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Apparatus and media effect in 360° Video

I cannot begin with general considerations on the epistemological roots of the main concepts emerged in the field of cognitive science, but I can make the choice of the object that it, to be studied, should be understood in all its aspects. Animal and then human culture belong to this class of phenomena: derived from the Living, they require elucidation of issues that cross the several epistemological fields.

Epistemological depth of the culture

Biological substratum of culture

First, we must ask ourselves questions about the biological substratum who, evolving, gave birth to the culture, and then continued to evolve in parallel with this one, finally to be stimulated by it in its current evolution. We are living this time when our culture is pushing us to states of ourselves, as intelligent biological beings, which we do not yet know. The epistemological tension between the two biologies, cellular, organic and neurophysiological, and cultural biology is enormous. But at the most elementary information level, that of our genetic mechanisms, we are living in an era of the simultaneity of biological genetics with cultural genetics, a time that will end with the confusion of the two, in a kind of generalized epigenetics whose reign characterizes the latest evolution of our species.

Technical emancipation of culture

Then we question the finding of a kind of emancipation of culture and techniques that support it, this is a process that makes us beings who produce objects with our own informational autonomy characteristics. But producing these objects, we are sucked into their own evolution, which escapes us. To this extent, the culture that shapes us and "informs us" is no longer our own culture and it leads us into its own process of evolution that will go through all stages of organic constitution, like those that crossed the biological being.

In other words, our existence and our actions must be regarded as a process of coevolution of biological complexity and techno-cultural complexity, and it is only in this doubly complex epistemological perspective that we must think our present.

This is my interdisciplinary proposition: by becoming interested in culture I choose an object that is anchored in a multitude of ontological regions, as philosophers would say.

Cultural object

But from the perspective I sketched above, what is a cultural object, exactly? For example, in film culture, we have become accustomed to giving film titles as labels of a whole process that has resulted in the production of the work in question. We say, "The Leopard", "Salò" or "The Matrix" to refer to the long work of several professional teams that helped bring these films to audiences. We can also say: Visconti, Pasolini or Wachowski sisters. But the designated object discusses also other aspects of film culture. On the creative side, we find the economy of the cinema, then all the techniques of realization, the capture of the natural spatial reality anthropic or artefactual, the treatment of the recorded material and the visual and sound postproduction, and finally the means of diffusions of the finished films. On the public side, we have the learning of the perception of moving images as a representation of the real, the convention or the movie viewing protocol, this famous confinement in a collective obscure chamber with a particular architecture, for 2 hours spent passively in front of a projection of light, in seats, if we talk about classical cinema. It is a banality, but here we already perceive the complexity of the processes that lead to the achievement of a cinematographic work. These processes play the role of media in relation to our titles / labels or authors' names. But the evolution and diversity of these media force us to produce another more covering concept that will allow to the historical media, such as silent movies, 3D cinema or ambiophonic cinema, to become items of the same culture phenomenon that is the cinema. For this reason, faced with the multiplication of techniques and social conventions related to cinema, several researchers have proposed a concept of device that could "historicize" at will.

Device concept

We have traced the filiation of this concept. It was founded and relayed by Foucault, Baudry, Bordwell, Carroll, Perron and Kessler[1]. All these authors also invoked the inspiration drawn from the work of Jeremy Bentham written in 1780 "The Panoptic".

1 Foucault, M., Surveiller et punir. Naissance de la prison, Paris, Gallimard, 1975, p 328
Baudry, J.-L., 1975, Le dispositif, In: Communications, 23, 1975. pp. 56-72

The concept of device is interesting, since it is not an ontological or existential concept. It crosses objects, techniques and knowledge by focusing each time on the perceptual and informational skills of the cognitive agents involved. The possibility of these skills is created by the cognitive arrangement of the perceptual space and its affordances of potential actions.

Principle of the device: the cognitive arrangement of the perceptual space

Let's analyze from this angle the cognitive arrangement of Bentham's perceptual space.

Jeremy Bentham wrote in 1780 in The Panoptic: "the field of inspection could be dilated to any extent [***]". The circular building designed by his brother for manufacturers with problems of product quality monitoring and professional accident prevention, can serve as a prison, school or hospital. The omnipresence of *visual inspection* is its first characteristic, and it remains closely related to the circular panoramas in the field of visual arts of the same period. This *inspection* has the following attributes:

- the maximum coverage of the field of vision

- the circularity combined with the kinetics of the body and its kinesthesia, and especially the set of movements and sensations that serve to explore the perceptual spaces: visual, auditory, olfactory or taste and tactile,

- the control of the distribution of the poles of activity and perceptual passivity, - one finds there the cognitive techniques present in all the immersive historical realizations: (monitoring / vision into "*Veduta*")

- the possibility of triggering physical interventions

- the possibility of psychological control of the agents / patients,

- the possibility of the self-control of the individual and social agent, a consequence that results from the previous control

Bordwell, D., Carroll, N., (dir.), 1996, Post-Theory: Reconstructing Film Studies, Madison: University of Wisconsin Press et Bordwell, D., 1985, Narration in the Fiction Film, Madison: University of Wisconsin Press
Perron, B., « Faire le tour de la question », in Cinémas : revue d'études cinématographiques / Cinémas: Journal of Film Studies, Cinéma et cognition, Volume 12, numéro 2, hiver 2002, p. 7-202
Kessler, F., 2003, « La cinématographie comme dispositif (du) spectaculaire », Cinémas : revue d'études cinématographiques / Cinémas: Journal of Film Studies, vol. 14, n° 1, 2003, p. 21-34.

Bentham's unity of thought assuming simultaneously several forms: architectural, moral, state and pragmatic, Michel Foucault, in *Discipline and Punish: The Birth of the Prison*, generalize and encompasses it in a single concept, that of *device*. In the same year 1975, Jean-Louis Baudry proposes, in terms of media and artistic techniques, the definition of cinematographic practices as a device called a simulation device and aimed at producing a global psychological effect for the viewer.

> "The simulation apparatus therefore consists of transforming a perception into a quasi-hallucination, endowed with a real effect incomparable to that brought by simple perception. The cinematographic device reproduces the device of the psychic apparatus during the sleep: cut of the outside world, inhibition of the motricity; in sleep, these conditions leading to an over-investment of representations that will be able to invade in the form of sensory excitations the perceptual system; in the cinema, the perceived images (undoubtedly reinforced by the data of the psychic apparatus) will be overinvested and thus obtain a status which will be itself sensory images of the dream."

There, where the recovery of benthamian device perpetrated by Baudry advocates a dreamlike effect, close to the effects observed and theorized by Freud at the time of the beginnings of the cinema, the experimental results obtained since the 1990s find in the cinema spectators different inverse effects at the level of both "top-down" cognition and "bottom-up" perception. These results can be summed up by the pithy formula of Canadian researcher Bernard Perron:

> "The spectator uses the same perceptive and cognitive processes to embrace the film and the world in which he lives, his understanding is analyzed from notions borrowed from cognitive psychology, and more generally from cognitive science. ".

Here are the most important experimental facts:

- The real perspective in relation to the angle formed by the viewer's gaze with the "normal" of the surface of screen suffers the cerebral effect of

recovery that results from the cognitive agent's adoption of the conical perspective used in parallel to the axis of the shot.

- The eye focuses sometimes on the virtual distance of the objects represented in the visual scene, most of the time to infinity, sometimes on the surface of the screen, it "pump" thus without stopping, during the session.

- The ocular saccades and the continuous tracking movements of visual targets into the screen, correspond to the same behaviors in the "natural" environment.

- The architectural sensory repository (furniture and combined real estate) will never disappear completely, while decreasing with the rise of the fictional effect.

- The spectator aligns his virtual point of view intermittently sometimes on the points of view of the filmic characters and sometimes on the point of view of the best possible observer of the actions of filmic characters, by engaging in a "discussion" of this axis with the axis actually borrowed by the operator.

- The perception of movement, based essentially on the cerebral effect phi (and alternatively on the retinal persistence), shares the speed of the perceptible intermittency as a trajectory with the speed established at an optimal level in the evolution of our species and our ecological niche. In other words, this neurophysiological effect has been forged with the perception of real motives usually traversing the visual field of humans.

- The acoustic effects sometimes refer to the filmic action sometimes to the acoustic characteristics of the building housing the projection.

- The mirror neurons are fully involved in the cinematic show and participate in the orchestration of the emotional states of the viewer.

- The emergence of the fictional effect collaborates at every moment, through the intracerebral communication, with pre-existing patterns of actions and patterns of inheritance phylogenetic and ontogenetic.

All of these effects are the result of different perceptual strategies and different types of brain treatment. They can converge briefly, at a given stage of the evolution of the techniques of the reception and produce a massive effect, but they can also appear separately, some in parallel with the others, or occur momentarily, one after the other, and disappear.

Device *versus* apparatus - the emergence of the concept of media effect

As the Dutch *apparatus* theorist Frank Kessler puts it, it is necessary to make the device susceptible of historicity. Indeed, according to this criticism, the theorists of the device wanted to see it as a generator of absolute psychological effects, which forces them to note its different states of maturation, until the decline. As such it is necessary to substitute another term, more fundamental, as is the *effect of media*, the mechanism that retains the effectiveness of the bilateral transmission, sender / receiver and receiver / sender, the message and appears at the junction tool / subject, at the junction of several technical and perceptive characteristics. The effect of media thus speeds up the evolution of the device by constituting its remarkable achievements by the force of their ascendancy on the message receiver. The effect does not lead to a fixed reaction or psychic mechanism, it leads to a constant that can be preserved in the changes of scale. The architectural project of Bentham's brother thus described an effect that could be broken down into several types of assignments, and which finally had the property of situational adaptation (scalability) and adaptation of functions. All in all, Bentham's effect conforms to Weber-Fechner's law[2] in his differential threshold version of perceived sensation, given by Bouguer-Weber's famous constant report. To be media, each provision or rather material and functional (technical) arrangement dedicated to the transmission of information must be able to assume the interaction with a human cognitive agent and be able to mediate between human cognitive agents. In order to constitute an effective medium, this arrangement must moreover preserve the

2 Fechner G.T., 1860, Element der Psychophysik, Leipzig, Breitskopf and Härtel

psychological constant, at the purely sensory level and at the higher level, independent of the scale, whether in the quantitative or qualitative order.

Gregory Bateson discusses the variation of Norbert Wiener's[3] Weber-Fechner's law for the mechanism of the muscular response to the external stimulus:

> "...the efferent side of the brain works by the same epistemological limits at the afferent."
>
> And he adds:
>
> "Or, we might say that the muscle vis-à-vis the efferent nerve which serves it is precisely comparable to a sense vis-à-vis differences arriving from outside."[4]

In our view, this formula applies, mutatis mutandis, to the definition of the media effect.

Nomenclatural paradox of virtual and real

If the cinema is producing a dream effect, we have seen, with Perron and Kessler, that it also contains elements of the cognitive arrangement of the perceptual space allowing to distinguish its predispositions to maintain the real environmental reference (spatial baseline). These specific characteristics increase considerably in *post-cinematographic technologies*. If the term "virtual" is still used to designate them, it is because of the digital technology that is at their base. But as we tried to show in our book *Immersive computerized media. Cognitive reasons for re-analogization*[5], VR, AR, MR and 360° Video are techniques resulting from the hypertrophy of peripherals / interfaces of our computer machines, and as such, they participate in the process of re-analogization, tributary of our times.

3 Dans l'introduction à l'ouvrage Wiener, N., Cybernetics: Or Control and Communication in the Animal and the Machine, Hermann & Cie, Camb. Mass., MIT Press, 1948

4 Bateson, G., 1991, A sacred unity. Further Steps to an Ecology of Mind, A Cornelia & Michael Bessie Book, p.200

5 Sobieszczanski, M., 2015, Les médias immersifs informatisés. Raisons cognitives de la ré-analogisation, Bern, Peter Lang, 300 p.

Example of the 360° Video

This example it's not an accidental choice. The 360° video issue is interesting for several reasons. This is a technique that fits easily into the VR device. It includes some essential ergonomic elements (interactive circular viewing, spatial translation, in some cases, plenoptic focus, 3D "relief", etc.) but without offering full 3D. It compensates for its weaknesses by its ability to democratize. If the 360° manages to prove itself in its capacities to accept narrative techniques, it will be able to establish itself as the main factor of the future evolution of the cinematographic device. In short, if the 360° becomes a media, it will then draw 3D, VR and AR to new uses. Interesting solutions are also to be expected in the hybridization of the 360° with all other techniques, including the classical technique.

360° video - the renewal of psychomotor spatiality

- The 360° video covers the classic field of view, 180° on 90°. But as soon as the viewer begins to engage his kinesthesia, this field becomes fully spherical. The geometry of the perceptible space, the muscular solicitation and the postural control relating to the verticality, bring the 360° knowledge closer of the tactile perception.

- The 360° video necessarily activates a physical intervention in the spectator's ambient space. Without this intervention, she does not reveal herself.

- How does 360° Video control the psyche of the actors? In appearance, the psychic relationship between the filmed actor and the viewer is the same as in each recording technique. The spectator, who is not guided by the axial and directional projection, programs his own attentional choices by multiplying alternations, as in real conversation group. It keeps the possibility to select and scrutinize the registered actors. These two processes carry many well-known cognitive effects in real situations: the threshold of understanding of verbal communication is lower with the people visually selected in a group or in a scenery. Thanks to this, the viewer chooses the length of the sentences he wants to hear and understand.

- The viewer is obliged to control his own spatial position since access to knowledge of the visual scene depends on it.

360° video - the renewal of emotional temporality

The 360° camera is not directional. This results in two kinds of recordings and spectatorial effects:

- The spatial "translation" (side shot), during which the viewer necessarily "embedded" (viewing side) can change direction of view and get the multidirectional landscape, running away under his gaze.

- "Stations" where the immobile camera scans spherical space for a period.

From this duplication ordered by the technique of the spherical camera follows the major consequence for the verbal communication: the fragments of the conversations recorded during the spatial "translation" are always fragmented, but those recorded during the "stations" must be complete since the viewer can go back in the headset or the viewer and be interested in the whole conversation that has caught his attention. The "stations" that coincide with the dialogue scenes must be recorded until the total duration of the "translation".

The duration of the translation DT without any intervention of the viewer over the duration of the "stations" (TS) is the total duration of the film "passive" (TFP).

The maximum duration of the "active" film (TMFA) where the spectator manipulates the "stations" is thus obtained by this formula: TMFA = DTR + DS, where DTR = DS.

The viewer directs his own emotional temporality since it allocates his time to different sequences of verbal interactions of the actors.

Conclusion - device - apparatus - media effect

Note, that the realizing effects of Bentham's device go beyond Baudry's cinematographic effects, probably because the psychology of the late 18th century was only a prescientific discipline, remaining strongly tainted by the amalgamation of religion, of proto-psychology of observation from Franz Joseph Gall, of morality,

of ideologies and social pragmatics. But what we know today about cinematographic practice on a global scale for more than 100 years, confirms quite well the intuitions of Bentham, pronounced a century earlier, concerning the social regime of the panoptic vision.

We find that Bentham's visual inspection, when applied to the classical cinema device, whose historical peak is in the 1970s, becomes a truncated concept. If we take it literally, it functions as a metaphor or it describes the cognitive actions that remain as much on the part of the director as on the spectator side a virtual appanage, in the trivial sense of this term.

Paradoxically, it is the post-cinematographic technologies, such as Virtual Reality, Augmented Reality, Mixed Reality and 360° Video, which accomplish in a real way, in the sense of cognitive realism, the characteristics of the Benthamian project.