with the new conceptions and the calendars of scientific and technological investigation being definitively incorporated to the accumulation and circulation process of the transnational capital.

The invention and the consolidation of multilateral institutions of the stature of he Organization of the United Nations, ONU, and of the Organization of the Nations for the Education, the Science and the Culture, UNESCO, immediately after World War II, demarcated a new world geopolitical division, reaffirming the Western hegemony and printing the contours of the future political and cultural mega-sceneries that would exist at the end of the 20th century.

Themes such as safety and peace; culture and education; science and technology; atomic energy and international right; trade and international cooperation, labor and human rights; agriculture and health; economic and social developments; ..., international finances and remote areas (Antarctic, space,..., and the seas) constituted the foundations of the world calendars of those multilateral institutions. Under the mastery of those political forums, it was unchained and maintained an accelerated marketing process and of planetary institucionalization of the global connections of emergent new economic and political order.

Hegemonic institutions, also create in that period, the International Monetary Fund (IMF) and the World Bank, in growing and systemic form, imposed on the occident a fiscal discipline and an economic

formatting based on an accelerated planetary privatization process. Recent studies supported by ONU, show that the world economic integration, seated in this premise and articulated by the new industrial and technological womb based on the use of fossil fuels, impelled the real growth of the world economy from US$2 trillion in 1965 to US$28 trillion in 1995. Divided by the population, the world average per capita economic grew from US$614 in 1965 to US$4908 in 1995, in spite of those projections to hide the known economic disparities from the places, from the regions, from the countries and also from the continents. Projections for this final century, indicate that the poverty and the social inequality also grow in proportional to the accumulation of the capital; at the moment exist more than 1.3 billion people (more than a fifth of the world population) living at a social level classified as being in poverty, without access to the basic public politics. Around 80% of the poor of the world live at 12 countries: China, India, Brazil, Nigeria, Indonesia, Philippines, Ethiopia, Pakistan, Mexico, Kenya, Peru, and Nepal. If the dynamics of population growth continues in the same current rhythm, it has been estimated that in the year 2015, the number of poor people in the world will reach 1.9 billion (Reed and Rosa, 2001).

Conceived and implanted trends as foundation the exacerbated consumption and the continuous use of the natural resources, the model of industrial and technological development of the hegemonic countries resulted in an environmental degradation that puts at risk the future of life existence on Earth. The rural and urban pollution, the acid rain and the greenhouse effect, the inadequate use of the waters, soils and atmosphere,..., the de-stabilization of the heat, hydrological and biogeochemical atmospheric cycles, are problems with impacts in regional and global ambit and that affect the sociabilities and the economic processes of all the world's people. The growth of poverty worsens this ecological picture, hindering the projection of more approximate and adjusted sceneries to the future realities.

The incorporation of new political conceptions centered on the non-divisibility of the man and of nature and in the valuation of the collective processes still continues being denied for the voracious character of the profit in great scale. In the same form, the construction of energy politics and of alternative development technologies, self-sustainables, has not been done with the necessary speed to stop the picture of degradation of the main world ecosystems.

Estimates indicate that the global use of energy increased by 70% in the last 25 years, and is projected to grow by 50% in the period from 1993 to 2010, with a worsening of several environmental problems, all of them connected to each other, in particular of the greenhouse effect resulting from the emissions of carbon dioxide (Reed and Rosa, 2001). Studies with reference to 1990, indicates that 97% of the CO_2 emitted by the industrialized Western came from the burning of coal, oil and gas to obtain energy, to assist the social needs of 25% of the world population that lives in those nations. In this same period, this same population consumed about 80% of the energy produced on the planet. The sources of emission of CO_2 due to the burning of fuels are distributed between residential heating and section of services (15%), transport (27%), industrial energy in general (57%) and other (1%). An additional source, whose emissions have been increasing systematically is constituted by the burning and deforestation in tropical regions, in particular in the African continent, in Southeast Asia and in the Amazon basin.

Recent measures show the possibility of the Amazon basin, while tendency, to behave as a sink of CO_2, with the above-ground biomass absorbing 0.5 gigatons (500 million tons) of this scalar per year (1.61×10^7 g/s), from upper atmospheric layers in direction to the above-ground biomass. This result constitutes an unfolding of the carbon budget resulting of measures that indicate a total emission of this scalar from forest, due to the contributions emitted from soil, for the leaves and for the logs and consumed it for the vegetation for photosynthetic effect (Meir et al., 1996; Nobre et al., 1996). The degree of competition between those two processes, emission and absorption for and in the forest canopy, will determine if the Amazon above-ground biomass behaves as sink or source of the dioxide carbon.

The studies about climatic variation accomplished by Hulme (1999) and divulged by World Wildlife Fund (WWF) – non-government organization that acts with the firm purpose of defense of nature – advance that if preventive measures are not made, the current emissions of CO_2 will grow at 4-320% above the current concentration level, until the year 2100. The current concentration of 370 parts of CO_2 per million parts of air (370 ppmv) should increase to about 550 ppmv in 2100, for a scenery of smaller emission or above 830 ppmv for a scenery of larger emission. The consequences of those projections for humanity's future are still unknown.

The current energy crisis installed in Brazil [year 2000] it tunes in Amazonia with possibilities of worsening of that picture, in world ambit. With the large Brazilian hydroelectric potential, is waited an intense pressure of the transnational conglomerate in the expansion of those services with the construction of new hydroelectrical plants in that region. With the total privatization of the energy section, the current Brazilian

government projects that, in the next ten years, the private investments will double the capacity of generation of electric energy in Brazil, from the current 60 million KW to about 120 million KW. The small rates of economic growth, the low consumptions of energy for inhabitant in Brazil, esteemed at about 1600 KWh per capita and the national domain of the generation and distribution technologies of electric energy of large hydroelectric enterprises stimulate the expansion of that section in the near future. Pressure from organized sections of the national and world societies has minimized, but not avoided the construction of large hydroelectrical plants in the Amazon region (Eletronorte, 1998), enterprises that can accelerate the imbalance of the CO_2 cycle and to unchain several ecological problems on a global scale. The estimates indicate that the Amazon region presents a hydroelectric potential of more than 100 million KW. The construction of large hydroelectric plants in this region inundate extensive areas with vegetal coverings, resulting in the emission of greenhouse gases, especially carbon dioxide, methane and nitrogenated compounds, because of the process of decline of the biomass in the reservoirs of the dams. The participation of hydroelectric energy in the Brazilian energy balance reaches levels larger than 90%, one of the highest in worldwide terms (Eletrobras, 1998, p. 7). The non- diversification of its energy sources can constitute a great impediment for Brazilian economic development, in adjusted and rhythm form. In France, the electricity of hydraulic origin represents 18.5% of the total electric energy consumed in the country (Ministère de l'Équipement, des Transports et du Logement, 2000, p. 9). In a recent declaration in the national press, the president of Eletronorte, Jose Antonio Muniz Lopes, declared that the design of the hydroelectric plant 'Belo Monte' has been concluded. This plant which is forecast to be functioning by 2008, will be constructed in the river Xingú, 50 km from the city of Altamira in the state of Pará, eastern Amazonia, and will generate about 11000 KW constituting the third largest in the world. According to Lopes, the plant will flood an area of 400 km^2 half of which is the proper riverbed; the design of the plant is calculated at US$3.8 billions and has a forecast operational cost of US$12 per MW, one of the lowest of the hydroelectric enterprises in the world (Folha online, 2 November 2001).

The mineral and metallurgist pole in Amazonia, especially the aluminum industry, consumes a huge amount of energy. The Albrás, aluminum industry, located in the state of Pará, was responsible for 1.5% of the whole consumption of electric energy of Brazil, at the time with 150 million inhabitants [data of 1996] (Pinto, s.d., p. 150).

Another complex world concern refers to the maintenance and the distribution of drinkable water for regional populations. The projections indicate that two thirds of the world's countries will have problems with its sources of water by the year 2025. The heterogeneous distribution together with the growing demand, and with the fast pollution of sheets of water its have been worsening this picture in several regions of the Earth. It is reckoned that 2.9 billion people in the world don't have access to the appropriate sanitary conditions and 1.4 billion don't consume drinkable water regularly. As added difficulty is that the fast industrialization process has provoked high pollution levels in the waters, in the soils and in the terrestrial atmosphere. The intense use of chemical fertilizers, combined with the burning of fossil fuels and of biomass, and the inadequate handling of soils and of vegetable coverings have been accelerating the emissions of several gases trace, especially of carbon dioxide, methane and nitrogenated compounds, intensifying the greenhouse effect and other physical-chemical processes that contribute to the climatic non-stabilization of the planet (Reed and Rosa, 2001). The existence of about 20% of the world's resources of fresh water in Amazonia, reaffirms its strategic importance in the planetary socio-environmental dynamics.

Projections of the World Bank, esteem that an investment of 5% of the total expenses for the governments of the developed countries would reduce the number of undernourished children from the current 166 million to 94 million in 2020, in global ambit. However, if the current political picture persists, more than 500 million people will not have a safe and continuous access to the basic level of food and 130 million children of preschool age will live in sub-nutrition conditions in several world peripheries, by that same year. This multilateral institution also put the need for the governments of the developing countries to obey the rules of laws, they print transparency to their political actions,..., they eliminate the corruption and they respect and protect the human rights as necessary condition to reach a self-sustainable development. It emphasizes that the national governments are responsible for the failures of the public politics in the developing countries (World Bank, 23 August 2001). However, this same institution omits and doesn't illuminate that the poverty and the terrible social indicators of those countries were also built, in the past and in the present, through economic and political enterprises that articulate the interests of the directing elites of those countries with this multilateral institution and with the great capital. It also omits the political and economic blackmail that this institution [World Bank] and the IMF submits the outlying people to. Based in more complex and realistic methodologies, the critical specialists also question these statistics and they

project much more dramatic sceneries for humanity's future. And they insist in the need for structural changes in the political and economic conceptions that permeate the current world processes.

The political manipulation, the control of the media, the institutionalized corruption, the spurious agreements,..., the absences of an organized civil society and of democracy in a vast majority of the governments of the underdeveloped countries contribute to the crystallization of that picture. The pressure of organized sections of the world society on the multilateral institutions and the growing discredit of those governments has been inducing the institucionalization in new social control forms, for the multilateral institutions. In the session accomplished on 29 February 1997, the Commission of Statistics of the United Nations approved the adoption of a group of social indicators to compose a minimum base of national data. These indicators will facilitate a better accompaniment of the social programs in national ambits, especially of those programs that have connections with the calendars of the conferences on human settlement (Cairo, 1996), on woman (Beijing, 1995), on social development (Copenhagen, 1995) and on population and development (Cairo, 1994). The group of social indicators understands general data on population and development, distribution of the population for sex, age, color or race, poverty, employment and unemployment, education and life conditions, themes identified by Expert Group on Statistical Implications of Recent Major United Nations Conference as essential in the calendar of the international conferences (ONU, 2001, www.un.org / depts / unsd / social). It has built a net and a world map of the poverty in strategic areas. Regions of India, of Brazil, of Indonesia and of the countries of central Africa are priorities in that socioeconomic sweeping. The environmental subject and the potentiality of the consumption market guide the choices, the degree of importance of the areas focus and the intensity of the programs that will be developed in the same ones.

Ianni affirms that:

... When it finishes the Cold War, with the breakup of the Soviet block, it is intensified and it is extended the development of the capitalism. The nations that had tried socialist projects are transformed in spaces of the world market, in which the companies, corporations and transnational conglomerate prevail. It meets in course a new cycle of globalization of the capitalism, that reaches more or less drastically so much the Latin America and Caribbean like Asia, Africa and central and eastern Europe (...). This is the historical scenery or, more properly, geohistorical, in which the International Monetary Fund (IMF), the World Bank (BIRD) and the World Organization of the Trade (WOT), as well as the transnational corporations, press the national States to promote political, economic and sociocultural reforms, involving juridical-politics institutions, destined to favor the dynamics of the productive forces and of capitalist relationships of production. That is the context in that the reform of the State becomes the predominant word of order in whole the world... Besides, its are opened the markets, it are facilitated the negotiations and associations of transnational corporations with national companies... Many social conquests of different labor categories and other salary earners already were or are being re-defined, reduced or same eliminated,..., with serious damages for the ones that are forced to sell its manpower to live or to survive (Ianni, 2000, pp. 55-56).

Recent projections of UNESCO show that the literacy process for adults continues moving forward in world ambit; in the last 30 years, according to this institution, literacy grew from 63% in 1970 to 75% in 1990 and to 79% in 1998, and could reach 83% in 2010. The number of adults alphabetized in the world grew by more than 100%, of a value esteemed at 1.5 billion in 1970 for about 3.2 billion in 1998. However, this same institution alert that in spite of this progress, there still exist in 1988, 880 million illiterate adults in the world, two thirds of which are women (64%). It indicates although, maintained the same current political tendencies, this number will reduce to 830 million in 2010, which shows [according to UNESCO] the need for a larger concentration of efforts in the improvement of the quality of the basic education and the elimination of illiteracy. The projections also show that 98% of the illiterate population are in the non-developed countries (UNESCO, 2000a). With an added difficulty: in general, the known problems of human poverty are added; constant immigrations, illiteracy, malnutrition, absences of health and of diversion, unemployment, family and community non-structuring, high crime rate,..., affectivity problems and citizenship absence are typical problems of wide portion of those peripheral populations. Historically, the market and the liberal politics of the national governments reproduce and recreate the poverty in scales and speeds that best assists its specific interests.

The World Conference about Science, promoted by UNESCO which took place in Budapeste, Hungary, from 26 June to 1 July 1999,[6] built a declaration on science and the appropriate use of scientific knowledge in the 21th century. It established a calendar and scientific and technological priorities that the world governments should assure and to stimulate for the mondialisation of the science while agent of social promotion and of better cultural interlacing among the different world people; commitment with the

ecological equilibrium of the Earth, and with the firm purpose of eliminating the growing social inequalities and the scientific and technological differences between the people and the nations. Themes such as: science and knowledge and progress; science for peace and for development; science in and for society, guided the debates and the resolutions deliberated in this important event (UNESCO, 2000b). However, the intentions and the scientific and ethical commitments, have been speedily and easily transfigured for the economic and political interests in course. The scientific calendars are transfigured and put in a decision level in that the scientific agents' participation, in the limit, has been innocuous and dispensable. It is imposed the need of the world society to intervene more firmly in this process. And to press the economic and political agents for a radical pact for the peace and social promotion among the different people of the world, to build new world autonomous and independent forums that control the appropriate use of science and technology, and structures of world solidarity that stimulate the constant political evaluation of the processes of civilization in course.

The synthesis of the world social indicators in the year 2000 is alarming: 1.3 billion people don't have access the drinkable water; more than 5 million people die annually due to diseases provoked by consumption of inappropriate water; 1 billion people inhabit precarious dwellings; 100 million don't have dwelling; 790 million people starve and they don't have alimentary safety; 2 billion people are anemic with alimentary inadequacy; 35,000 children die daily for alimentary lacks; 880 million don't have access to health services; 2.6 billion don't have basic sanitation and 2 billion don't have access to electricity. The morbidity of this picture intensifies when it is considered that: 1.2 billion people live with less than US$1 per day; 1 billion people cannot satisfy their basic needs of consumption; more than 850 million are illiterate; 27% of school age children don't go to school; 260 million don't have access to the primary education; 145 million people live outside of their countries; 900 million have precarious employed; 150 million unemployed and 250 million children in school age are working.[7] The concern with these projections has been enlarged the measure that we have verified the constant permeability and permittivity of the ONU to the mediations and manipulations of the economic forces and the interests of the worldwide market. More efficient and critical studies, certainly, will evidence a more dramatical social scene.

This is a picture that is being forged and crystallized by the globalization of economic processes led by the economic conglomerate and for the political hegemony of the developed countries of Western world, especially the USA. On a world scale, 86% of the total private consumption is reserved for 20% of the human population (UNESCO, 2000b, p. 18). The paradigms of science while agent of social promotion among the different people; of the economy while mechanism of integrated physical and human development and ally to the world aspirations of prosperity and dignity, and of the politics while process of construction of a freer, solidary, fraternal and human world, are definitively put in check. The temporal non-connection among the scientific, economic and political processes and the organized society, constitutes a barrier for the construction of an immediate solution. The speed with that the economic conglomerate, allies with the technologies of information and of communication, are articulated to each other and with strategic sections of the media and of the economic and political establishment, consolidating positions and global alliances, and subverting individuals, people's groups, associations, unions, political parties, governments, States and blocks of countries, it hinders, it disperses and it brakes a chain reaction of the world societies. The world was never so interlaced in its socioeconomic dynamics and, simultaneously, ‘broken into compartments’ in its civilization humanism.

The need for the construction of a theoretical and empiric substratum civilization, more consistent and including that it redirects, mold and modulate the foundations of the processes of economic globalization and of mondialisation of the culture, facilitating the emergency and the hegemony of philosophical conceptions commitment with the civilization and racial diversities, with the differences and the social inequalities. In this context, the construction and the planning of new education politics, at all levels, acquire a special meaning. The tendencies of the current national and world educational systems that have as presupposed the principles of ‘competitiveness’ and of the ‘financial imperative’, need to be reverted in prol of a tendency anchored in the ‘justness’.

Carnoy (1999, pp. 41-51) classifies the education reforms, in the context of the mondialisation of the culture, in the following form: 1) the form with references in the competitiveness that has as paradigm, the evolution of the demand of qualification in function of the necessities of the national and international labor market and of the innovations of organization of production of school results and the professional competence. This reform has as central axis, the decentralization, the educative norms..., the national management of the educative medium. 2) The reform with reference to the financial imperatives than are based on the reduction of the volume of public deficit and on the transference of the control of national

sources of the State to the private sector, including the investments in education. This reform is a guide by a private component fort and of reduction of the public charges of education, and finally; 3) the reform that have as reference the justness, which is anchored in the presupposition of equality and an education of quality. This tendency reserves special attention to women..., to the minorities and strengthens the educational programs special.

For us justness is a notion that embrace individuals, communities, peoples and nations; notion that is interlaced with the social diversities and the right of self-determination and that potentially the economic and politicians instruments, proper and necessary for each model of development.

Education and public teaching, of quality and gratuitous, at all the levels, should be assumed as a collective conquest and a universal right, and for this reason it cannot be submitted to the regulation of the market. The budgets for the public financing of education need to be enlarged immediately, in differentiated form and establishing new world forums that press and fasten goals so that the countries, especially the peripheral, strengthen their education systems in compatible scale with its needs and with its educational deficits. The agreements, exchanges and diplomatic calendars between the developed and peripheral countries need to be recreated and revitalized with the establishment of new contours and delimitations of the world public debt, guaranteeing more financial resources for combating poverty and world illiteracy. And considering the consensual thesis that it attributes to the agents of the globalization processes in course the co-responsibility for the worsening world eco-sociocultural indicators, it is put as priority the creation of specific global audits on the financial capital that anchors and permeates these processes. With the establishment of taxes and specific rates that facilitate a continuous flow of investments in projects in areas with more precarious social indicators. The sophistication of the current accounting methods already makes possible the implementation of those 'global taxes' coupled to the world nets and in real time. Although of topical nature, this proposal would facilitate, in the limit, the construction of reverse tendencies to the current picture of world poverty, contributing to a more fraternal and equal dialogue among the different people of the world.

The world sceneries that are projected for the future, definitively, contaminated by the menace of 'bioterrorist' and by the political and religious intolerance, amplify the difficulties of the current diplomatic and multilateral forums to mediate, with the necessary speed, a systemic solution, durable and stable for this crisis of the humanity. The need for societies and for different people to conceive new forms and mechanisms of world organizations, new social contract, has become indispensable in the contemporary world.

4. Amazonia: contours and delimitations

The importance and the destiny of Amazonia in that world macro-scenery are still a little diffuse, but it has been verified that its growing transnationalization already permeates the megaeconomic and ecological processes in course.

In spite of the great problems that the scientific and technological processes provoked in the environment, in the contemporary world, the world citizen has been mobilized, he has been articulated, he has self-organized and he begins to influence the global political conceptions in course. And new methodological and ontolological structures have been projected for the construction of sceneries more committed with the humanity, with the uses and the preservation of the environment, in particular, with the Amazon ecosystems and with its regional populations.

The current tendencies show an intense and growing involvement of non-government organizations with the environmental subjects in Amazonia. Education and environmental monitoring, development of new technologies and technical and social attendance to the rural populations, conservation and administration of natural resources, environmental fiscalization and mobilization of public opinion,..., ecotourism and ecological research are themes that, necessarily, compose the calendar of these world institutions.

The world has been projected in the place at the same time that the Amazon regional historical constructions are overflown for on everywhere and continents capturing growing world solidarities. The modernity discovers that the 'Amazon world' constitutes an important knot in the global dynamics of genetic storage.

The inventory on the world biodiversity has already identified about 1.75 million species on the Earth, of the which 4500 are animals; 10,000 are birds; 1500 are amphibians and reptiles; 22,000 are fish; 270,000 are plants; 70,000 are fungi; 5000 are viruses; 4000 are bacteria; 400,000 are spineless species, not including insects; 960,000 are insects, of which, about 600,000 of them are beetles (Dallmeier, 2000, pp. 454-455). Specialists speculate that these projections represent less than 10% of the actual number of species on

the planet, most in the oceans and in the tropical areas, with more than 50% of them residing in pan-American Amazonia, in central Africa, in Southeast Asia and in areas of Australia.

Amazonia is crossed by the Amazonas river that drains more than 7 million of km^2 of lands, and has na average annual outflow of approximately 176,000m^3/s, which makes it the largest river by volume of water on the Earth, overcoming the Congo river in Africa (the second in volume of water) by about four times, and the Mississipi river some 10 times. At that time of low waters, the river Amazonas drives for the sea, about 100,000m^3/s; at that time of the floods, more than 300,000m^3/s (Sioli, 1991). The Amazon basin constitutes an inhabited area with one of the highest indexes of rainfall on the planet, with a total medium of the order of 2200 mm/year. This represents a total volume of water in liquid form of the order of $12x10^{12}m^3$ that this area receives every year, resulting in the world's largest rainforest (Salati et al., 1983).

The Amazon basin, the Congo basin, and the area around Borneo, are typically tropical, healthy extremely important and efficient in the absorption of solar energy and in the planetary re-distribution of this heat through the terrestrial atmosphere (Crutzen and Andreae,1990). Recent studies project that the process of humidity conversion in rain in the Amazon atmosphere liberates a large amount of equivalent heat of about 400 million MW, that corresponds to the explosion of about 5,580,000 nuclear bombs per day (Bautista Vidal, 1990), similar to those that the North Americans dropped in the city of Nagasaki, in World War II, on 9 August 1945, causing the death of 45,000 people.

Special prominence is attributed to the participation of Amazonia in the indispensable basic processes for the chemical stability of the terrestrial atmosphere on a global scale. Specialists speculate that it contributes, in regional and planetary levels, to the budgets of carbon dioxide (CO_2), main 'greenhouse gas', of nitric oxide (NO) and of dioxide of nitrogen (NO_2), main responsible agents for the degree of oxidation of the atmosphere, and of nitrous oxide (N_2O), gas, approximately, 200 times more greenhouse than CO_2. The studies also confirm that annually about 3.5-4 gigatons (billion tons) of CO_2 due to the agents of human and natural character are stored in the atmosphere (Leggett, 1992). A lot of controversies still exist on the global emission of CO_2. The Intergovernmental Panel on Climate Change (IPCC) projects that in 1990 about 7.4 billion tons of carbon dioxide were emitted into the terrestrial atmosphere. The Amazon ecosystems behave as 'gigantic vacuum cleaners of air', participating in that dynamics, with an absorption, for photosynthetic effect, of order of 0.25-0.5 gigatons (250-500 million tons) of this gas per year (Nobre et al., 1996), corresponding to the annual absorption of up to a ton per hectare of the 500,000,000 hectares of those ecosystems. Estimates accomplished by Salati (idem, 1983), based on the existence of an average amount of 320 tons of carbon per hectare, verified that the Amazon ecosystems stored about 192 billion tons of carbon, 27% of the total carbon existent in the terrestrial atmosphere. Specialists also project that about 15-20% of the amount of nitrogenated compounds, especially NO, NO_2 and N_2O, that circulate in the atmosphere, on a global scale, are emitted by the Amazon ecosystems (Keller et al., 1988). The degree of importance of the first two nitrogenated gases in the chemical stability of the atmosphere, and of the last in the climatic stability on planetary scale are complex problems and still the subject of scientific speculations.

The research also indicate that the Amazon forest produces annually, 7.5 tons of biomass per hectare that highlights, due to its great extent, one of the largest world sources of renewable biomass. Exploratory research also signals that the extraction of petroleum, the chemical-pharmaceutical industry, agriculture and extractivism, agriculture-forest and fishing industry, the exploration of the mineral and metallurgics resources with a re-planning appropriate, the eco-tourism, the alimentary industry, the creation of environmental commodities, the use of alternative energy sources,..., the biotechnical industry and the payment of the rights of intellectual property to the traditional populations and the indigenous people from Amazonia, in the medium term, can result in an economic projection of that area, larger than US$ 3 trillion per year, more than six times the current Brazilian GDP (reference of 2000).

Official registrations mark a deforestation of 15% (75 million hectares) of the total area of the Amazon, in the period 1970-1990, a larger area than the territory of France. The deforestation, the burning and the uses of the soils in the tropical areas are problems with impacts in global ambit.

The recent proposal of territorial re-division of Amazonia involving an area with vegetable covering of more than 100 million hectares - 70 million in the state of Amazonas and more than 30 million hectares in the state of Pará - and the creation, simultaneously, for the Brazilian government of five great macro-areas of ecological preservation in Amazonia, defined in an area of about 40 million hectares, only in the state of Amazonas, are recent problems and also of world interest.

Rangel (2001) argues that:

If approved the creation of the three territories in Amazonas state, 641 indigenous communities will leave the map of the state, and 445 will be in Rio Negro territory, 157 in Alto Solimões territory and 39 in

Juruá territory. The total of the indigenous areas reached by a probable division is of 29,588,979 hectares, with a population of 63.081 inhabitants.

Continuing Rangel (idem) affirms that: '... of the 215 peoples from Brazil, 62 are in Amazonas state, where 90 of the 345 thousand of the indians of the country also live...'.

And with an added difficulty, the privatization of a great part of the 500 million hectares of the ecosystems of the Brazilian Amazonia, the illegal ownership of extensive territorial strips in Amazonia reaches estimates now in the order of 100 million hectares, 55 million being in the state of Amazonas, conform thoroughly disclosed in the Brazilian press.

The economic potentiality of the Amazon region grows as its importance for the planetary environmental balance has been reaffirmed and that the politics of Brazilian development enter in collapse, creating new dominance and of colonialism forms in the region by scientific, politics and managerial leaderships.

The 'nature x culture' confrontation mediated by the projections and reverberations of the world problems in Amazonia, is put as one of the main contemporary political subjects. The constant tension of the 'region-nation-world' is a fact that has became common sense in Amazonia.

The transport of the physical, chemical and biological agents, indispensable in the process of mechanical, thermodynamics and chemistry stabilization of the terrestrial atmosphere and of world climatic changes, constitutes one of the connections of articulation of Amazonia with the scientific, economic and political processes on a global scale.

The sciences of nature are revitalized while the field of scientific knowledge; as in the remote past, the skies, in particular the terrestrial atmosphere, becomes the largest and more important 'laboratory' of the 21th century. Definitively, the environmental subject, also becomes mediated by the meteorological processes, in local, continental and world ambit.

The scientific research on the Amazonia must consider the dimensions of the complexity presented in this article.

Notes

(**1**) René Descartes (1596-1650), one of the founders of modern philosophy, is considered one of the main representatives of the rationalism and precussor of analytical geometry. Amongst diverse contributions, is detached the "Discurso do Método". Pitágoras (about 580-497 AD), eminent figure, around 540 a.C was established in Great Greece, south of Italy, where he created an order, whose doctrines were transmitted verbally, with great influence on the Greek philosophy at that time and on the following thinkers. Galileu Galilei (1564-1642), one of the founders of modern astronomy and classic mechanics, had an excellent paper on the establishment and the mondialisation of the scientific method. Together with Kepler and Newton he had constructed the foundations and the contours of classic mechanics and astronomy, with great impact at that time and in the later civilization processes. Claúdio Ptolomeu (about II BC), from Alexandria, proposed an astronomical model that was based on the platonic conception to explain the dynamics of the universe in terms of circles and spheres, and uniform movements, with the Earth at its center. This geocentric cosmology lasted during 14 centuries. Immanuel Kant (1724-1804), influential German philosopher, constructed a work that is basic for the understanding of the modern theory of the knowledge and the modern social theory (Bottomore, 1997, p. 205). Isaac Newton (1642-1727), English physicist, constructed the main and fuller work in physics already published, constituted of a systematization, simultaneous to the creation of one sophisticated theory concerning the studies of the mechanics and astronomy to the time. Also he invented integral and differential calculus and the theory of the corpuscular nature of light. Santo Tomás de Aquino (1225-1274), prominent theologian of the medieval period, through his teachings contained in his workmanship Suma Teológica, exerted great influence on the model of Christian thought, present in the following centuries, and that it permeated important philosophical and scientific theories to the later medieval period. Charles Robert Darwin (1809-1882), English naturalist, author of the Origem das Espécies, constructed a theory of the evolution of the species in terms of selection, hereditary and variation that resulted in great impact in all the knowledge areas, to the time. Karl Heinrich Marx (1818-1883), social scientist and historian, was one of the occidental thinkers with greater influence in the history of humanity. The set of his works constitutes one sophisticated and innovative economic and politics conception that still challenges the main thinkers of the contemporary world. Albert Einstein (1879-1955), German physicist, responsible for the establishment of the theory of relativity, and with diverse important contributions in thermodynamics and in

mechanics statistics, in electrodynamics, amongst others. Georg Wilhelm Friedrich Hegel (1770-1831), German philosopher, had an important paper on the construction of the dialectic method, which anchored the later development of the marxist theory. Ludwig Planck (1858-1947), German physicist, corroborated with the construction of the foundations of thermodynamics, of electromagnetic theory, of relativity, creating essential connections between the classic and the contemporary sciences, amongst other scientific contributions. Aristoteles (384-322 BC) is considered as one of the most eminent thinkers of the Western world. He constructed an explanatory language for the phenomena of natural sciences and enlarged the horizons of the foundations of philosophy, influencing generations of researchers that has followed him. Johannes Kepler (1571-1630), German astronomer, published sophisticated scientific works that make possible the understanding, in scientific bases, of the dynamics of the solar system and that laid the foundation for the development of universal gravitation. Max Weber (1864-1920), eminent social scientist, constitutes an obligatory reference in the studies of the 'wombs' of the scientific and politician thought of the Western world. Werner Karl Heinsenberg (1901-1976), German physicist, published an excellent paper on the construction of the physical and mathematical foundations of modern physics, especially of quantum mechanics. Gaston Bachelard (1884-1962), French philosopher, was the author of vast and sophisticated philosophical works. Among his works, are distinguished Novo Espírito Científico and the Formação do Espírito Científico in the context of the scientific currents proper of the 20th century. Also he contributed with excellent publications concerning the nature of the category 'time'. Sigmund Freud (1856-1939), singular figure in the history of Western thought, from psychoanalysis, created a scientific language that has infiltrated and it is sedimented in all the knowledge fields, with impacts in the daily, material and psychic life of the people. Nicholas Maquiavel (1469-1527), from Florença, constructed the work O Príncipe, one of the main literary references in the field of theory politics. Platão (about 427-347 BC), one of the most eminent Greek thinkers, constructed the presuppositions of the conception that the dynamics of the universe, can be explained in terms of forms and geometric symmetries. His more important work A República, that deals with philosophical, politics, legal and ethical questions, still constitutes an important intellectual reference for the scholars of the history of universal thought. Ernest Rutherford (1871-1937), English physicist, was one of the creators of nuclear physics. The non-inclusion of the literary and artistic contribution in this citation does not mean that these human enterprises have not been important in the formatting of the civilized Western womb, what is intended is to show the scientific and philosophical contribution to the thoughts systems, own of the epoch different.

(**2**) One rich and didactics discussion on the influence of the wombs of scientific thought in sociology is presented by Octavio Ianni in the assay "A sociologia numa época do globalismo", published in the collection A Sociologia no Horizonte do Século XXI, São Paulo, Boitempo Editorial, 1999, pp. 13-25; and more recently in his book Enigmas da Modernidade-Mundo, Rio de Janeiro, Editora Civilização Brasileira, 2000, 319 pp.

(**3**) Two important works on the discontinous nature of time, A Intuição do Instante, and A Diáletica da Duração, that were published in 1935 and 1936, respectively, by Gaston Bachelard.

(**4**) Good parents of family.

(**5**) Werner Karl Heisenberg (1901-1976), German physicist, and, Erwin Schrödinger (1887-1961), Austrian physicist, published relevant papers on the structuring and theoretical consolidation of quantum mechanics, a knowledge field that studies the physical phenomena at the atomic level. Louis de Broglie (1892-1987), French physicist, and Arhur Holly Compton, (1892-1962), American physicist, produced decisive contributions for the consolidation of the thesis that proves the dual undulatory and corpuscular nature of electromagnetic radiation, with impacts in several technological fields. Max Born (1882-1970), German, published a central paper on the construction of the language of physical mathematics that cemented and molded the development of quantum mechanics. Josiah Willard Gibbs (1839-1903), American physicist, created important analytical connections between the classic thermodynamics and statistical mechanics, contributing for the consolidation of this scientific area. Paul Adrien Maurice Dirac (1902-1984), English physicist, published important scientific works on the foundations of quantum mechanics, contributing to its consolidation and generalization. Wolfang Pauli (1900-1958), Austrian physicist, constructed excellent scientific articles on the foundations of the mechanics and the theory of relativity with innumerable applications in the atomic dynamics of chemical elements that compose the periodic table. Lev Davidovic Landau (1908-1968), eminent Russian physicist, constructed works of great scientific reach on condensed matter, with vast applications in the physical fluid and solid theories. Enrico Fermi (1901-1954), detached Italian physicist, had a decisive part in the development of nuclear physics and in the foundations of statistical mechanics.

(**6**) This conference had the participation of more than 1800 commission agents representing 155 countries, 28 inter-govermment organizations and more than 60 non-governmental scientific organizations and 80 Ministers of Science and Technology, Research and Education or their equivalents.
(**7**) This is the worldwide social picture systemize for J. Tezanos from documents 'ONU: Informe sobre Desarrolho Humano 1988; 1999; 2000", and, 'OIT: Informes sobre el trabajo en el Mundo (varios años)' – presented for José Antonio Caride Gómez in the article 'Educación Ambiental, Desarrollo y Pobreza: Estrategias para "outra" globalización', in Reunión Internacional de Expertos en Educación Ambiental – nuevas propustas para la acción, Santiago de Compostela, Espanha, November 2000, pp. 367-391.

References

A Crítica (9.12.2001) Pobreza é principal ameaça para a paz, afirmam laureados. Newspaper published regularly in Manaus.

Alloufa, J., M., L.; Silva, M., C. (2000) Singulière et universelle: les dimensions de la dialectique dans la pensée sociale, 17p. Article presented in IX Colóquio Internacional da AFIRSE, em junho de 2000; Rennes, França.

Auger, P. (1990) PROBLEMAS DA FÍSICA MODERNA. Editora Perspectiva, São Paulo.

Bautista Vidal, J., W. (1990) Potencialidades para uma Civilização nos Trópicos, p. 228; in: Desafio Amazônico, O Futuro da Civilização dos Trópicos. Editora Universidade de Brasília, Brasília.

Born, M. (1990) PROBLEMAS DA FÍSICA MODERNA. Editora Perspectiva, São Paulo.

Bottomore, T. (1997) Dicionário do Pensamento Marxista, , p. 205. Jorge Zahar Editor, Rio de Janeiro.

Carnoy, M. (1999) Mondialisation et réforme de l'éducation: ce que les planificateurs doivent savoir; p. 41-51. UNESCO, Paris.

Carvalho, L., O. (2000) Perspectiva de Compreensão Ambiental da Amazônia. Master dissertation presented in the program of pos-graduation of the Instituto de Ciências e Letras da Universidade do Amazonas, Manaus.

Crutzen, P., J.; Andreae, M., O. (1990) Biomass Burning in the Tropics: Impact on Atmospheric Chemistry and Biogeochemical Cycles. Science, v. 250, pp. 1669-1678.

Dallmeier, F. (novembro de 2000) Biodiversity: Earth's most important and most threatened asset, in: Reunión Internacional de Expertos en Educación Ambiental – nuevas propustas para la acción, p. 453-470; Santiago de Compostela, Espanha.

Eletronorte (1998) CD-ROM: Cenários Mundiais, Nacionais e da Amazônia: 1998-2020.
Folha online (02.11.2001) Hidrelétrica de Belo Monte será a 3ª do mundo; in: http:// www.uol.com.br.

Freitas, M; Silva, M., C. (2000) Estudos da Amazônia Contemporânea: dimensões da globalização, 308 p.; ver capítulos VII e VIII. Editora da Universidade do Amazonas; Manaus, AM.

Gómez, J., A., C. (novembro de 2000) Educación Ambiental, Desarrollo y Pobreza: Estrategias para "outra" globalización, in: Reunión Internacional de Expertos en Educación Ambiental – nuevas propustas para la acción, p. 367-391; Santiago de Compostela, Espanha.

Heisenberg, W. (1990) PROBLEMAS DA FÍSICA MODERNA. Editora Perspectiva, São Paulo.

Hobsbawm, E. (1995) ERA DOS EXTREMOS – O BREVE SÉCULO XX – 1914-1991, Translated by Marcos Santarrita, São Paulo, Editora Companhia das Letras, p. 526.

Hulme, M. (1999) Scenarios of global climate change impacts, 10 p. According to the electronic address of WWF, <htpp://www.panda.org>.

Hurwic, A. (1990) A Física, p. 13. Editora Loyola, São Paulo.

Ianni, O. (2000) Enigmas da Modernidade-Mundo", 319 p., Editora Civilização Brasileira, 2000, Rio de Janeiro.

_____ (1999) "A sociologia numa época de globalismo", in: A SOCIOLOGIA NO HORIZONTE DO SÉCULO XXI, p. 13-25. Boitempo Editorial, São Paulo.

Keller, M.; Kaplan, W., A.; Wofsy, S., C.; Costa, J., M. (1988) Emissions of N_2O From Tropical Forest Soils: Response to Fertilization With NH_4^+, NO_3^-, e PO_4^{3-}. Journal of Geophysical Research, v. 93, No. D2, pp. 1600-1604.

Leggett, J. (1992) A natureza da ameaça do efeito estufa; In: Aquecimento Global - O Relatório do Greenpeace, p. 32. Published by Jeremy Legget, Fundação Getúlio Vargas, Rio de Janeiro.

Marx, K. (1985) O Capital – Crítica da Economia Política; volume III, Tomo 2, Victor Civita Editor, São Paulo, Editora Abril Cultural, p. 239.

Ministère de l'Équipement, des Transports et du Logement (2000) L'EAU – L'EXPÉRIENCE FRANÇAISE, p. 9; França.

Meir, P.; Grace, J., Miranda, A., C.; Lloyd J. (1996) Soil respiration in a rainforest in Amazonia and in cerrado in central Brazil; In: Amazonian Deforestation and Climate; pp. 319-327; Published by John Wiley & Sons; England.

Morin, E. (1977) O método I. A natureza da NATUREZA, 2ª edição, Portugal, Editora Publicações Europa-América, 363 pp.

Mota, E., S. (1998) Time Granularity in Simulation Models within a Multi-Agent System; 230 p. Doctorate thesis presented in the University of Edinburg, Scotland.

Nobre, C., A.; Gash, J., H., C.; Roberts, J., M.; Victoria, R., L. (1996) The conclusions from Abracos; In: Amazonian Deforestation and Climate; p. 577-596; Published by John Wiley & Sons; England.

ONU (2001) MNSDS: Minimum National Social Data Set. According to the electronic address: www.un.org/depts/unsd/social.

Packard, N. (1995) PREDICTING CHAOS; In: Reinventing the Future – Conversations with the World's Leading Scientists, p. 202. Organizado por Thomas A. Bass, 249 p. Addison-Wesley Publishing Company, EUA.

Pinto, L., F. (s. d.) Amazônia: o século perdido, 160 p. Edição Jornal Pessoal, Belém, Pará.
Prigogine, I. (1996) O fim das certezas. Tempo, Caos e as Leis da Natureza, p. 170-199. Editora da UNESP, São Paulo.

Rangel, B. (20.04.2001) Amazonas em Tempo, p. A7. Newspaper published regularly in Manaus, Amazonas.

Reed, D; Rosa, H. (2001) Economic Reforms, Globalization, Poverty and the Environment, 25 p. According to the electronic address of the ONU, <htpp://www.un.org>.

Salati, E.; Junk, W.; Shubart, H.; Engrácia, A. (1983) Amazônia: desenvolvimento, integração e ecologia. Editora Brasiliense S. A., São Paulo.

Schrödinger, E. (1990) PROBLEMAS DA FÍSICA MODERNA. Editora Perspectiva, São Paulo.

Silk, J. (1988) O BIG BANG – A Origem do Universo, translated by Fernando Dídimo Pereira Barbosa Vieira, Brasília, Editora UnB, pp. 40, 83-117.

Silva, M., C. (1999) Metamorfoses da Amazônia; Editora da Universidade do Amazonas, Manaus, Amazonas.

Sioli, H. (1991) Amazônia: fundamentos da ecologia da maior região de florestas tropicais. 3ª Edição. Editora Vozes. Petrópolis, Rio de Janeiro, 72 p.

UNESCO (2000a) CD-ROM: Une décennie d'éducation dans le monde, p. 46-50; Paris, France.

_____ (2000b) Conférence mondiale sur la science – La science pour le XXIe. Un nouvel engagement, 53 p. UNESCO, Paris.

Watson, J., D.; Crick, H., C. (02.04.1953) A Struture for Deoxyribose nucleic Acid; Nature, vol. 171, p. 737.

World Bank (23.08.2001) Draft: Sustainable Food Security For All By 2020, 26 p., International Food Policy Research Institute, <Web: www. Ifpri.org>, NY, USA.