A critique of the essentialist critique of cyberculture

A crítica da crítica essencialista da cibercultura

ANDRÉ LEMOS*

Universidade Federal da Bahia, Faculdade de Comunicação, Departamento de Comunicação. Salvador-BA, Brasil

ABSTRACT

The aim of this article is to analyse the critique of cyberculture through a discussion of the essence of technology. The article revisits the classic treatment of this theme and its actualization in the viewpoints of the new critics of digital culture. The central argument is that the traditional critical perspective (fundamentalist or pessimistic) fails to address the phenomena of digital culture due to this essentialist bias. The article proposes an analysis of cyberculture based on Actor-Network Theory (ANT), arguing that a focused view, sticking closely to the constituent networks of technical phenomena and the associations that form the social, may offer a solution to the empirical failure of critique.

Keywords: Technology, critique, essence, Actor-Network Theory, cyberculture

RESUMO

O objetivo deste artigo é analisar a perspectiva crítica da cibercultura a partir da discussão sobre a essência da tecnologia. Para tanto, o artigo retoma a discussão clássica sobre a essência da técnica e a atualiza a partir das visões dos novos críticos da cultura digital. O argumento central é que a perspectiva crítica tradicional (fundamentalista ou pessimista) falha ao abordar os fenômenos da cultura digital pelo viés essencialista. É proposta uma análise da cibercultura pela Teoria Ator-Rede (TAR) já que uma visão focada no *oligóptico*, presa às redes constituintes do fenômeno técnico, fiel às associações que formam o social, pode oferecer uma solução ao fracasso empírico da crítica.

Palavras-Chave: Tecnologia, crítica, essência, teoria ator-rede, cibercultura

* Doctor in Sociology from the Université René Descartes, Paris V, Sorbonne. Level 1A Researcher for the National Research and Development Council (CNPq/MCT) and Full Professor at the Faculty of Communication, UFBA. E-mail: alemos@ufba.br

DOI: http://dx.doi.org/10.11606/issn.1982-8160.v9i1p29-51

> To conceive humanity and technology as polar is to wish away humanity: we are sociotechnical animals, and each human interaction is sociotechnical. We are never limited to social ties. We are never faced with objects. This final diagram relocates humanity where we belong – in the crossover, the central column, the possibility of mediating between mediators.
>
> Bruno Latour (1994b: 64).

INTRODUCTION

Critiques of new technologies are frequently heard. The spectre of technology always seems to loom large, quashing any naive hopes for the human use of all kinds of different artefacts. At the same time, we also often hear eulogies for the freedoms that technological devices and networks have brought – and continue to bring – to humankind. Taken in isolation, I shall argue, both viewpoints are mistaken.

Ever since the emergence of the first computers and telecommunication networks, these divergent views have only intensified. For better or worse, optimists and pessimists argue, technology acts through its intrinsic mechanisms, its substance, whether these are driven by positive or negative tendencies. Either way, there is no point in fighting them. It's that simple. For some, the internet is liberating. For others, totalitarian. For some, social networks are a new and potent form of sociality. For others, they spell the very end of sociality. For some, books and reading are seriously under threat. For others, they are rapidly developing. For some, games amount to an art form and the possibility to enhance cognition and bodily skills. For others, they are a source of alienation, violence and social isolation.

In this article I look to show that both positions are flawed precisely because they implicitly or explicitly maintain an essentialist view of technology. By setting out from analyses of immutable essences, both technology's critics and their opponents, the fundamentalists, fail to observe how diverse sociotechnical networks are constituted in any relation with technical objects. They are therefore unable to describe the associations that empirically form the social. Technology cannot be understood in isolation as an autonomous domain separate from the relations that compose it. It is, above all, a form of mediation.

Actor-Network Theory (ANT) avoids setting out from an analysis that takes essences as indisputable and works to polarize the human and non-human. "Technology" should be conceived less as a substantive and more as a movement involving humans and non-humans alike in which subject and object are mutually constructed. As Bruno Latour explains: "technical action is a form of delegation that allows us to mobilize, during interactions, moves made elsewhere, earlier, by other actants" (1994a: 52).

By positing technology as an extension of human beings, an external factor, both critical and fundamentalist scholars have purified the phenomenon, overlooking it and fitting it into structures that, for better or worse, freeze its relations. Rather than focusing on isolated and provisionally established structures, therefore, replying to these questions adequately means exploring the constitution of sociotechnical networks, their *scripts* and *descriptions*, visualizing and describing relations that are always open and always in motion, irreducible to any other association, and which take place between those who provoke actions, whether human or otherwise (the *actants*).[1]

To comprehend contemporary culture, and more particularly digital culture, we need to move closer to the empirical and the grounded. Moreover technical devices need to be seen not as self-enclosed and individually complete entities, acting autonomously on others, but as a *monad*, an *actor-network* that acts and is acted upon depending on the associations formed (which are always irreducible to each other). Hence, the actor-network is defined by its associations, at each moment, rather than by any particular substance or essence. As Latour (2012, 2013) states in his inquiry into the modes of existence, the actor-network is more subsistence than substance: more an *être-en-tant-qu'autre* (in the struggle for subsistence) than an *être-en-tant-qu'être* (self-enclosed in its essence and substance).

Firstly I shall trace the origins of this misunderstanding of technique and technology. I then turn to identify contemporary forms of critique and, finally, I present ANT as a theoretical-methodological solution capable of escaping essentialist critiques of technology, focusing instead on descriptions of empirically established sociotechnical networks.

1. A term coined by Lucien Tesnière and used in semiotics to designate the participant (person, animal or thing) in a literary narrative. For Greimas (1974), an actant is who or what performs the action.

THE ESSENCE OF TECHNOLOGY

Both optimists and pessimists base their views on the idea that technology possesses an essence. It is precisely this essentialism that many contemporary theories of digital media perpetuate. To substantiate my argument I shall quickly trace the origins of this critique, a topic I have explored in more detail in earlier works (Lemos 2002, 2013[2]). Later we shall see how this critical perspective is mistaken when we re-imagine *technique* from the viewpoint of ANT.

The contemporary critique of technology has been shaped by ideas of technology originating in the philosophies of Plato (1985) and Aristotle (1990). Plato sought to show how philosophical contemplation was the most important human activity, higher than the *tékhnè* (practical knowhow) of the manuals and recipes of the sophists. *Tékhnè* is opposed to theoretical-contemplative knowledge, the *épistémè*. Aristotle, meanwhile, in his *Physics*, argues that practical activity is inferior to the things of nature since nothing fabricated contains the

2. Sections of this article return to topics covered in some of my earlier texts. I shall not dwell here on the origins of the philosophy of technique in Ancient Greece: I merely note its origins and concentrate on the discussion contained in Heidegger (1958) and Ellul (1968, 1964).

principle of its fabrication (*poièsis*) within itself. *Physis* is autopoietic, *tékhnè* poietic. The philosophies of Plato and Aristotle went on to influence subsequent perceptions of the practical arts, deemed inferior to intellectual activity and the things of nature (*physis*). In Greek myth, practical knowhow also appears as a transgression of sacred space, typically subject to severe punishment (as in the myths of Prometheus and Sisyphus, for example). This Greek conception of technology has profoundly shaped our present-day views.

However it was in the contemporary era with the German philosopher Martin Heidegger that the essentialist philosophy of technique acquired its most significant impulse. In *The Question Concerning Technology* (1958), Heidegger ponders the essence of modern technology. He looks to identify it in opposition to the essence of techniques prior to the scientific revolution. Heidegger argues that the attempt to understand technology through its instrumental or anthropological conception will fail to reveal all its essence. Defined as knowhow, an art, a means and a productive – and thus *poietic* – activity of man.

Tekhnè and *poièsis* are located in the field of production. By production Heidegger means the process that reveals a hidden, concealed truth. It is *poièsis* that causes a thing to pass from latency or absence to presence. Production is *poièsis*, which may be natural (*physis*) like the blooming of a flower, or artificial (*tekhnè*) like the manufacture of a table. Heidegger explains that *poièsis*, production (the passage from concealedness to unconcealedness) is, in Latin, *veritas*, truth, precisely *Aletheia* (disclosure). Hence all *poièsis* – whether *physis* or *tekhnè* – is an act of disclosing the truth. Every technical activity is a mode of disclosure, one of man's ways of being in the world.

Heidegger is thus a philosopher of disclosure. Every real object is inscrutable in its essence, he argues, proposing the idea of *das Geviert* to move as close as possible to its ultimate truth.[3] Contrary to instrumental and anthropological approaches, Heidegger sees technology not just a zoological means for the evolution of the human species, as Leroi-Gourhan sustains (1964, 1971), nor as an original mode of evolution that seeks to recapture a lost magic unity, as Simondon suggested (1958), but as a mode of disclosure, a mode of existence of man in the world, tied to his destiny.

3. On the fourfold and the real object, see Harman (2011).

For the German philosopher, the essence of modern technology is characterized by a mode of disclosure founded on modern science, originating in the seventeenth century, which took a specific relationship with nature (empiricism, mathematical quantification, universalism) as its underlying principle. The mode of disclosure in modern technoscience is enacted as a scientific provocation of nature through which the latter is forced to release matter and energy for free human control and manipulation. The essence of modern technology is grounded

in this mode of disclosure: a mode of production that provokes nature, which Heidegger called *Gestell* (or sometimes *Ge-stell*; *arraisonnement*, in French; *dispositivo*, in some Brazilian translations; enframing, in English): nature becomes a reservoir, a stock at the disposal of free human manipulation. *Gestell* is the essence of modern technology, a scientific mode of controlling nature, turning it into a reservoir and store at man's disposal. As a form of human being in the world – recognizing that, for Heidegger, man has to *build to dwell* – *Gestell* is simultaneously destiny and danger (*Geschick* and *Gefahr*, respectively).

Curiously there is nothing technical about *Gestell*. It appears before the emergence of modern technology, marked by the English Industrial Revolution of the eighteenth century. It is modern physics that prepares the ground for the emergence of modern technology. Or in other words, it is modern science that sets the conditions for treating nature as a reservoir, implying a legitimate form for humans to provoke nature through the use of devices. For the first time in history, therefore, a (technical) activity emerges from applied science, taking nature as a field of requisition and control (the domain of *Gestell*, of *pro-voking*). In Heidegger's words:

> Enframing is the gathering together that belongs to that setting-upon which sets upon man and puts him in position to reveal the real, in the mode of ordering, as standing-reserve. As the one who is challenged forth in this way, man stands within the essential realm of Enframing. [...] The essence of modern technology starts man upon the way of that revealing through which the real everywhere, more or less distinctly, becomes standing-reserve (1977: 24).

Modern technology is no more than the concretization of the plans of Big Science, marking the emergence of a technical form (a technology), a sociocultural form (a technoculture) and an ecological form (a technosphere). Technology, or modern technoscience, results from this marriage of science and techniques as part of the scientization of technology and the technization of autonomous and instrumental science, most of the time associated with technocratic-political and thus futurist, militarist and totalitarian projects. This process will culminate in the twentieth century in the creation of Research and Development (R&D) Centres, representing the fusion of science and technology.

Technology, in its essence, becomes the human transformative act that prepares nature for the formation of the human species and culture (and no longer God). And explaining phenomena now becomes the task of science (and no longer religion). As Weber would say, a desacralized, disenchanted modernity is prepared, one which, as we shall see later, will produce more and more hybrid beings of technology and simultaneously conceal them, precisely

through its substantialist view. For Heidegger, though, the real danger lurks here in this separation of man from his (open and negotiated) destiny with nature (a cabin in the Black Forest) and in the constitution of another destiny that takes nature as a reservoir (a hydroelectric or nuclear plant). Modern technology is a scientific provocation of nature. Unsurprisingly, therefore, critique bases itself on this new essentialist idea of technology, which re-institutes the negative view of artefacts propagated by the Ancient Greek philosophers.

During the same period, Jacques Ellul (1968), a French theologian, philosopher and sociologist, turns to history, social dynamics and culture in his book *The Technological Society* in order to explore the differences between modern technologies and those of the past. Ellul develops a systemic, fatalistic and closed view of technology, definitively separating man and technology, establishing a view centred on a technological determinism difficult to escape. Everything in modern societies is governed by technology, identified as an instrumental reason that makes man no more than an object in its planetary development. Ellul's thought would go on to shape modern critiques of technology and contemporary communication.

For the French thinker, technology in archaic societies was applied to some domains of society only, since man never linked his fate to technical progress. There was no great variety in the means used to attain a particular outcome and the mode of use was more important than perfecting specific techniques. Hence the technical world prior to the seventeenth and eighteenth centuries – and note that for Heidegger this coincides with the emergence of the essence of modern technology – is always local: evolution is not seen through the logic of technical progress and human destiny is not linked to the innovation of artefacts. Man dominates the process and imprints it with his own dimension. For Ellul:

> The techniques which result from applied science date from the eighteenth century and characterize our own civilization. The new factor is that the multiplicity of these techniques has caused them literally to change their character. Certainly, they derive from old principles and appear to be the fruit of normal and logical evolution. However, they no longer represent the same phenomenon. In fact, technique has taken substance, has become a reality in itself. It is no longer merely a means and an intermediary. It is an object in itself, an independent reality with which we must reckon (1968: 65).

Ellul argues that this situation defines modern technology: it is no longer external demands that drive forward the development of techniques, but precisely its own internal demands. Hence the essence of modern technology involves the adherence to its own laws, its own internal needs, transforming

human reality into its own determinations. For Ellul, man will lose control over the destiny of technology and become just one more instrument in a global system governed by reason. He proclaims:

> In the coupling of man and machine, a genuinely new entity comes into being. Most writers still insist on the modern tendency, which they profess to discern, to adapt the machine to the man. Such adaptation doubtless exists and represents a great improvement; but it entails its counterpart, the complete adaptation of the man to the machine. This last does not lie in a remote future. Man's nature has already been modified; and it is to an already adapted individual that technique adapts mechanical apparatus. [...] the more monumental and exacting the machine becomes (and by machine I understand *organization*, too), the more indissoluble the complex man-machine becomes (1964: 395-396).

In Ellul's view, the characteristics of the relations between technology, culture and society are common to all civilizations until the eighteenth century. It is the advent of modern technology that transforms society into a closed, universal, automatic system, changing the face of the planet forever. Technology is thus autonomous from man. And that is its essence. According to Ellul, the main characteristics or essence of modern technology can be expressed as: Rationality, Artificiality, Automatism, Self-Augmentation, Monism, Universalism and Autonomy. Let's examine these more closely.

Rationality tends to subject whatever belongs to spontaneity or the irrational to its own internal mechanism. Every technical intervention is, in effect, a reduction to the logical schema of facts, impulses, phenomena, means and instruments. Only the rational exists. It is technology's *artificiality* that opposes it to nature. The world constituted gradually through the accumulation of technical means is an artificial world and, therefore, one radically different from the natural. *Automatism* involves orientations and choices becoming governed by the internal logic of techniques. Technical activity automatically eliminates all non-technical activity, or transforms it into itself. Consequently technique has reached such a level of development that it transforms and advances almost without any decisive intervention from humankind. It is *self-augmenting*. Technical progress tends to occur in geometric progression. Moreover technique evolves through causality and within its own logic, forming a unified and universal system: this is what Ellul calls *monism*, or indivisibility (*insecabilité*). Following technical *universalism*, technology's area of operation is the entire world, leading to what we today call *globalization*. It is also *autonomous*, since it conditions and provokes social, political and economic changes, producing a full-blown technological system. In other words, Ellul writes:

> Technique elicits and conditions social, political, and economic change. It is the prime mover of all the rest, in spite of any appearance to the contrary and in spite of human pride, which pretends that man's philosophical theories are still determining influences and man's political regimes decisive factors in technical evolution. External necessities no longer determine technique. Technique's own internal necessities are determinative. Technique has become a reality in itself, self-sufficient, with its special laws and its own determinations (1964: 133-134).

Hence the views of Jacques Ellul and Martin Heidegger, developed more or less coterminously, both emphasize an essence to modern technology that takes the place of man at the very centre of the historical process, resulting in the range of problems we today identify as typically modern: industrialization, environmental issues, the robotization of the human, hyper-rationalization and the bureaucratization of the modes of existence. Here, then, we can see the grounds for a modern critique of technology take shape: technical activity is identified as a substance, a created essence and a cultural context (modernity) that will indelibly mark the relation of humans to the world.[4] This modern world will also become the world of global communications and the mass media. And the essentialist critique of technology will be developed precisely in this field.

In the area of communication, the biggest exponents of an essentialist critique of technology can be found among the researchers of the Frankfurt School, responsible for the creation of the concept of the Culture Industry in the 1940s. Max Horkheimer and Theodor Adorno (1974), Jürgen Habermas (1980, 1981, 1990), Walter Benjamin (1984, 1985, 1997) and Siegfried Kracauer (1998) were responsible for theories that focused on the potential for the masses to be manipulated by media systems and artefacts, creating a society governed by cultural homogeneity, the flattening of values through the commodification of culture, and the banalization of communicational exchanges. Because of their critical stance vis-à-vis the advances of science and technology, and their aversion to the culture that emerged with the expansion of the mass media, these post-Marxist thinkers created what became known as the *Critical Theory of Communication*.

Diverse studies – like those of Adorno and Horkheimer on the dialectic of reason, the culture industry and music, Benjamin's texts on the Parisian landscape, cinema, photography and the aura of works of art amid the avalanche of technical reproductions, Habermas' critique of the emptying of the public sphere, the incompleteness of the modern project and the crisis in communicative reason, and Kracauer's works on cinema and the threats posed to memory by technological development – went on to highlight the effects of technology,

4. There is not enough space here to discuss other thinkers who adopted similar perspectives. I highlight Heidegger and Ellul since they are emblematic, but authors like Max Weber (1950), Lewis Mumford (1934), Oswald Spengler (1958), Hans Jonas (1990), Hans Freyer (1965), Herbert Marcuse (1968) and others were extremely important in terms of establishing the modern critique of technology.

embodied in the media linked to the mass market, the standardization and commercialization of tastes and the levelling down of desires.

The combination of the mass media and modern technology dulls the human spirit through the capitalist logic, reducing everything to instrumental rationality and the industrial dynamic. At the epicentre of this phenomenon is the emergence of a close association between science and technology, between technological and instrumental reason and the future. Technology is associated with the repressive forces of instrumental reason, market homogenization and the productivist logic of industry. Massification is thus synonymous with a lowering of cultural quality. Culture comes to reproduce the industrial logic of production.

It is worth noting that these critiques formed an interesting movement of resistance to the type of culture developing at the time that eventually became the society of the spectacle of the twentieth century and the cyberculture of the twenty-first. Their denunciations of diverse aspects of mass industry (photography, cinema, music, literature) are both pertinent and significant in terms of identifying the ills caused by commodification. However, as shown by the Cultural Studies and Media Studies that developed in the 1980s, these critiques were flawed precisely by their identification of essences, whether in relation to technology or the media.

This led to global, substantialist analyses that paid too little attention to the real challenges and associations involved in the mediations between media, technologies and culture. Ignoring the diversity of associations in their concrete dimensions thus led the Frankfurt critique, Heidegger's philosophy of disclosure and Ellul's total system to produce analyses that were generalizing and important, but far too global, failing to descend to the level of phenomena and their networks. The substantialist, idealist and normative character thus makes technologies hostage either to communicative and substantive reason, or to instrumental and manipulative reason, given that there was no possibility of negotiating between these dimensions.

Nonetheless, as I shall argue later, this view ignores programs of action and symmetries that were effectively no longer global but particular, the sociotechnical networks, which characterize technical and media phenomena. Adopting an ANT approach, the Frankfurt critiques should not be excluded *tout court*, but neither should they be taken *a priori* as global structures. Although they evidently appear in the analysis of some phenomena, these instances do not amount to a framework capable of explaining each and every contemporary technomedia relation.

In the 1970s, 80s and 90s, the sociologist Jean Baudrillard and the urbanist Paul Virilio – who, symptomatically enough, have today vanished from the

references cited by studies of contemporary communication in Brazil – were critics of the new media, pointing to the negative aspects of speed, hyper-reality and simulacrum.[5] Now it is not so much the mass media that is focused on by critique, but the technologies of the virtual, the digital media, seen as the ultimate weapon of capital and the spectacle, which, according to the visionary Guy Debord (1992), transform rites of sociability into a simulacrum of communication and social relations. As Baudrillard would say, nothing is more than a simulacrum of communication achieved through the transfer of bits, or as Virilio asserted, alluding to the speed of exchanges, nothing is any more than the wiping out of true relations, communications and even urban space and cities.

Again these critiques seem excessive today, at least when taken in global and structural form. Sure enough, we can encounter such situations in some specific cases, but this blanket view cannot really be taken to identify an essence applicable to all mediations involving digital technology. The weakness of this line of critique resides precisely in its over-generalization.[6] However, as we shall see with ANT, they – the media, techniques, devices – are nothing by themselves: they exist only in associations, making them entirely dependent on the action plans and symmetry of the diverse mediators in each association.

The same thing occurs today with the new critics of the internet. Young analysts like Evgeny Morozov (2011, 2013), Andrew Keen (2007, 2012) or Jaron Lanier (2010a, 2010b) have argued, once again adopting an essentializing perspective, that reality has not only been flattened by the mass media, the new virtual media are derealizing the world. Everything is being transformed into a fun park for economic liberalism, involuntary work and the cult of amateurism, centred on the idea that collaboration and participation will somehow save the economy, the media, communication, social relations and politics. An updated version of the (old) essentialist critique has thus emerged, heir to Heidegger, Ellul, the Frankfurt School, Virilio and Baudrillard.

For these new critics, participatory and collaborative culture is a myth, a fiasco, ultimately producing a mediocre and amateurish culture (Keen, 2007, 2012). Digital culture is no more than a form of enchantment for a thinking centred on the internet and its making of fortunes at the height of neoliberalism, impelled above all by the naivety and ignorance of the political sciences (Morozov, 2011, 2013). Likewise the world of the new web with its applications and mobile technologies is nothing more than a fetishistic worship of gadgets, such as the new tablets, smartphones and similar devices, Web 2.0, the culture of collaboration and the bankruptcy of open source software that Lanier calls digital Maoism. All of them criticize the false perception of collective

5. Here numerous, more contemporary authors can be pointed out, like Bernard Stiegler (1994), Gilbert Hottois (1984), Anthony Giddens (1990), Richard Sennett (1998), Raymond Williams (1974) and others. I select the two French writers simply as emblematic of a period, without wishing to reduce the thought of these others to those of Baudrillard (1970, 1981, 1990, 1995) or Virilio (1989, 1996).

6. This perhaps explains the disappearance of these thinkers from contemporary texts, at least in the field of communication studies in Brazil. This is extremely counterproductive since it establishes a polarization that leads to the same kind of error as the idea of an essence. By asserting that these authors were wrong and that they produced no more than a sterile global critique, an entirely optimistic vision is promoted (which some would call *acritical*).

intelligence (Lévy, 1994, 1997), the convergence culture (Jenkins, 2006), or the culture of emergence (Johnson, 2001).

We are faced, therefore, with the same essentialist critique of technology, insisting on a hyper-specialized view and scale conceived through a line of thought that fails to capture sociotechnical networks in all their diverse dimensions and programs of action. For these new critics of technology, everything is given in advance by the essential character of artefacts. We can offer another view of technique that foregrounds the dimension of mediation, hybridism and networks as a form of comprehending the associations that form in this dimension of existence. This non-essentialist view of technique is present in Actor-Network Theory (ANT).

THE (NON)-ESSENCE OF TECHNIQUE IN ACTOR-NETWORK THEORY

> They (artifacts) mediate our action? No, they are us.
> Latour (1994b: 64).

I believe that one way of escaping this essentialist polarization of technology and contemporary media, which locates optimists and pessimists on the same level, a way that also permits us to see mediations in all their fragility, is the approach to social life offered by ANT.[7] This theory was developed in studies of science and technology in the 1980s-90s by Michel Callon (1980, 1986a, 1986b), Bruno Latour (1994a, 1994b, 2012, 2013) and John Law (1992) to cite the most prominent figures. In studying the relation between science and society, these researchers observed an ontological error in the constitution of autonomous fields. The social was not what explained associations from the outside, but what emerged from all kinds of mediations between human and non-human.

7. I recently published a book emphasizing the importance of ANT in the study of diverse phenomena of cyberculture (Lemos, 2013).

For Bruno Latour, modernity should be understood as a double process of mediation (the production of hybrids) and purification (the negation of this hybridism). A process that situates the moderns as strange beings, developing specific modes of existence in diverse areas (law, religion, technology, subjectivity). Modernity does not cease producing associations between humans and non-humans, but, at the same time, it purifies this relation by separating subject from object, nature from society, the technical from the social. For the French sociologist, modernity is no more than the "proliferation of the hybrids whose existence, whose very possibility, it denies" (Latour, 1993: 34).

In the case of technology and the communications media, this dynamic of purification is only possible through an instrumental and essentialist view of technology that sees humans either as the *lords and masters* of actions

(a perspective we could call *sociodeterminist*) or as the victims of the harm caused by the external, independent and autonomous force of technology (*technodeterminism*). Either way, the mediations capable of providing us with a better insight into what really happens in the associations between humans and non-humans are erased in favour of essences, applied as grand theoretical frameworks capable of explaining everything.

I am not arguing here that *sociodeterminist* or *technodeterminist* programs of action do not occur, but that they can only be affirmed *a posteriori* through an analysis of the traces left by (multiple) agents in determined mediations. By approaching them in an essentialist way, everything said works to erase the mediations and programs of action of the multiple agents. This perspective valorises global frameworks instead of associations. The impression always lingers that there is something wrong with the analysis: not everything that really unfolds is being said. We cannot say anything meaningful if we fail to analyse the traces.

For example, the assertion that digital social networks always take such-and-such a form can be refuted by one simple experiential example. This is the weakness of substantialist and generalizing critiques. Analysing specific associations, however, allows us to obtain results that may indicate a strong agency, whether that of the technical device or the human subject, like the uses of Twitter and Facebook during the 2011 Arab uprisings. But even here, nothing can be said without *tracing* what is really happening.

What then is technique, technology or its mode of existence, given that we cannot talk of *essences*? In Chapter 8 of his new book, *An Inquiry into Modes of Existence. An Anthropology of the Moderns* (*Enquete sur les modes d'existence)*, Latour (2013/2012) seeks to describe, in order to make visible, what he calls *beings of technology.* All of Latour's work is an affirmation of the interdependence of diverse domains (labelled social, economic, cultural, technical) and the fact that we cannot think of technique (or science, or society) as substantives. For Latour, everything is defined in associations.

As innumerable analysts have pointed out, the moderns sought to establish the end of superstition and the beginning of the hegemony of reason. It is no coincidence that Weber (1950, 2000) writes of a "disenchantment" of the world, Marcuse (1968) of the "unidimensional man," Habermas (1990) of "instrumental reason," Mumford (1934) of the "substitution of religion and God by science and technology," and Freyer (1965) of an "administration of things." They base these arguments on the transformations undergone by civilization with the expansion of the modern discourse of scientific truth and the efficacy of the transformations caused by technological devices. Science and technology replace religion and science, or so the moderns believed.

Nonetheless, the most impressive aspect of the moderns is not that they developed an ontological distrust of religion or subjectivity (what Latour calls *the beings of metamorphosis*), but the scant recognition given to the beings of technology. There has been huge technical development since the seventeenth century, but a still greater absence of a *philosophical* correlate of technology. In other words, many hybrids have been produced and, at the same time, an immense invisibility created. There is little thought about their modes of existence. Under modernity, technology, though highly developed, paradoxically only exists in an invisible mode, since it depends on specific forms of astuteness, deviation or appropriation to reveal all its form of subsistence. Latour argues that we need better descriptions of the beings of technology and their networks without falling into an essentialist, substantialist perspective or the separation of man and object.

Sociotechnical networks are ways of describing the sheer diversity of the physical devices available to us in any given situation. For ANT, separate domains of the technical or the social, for example, do not exist, only *actor-network* hybrids, circulating and transcending the boundaries of these supposed domains (technical, social, cultural, economic). There are no subjects and objects, only quasi-subjects and quasi-objects (Serres 1982, 1994, 1996) formed within a symmetrical relationship. There is no technical system, nor technical or social domain, as Heidegger, Ellul, the Frankfurt School, Baudrillard, Virilio or today Morozov, Keen and Lanier have led us to believe. In this sense, the moderns produced a fiction that we all believe in (which is why we are and at the same time *have never been modern*): this functioned extremely well, since it is both proactive and transformative, but it does not amount to an ontology of the beings in question. As Latour writes:

> As if a nuclear power plant, a drone, an eel trap, or a metal saw could be content to maintain itself in existence with the help of elements from two domains, the "social" and the "technological" – and these two alone. The ethnologist has already learned this at her own expense: even though what historians call "technological systems" do exist on the local level, they are no more made *of* technology than law is made *of* law or religion *of* religion. What complicates the analysis is that there is no domain at all that can be mistaken for that of "technology" (there is no domain of "the social," either, but that is another matter) (2013: 212).

It is precisely through the controversies (openings, deviations, ruptures, appropriations) capable of revealing the invisible sociotechnical networks within their enclosures (like a *black box*). *Technical infrastructures* are always one-off and provisional, such that controversies help to reveal the entangled world that

constitutes them: in other words, they help open the black boxes and expose the previously stabilized networks. They seem invisible – taken for granted – but are in fact no more than temporary stabilizations, meaning they are not *necessities*, or *unavoidable chains*, since everything is produced and inscribed within the dynamic of hybrid networks. The *domain of technology* is constituted as an artificial and thus one-off construction, a mechanism that over-simplifies reality. Reality is an assemblage that becomes stabilized through mediation, translation, networks, black boxes, delegation, inscription and deviation.

To become constituted, everything must pass through the deviations and translations of others (human and non-human). Consequently the trajectories of beings of technology never go *directly* from A to B, they always involve deviations and appropriations. As Latour explains:

> Like Zorro, the technological being traces a fiery Z in a lightning stroke! Let's try to follow this zigzag. Nothing more common, more ordinary: you were heading for your office, getting into your car, and suddenly, without quite grasping what's going on, you find yourself in a garage, trying somehow to understand what a mechanic in work clothes is muttering as he crouches under the chassis, seeming to point with his hand dirtied by the oil leaking out to a part whose name and function escape you completely, except that (you are beginning to get it) you are starting to "expect miracles" from the availability of the spare part and from the skill of the mechanic, knowing that "you're going to have to go through this" if you want to find the path to your office again [...] (2013: 217)

It is precisely the *presence-absence* dynamic of technology that causes its beings to become occulted under modernity. Technological artefacts and devices are produced ever more quickly, yet, simultaneously, technology seeks to become forgotten, vanishing in the very constitution of the modern era. What matters is the zigzag, a movement of appearing and hiding, since purification (realized through what he calls the simplifying demon of modernity, Double Click), kills all intermediations and leaps from subject to object, nature to culture, and back again. Paradoxically it is precisely this instrumental and essentialist vision that seeks to reveal the reality of the technical objects that it hides, enabling the withdrawal and concealment of the beings of technology.

Heidegger's philosophical critique, Ellul's technical system and the discourse of *Homo Faber* appear here as the causes of this concealment. If technology is always hidden away, establishing itself as a total system from which nothing escapes, if technology really is the intention of science and economics, then it can effectively withdraw and act as a *system*, as the *danger* and *destiny* of humans in the world. The moderns developed and concealed

technology by believing in the essentialist discourse that founded them. As Latour explains:

> If you succeed in seeing in all technology a preexisting form that it applies to a hitherto inert and formless matter, then you are going to be able, by sleight of hand, to make the material world disappear even while giving the impression that you are populating it with objects whose materiality would have the same phantasmatic character as that of Nature! Here is where *Homo faber* comes on stage, shaping his needs through tools by "effective action on matter." Four little words as completely innocent as they are inadequate to grasp such a zigzag: there is no matter, one does not act "on" it, the action is not "effective" (it will be, perhaps, but later on), and, finally, as we shall see, it is not at all certain that this is an "action," at least not the action of "someone" (2012: 218-219).

In the essentialist view that defines the emergence of *Homo Faber*, Latour argues, technology disappears precisely in the appearance of its essence. Considering technology as *means to an end* is an unworthy way of treating beings so important to the constitution of the subject and society. Based on an essentialist philosophy that treats *being-as-being* (*être en tant qu'être*) rather than a *being-as-other* (*être en tant qu'autre*) that points to trajectories and movements, modernity produces more and more human and non-human hybrids while simultaneously eroding the reality of the beings of technology. The result is a wide-ranging modern movement of concealing technology and scorning objects, formed by the essentialist critics from the emergence of the modern matrix of reason with the philosophy of Plato and Aristotle, passing through Heidegger, Ellul and their contemporaries, as we have seen. But as Latour explains:

> The scorn with which people view technologies comes from the fact that they are treated according to the same model that we saw used to misunderstand the work of reference. Just as there was, in epistemology, a theory of objectivity as "correspondence" between map and territory, there is in technology a theory of effectiveness as correspondence between form and function. Technology is believed to be an action stemming from a human being – most often male, moreover – that would then bear "on" matter itself conceived through confusion between geometry and persistence [REP - REF]. Technology then becomes an application of a conception of science that is itself erroneous! […] But it is not technology that is empty, it is the gaze of the philosophy of being-as-being, which has deliberately emptied itself of all contact with its own experience. In the finest dam, this philosophy doesn't manage to see anything original with regard to Being. "Mere beings," Heidegger would say… (Ibid.: 219-220)

Only a radically instrumental and essentialist purification can make us believe (given that it is indeed a question of belief) that humans are on one side and instruments on the other. Latour thus proposes overcoming this essentialist vision of technical instrumentality (Latour 1994a: 30) through the notion of mediation. This is a form of translation between the actants in a network that constitutes social life in movement. This notion of mediation can be very useful to escape narrow views of communication, since mediations allow us to go beyond the essentialist vision and show the dynamic of networks without fixating, in advance, on polarizations of subjects and objects, cause and effect, media and contexts. The most important dimension of this concept of mediation is the idea that the "techniques have meaning, but they produce meaning via a special type of articulation that crosses the common sense boundary between signs and things" (Latour 1994b: 38).

Translation (another name for mediation) is an interesting methodological resource since it always involves the transformation of the actors in a given association. By mapping mediations, we can dispense with essentialist and/or instrumentalizing views of media devices and observe the formation of sociotechnical networks with more tranquillity, enabling us to analyse the social world that emerges in the process. This would seem more useful to studies of communication than setting out from generalizing viewpoints that, irrespective of the fact under observation, always end up saying the same thing. We can move away from generalizing and ineffective approaches that – incredible though it may seem given their origin in the human sciences – dispense with an analysis of relations and the traces of actions. If everything is given in essences and substances, little remains for what is actually happening in associations.

Translation thus implies adopting an approach informed by inclusion, not separation, in which subject and object are mutually defined. In adopting this perspective, we are no longer autonomous beings, nor subjected to the linear causality of an essence of objects. What matters in terms of giving an air of nobility to the beings of technology is to rid the technical object of all the opacity that renders it incomprehensible and to reassemble the network (that Double Click wishes to erase) to which it is connected through deviations and operational chains. Technology cannot therefore be designated any longer by an object, a thing, a device. Rather, it is a trajectory of *being-as-other*, always a transformation of one being into another. Every object is merely the temporary mark of a trajectory.

> "Ah, you mean that there are technicians, engineers, inspectors, surveyors, intervention teams, repairmen, regulators, *around* and *in addition to* material objects? In short, humans, and even a 'social context'?" "No, I didn't say anything of the sort,

> for the good reason that technologies *precede* humans by hundreds of thousands of years. I am simply saying that if you are capable, you Moderns, of leaving out the paths of reference when you speak of objective knowledge, you are perfectly capable of leaving out what is responsible for the instauration of technological objects on the pretext (which is also true) that they hold up on their own once they are launched. Except that they can never remain alone and without care – which is also true! It is only the flow of operational sequences that allows us to sketch them." Technology is better hidden than the famous *aletheia* (Latour, 2013: 222-223).

As a consequence, technology's way of being, its mode of existence, unfolds through invention, through the leap of two other modes, metamorphosis (MET) (the transformations of the world) and reproduction (REP) (the search for persistence and insistence proper to the things that exist and live). Technology thus results from the crossing of two beings (MET and REP), forming a mixed mode of existence. Technology is not – or cannot be reduced to – the object, device, instrument or machine, therefore: it emerges, rather, from a movement that will extract a moment of metamorphosis and reproduction from the inert and the living, and that will go on transforming. Technical objects are *monads*, *actor-networks*, punctuations in sociotechnical networks forever in movement. They are not things or nouns, but adverbs and verbs. Technology is a form of alteration of one being into another, or as Latour explains:

> We need to see "Technique" and "Technology" not in their noun forms but as adjectives ("that's a technical issue"), adverbs ("that's technically/technologically feasible"), even sometimes, though less often, in verb form ("to technologize"). In other words, "technology" does not designate an object but rather a difference, an entirely new exploration of being-as-other, a new declension of alterity. […] But at the same time, my table, the walls of my house, my crystal vase *persist* after their transformation. Unlike the beings of metamorphosis, once they have been radically transformed the beings of technology *imitate* those of reproduction through their persistence, their obstinacy, their *insistence*. It is as though technology had dragged some of the secrets out of reproduction [REP - TEC] and of metamorphoses [MET - TEC] by *crossing* the two species of modes of being. Technology appears in a first approximation as a mixed mode: proteiform speed on one side, persistence on the other (2013: 223 and 225).

And what would be its proper mode of verification, its felicity condition? Not immutable essences, but adjustments, corrections, appropriations, deviations, foldings and couplings. Without doubt, it is not the technical object that functions in its wholeness as individual and substance that reveals the truth and falsity of its mode of existence. It is not its concealed essence,

hidden from the networks in a *being-as-being* of substance, that can disclose the mode of existence of the beings of technology. For Latour, it is precisely in the errors of the search for *subsistence* that we can verify the felicity conditions for understanding the modes of existence of the beings of technology. Only the modern demon of Double Click (the critics from Plato to Morozov can be seen as worshippers of Double Click) takes technique in its initial essence, or in its final outcome, erasing the networks and mediations, leaping, *clicking* from the subject to object, from culture to nature, from humankind to technique. Here Latour argues: "To say that technologies are effective, transparent, or mastered is to take the conclusion for the pathway that led to them. It is to miss their spirit, their genesis, their beauty, their truth" (2013: 227)

Hence two actions are fundamental to qualifying this mode of existence, which is not the mode of substance, but the mode of the relation, movement, metamorphosis (MET) and persistence (REP), the *project*, not the *object*: the folding and the shifting (*pli* and *débrayage*). The fold is a way to avoid speaking of any (independent) technical mastery over matter, nature or the subject. This *pli* contains what is *implicated*, *complicated* and *explicated* with each association. The fold is the maze-like translation of other modes of existence and subsistence, producing labyrinths. Hence, nothing linear, substantial or essential can explain the modes of existence of the beings of technology. In relation to the fold, the French thinker explains:

> The term "folding" will allow us to avoid the blunder of speaking of technology irreverently as a piling up of objects or as an admirable example of mastery, transparence, rationality, that would prove "man's dominion over matter." Technology always entails folds upon folds, implications, complications, explanations. Its canonical representation, thoroughly studied by the sociology of technologies, sketches it in the form of a series, often a very long series, of nested translations, a labyrinth (Ibid.: 228).

The other dimension is shifting, which engages and disengages like a car gearbox that shifts from parked to four or more different situations. Shifting is that which *makes making* happen, what mobilizes the plans of actions and causes transformations in space, time and the different types of actors (actants mobilizing metamorphoses and reproductions). It is through shifting that *technology makes man*, as Leroi-Gourhan would say, man is fabricated more than *fabricator*. On the idea of shifting, Latour writes:

> It is by insisting on the notion of shifting that we shall succeed in qualifying these gradients of resistance more accurately. There is a great temptation, in fact, to think that if there are technologies, it is first of all because there are technicians!

> If we gave in to this view, we would be firmly placing the origin of technological beings in thought, or at least in the gestures of *Homo faber*. The spirit that we are invoking would simply be the inventive spirit of humans, the creator that has to precede all creation, or so we are told. [...] [W]hen you are resting in the hammock, it is indeed the hammock that takes over – and it does not resemble you, others have woven it for you; when you entrust yourself to an aspirin tablet, it is the tablet, another actor from elsewhere, manufactured by others, to whom you have entrusted or delegated the work of treating your headache – and the tablet doesn't resemble you in the least, either; when a shepherd, tired of watching over his sheep, entrusts to a fence and to his dogs the task of protecting the flock against wolves (or perhaps stray dogs), those who are now standing guard are the fence posts, the barbed wire, and the dogs, each with its own history, its own fidelity, and its own fragility (2013: 228-229).

In this way, subjects emerge from what they make. Instead of taking actions to originate in the *self* and move from there to matter, it is more useful, perhaps, to invert our way of looking in order to enable the encounter with other human and non-human beings to emerge. Rather than *Homo Faber*, the master of technology, who manipulates the hidden object in its never-revealed essence, inventing, transforming and giving it meaning, we are faced by *Homo Fabricatus*, the child of his own creations, hybrid, invented by the couplings and folds of technicity. Liberated from matter and mastery (by foldings) and from the subject (by shiftings), the beings of technology can thus become free of the instrumental and essentialist vision and emerge finally and definitively from its modern occultation. We can now see with other eyes the dynamic of the sociotechnical networks that form and deform in digital culture. We can escape the essentialist circle of critique.

CONCLUSION

In analysing the role of social networks in the February 2011 uprisings in various Arab countries (Lemos, 2013), digital media could be seen as merely tools in the revolution: the message was given and the revolution could be explained by a historical becoming, a program, or a potential of these media (tools do not make the revolution, they merely help as tools). Others claimed precisely the opposite: Facebook, Twitter, YouTube videos or SMS had made the new revolution, which some indeed hastily called *Revolution 2.0*. I have shown that both were wrong in their arguments since we can now imagine foldings and couplings that take place in some determined circumstances but that may not be repeated ever again. There is no historical becoming, or

hidden potential, but a game of associations in which an assemblage of actants execute specific folds and shifts at a given moment. In the case of the Arab Spring, the social media were fundamental (actants rather than mere tools or intermediaries) but that does not mean they will necessarily be so in the future (they may be precisely tools and intermediaries). We have to abandon essences in favour of the networks that actually form if we are to describe social aggregations well.

Persisting with a generic critique means occulting technology and, at the same time, making any analysis of networks in motion impossible. As we have seen, technology – whether an instrument of measure, a tool of transformation, an assemblage like an industrial machine, or a communication medium – combines in folds and couplings, forming associations, and must therefore be seen through its action (which may be negative and/or positive in determined circumstances). In terms of digital culture, we need to understand that action through the use of communication and information technologies, however simply they may be, associates multiple actors in a circulation of mediations and delegations traversing spaces and contexts: engineers, creators, producers of information, companies, distributers, users, laws, software and databases, servers, networks... Comprehending digital culture entails understanding the relations between these diverse actors and their forms of folding and coupling through good descriptions and analyses of their traces. The essence that conceals provides little help in describing the social. Technique is mediation and movement. It does not designate anything: it is a mode of operation. As Latour explains:

> "Technical" also designates a very specific type of *delegation*, of movement, of shifting, that crosses over with entities that have a different timing, different properties, different ontologies, and that are made to share the same destiny, thus creating a new actant. Here the noun is often used as well as the adjective, as when we say "a technique of communication," a "technique for boiling eggs." In this case the noun does not designate a thing, but a *modus operandi*, a chain of gestures and know-how, bringing about some anticipated result. […] Technical skill is not a thing we can study directly. We can only observe its dispersal among various types of actants (1994b: 44).

Is the internet a liberating force or is it totalitarian? If we set out hastily towards essences and global and universal structures, we overlook associations, the social that is actually being made. Critique based on essences and the analyses of structures, always leave us with the feeling that the *truth* was not said, something is always missing. In this sense both Morozov and Johnson

are right and wrong at the same time.[8] The critiques of new technologies are generally speaking poorly constructed since they insist on the essentialist view of technical phenomena. By appealing to essence, we hide the beings of technology, lose sight of associations and produce rapid leaps between domains which are apparently separate but which are always, in fact, connected and hybrid. Moving beyond the essentialist critique, ANT proposes to open up networks and discern a third possibility that escapes sociodeterminism or technodeterminism, bringing responsibilities for everyone, human and non-human. In Latour's words:

> The myth of the Neutral Tool under complete human control and the myth of the Autonomous Destiny that no human can master are symmetrical. But a third possibility is more commonly realized: the creation of a new goal that corresponds to neither agent's program of action. [...] I call this uncertainty about goals translation. […] Essence is existence and existence is action. […] Responsibility for action must be shared among the various actants (1994b: 31, 34). M

8. Here I refer to an article by E. Morozov criticizing the *internet-centred* perspective of S. Johnson and the latter's attribution of emancipatory forms to the collaborative and participatory practices of the internet. See the article "Why Social Movements Should Ignore Social Media" in *The New Republic*. Available at <http://www.newrepublic.com/article/112189/social-media-doesnt-always-help-social-movements>. Accessed on 13 May 2014.

REFERENCES

ARISTOTE. *Physique*. Paris: Belles Lettres, 1990.

BAUDRILLARD, J. *La société de consommation*. Paris: Denoël, 1970.

_____. *Simulacres et simulation*. Paris: Galilée, 1981.

_____. *La transparence du mal*. Paris: Galilée, 1990.

_____. *Le crime parfait*. Paris: Gallilée, 1995.

BENJAMIN, W. *L'oeuvre d'art à l'epoque de la reproductivité technique*. In: *Essais*, Paris, 1984.

_____. *A modernidade e os modernos*. Rio de Janeiro: Ed. Tempo Brasileiro, 1985.

_____. *Obras escolhidas III*. São Paulo: Brasiliense, 1997.

CALLON, M. Struggles and negotiations to define what is problematic and what is not: the socio-logic of translations. In: KROHN, K. D.; WHITLEY, R. (eds.). *The social process of scientific investigation: sociology of sciences,* v. 4. Dordrecht: D Reidel, 1980. p. 197-219.

_____. The sociology of an actor-network: the case of the electric vehicle. In: CALLON, M; LAW, J; RIP, A. (eds.). *Mapping the dynamics of science and technology*: sociology of science in the real world. London: Macmillan Press, 1986a. p. 19-34.

_____. Eléments pour une sociologie de la traduction: la domestication des coquilles saint jacques et des marin-pêcheur dans la baie de Saint Brieuc. *L'année Sociologique*, p. 169-208. 1986b. Special issue.

DEBORD, G. *La société du spectacle*. Paris: Gallimard, 1992.

ELLUL, J. *A técnica e o desafio do século*. Rio de Janeiro: Paz e Terra, 1968.

_____. *The Technological Society*. New York: Vintage Books. 1964.

FREYER, H. *Teoria da época atual*. Rio de Janeiro: Zahar, 1965.

GIDDENS, A. *The consequences of modernity*. Cambridge: Polity Press, 1990.

GREIMAS, A. J. Les actants, les acteurs et les figures. In: CHABROL, C. *Sémiotique narrative et textuelle*. Paris: Larousse, 1974.

HABERMAS, J. *Técnica e ciência enquanto ideologia*. (Coleção os Pensadores). São Paulo: Ed. Abril, 1980.

_____. La Modernité: un projet inachevé. *Critique*, n. 413. Paris, October 1981.

_____. *O discurso filosófico da modernidade*. Lisbon: Dom Quixote, 1990.

HARMAN, G. *The quadruple object*. Winchester, Washington: Zero Books, 2011.

HEIDEGGER, M. *Essais et conférences*. Paris: Gallimard, 1958.

_____. *The Question Concerning Technology and Other Essays*. New York and London: Garland Publishing, Inc. 1977.

HORKHEIMER, M; ADORNO, T.W. *La dialectique de la raison*. Paris: Gallimard, 1974.

HOTTOIS, G. *Le signe de la technique. La philosophie à l'épreuve de la technique*. Paris: Aubier, 1984.

JENKINS, H. *Convergence culture: where old and new media collide*. New York: New York University Press, 2006.

JOHNSON, S. *Emergence: The Connected Lives of Ants, Brains, Cities, and Software*. Scribner, NY, 2001.

JONAS, H. *Le principe responsabilité*. Paris: Flammarion, 1990.

KEEN, A. *The cult of the amateur*: how blogs, mySpace, YouTube, and the rest of today's user-generated media are destroying our economy, our culture, and our values. New York: Doubleday, 2007.

_____. *Digital vertigo*: how today's online social revolution is dividing, diminishing, and disorienting Us. [s.l.]: St. Martin's Press, 2012.

KRACAUER, E. *The disposition of the subject*: reading Adorno's dialectic of technology. Evanston: Northwestern University Press, 1998.

LANIER, J. *Gadget: você não é um aplicativo*. São Paulo: Saraiva, 2010a.

_____. The Hazards of nerd supremacy: the case of wikiLeaks. *The Atlantic*, 2010b. Available at: http://www.theatlantic.com/technology/archive/2010/12/the-hazards-of-nerd-supremacy-the-case-of-wikileaks/68217/. Accessed on: 20 September 2014.

LATOUR, B. *We Have Never Been Modern*. Cambridge: Harvard University Press, 1993

_____. *Jamais fomos modernos: ensaio de antropologia simétrica*. Rio de Janeiro: Editora 34, 1994a.

_____. On technical mediation. Philosophy, sociology, genealogy. *Common Knowledge*, fall, v. 3, n. 2, 1994b. Available at: http://www.bruno-latour.fr/sites/default/files/54-TECHNIQUES-GB.pdf. Accessed on: 22 August 2009.

_____. *Enquête sur les modes d'existence*: une anthropologie des modernes. Paris: La Découverte, 2012.

_____. *An Inquiry into Modes of Existence. An Anthropology of the Moderns*. Cambridge: Harvard University Press, 2013.

LATOUR, B.; VENN, C. Morality and technology: the end of the means. *Theory, Culture & Society*. London, v. 19; n. 247, 2002. Available at: <http://www.bruno-latour.fr/sites/default/files/downloads/80-MORAL-TECHNOLOGY-GB.pdf>. Accessed on: 12 March 2006.

LAW, J. Notes on the theory of the actor-network: ordering, strategy and heterogeneity. *Systems Practice*, v. 5, n. 4, p. 379-393, 1992. Available at: <http://heterogeneities.net/publications/Law1992NotesOnTheTheoryOfTheActorNetwork.pdf>. Accessed on: 7 October 2010.

LEMOS, A. *Cibercultura*: tecnologia e vida social na cultura contemporânea. Porto Alegre: Sulina, 2002.

_____ . *A comunicação das coisas*: teoria ator-rede e cibercultura. São Paulo: Annablume, 2013.

LEROI-GOURHAN, A. *Le geste et la parole*. Paris: Albin Michel, 1964.

_____. *L'evolution des techniques. I*: homme et la matière et II, milieu et technique. Paris: Albin Michel, 1971.

LÉVY. P. *L'Intelligence collective*: pour une anthropologie du cyberspace. Paris: La Découverte, 1994.

_____. *Cyberculture*. Paris: Odile Jacob, 1997.

MARCUSE, H. *L'homme unidimensionnel*. Paris: Editions du Minuit, 1968.

MOROZOV, E. *Net delusion:* the dark side of internet freedom. Philadelphia: Perseus Books, 2011.

_____. *To save everything, click here. The folly of technological solutionism*. Philadelphia: Perseus Books, 2013.

MUMFORD, L. *Technics and civilization*. London: Routledge, 1934.

PLATON. *Le Politique, philèbe, timée, critias*. Paris: Gallimard, 1985.

SENNETT, R. *The Corrosion of Character, The Personal Consequences Of Work In the New Capitalism*. New York: Norton, 1998.

SERRES, M. *Hermes:* literature, science, philosophy. Baltimore: John Hopkins University Press, 1982.

_____. *Atlas*. Paris: Juilliard, 1994.

_____. *Diálogo sobre a ciência, a cultura e o tempo*. Lisbon: Instituto Piaget, 1996.

SIMONDON, G. *Le mode d'existence des objets techniques*. Paris: Aubier, 1958.

SPENGLER, O. *L'homme et la Technique*. Paris: Gallimard, 1958.

STIEGLER, B. *La technique et le temps. 1. La faute d'Epiméthée*. Paris: Galilée, 1994.

VIRILIO, P. *Esthétique de la disparition*. Paris: Galilée, 1989.

_____. *Cybermonde: la politique du pire. Entretien avec Philippe Petit*. Paris: Les éditions Textuel, 1996.

WEBER, M. *The protestant ethic and the spirit of capitalism*. New York: Charles Scribner's Sons, 1950.

_____. *Economia e sociedade*. Brasília: Universidade de Brasília, 2000.

WILLIAMS, R. *Television: Technology and Cultural Form*. London: Routledge, 1974.

This text was received at 20 July 2014 and accepted at 26 September 2014.