

## Inventions – information and society

*Information is not knowledge.*

*Albert Einstein*

It is estimated that the average of technological inventions responsible for relevant social transformations was one in each twenty thousand years during the Middle Paleolithic. Archaeological data indicates that around fifteen thousand years ago, with the appearance of the first cities, or proto-cities, revolutionary inventions passed to emerge in a rhythm of one each two hundred years, in average.

In 1989, the writer Isaac Asimov, who became worldwide famous for his passionate science fiction works, dedicated himself to an exhausting research on inventions and discoveries that were, in some way, responsible for important changes and enrichment of human relations.

From 20000 BC to the year zero, in twenty thousand years period, Asimov detected around seventy-seven revolutionary inventions. From the year zero to the year one thousand, in only one thousand years, twenty-four inventions! But, the acceleration did not stop, designing an asymptotic curve and, so, the writer identified forty inventions in the five next hundred years, from 1000 to 1500; forty-three from 1500 to 1600, in one hundred years; ninety-four from 1600 to 1700; one hundred fifty from 1700 to 1800; more than four hundred forty from 1800 to 1900; and from 1900 and 1988, in less than one hundred years, about seven hundred inventions!

A true explosion of inventions and technological mutations!

Even if such kind of statistics can be questionable under many aspects, they show a notable increase of complexity of human systems.

And even if one can immediately establish, with apparent reason, an association between those events and demographic density, this will not be *per se* generator of inventions or discoveries. China has been, since a long time, overpopulated, but it passed through large periods without great discoveries or inventions, and the ancient Greece had a relative low demographic density in comparison with Egyptian and Mesopotamian urban centers at that time.

The quantity of scientific discoveries and inventions seems to be associated to mental structure, to a certain type of organization of intelligence.

What we call *intelligence* is *between us*, established in the dynamic network of differential elements that constitute the most diverse kinds of language.

The so-called *scientific spirit*, at least in its modern sense, seems to be associated to strongly predicative structures of thought, what means to say: *high concentration*.

The action of to plant, or to domesticate animals, brings in itself the principle of concentration.

The invention of wheel and its association to the horse, in the beginning of Neolithic, projecting long straight visual movements through the emergence of the use of the chariot, generated a new kind of visual environment, emphasizing peripheral vision. Until them, central vision was the main environment, as essential technology for the identification of the prey.

When peripheral vision became more important, central vision was transformed into the *content* of the new medium, and the first cities appeared.

Central vision is sensitive to high informational concentration, to texture and color, while peripheral vision is specialized on light perception and movement.

A fundamental characteristic – typical in central vision – is the phenomenon known as *systasis: everything took in a single shot* – everything concentrated in a single frame.

When we admire a Leonardo da Vinci's painting or an engraving by Hokusai, for example, we do not see one thing at each time. If not, we would simply lose the comprehension of the whole.

*Systasis* is the *image*, par excellence, of the first city.

The dynamic articulation between the old use of vision, more oriented to central vision – because we are predatory animals – and the new scale of peripheral vision, defining long straight paths, generated writing.

This does not mean to forget Denise Schmandt-Besserat’s and Pierre Amiet’s formidable discoveries, according to whose first writing appeared from the intensive use of tokens made in small clay figures.

Schmandt-Besserat’s brilliant thesis explains how the debit produced in a commercial negotiation was registered through the use of closed clay packs where those small objects were kept. Three cones of clay would mean that one part of the business was in debt of three sacs of grain, for example. The proof of the compromise would be locked in the interior of the clay pack. With the intensification of such process, the small clay figures started being printed on the external surface of the pack, still

soft, as to make possible the reading of what was inside it, turning unnecessary its violation.

But, here, it is not about to investigate what characterized sensorial transformation, and yes its deepest roots at the level of knowledge, the mental paths that anticipated it.

Action is knowledge, one never anticipating the other. The question is to know the origin of *concentration*, at a logical level, which characterizes, for example, the representation of a debt – both in quantity and in quality – with small clay tokens.

Even if it seems us too distant now, the logical strategic principle that designs modern reading is the same, in general basis, of that which characterized the first writings.

It is about the dynamic articulation between those two basic kinds of vision, establishing a strongly directional structure, with hypotactical nature, which in many senses is similar to what we would call *perspective* after the Italian

Renaissance.

In last analysis, it is about the *form of thought*, or what George Boole genially synthesized through the concept of *logic*.

Such visual transformation is just one of the elements to understand human metamorphosis. We should add the use of stone, clay, papyrus, phonetic alphabet, glass, mirror, radio, television and so on.

Each one of these elements means a type of energetic transformation, in concrete terms.

The appearance of the *article* in Greek language is another curious phenomenon of this complex in permanent mutation. In ancient Greek language the article appeared defining the object in itself and not its class, like what happens in several other languages, even in Latin.

When we say *the* building, the article “the”



indicates us a specific object and not *buildings in general*, as it happens in Latin – then, a clear concentration of attention on a specific object appears.

The celebrated historian Bruno Snell, in his classical studies on the emergence of the scientific thought among Greeks, argued that Greek language is «the only one which permits us to trace a true relation between speech and the emergence of science, because in no other language the concepts appear directly from the body of verbal language».

The presence of the *article* permits us to distinguish an abstract concept from and an adjective or a verb. It permits us to formulate *universal* questions as *particulars*.

Normally we are not aware about a curious fact. Many times, in the peripheries of megacities, the *article* gradually becomes out of use, practically eliminated inside a strongly simplified context and

in a less predicative order.

When, about two thousand years ago, Greek language lost importance with the emergence of Latin, gradually scientific discoveries also diminished – but it is important to keep in mind that such moment also coincided with the end of control by the Roman Empire on the production of papyrus.

It is the *article* what providences *prose*, unchaining *literature* and *tragedy*.

However, those changes are not obligatorily *positive*, as the believers of the idea of *progress* defended. Archaeological studies have showed, sometimes, that first sedentary agricultural people's life, with longer and heavier labor journeys, was more difficult than that of their ancestral hunter-collectors.

In a first moment of the passage from the nomadic universe to that of agriculture, stature and

even life expectancy seem to have diminished – as it is demonstrated by the archaeological studies of the anthropologist John Lawrence Angel, who lived between 1915 and 1986.

One can argue that the emergence of stable and sedentary groups represented an improvement of collective defense in comparison to other groups – but mobility also is an important strategic element of defense.

In this way, the nature of change does not happen according to the classical *functionalistic* teleological principles, but yes according to *teleonomical* principles, operating different principles of order, different principles of differentiation. By this way, the clue for the comprehension of the origin of the human mutation is what we call *esthetics*: mind organization.

Gradually, in the most different cultures, in the unfolding of mind structural metamorphosis and the planetary expansion of energetic

consumption – which possibly will lead us to a condition of energetic civilization *Type I*, if we will not start an auto destruction process – a new phenomenon emerges: the *low power society*.

It is not about the future or about the past – it is now: permanent present.

Through thousands of years we were used to deal with the expression *power* while *high power*: *high* concentration of energy, *high* concentration of domination, *high* concentration of memory and knowledge.

Francis Bacon defended that *knowledge is power* and John Archibald Wheeler, always brilliantly, alerted to a fundamental fact: *it from bit*.

Everything is information, all the time.

When we deal with the understanding of Nature we are dealing with information, and the order of information, of differential elements,

nothing more is than logic and, in last instance, esthetics.

Thus, the *Greek miracle* nothing more was than an esthetical revolution.

Curiously, the United States like we know, founded on the constitution adopted in September seventeen, 1787, seems to have born as a deliberated process of *informational design*.

James Madison, Alexander Hamilton and John Jay were the authors of the famous *Federalist Papers* – in defense of the constitutional text – which they signed together under the pseudonymous *Publius*, in homage to the Consul Publius Valenius Publicola, in a giant metaphorical leap to the Roman Republic where Publius was one of its founders.

For the personage Publius, in this case Alexander Hamilton, the new govern should be the *informational center* of the new nation. According

to his ideas, the entire structure of the State should pass through the solution of the flux information – transforming the famous statement of Francis Bacon and turning, no longer *knowledge*, but *information* as power.

Quickly, good part of the discussion about the American Constitution passed to turn around *informational* questions.

Anti Federalists, fiery critics of the constitutional text, feared that informational diversity would never be enough synthesized as to arrive, in a clear and unequivocal form, to a center of power. Anti Federalists operated an acoustical logic that was characterized by restrict intersected informational fields. They were not able to understand the literary and visual logic according to which everything is established inside a homogenous field where information is easily simplified and centralized. In the world of literature the whole reality can be quickly synthesized, like what happens to sound through letters.

Richard Henry Lee, one of the leaders of the American anti constitutional movement, manifested his incomprehension: «I have no idea that the interests, feelings, and opinions of three or four millions of people, especially touching internal taxation, can be collected in such a house».

On the other side, Madison and Hamilton had an interesting explanation for that question. Everything would be basically organized on the establishment of two great principal sets: a *majority* and a *minority*.

Both *majority* and *minority* could be divided in two categories: *factions* and *non-factions*. *Factions* happened when the objectives were opposed to the other's rights or to the common good. So, four great possibilities happened – majority groups, factious or not; and minority groups, also factious or not.

The problem was centered on how to avoid

factions – in majority or not – to be well succeeded. That is, to avoid desegregation forces to triumph.

It did not matter if one was in favor or against this or that idea, but if his ideas would be conflicting to general rights, to the general *ethos*, should be condemned. That is, one can criticize, but never eliminate the regime.

This was the principle adopted by the *middle class* spirit, whose values were determinant for the establishment of the dominium of the so-called Western culture along two hundred years at least.

While for the Federalists reality should obey to a hierarchical and teleological control of desegregation forces; for the Confederates, more profoundly involved with agriculture, reality was designed by an acoustic dimension, operating by physical proximity.

In opposite way, but similar to what so many times happened in the past when the



world of agriculture won the nomadic universe, Federalists dominated the scenario, the State became bureaucratic and the concept of war was transformed in statistics.

Winston Churchill created the first official team of Statistical Studies in the ambit of the Second World War. Churchill understood that the best tool, of visual logical nature, to control desegregation forces was mathematical statistics.

In this case, the control of desegregation forces nothing more is than the imposition of a *non-zero sum game* to a complex scenario.

Despite some historical exceptions – like what happened to Genghis Khan – if for the Eastern world the art of domination and conquest was, many times, immersed in the subtleness of agile movements between *zero* and *non-zero sum games*, the idea of *power* that characterized the modern period in the Occident, very evident in Adam Smith’s and Charles Darwin’s brilliant texts,

is the prevalence of the *zero sum* principles: a world made by losers and winners.

Inspired on the works by the English positivist philosopher Herbert Spencer – responsible for the creation of the expression *the survival of the most apt* and considered the father of the *social Darwinism* – the American journalist and science writer Robert Wright argued, in the first years of the 2000, that «war, by making fates more shared, by manufacturing *non-zero-sumness*, accelerates the evolution of culture toward deeper and vaster social complexity».

Even if at the level of military organization and action there is a *non-zero sum* reality, deaths, destruction and domination evidence the terrible prevalence of a *zero sum* reality.

But, would the nature of *power* – in all its amplitude and in all its subtle variations – inevitably be associated to war and to *zero sum* games?

In May 2007, the Department of Defense of the United States announced the interdiction of the access to *Youtube*, to *MySpace* and to many other similar sites through Internet in Iraq and Afghanistan, because real time communication between soldiers, their families and friends, as well as the transmission and distribution of a large quantity of information could change the concept of war.

In October 22, 2008, the newspaper *Le Point* announced that the French army would interdict cellular phones used by soldiers in action at Afghanistan, because of the great quantity of images and text messages sent.

Without a history, that is, without a specialized *image* of a precise set of events, without a teleological structure, the only possible war is guerrilla.