

Writing, city and high power: carbon, gas and hydrogen - war

Power never takes a back step - only in the face of more power.

Malcolm X

It is the emergence of writing and the appearance of the city that establish the first moments of a *high power society*. There is no high concentration of power without some kind of writing.

Writing begins as a projection of *figuration*, of image and sound fixation, as an extension of our long-term memory systems – the first nature of

representation. And this is an esthetical condition par excellence.

Even pictographic writing incorporates the acoustic universe.

Writing – pictorial or phonetic – means not only the extension through true long-term memory accumulators, but also a transformation of the logical universe, that is, mutation of *thought* structure.

Prehistoric figuration starts as non-linear, dynamic and multidimensional structuring.

In a classical and notable text of the 1950s, Sigfried Giedion related how, at Laugerie Basse’s museum, in France, he was deeply surprised by the universe of prehistoric representation when dealing with a small triangular artifact – «I brought the small piece of stone to sunlight. It became evident, then, that on the upper side of the left face and decisively inclining down, there was the

profile of a bull. His back disappeared in the stone, as well as the extremity of its posterior feet. But, the line of its back was firmly engraved, with a clear protuberance together the shoulders. As it frequently happens in prehistoric artworks, the head was vigorously modeled. At a first sight it was as if the animal was pasturing in a lightly convex plot of land, with its frontal feet strongly marked in an inferior level. When I brought up the stone to put it back in its place, by chance I turned it in an angle of one hundred eighty degrees. This made me to notice that the curve of the land composed the neck and the chest of another animal that, depending on our way to see a painting, would be described as to be up side down. (...) Apparently, the animal was portrayed in free run. The frontal straight foot was at the side of the bull's head which, also because of the change of lighting, disappeared, at least from our sight. But the prehistoric human's eyes were free. He did not consider necessary to translate all compositions in vertical parallels».

Giedion would make, still, another important observation – «Prehistoric human could apprehend things in their totality, with no need to organize them according to a static point of view...».

Prehistoric human’s eyes were free from the rules and laws that would be established by the specialized exercises of vision, determined by writing.

Sumerian and Acadian worlds still breathed some of that sense of freedom. In cuneiform – especially in the archaic period – the meaning of the message depended on the disposition of the elements in each tablet, taking it as a complete universe of events in action.

Later, phonetic writing would assume the diachronic universe of hearing as its *content*, and the discourse passed to be frankly linear and directional: *one thing after the other* – what transformed, for example, the entire mythological universe. Even if the Greek mythological universe

is built on some paradoxical conflicts, they are incomparably more profound as we dive in the past. In fact, they are incoherent only for the dominant logic of predication – but, they survive in poetry, for example.

The *linearity*, or *directionality* – with which predication would quickly emerge – coined all Western societies along thousands of years. It was its intensification what turned possible the emergence of ideas like *isonomy* and *democracy* in the ancient Greece.

It is this esthetical phenomenon that draws the ancient Greek principles of *freethinking* and *freedom* – each person responsible for his own *limits* – principles that are the base of what we call, in its modern sense, *art* and that implicate the privileged projection of *non-zero sum* game: symbiosis.

It was this logical phenomenon, intensified by the use of paper and by Gutenberg’s metal

movable types press, what generated *flat perspective* technologies.

It is a logical metabolism that indicates a process of concentration and abstraction.

In general, we are so addicted by literary thought strategy that we automatically believe that those sensorial revolutions obligatorily happen obeying to a principle of *local causality*.

But, sensorial and cognitive revolutions happen more like space-time pulsars, projecting their tentacle roots to all directions.

We are always dealing with esthetics – because it is about sensorial strategy.

Any manifestation of power – of any kind – emerges from logical structures, from sensorial and cognitive strategies.

After Aristotle's thought we passed to

believe that any logical system will obligatorily be founded in one of two excluding principles. They will be *concentration* or *dispersion*.

Writing, elements of what we vulgarly call *painting* or *sculpture*, and even *architecture*, implicate a high level of concentration tending to *synthesis* – but, paradoxically, any concentration provokes, in its intensification, some kind of dispersion.

Phonetic alphabet synthesized the representation of all basic sounds of speech in little more than twenty symbols, in a process of great implicitness that made possible a formidable informational concentration, generating a true explosion of dispersion.

Both papyrus and paper are light, inexpensive and one-way media. The velocity of use made them powerful informational accumulators. With the use of papyrus – and, later, even more with paper – writing was very simplified and a true planetary

wave of dispersion happened.

In the sequence of a long process with some centuries, Johann Sebastian Bach and Jean-Philippe Rameau promoted the synthesis of the musical scale through *temperament*, implicating a kind of concentration of resources, synthesizing the number of frequencies used, what brought to a great expansion of tonal music.

Even the invention of the bicycle in the 19th century, turned possible by the use of rubber in pneumatics, meant a great power of synthesis and an impressing dispersion – it is estimated that a little more than one hundred fifty years after its invention the number of bikes in the planet surpassed one billion of unities in use.

When such process of synthesis and concentration – but without dispersion – happens, what we call *aura* emerges.

Aura can also occurs in negative terms like

what happens with the value gave to antiques, for example. It is the value gave to the unique object, but never a vulgar one.

Such *aura* – so exuberantly evidenced by Walter Benjamin – indicates us another essential element pertaining to all ancient kinds of writing: *abstraction*.

When we admire walls and ceilings in Lascaux, Altamira or in Foz Coa Valley we wonder with those two elements vibrating as a birth: concentration and abstraction.

Once information is concentrated, all elements explode in multiple references, abstractions – which would become so common to us through the most different kinds of non verbal language.

Thus, the meaning of a sign is another sign, of different nature – fascinating phenomenon that can be clearly identified even in prehistoric

paintings.

With writing not only an era of high concentration of power, but also of high concentration of energy begins. With writing it is about the appearance of a power that is beyond the physical element, the thing in itself, like wood, oil, solar or Aeolian energy.

When we consider the transformation from prehistoric universe to the first agrarian societies, we note with lucidity that two elements designed the whole process of metamorphosis: *concentration*, in its most varied forms, and *abstraction*.

Sovereign expression of this process is the appearance of the figure of the *king*, bearer of divinity, abstracting what was already abstract and seeming to concentrate in himself the entire power.

The phenomenon, about which Sigfried

Giedion alerted as to be a dynamic and non-linear complex, reveals us about how the passage from a system of relative low concentration and strong interaction happened, like the prehistoric pictorial universe, to another one, of high concentration and strong hierarchy, like what passed to happen especially with the emergence of the Sumerian world.

This is also the clue present in the passage from the cuneiform writing, established on clay tablets – and more specifically in archaic cuneiform – to the revolution promoted by the phonetic alphabet writing.

In archaic cuneiform, information is present between dispersed signs, everything happening by *approximation*. In this way, the meaning depended over the position and distribution of the signs. Its interpretation, more than simple linear reading, implicated a spatial knowledge, providing multiple associations in an unstable and open system.

This also is an essential element of the prehistoric parietal paintings.

With the appearance of phonetic writing each sound passed to be represented by an image, revealing a powerful factor of abstraction and concentration.

Any concentration implicates fewer possibilities for free interpretation – like what happened with the *temperament* in Western music, or even with the invention of the bicycle.

With concentration, information became denser, more complete – more distant from its object and, therefore, more abstract.

Such esthetical mutation implicates an energetic and spatial mutation – everything being even more concentrated and abstract.

Inside forests, among animals and insects, or also when we deal with groups of hunter-collectors,

energy is fully distributed. Even constituting biological niches, the general structure is designed by dispersion – and this is the essential logic of the nomadic world.

Along centuries, Bororo aboriginal tribe settlements, in Central Brazil, were constructed on a diagrammatic circular structure of shelters that should be destroyed and rebuild in a different area, in cycles of around seven years.

A complete representation of the cosmos is present in each Bororo village’s design, or circular design, with the projection of the solar movement and a whole refined system of social relations.

Thus, villages were deconstructed and reconstructed in different areas, spreading out through the entire region.

There, we do not find a process of concentration and transformation – the villages remain practically the same along hundreds of

years.

When we pass to the universe of agriculture, to the first cities, we start a gradual process of concentration – in all senses – and metamorphosis accelerates.

One of the most fascinating, revealing and intriguing questions that emerged from the reflection on that process of civilizational concentration and transformation is to know how the strategy of energetic use happened along the centuries.

Two elements characterize, by their abundance, great part of the known Universe – *carbon* and *hydrogen*.

Carbon, with its uncommon properties leading to the formation in polymers, constitutes the base of all known life – it is the fundamental element of organic chemistry.

The very first signs of the carbon atom are aggregation and high concentration.

When carbon is associated to oxygen we have dioxide of carbon, which is the essential source for the growth of vegetables. When it is associated to hydrogen, diverse inflammable composites knew as hydrocarbons are formed, which are the base of what we know as *fossil combustibles*. When it is associated to hydrogen and oxygen, sugars, celluloses, alcohols and fats appear, among others. If it is associated to nitrogen, alkaloids are formed, which once associated to sulphur generate, among other elements, proteins. If these elements are associated to phosphorus we will have the emergence of DNA and RNA – dioxide ribonucleic and ribonucleic acids, the chemical codes of life.

Everything in carbon implicates concentration. And the word *concentration* indicates, precisely, that everything is attracted to a *center*.

City and writing seem to obey to carbon's logic.

With writing, cities and phonetic alphabet, a gradual concentration of energy through the use of carbon also emerges.

During Paleolithic, great part of energy consumed by human being was lost as heat. The chemist and environmentalist George Tyler Miller showed how in the act of hunting and to devour the prey, the predator generally loses in heat around 80% to 90% of the consumed energy.

In a forest, energy is dispersed and the most characteristic element, in terms of the *Theory of Games*, essentially is the *zero sum game*: losers and winners.

In the city, energy is concentrated and its essential element is the *non-zero sum game*: symbiosis.

The first human concentrations started the *non-zero sum game* as essential fundament of what we would call civilization: collaboration.

Of course, it is not about pure symbiosis, which implicates a reality of continuous exchange, because we started to have all variations of power in the genesis of such phenomenon.

Two apparent paradoxes: while in the forest *zero sum game* prevails as a condition that apparently is in first plane, the essential logical element in statistical terms is dispersion, distribution. But, when we have the emergence of the principle of collaboration articulated in terms of long-term memory, the emergence of *non-zero sum game* – collaboration is strongly distributive in logical terms – we also have an intense process of concentration in all its manifestations. This happens because Nature works by opposites.

That is, as the central characteristic of *zero sum games* is concentration, when it is the most

evident trace, the effect is dispersion. On the other hand, when *non-zero sum games* – where the fundamental characteristic is distribution – become the principal element, the effect is concentration, with the appearance of the city.

Paper, wood, carbon, fossil combustibles, proteins, sugars and alcohol are powerful energetic accumulators structured in the carbon atom – elements always present in large scale in any writing civilization.

A writing civilization without an intense consumption of carbon never appeared. The intensification of carbon consumption seems to be directly associated to the emergence of writing and of other civilizational elements of concentration. This is the history we have designed along several thousands years.

Any human act of concentration points out to a *systasis* – logical visual element that makes us to approach *everything in a single shot*. Hearing

has a totally different sensorial nature: *one thing after the other*.

With vision we have informational concentration and with it also the emergence of long-term memory accumulators. With its domination, the old aspiration to absolute knowledge of everything simply disappears. With vision in the rule of main sensorial faculty – and, consequently, *systasis* – it became enough to have *key ideas* to access specialized sets of information and with them unchain always new discoveries.

The ancient aspiration to universal knowledge – typical trace of acoustical societies – passed as *content* of religion in literary cultures.

In this way, the nature of hearing is distributive – by its logical nature – generating the process of continuous change in time, of nomadic and gregarious universe but, paradoxically, projecting a strong idea of *tradition*, which is a kind of concentration.

Like what happens with the forest and the *zero sum game*, each configuration generates its opposite as effect.

Vision, with its *design* of strong concentration, establishes the aspiration to continuous change and dispersion, to novelty, through overcoming; while hearing and its fragility in terms of memory makes to emerge aspirations to continuity and centralization.

The process of concentration established by esthetical principles – perception and cognition – started in the passage from Paleolithic to Neolithic, knew all kinds of fluctuations.

The gradual concentration in Sumerian, Acadian and Egyptian worlds, to the Greek State Cities and to the Roman universe knew a reversion during the medieval period and a new and overwhelming wave of concentration after Romanesque and Gothic, continuing until the 20th

century.

It is a metamorphosis that can be detected in buildings, cities, in all kinds of artifacts and artworks along the centuries.

While in prehistoric dynamics elements floated in a dispersion system – in a certain way still relatively present in the archaic cuneiform writing – the design of the first cities and the plastic representation in their context revealed a strong coherence related to concentration.

We can admire this phenomenon in crescent intensification until the end of the Roman Empire, when the mosaics became more popular and a new period of dispersion emerged and we penetrate into the called *Age of Darkness*, or of the *non-vision*.

In informational terms, *concentration* indicates what Edward T. Hall, and after him also Marshall McLuhan, called *hot medium* – when all

information is so concentrated that imagination is relatively less requested.

Mosaics *explode* information, making everything *cooler*, transformed in particles to be freely associated by imagination – emptiness filled by what we already know. So, with mosaics, also graphic representation becomes less *hot*, as if figures were established inside a more distributive and less concentrated informational complex.

Later, the gradual emergence of *flat perspective* technologies indicated a new wave of concentration – coinciding with a formidable *explosion* in book production as true information accumulators.

That formidable concentration, which initially took plastic representation as abstraction of Nature – or *imitation* of Nature, as it is generally said – reached its climax with *conceptual art* in full 20th century – high concentration in pure abstraction.

In this way, conceptual art nothing more is than a criticism, in terms of process, of the whole informational path since Neolithic, with special emphasis on the Italian Renaissance revolution. Because of this, any conceptual art inevitably implicates an *a priori* knowledge of its context.

In the same way, we have been spectators and actors of an *explosion* of energy and urban concentration since the beginning of the Neolithic.

Circa 7000 BC, Çatalhöyük – where today is Turkey – probably was the highest urban planetary concentration with around seven thousand inhabitants. Five thousand year later, Ur already counted with seventy five thousand people. In 650 BC, Nineveh had a population of around one hundred and twenty thousand people. In 430 BC Babylonia had about two hundred thousand people. In 200 BC, Alexandria had more than three hundred thousand. In the year 100 AD, Rome

counted with four hundred and fifty thousand people.

Like what happened in other fields, after that moment the Western world started a process of reversion of concentration. Cities passed to count with less people, population became dispersed.

In the year of 775, Baghdad already had reached one million inhabitants.

But the European continent would continue with low urban concentration until the end of the Middle Age, and it would be only in 1700 that Paris would reach six hundred thousand people.

One century later, London surpassed the number of one million inhabitants. In 1900, the capital of the United Kingdom would reach six million and five hundred thousand people. In 1950, New York would have twelve million people. And in the end of the 20th century, Tokyo already had around thirty-two million inhabitants, surpassing

the number of thirty-five million in the first years of the 21st century.

In 1950 eighty-three cities all over the world had more than one million people. In only fifty years, just after the passage of the year 2000, this number was of almost five hundred cities!

With the emergence of *megacities* and the transformation of the planet into a *hyperurban* system with the interactive telecommunication networks of networks, the urban dimension reached a scale in which the phenomenon of concentration as we knew until then simply stopped to exist.

The large urban conglomerates in fast fusion with the countryside passed to design a great dissipative fabric of discontinuities: Earth as *hypercity*.

In 1800, only about 3% of the world population lived in cities. That number passed to 14% in 1900. In the end of the 20th century around

50% of the people all over the world lived in urban structures and it is estimated that this number will reach the 75% of the world population in the first twenty years of the 21st century.

Megacities are urban centers with more than ten million people. In the end of the 20th century there were eighteen megacities in the planet – in 2015, little more than fifteen years later, they will be more than sixty.

What it was known as the countryside was transformed and, in a certain sense, urbanized – annulling even the classical phenomenon of city as a condition opposed to *urbis*, through multiple *real time* connections, making the planet to dive inside a *hyperurban* era.

Paradoxically, *superconcentration* – not only physical but also informational – produces a reversion, eliminating the condition of *concentration*.

With the expansion of virtual systems at the end of the 20th century, gradually but quickly, we started a metamorphosis transforming the old wave of concentration and distribution of informational singularities into a wave of dispersion in massive density.

Artworks anticipate this phenomenon and, also gradually, stopped *representing* and passed to be their own object, getting closer, in a certain way, to what happened in the prehistoric world.

From Neolithic to modern world, the increasing process of concentration and abstraction was the very first sign of the called *Western civilization*. During all that period the *form* of war – wisely understood by Napoleon Bonaparte as being the conjunction of *strategy* and *tactics* – was an excellent representation of that sign.

The Latin term for *war* was *bellum* – from where we have our word *belligerent*. It indicated the fight between organized armies, between high

concentration groups. In the beginning of Middle Age, with the end of the Roman Empire and the constant attacks by German peoples – that *worked* with a different logic, many times established by the dispersion of small groups or non-homogenous groups of warriors – the expression *bellum* left to be applicable.

Thus, already in the 11th century, the word *war* appeared from the Franc term **werre*, in Northern France, and from the Germanic expression *werra*, both with an Indo European root **wers* indicating a state of *confusion*, of *dedifferentiation* – a very curious reference to *entropy*.

The eleventh century knew the beginning of papermaking in Europe, indicating a greater use of vision and the reversal of the medieval non-concentration process. What was the condition of war fighting in the Middle Ages, designed by dispersion and ambush, became content of the new reality, as a symbol, illustrated by the new word for *war*.

When we have a scenario of dedifferentiation, of disorder, provoked by destruction, we also have *confusion*. Therefore, the word *war*, in its etymological sense, seems to indicate the consequences of the disaster, or the action's *content*. This could only have happened after the 11th century, when Europe already produced paper and plunged into a directional and *hypotactical* strategy of thought.

But, what we started seeing in the beginning of the 21st century is no longer about *wars* in their old sense – it is about another nature of conflict, many times no longer established between armies, but confused with civil wars alike, apparently disordered violence, many times without clear objectives, brutal massive attacks in defense of the interests of small groups, principally in the defense of specific and private business, everything working as a new kind of *process*.

Several thinkers in the first years of the 21st

century, like the writer Amin Maalouf, felt the contemporary world immersed into a reality that is similar, in some sense, to a *planetary civil war*.

The called *contemporary war* practically has no similarity with the ancient concept of *power concentration* between distinct homogenous groups.

Wars were expanded to the virtual universe and with them the concepts of *cyberwar* and *netwar* appeared. The concept of *cyberwar* refers to the use of digital systems and informational networks generating a war in cyberspace.

According to several authors, the planet has already entered in a scenario of continuous *cyberwar* since the end of the twentieth century – which certainly is a very appropriate statement to a *third world war*.

Cyberwar encompasses all persons, military or not, all the time. It is characterized mainly by

hackers working for governments aiming to affect enemy countries.

The *cyberwar* may consist of industrial, militar, political or even personal espionage; propaganda, the sending of messages not only via the Internet, but also through mobile phones, PDAs and smartphones among others; attacks on network systems, distribution of viruses and Trojan Horses; alteration or destruction of websites; attacks on military computers responsible for coordinating satellites; attacks on infrastructure such as transport systems, urban systems, radio stations and television networks, telephone networks and so on.

According to the Internet security company McAfee, in 2007 one hundred and twenty countries actively worked on the development of virtual instruments on the Internet in order to reach computer systems in other states and financial markets among others.

At McAfee's web site dedicated to virtual criminology, it was asked: «Are we in the midst of a cyber cold war?».

In 2009, Jeff Green, senior vice president of McAfee, said that «cybercrime is now a global issue. It has evolved significantly and is no longer just a threat to industry and individuals but increasingly to national security». (...) «Attacks have progressed from initial curiosity probes to well-funded and well-organized operations for political, military, economic and technical espionage».

In August of that year, newspapers around the world announced that a group of hackers had simply stopped *Twitter*!

Different authors indicated China as the most aggressive country in *cyberwar*. India, Germany and the United States among others denounced attacks from China against their countries. The Chinese government denied all accusations.

In April 2007 Estonia accused Russia of promoting a cyber attacks against the country. The Russian government denied.

In 2003 the government of the United States reported a continuous and coordinated cyber attack against their computers – the attacks were initially classified as having been perpetrated by China, although many of them escaped origin detection.

The mistrust towards China continued with attacks carried out over the years – to the point that those continuing and coordinated cyber attacks have been termed by the U.S. government as Titan Rain.

Titan Rain’s hackers even managed to gain access to NASA computers!

Netwar concept was elaborated by David Ronfeldt and John Arquilla, both experts on war strategies.

Netwar means a form of continuous virtual conflict in low intensity, exactly as it happens the low power society. A widespread conflict, without identification, distributed by communication networks through viruses, Trojan Horses, false information and identity theft among others, terrorists, criminal organizations, activist groups, social movements or even unrelated people, creating flexible and decentralized structures of attack, in low intensity and continuous spectrum.

John Arquilla was not only an expert on international conflicts, with several works developed in partnership with Ronfeldt, but also a longtime collaborator of Donald Rumsfeld and, like him, a declared supporter of the *Revolution in Military Affairs* – movement that aims to turn war into a total event, involving all technological, information and communication resources, and, therefore, no longer being restricted to the figure of the army. The origins of this movement launch roots in the armed forces of the former Soviet

Union in the 1970s, especially in the figure of Marshal Nikolai Ogardov. Orgadov was quite known for defending that the country should spend less on consumer goods and to maximize investments on research, development and manufacture of weapons.

The principle of the *Revolution in Military Affairs* was absorbed, in the first years of the 21st century, by the doctrine of China's People Liberation Army.

John Arquilla and David Ronfeldt were researchers at *RAND - Research ANd Development*, independent think tank on global policy formed by the Douglas Aircraft Company for the armed forces of the United States.

In the introduction of the book *Networks and Netwars: the future of terror, crime and militancy*, Arquilla states that «netwar includes conflicts waged, on the one hand, by terrorists, criminals, gangs, and ethnic extremists; and by

civil-society activists – such as cyber activists or WTO protestors – on the other. What distinguishes netwar is the networked organizational structure of its practitioners – with many groups actually being leaderless – and their quickness in coming together in swarming attacks».

The same phenomenon happens with commercial structures. From the tendency of crescent concentration that characterized Western society along thousands of years – and the Industrial Revolution is a clear example – we passed to live an inextricable complex of gigantic business conglomerates distributed all over the world.

The Canadian American economist John Kenneth Galbraith alerted, already in 1976, for the existence of two very distinct types of companies – the big conglomerates and the small companies. Then, he said, the first kind of them becoming each day bigger, and the later becoming smaller and smaller.

In the beginning of the 20th century, American economy was dominated by some gigantic companies, like *Ford*, *US Steel*, *AT&T*, *General Electric*, *General Motors* or the *Standard Oil*. In 1994, almost one century later, more than half of the active companies in the United States, according to the *Fortune* magazine, were created in the passage of the 19th to the 20th century.

Three hundred multinational corporations represented, in 2003, more than 25% of the world financial movement. The annual values of sales of the six largest transnational corporations were exceeded by the Growth National Product of only twenty-one countries. 40% of the world trade happened within transnational corporations – as showed by Noreena Hertz.

The classic economic principles still in use in the beginning of the 21st century turned around the reality of small companies, which were the early 19th century's reality, when great

economic theories received *body*, establishing the supremacy of the control on credit restriction and rigor of public deficit. But they do not work in big transnational conglomerates reality.

In the end of the 20th century, among the hundred largest world economies, more than half were companies. The sales of each one of the five biggest companies in the planet surpassed the Growth National Product of one hundred and eighty-two countries of the world. That is, the sales of the five largest companies were bigger than the Growth National Product of around 94% of the existent countries!

Profoundly interlinked, in their great majority those business complexes not even have an owner, as it happened in the past. They are no longer the concentration resultant from any personal or familiar wealth.

And *family* is a strong element of *concentration*, which is the ancient and original

element that gave substance to the emergence of Western universe.

Just to have an idea, in 1970s only 16% of the Americans owned shares of companies. Fifteen years later, in 1985, that number was of about 20%. But, another fifteen years later, in the beginning of the 2000s, the great majority of the American people owned, in one or other way, shares of companies.

This curious metamorphosis also happens in relation to energy production and consumption.

Contrarily to carbon, hydrogen is an element that obeys to a logical principle of ample distribution. Around 75% of the mass of the known Universe is composed by hydrogen – which constitutes around 90% of its molecules.

By the beginning of the 21st century there were two essential types of energy from hydrogen. One of them happened from the fusion of hydrogen

in helium, like what happens in the Sun and the old hydrogen atom bombs, which became known as *H Bombs*. This is the so-called *nuclear energy*.

The other kind of energy is characterized by the combination of hydrogen and oxygen – that is the basic principle of the called hydrogen batteries.

In fossil combustibles composition, wood has ten atoms of carbon for each atom of hydrogen; coal has two atoms of carbon for each atom of hydrogen; petroleum has one atom of carbon for each atom of hydrogen and natural gas only one atom of carbon for each four atoms of hydrogen.

Since Neolithic until the 20th and beginning of the 21st century, practically the whole accumulated energy was always directly related to carbon.

In the first years of the 21st century, energy produced from hydrogen, opposed to that tendency, reached four hundred billion cubic

meters, already equivalent to around 10% of the petroleum production in 1999 – in a process of clear evolution.

Hydrogen represents three times more energy by unity of weight than gasoline – factor that jumps to fifteen times if we have in mind that 80% of the energy produced with gasoline is lost in heat.

It is curious to imagine how a civilization process based on the control of fire is substituted, in a certain sense, by water – exactly when, ironically, it becomes a good each day more and more rare to Humanity.

The process of passage from a logic of high *concentration* – which characterized the last thousands of years – to one of *distribution* can easily be observed in terms of energy consumption. Wood gave place to carbon; this, to petroleum that, by its turn, passed to find in natural gas a serious competitor, with crescent consumption.

Another form of energy which nature is frankly distributive is the called *solar energy*, based on the use of solar heat and light. However this energy is produced in our star, the Sun, it can be considered as a typical form of energy of the *Type I*, according to Kardashev’s classification, as it is captured inside our planet.

Photons – called *light quantum* by Einstein, the term *photon* would be coined only in 1926 by the Physicist Chemist Gilbert Lewis – are not only generously distributed, like what happens with hydrogen, but also are the maximum expression of the non-concentration principle, because they have zero atomic mass.

We departed from strong concentration methods of energetic accumulation, which implicated a relation of ten atoms of carbon for each atom of hydrogen, passing to two atoms of carbon for each atom of hydrogen, following to one atom of carbon to each atom of hydrogen and,

finally, with natural gas, to one atom of carbon to each four atoms of hydrogen.

Then, we included light, wind, gravitational force with the use of tides, and geothermic energy.

Since the middle of the 1980s to the end of the 20th century, in only fifteen years, the consumption of natural gas growth about 26%. In the end of the 20th century, natural gas consumption already represented about 60% of the world oil consumption according to the *World Energy Council*. Only forty years before, in the 1960s, that percentage was of about 40%.

In circa 1000 BC, in Greece, it was observed at Parnassus Hill that fire blazes appeared from the rocks – produced by gas in combustion. Believing to be a god, ancient Greek built a temple to the *god of fire*, later known as the celebrated Delphi Oracle. Coincidentally at the same epoch, cults to the *god of fire* appeared in India and Persia.

Five hundred years later the Chinese would be the first to systematically use natural gas – distributed through bamboo tubes – which was used to warm seawater in an efficient process of desalinization.

British were the first to commercialize natural gas for urban and housing lighting around 1785. During the entire 19th century natural gas was applied almost exclusively for lighting.

The peak of natural gas production coincides with that of petroleum – both happening in the first years of the 21st century. And the same can be said about the atom energy production from uranium.

Jeremy Rifkin predicted in 2002, in his book *The Economy of Hydrogen*, a new planetary economic revolution through the intense use of hydrogen. He even imagined the creation of a *hydronet*, an energetic network regulated by

millions of users online all over the planet.

Everything following to a strategy of order in change – what Kant called *natural hidden plan*.

When, sometimes, we are surprised by popular movements that apparently do not follow to objective data, as if they were emotional manifestations of subterranean affects, of an overwhelming subjectivity – like what happens with public manifestations that degenerate into violence – we are in fact facing to structural elements of a great game.

A great game in continuous metamorphosis.