

---

# Elements of the General Configuration and Adaptive Landscape of Collective Intelligences

---

The conditions in which intelligence is applied evolve. All encompassing narratives and anthropological accounts are on the rise, and their discourse envisions a very specific future. Sometimes, they relatively boldly predict that humanity will soon overcome the limits of physiology, medical practice, intelligence or creativity. Sometimes, they find allies in key sectors of scientific or technological research as well as in large sections of the most powerful politico-economical agencies and legitimize the implementation of actual apparatuses that aim to redefine the essence of knowledge and existence to set up new ways of collectively inhabiting the world. This chapter explains why we try to relate these transformations and why we stress the lines of tension they bring about.

## **1.1. The intertwined narratives of tangible utopias and brilliant futures**

Relating these transformations is indeed nowadays unavoidably necessary because of the very transformations globally affecting the ecologies that constitute our associated milieus and of which we are both the expression and the expressed. This renewed effort to address the issue of the collective intelligences is produced in specific conditions that are worth reminding, if not exhaustively, at least through some of its moments and main

characteristics. We will stick to recent history, because we see the decades between the two world wars and the few years that immediately followed WW2 as specifically rich periods of transformations of modes of production and circulation of knowledge, as well as moments of change in the means of semiotic management of societies, organizations and companies.

This period was followed, at the end of the 1950s, by the first massive effects of the process of digitization of the sign, itself the forerunner of what was about to happen, a phenomenon we could call the great disruption. The disruption was caused by this very potent new system of digital, networked writing, whose virtual productions and constant updates increasingly influence and encompass our lives and experiences.

During the 1920s and 1930s, several innovative research projects were carried out, especially in the documentation domain. They epitomized the growing awareness that fundamental issues were becoming prominent concerning document and information management, in societies whose modes of organizing was becoming increasingly complex. These works remind us of the necessity to reflect on the environments of intelligence and on the environments of memory under the constraining weight of complexity and on the constant challenge of always renewed forms of collectives that become increasingly heterogeneous. Vannevar Bush, on his part, developed an interest for the new apparatuses of intelligent access to documents (Memex<sup>1</sup>), showing in his research that accessing issues were somewhat overridden by cognitive navigation practice. Of course, accessing documents involves collecting and classifying them, but only in order to better sort, navigate and associate them. In a nutshell, in order to better exploit and create in an ever-growing indeterminate mass of knowledge and documents whose differentiation keeps increasing.

Many research works were published across the world around this time, that all pushed in the same direction. The Second World War and the fast rise of the American War Machine, with in particular the Manhattan Project Vannevar Bush was in charge of, strikingly exposed the collective dimensions of (applied and fundamental) research as well as the coexistence of heterogeneous processes and evermore sophisticated mediations. This increase in complexity in turn proved to be urgently in need of

---

<sup>1</sup> See <https://en.wikipedia.org/wiki/Memex>.

collective organization and new intellectual technologies in order to augment the cognitive abilities of the human mind. Vannevar Bush himself expressed this call [BUS 45] in his famous 1945 paper “As we may think”<sup>2</sup>, an essay in which he brings to light a number of transformations that affect the modes of production of knowledge. The effects and the posterity of this essay are well known.

To keep a long story short, during the end of the 1950s and the beginning of the 1960s, Carl Robnett Licklider<sup>3</sup> [LIC 58], initially working as a psychoacoustics specialist, promptly imagined the possibility of connecting several computers together with user-friendly interfaces. Licklider therefore played a significant role in the design, financing and management of the research that led to the elaboration of personal computers and the Internet. In *Man-Computer Symbiosis*, he wrote: “Man-computer symbiosis is an expected development in cooperative interaction between men and electronic computers. It will involve very close coupling between the human and the electronic members of the partnership. The main aims are (1) to let computers facilitate formulative thinking as they now facilitate the solution of formulated problems, and (2) to enable men and computers to cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs. In the anticipated symbiotic partnership, men will set the goals, formulate the hypotheses, determine the criteria and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking. Preliminary analyses indicate that the symbiotic partnership will perform intellectual operations much more effectively than man alone can perform. Prerequisites for the achievement of the effective, cooperative association include developments in computer time sharing, memory components, memory organization, programming languages, and in input and output equipment”<sup>4</sup>. Douglas

---

2 Vannevar Bush, As we may think, 1945. <http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/>

3 [https://en.wikipedia.org/wiki/J.\\_C.\\_R.\\_Licklider](https://en.wikipedia.org/wiki/J._C._R._Licklider).

4 Carl Robnett Licklider, Ire Transactions on Human Factor in Electronic Man-Computer Symbiosis.

Engelbart<sup>5</sup> also inscribed his work in the perspective of collective and augmented intelligence. His invention of the mouse and more generally his work on the computer were nested in the reflection on the collective dimensions of intellectual activities, within the framework of the emerging systems of digital hypertext.

Nelson<sup>6</sup> [NEL 65] invented digital hypertext (20th National Conference of the Association of Computer Machinery). He developed, with the Xanadu project, a system that aimed at enabling each individual to store information and make it accessible to all. “The aim of Xanadu was to build a universal system for hypertext publishing: in other words, a virtual library that could host infinite numbers of documents, in which we could wander freely via hypertext links. The authors would be automatically remunerated by a ‘royalty micropayment mechanism’”<sup>7</sup>.

We thus see that the whole process of work began to transform as soon as the Second World War was over, as well as all the modes of production of knowledge, all the organizing types and methods. Far be it from us to immodestly attempt to draw in this book a general history of the concept and notion of collective intelligence. We furthermore would not attempt such a history because we inscribe our reflection in the line of those who think that intelligence “is always-already collective and machined” and that its history is always fundamentally bound to the history of the environments and to the ecologies of the brain-body-(writing-mediation)-world couplings. To keep a long story short, let us only state that we inscribe our work in the continuation of that of Leroi-Gourhan [LER 64], whose research and reflection have been, in recent years, furthered in the powerful works of Stiegler [STI 94] as well as in the ideas

---

5 Douglas Engelbart created the Augmentation Research Center in the Stanford Research Institute, as well as the famous on-line system. [https://en.wikipedia.org/wiki/Douglas\\_Engelbart](https://en.wikipedia.org/wiki/Douglas_Engelbart).

6 “Let me introduce the word ‘hypertext’ to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper”.

7 [https://en.wikipedia.org/wiki/Project\\_Xanadu](https://en.wikipedia.org/wiki/Project_Xanadu), <http://www.xanadu.com.au/ted/>, <http://hypermedia.univ-paris8.fr/jean/fiction/Nelson/Nelson.html>.

expressed by Goody [GOO 77], Lévy [LEV 93], Herrend Schmidt [HER 07] and Latour [LAT 84].

Further back in time, Condorcet during the 18th Century and Durkheim in the 19th Century had already developed ideas about the concept of collective intelligence. Fleck [FLE 05], on his part, insisted during the first half of the 20th Century on the essentially *collective* characteristic of scientific research and proposed, in order to elaborate on this concept, notions such as thought collectives (or thought styles). More recently, Lévy in his 1994 book entitled “L’Intelligence collective” (“The collective Intelligence”) remarked that in the new digital conditions of networked hypertext memories, “collective intelligence (appears as) the project of a varied intelligence, distributed all over, always building synergies and being valued in real time”.

## 1.2. Intelligence is “always already collective and machined”

There is a long history of collective assemblages of intelligence. In only a few millennia, humanity fostered the vast Nile water resource management system, the cities of ancient Greece, Rome and its empire, collective intelligences of the Arab world, the large network of copyist monks, the rise of merchant capitalism and the invention of the printing press, etc. This long tradition of collective intelligences is constitutive of our history.

Assemblages were complex from the very first times. In Sumer, for example, they combined the invention of writing systems, currencies and the State, all these intertwined with a growing urbanization that, although initially relatively slow, was irresistible.

Nowadays, the milieus of intelligence are heterogeneous and the types of writings that constitute them are legions. The couplings “cortex-mediation-world” are intricately woven together. The alliances that unite texts, images and sounds were initially only slowly varying, but have very recently begun to change rapidly. Semiotics and the diverse non-exclusively linguistic writings have very early played a major part and, today more than ever, the empire of artifacts relentlessly brings new differentiations and intensifications of analogical interplays.

Later in this book we will detail how, nowadays, the complication of the world alters the conditions of exercise of intelligence, the conditions of creativity and the cognitive becomings that affect the imitative and analogical regimes, the regimes of “meme”<sup>8</sup> propagation and translation and, once more, the regimes of memory.

As Stiegler writes in his comments about the current vertiginous deepening of non-exclusively linguistic writings, “digital printing allows to 3D print objects that renew, in depth, the question of the artifact, a question that has been constitutive of the epiphylogenetic tertiary retention since the beginning of hominization. As a printed object, the most mundane epiphylogenetic tertiary retention becomes altogether hypermnesic, transitional and industrial, all the more because RFID chips as well as other tags embedded in objects. The so-called “communicating” objects, endowed with Internet modules (whose generalization the IPV6 protocol would enable) are constitutive of the Internet of Things (IoT) in a hyperreticulation stage in which not only its inhabitants but the whole world itself is double. It becomes the subject of an interpretation grammar throughout, as realized by, for example, by smart cities. For one thing, the digital tertiary retention has forever upset the functional and oppositional divide between production and consumption. But more importantly, the offset of the function of materialization of industrial design toward the tridimensional printers as robotic terminals seems to complete the industrial metamorphosis: it irreversibly condemns the centralist reticulation that spread through the United States and then Europe via the networks of roads, motorways and audiovisual Hertzian broadcasting”.

In this perspective, we seem to be advancing toward complex “cognitive onto-ethologies”, according to the scales considered. This movement involves the possibility of combinatorics and appropriate semiotic grammars that should enable wider navigations than in the past. This point will be developed further in what follows. One finds so many phrases that invoke

---

8 Memetics: introduced by Richard Dawkins in 1976 by his book *The Selfish Gene*.

Also see: Francis Heylighen Proc. 15th Int. Congress on Cybernetics, Namur, 1999, What makes a meme successful? Selection criteria for cultural evolution,

Liane Gabora, A DAY IN THE LIFE OF A MEME 1996,

Susan Blackmore, *The Meme Machine*, Oxford University Press, 2000.

this trend that their repetition sometimes induces a sense of running gag: Smart Cities, Smart Agriculture, Smart Grids, Smart Factories, Smart Buildings, Smart Interfaces, Smart Algorithms, Smart Medicine, etc. The “associated milieu”<sup>9</sup> to which our cerebralities are bound keeps extending itself. What is called the IoT is central to this extension. From the IoT to the hybrid becomings of the Living, a hypernetwork of  $n$  dimensions is being deployed, a kind of network shaped by the multiplicity of connections and interfaces that come with or between artifacts, actants (be they organic, non-organic, algorithmic) and writings. A network that relies on operating concepts (linked data, metadata, ontologies, folksonomies)<sup>10</sup>, a network that connects billions of human beings as well as billions of things and documents in “clusters” of infinitely varying sizes that can legitimately and concretely be connected in a plastic and open way. This is an emerging anthropological stratum embroidered of an additional synaptic world that seeps in everywhere, weaving into the texture of the world, weaving against it, tightly adhering to the global fabric. This ever-expanding weaving of links and data are therefore complicated by the interweaving of being and things and beings and objects.

These new textures, as we briefly mentioned, are deeply involved in the continuous urbanization movement. More generally, they are at the heart of the transformations that redefine our associated milieus, the ways we inhabit them, the ways we travel across them, we think them, we live them, all the way to the deepest roots of our ways of life according to new or soon-to-be physiological–biological–cerebral conditions. These textures are therefore deeply affected.

---

9 G. Simondon defines the technical individual endowed with an “*associated milieu*” through the functioning of the machine that contributes to the production of his milieu, thus making his functioning possible.

Ars Industrialis (<http://arsindustrialis.org/>) borrows from G. Simondon the concept of “associated milieu” to analyze the collective individuation that constitutes any human society, in a way that binds the history of human individuation to the history of technical individuation. A techno-symbolic milieu is associated with you if it is the medium and vector of your individuation, which is itself only possible because this milieu associates individuals. On the contrary, a milieu is dissociated if it does not help your individuation, if you do not contribute to your milieu.

10 <http://www.w3.org/Metadata/Activity.html>, <https://www.w3.org/standards/semanticweb/ data>.

The movement of artificialization, a concrete expression of the interweaving of texture, is unprecedented and the convergence of NBIC<sup>11</sup> is very powerful. We must live through this evolution with renewed creativity in order to ensure a new stability of our lives in such uncertain ecologies. At the end of the day, it is the very survival of our species that is at stake.

The works and concerns of current and future religions, although we may have no knowledge of them yet, are also constrained by this transformation and by new types of productivity<sup>12</sup>. Among the narratives to come, and although it might be difficult to precisely perceive its borders, part of what we usually agree to call “speculative fiction” seems relevant in exploring the forces and hybrid forms in which the most archaic is mixed with the most futuristic, and narratives of immanence are intertwined with narratives of the great outside.

The emergence of such global assemblages of collective intelligences and the milieu for new forms of reflexivity to develop is central to these processes and the pluralism of writings, semiotics and hitherto unseen narratives, which are more than ever situated as a hub in the powers of algorithmic becomings.

The scales at which cognitive ecologies and the socius do transform are numerous and intertwined. The “problematic” need for new black boxes is pressing. We need to be able to inhabit this, especially because it does not go

---

11 NBIC: Nanotechnology, Biotechnology, Information technology and Cognitive science (NBIC) refers to a multidisciplinary scientific field that combines the domains of nanotechnologies (N), biotechnologies (B), information technologies and artificial intelligence (I) and cognitive sciences (C).

12 For example, see “LAUDATO SI”, the encyclical Pope Francis about the *care for Our Common Home* “We are not God. The earth was here before us and it has been given to us. This allows us to respond to the charge that Judaeo-Christian thinking, on the basis of the Genesis account which grants man “dominion” over the earth (cf. *Gen* 1:28), has encouraged the unbridled exploitation of nature by painting him as domineering and destructive by nature. This is not a correct interpretation of the Bible as understood by the Church.” “The biblical texts are to be read in their context, with an appropriate hermeneutic, recognizing that they tell us to “till and keep” the garden of the world (cf. *Gen* 2:15). “Tilling” refers to cultivating, ploughing or working, while “keeping” means caring, protecting, overseeing and preserving. This implies a relationship of mutual responsibility between human beings and nature”.

without challenging the conditions of collective living. The big data movement, coupled in an essential manner to the IoT<sup>13</sup>, is also linked to the sometimes worrisome will to permanently control strategic and political dimensions. It is tightly related to all that sets new conditions for the governance of populations. It strongly echoes the becoming of performative societies that is characterized, at least partly, by the triumph of means and procedures, a “constructual” perspective that invariably raises major anthropological issues. Its complex marriage with the trans- and posthumanist trends therefore needs to be reflected upon. We will come back to this later on.

The IoT also carries political issues that apply to, for example, the fields of hypercontrol and cyber criminality. It deeply alters how individuals, companies and institutions relate, which in turn influences all the domains of co-construction of knowledge, the fields of companies and administration management, including educating technologies. It also affects the modes of production of culture and health. From a sort of “HyperUrban” perspective, the IoT is altering the vast system of internal relations that constitutes our world. This transformation questions forms, arts and new subjectivities and places these issues in a key position, influencing even the still-in-limbo digital immersive becomings.

The IoT is central to all the modern technological developments whereby any object, any living being, any plant or mineral (with its associated data) can instantly be related with any other, through unprecedented semiotic elaborations and through the proliferation of interfaces and their software applications (smartphones, tablet computers, captures, CCTV cameras, etc.). Meanwhile, the consumerist vertigo finds therein new raw material to explore and exploit.

### **1.3. Collective intelligences in the weaving of data**

Collective intelligences carve their essence under the aura of a proliferating new species, the “Data”. Simultaneously, they are immersed in the intensification of both inherited political economies and the emergence

---

13 [https://en.wikipedia.org/wiki/Internet\\_of\\_things](https://en.wikipedia.org/wiki/Internet_of_things).

of modes of contribution of various level of novelty<sup>14</sup>. In allying a-signifying semiotics, digital technologies, data and the market, the axiomatic immanence of capitalism has gained an extremely powerful new source of energy. According to Joxe [JOX 12], the global system is now in crisis and, in Guattari's words, "integrated, computerized global capitalism tries to dominate everything through speculation, violence and willful misrepresentations – knowingly lying about the essence of agreements. Its aim therefore is to damage any other type of sovereignty, autonomy or economy. To keep calling it empire is a way of saying that this kind of global power is like the empires of the past, in the same time financial and war based.

Nevertheless, "capitalism [which represents] a paroxystic form of integration of various types of mechanism (not only technological or economy writing machines, but also conceptual machines, religious machines, esthetical machines, perceptual machines, desiring machines)" aims at a "semiotically deterritorialized power". Its semiotic mode – the mode of capital – would thus simultaneously constitute a kind of collective computer of the socius and production, and the spearhead of appropriate innovations (to respond to its internal pulsions). In that case its raw, primary material, staple food, would no longer simply be human or machine work. It would involve all the means of semiotic control related to instrumentalization, insertion in the socius, reproduction, the circulation of the many aspects of this machine integration process. What capital capitalizes on is semiotic power. Not any kind of power, however, or there would be no point in contrasting it with the anterior forms of exploitation. It is a semiotically deterritorialized power. Capitalism endows some social groups with the capacity to selectively control the socius and production through a collective semiotizing system. It is a very specific form of power in so far as it focuses on controlling only the dimensions that contribute to maintaining its processing essence. Capitalism does not try to exert a despotic power on every single thing happening in society. On the contrary, to manage to leave spaces of relative freedom and creativity is essential to its

---

14 On the economy of contribution, or "commons", see *Arsindustrialis* and the work of Michel Bauwens as well as Elinor Ostrom works. On Jeremy Rifkins: <http://www.grico.fr/articles/lecture-de-the-zero-marginal-cost-society-the-internet-of-things-the-collaborative-commons-and-the-eclipse-of-capitalism-de-jeremy-rifkin-avril-2014/>.

survival<sup>15</sup> [GUA 83]. Hence, the central importance of the a-signifying semiotics brought about by digital technologies. Later on, we will elaborate on this.

The context of value creation is situated in the advent of the Internet of objects of hybrids – we could call it the Internet of “everything”; in other words, in a period when a large relational system is created, an extended system connecting individuals, processes, data and things. In this context, value creation will be based on the powers of semiotic creation. More specifically, it will rely on the exploitation of data.

This system is based on producing interfaces and sensors, on the capacity of networked digital writings to leave increasingly numerous and varied marks that bear semantic, behavioral, geolocalized, energy-related value.

It can also be seen as a heteroorganizing system that has an ever-increasing number of recursive loops distributed over its whole extent, involving increasing quantities of applications, software and algorithms: the structural coupling of a “data-centric” society and algorithmic matter.

All the collectives and their associated institutions are affected. Today, more than half of the population has access to the Internet, but by 2025, two-thirds of humanity will be connected. Connected devices are expected to undergo a similar growth. Today, 14 billion of them are connected, and this number is expected to rise to 50 billion by 2030. As for applications, the embodiment of the vast spectrum of desires, their number is currently exponentially growing.

The unstoppable rise of algorithms and the quantitative–qualitative explosion of data production are both relatively brutal. This upsurge is also materialized in the doxic plane of immanence. Public debates of various complexities routinely discuss the impacts the algorithms of the dominant agents of software industry have on research, science, arts, marketing as well as on political governance in so far as it seeks to manage population, territories, wars, etc.

---

15 F. Guattari and E. Alliez, on the role of a-signifying semiotics in capitalism, in *Le Capital en fin de Compte*, Change, 1983.

The various ways of automating data production processes and their exploitation infuse into the imagination that governs political action. At the same time, they enable the design of apparatuses that striate the powerful human–non-human collectives. We all know how, nowadays, the forms of power are tied up to “statistical rationality”. Our modes of being are mediated by value production, the world economy, the collectives, the subjectivation processes, etc. We are well aware of how much their becoming real is mediated by the mathematization of relations, regimes of interfaces and multiplication of applications that come with them.

In the analysis of Galloway [GAL 10], “As one of the leading industrial giants, Google uses the pure math of graph theory for monetary valorization”. But he also writes: “... a grand dividing line between two schools of thought: Those who consider today that symbolic logic, geometry, linear analysis, set theory, algorithms, information processing, etc., are outside of ontic history, that is, outside the history of instances, appearance, and existence, and those who recognize that such mathematization exists today at the very heart of the mode of production, and therefore not only drives history, but in some basic way is history itself. It is not simple that “we must always historicize”; it is that there is a particular thing about *today’s* mode of production that obligates us to historicize mathematics [GAL 10]. In this context, data mining is presented as an imperial narrative, the master storytelling of performative societies. A narrative that is bound to the holy and obsessive trinity of “performance–prediction–preemption”, which characterizes intelligence societies and the marketing hegemony.

In 1990, Gilles Deleuze already wrote in a famous text: “In the societies of control, on the other, what is important is not a signature or a number, but a code: the code is a *password*, while on the other hand the disciplinary societies are regulated by *watchwords* (as much from the point of view of integration as from that of resistance). The numerical language of control is made of codes that mark access to information, or reject it. We no longer find ourselves dealing with the mass/individual pair. Individuals have become ‘dividuals’ and masses, samples, data, markets or ‘*banks*’” [DEL 90a]. This imperial narrative paradigm (as well as the digital data and algorithmic matter it produces while in the same time feeding on it) is being materialized in very various forms. It roams through various (relatively autonomous) milieus, not only challenging but also reviving their ability to

vary, to transform. Indeed, the complexity of semiotics, narratives and languages, the wealth of cognitive ecologies and the involved risks of chaos bring to the foreground the issue of reflectivity and simplicity in an unprecedented pressing way.

One could think the issues raised by interfaces (and the proliferation of applications that come with them) as the foundation of a kind of “noo-nomadology” that pushes to the foreground the diversity of perspectives and the way they evolve. It also is a noo-nomadology of interstices and a renewal of the notion of “boundary zones”, which is based on dispersion–disseminating as well as on the miniaturization of interfaces of translation, connection, exploitation, etc. Productive boundaries are ones that articulate the passageways and translations enabling the analogical freedom of interstices. Data, as elements of various sizes and complexity, are therefore both the means and the ends of the relentless activity of cerebralities and hybrid collective intelligences, that is, under the current conditions [NOY 15].

#### **1.4. Semiotics and statistics**

We now understand the strength of the ties that bind the “electronic revolution”, the computerized management of “markets” and the algorithmic policies that come with them. We perceive the magnitude of the tensions that develop between robotization<sup>16</sup> processes, monopolistic corporate becomings, and inequalities [KRU 12, LYN 10]. These tensions apply at the heart of the new industrial revolution that Anderson promises, or that Rifkins represents in his very political but aseptic prospective vision [RIF 12]. That industrial revolution would be based on the alliance of “3D printers, laser cutters, open source soft and hardware” [AND 12] and on the advent of globalized flexibility.

---

16 Including the robotization of war: A. Joxe, for example, remarks “how much this evolution is a new form of the bio-technical becoming of the military, a process aiming to abstract itself from the presence of the ground, to reduce the costs and maximize the benefits of confronting anthropological asymmetric patterns and especially the differences in the urge to death, whether it be its conjuration or its celebration. Although this falls beyond the scope of this book, the issue of global polemological becomings, obstinately implicit as the promised pacifying processes (both a sort of shadow theater and a promise of violence conjuration modes) carry worrisome oddities, cannot be overlooked” [JOX 12].

Several financial and economy mechanisms are also perceived to be disrupting innovation processes much more than the current robotization phenomenon does. Simultaneously, we cannot but see that the digitization of money – with its humongous trail of data – unceasingly fills the abyss of immanence, there introducing, in Schmitt’s words, “a distortion, a convulsion, an explosion. In short a movement of extreme violence” [DEL 72]. We know the extent and the strength to which the forms power and “statistical rationality” are tied together, as statistics and sociology perform an extraordinary fantasist function.

Mathematics, data mining as well as machine (deep) learning<sup>17</sup> [LEC 15] are immanent in the process of production. They are employed to extract value and make novel hermeneutics about the fields of ontology production and combining. They also aim to perform/predict phenomena that ensure specific strategical positions, and therefore involve the production of subjectivities through regimes of desire. In the near future, these learning algorithms will be coupled with our brains, which will certainly open novel smooth spaces, fertile grounds to invent new issues, architectures and configuration with  $n$  dimensions of intelligibility.

The everlasting question of writing is asked anew by its constant reelaboration, digitization of the sign and unstoppable rise of a-signifying semiotics [GUA 89], as we pointed out earlier. More precisely,

---

17 LeCun, Facebook AI Research, Center for Data Science, NYU, Courant Institute of Mathematical Sciences, NYU. L’apprentissage Profond: Une Révolution en Intelligence Artificielle Leçon Inaugurale au Collège de France Chaire Annuelle 2015–2016 Informatique et Sciences Numériques, <http://www.college-de-france.fr/site/yann-lecun/Recherches-sur-l-intelligence-artificielle.htm>.

David Balduzzi Semantics, Representations and Grammars for Deep Learning, ArXiv, 2015 “Let us recall how representation learning is commonly understood. Bengio *et al.* describe representation learning as “learning transformations of the data that make it easier to extract useful information when building classifiers or other predictors”. More specifically, “a deep learning algorithm is a particular kind of representation learning procedure that discovers multiple levels of representation, with higher level features representing more abstract aspects of the data”. Finally, LeCun *et al.* state that multiple levels of representations are obtained “by composing simple but nonlinear modules that each transform the representation at one level (starting with the raw input) into a representation at a higher, slightly more abstract level. With the composition of enough such transformations, very complex functions can be learned. For classification tasks, higher layers of representation amplify aspects of the input that are important for discrimination and suppress irrelevant variations”.

a-signifying semiotics interact with signifying ones in a way that opens new virtuals (that have undefined actualizations) and overflows toward the supremacy of algorithmics and software.

On the plane of the political economy of knowledge, one could say that, nowadays, economy is defined by the algorithm, the software.

From a social–cognitive perspective, we can see in this profound movement flows and dances of data, which find their rhythms and modes of infiltration or propagation “in” the application-equipped interfaces that feed the many recursive loops that themselves open to action and thinking. Obviously, the political does not come out unchanged.

The deployment of numerous and vast relational systems and of their specific cartographic methods indeed echoes the relatively pronounced evolution of “the political” toward a generalized experiment in which the means and performative procedures problematically prevail over the ends, be they political or ethical. Great ecological (social, mental, environmental) crises stem from the transformation of anthropotechnical, economical, cognitive, organizational, military, etc., mechanisms. They arise mostly under the conditions of the digital perspective and its associated technical and scientific becomings. Such crises in turn intensify these transformative tendencies and processes. There are bio-political and psycho-political becomings, then, that develop into new, previously unseen shapes.

One thus understands why so much effort is made to develop a semiopolitical thought about interfaces [CAR 13, NOY 13, LAZ 06]. This research attempts at signaling the new relations of production as well as the new forms of subservience (in the machinic sense) and subjugation. It also aims at detailing their hybridizing and implementation both by and central to various apparatuses. These subjugating apparatuses are informational and digitally communicational. They are apparatuses to create, store and exploit data, but they also involve existential patterns, temporalities and the breaches pierced through the suffocating texture of intelligence societies.

This engaging dance is endless and feeds on the immense flows and stocks of traces we leave behind on the Internet (Big Data). Online, on the N-dimensional labyrinth of the Internet, every single action and behavior, from the most furtive click to the most elaborate trajectories, betrays our personal cartographies and becomes a readable deposit. These cartographies

tell the interwoven fabric of our visions, and rhythms and of what we focus on, our preferences for such expression material, our compulsive or hesitant moves, our tremors and consumerist addictions, and also our silences and our “by default” choices of our disappearances.

The dance induces us to build that architecture of uncertain stability, which we constitute with our associations, and/or with all that connects within us, thus creating graphs that are sometimes crude and sometimes subtle, and that display myriads of different patterns. They embody the scientific dream of Tarde [TAR 95].

This movement complicates our skins and our geologies, involving our ways of being with the interactions of urges and passions of violence producing mechanisms. It complexifies our ways of waging wars (from the most archaic to the most futuristic ones). In other words, it alters the core of our “desiring machines”.

The current explosion of the Internet therefore leads to a novel dialogue between population of humans and non-humans. Data are produced and they travel through applications, sensors and databanks. The applications and sensors are in a way the cross stitches of various complexities that proliferate and constitute the texture of the worldwide N-dimensional relational system. This texture is threaded on the basis of an ever-extending, increasingly intrusive ictology. A specter is haunting the new modalities of work, existence and governing – the specter of traceability and associated data. At all scales, from intranets to globalization processes, there are transformations happening, shifts from the nation-state to the market-states (in the framework of the attempt to establish, forcefully and rapidly, a global market), shifts from traditional forms of sovereignty to new digital traces and avenues, or to decentralized pattern territories (in which the privatization of the most regalian functions, including that of war machines goes unfettered). These shifts result in a software issue that is of major politico-strategic importance.

In our perspective, the “digital” allows for the emergence of a new way of “rematerializing the social matter by making interactions visible” (the translation of traces into data), in Bruno Latour’s words. Similarly, and within the same move, social physics develop that, as Pentland [PEN 14] writes, “mathematically describe the impact of connections between, on the one hand, information and the flow of ideas and, on the other hand, people’s

behavior”<sup>18</sup>. It is well known that Pentland considers that the Big Data, in conjunction with powerful algorithmic methods, should enable the development of “a causal theory of local structure”. This view has been criticized and argued against many a time, and one can show it is linked with some trends of transhumanism.

### **1.5. Data cities and human becomings: the new milieus of intelligence**

Hand in hand with the urbanization of the planet, the digitization of cities (smart cities), agricultural areas and, more generally, of soils, the atmosphere and marine environments generate massive amounts of digital data (their quantity doubles every year).

A significant critique of this trend can be found in Nicolas Carr’s article, in the MIT technology review [CAR 14d] “tapping into big data, researchers and planners are building mathematical models of personal and civic behavior. But the models may hide rather than reveal the deepest sources of social ills”), which points some important issues out. For example, he remarks that Pentland’s notion of “data-driven society” raises several issues. This strategic choice, in his opinion, favors the status quo. It reinforces established anthropological and political power relations and shuns any possibility of alternative by forcing changes and becomings to conform to some kinds of evolutionary political and strategic creodes that only let change-desiring agents craft computational optimizations within given, stable systems.

This is, by the way, one of the major dangers of “performative societies”, of a “constructal” understanding of societies that, once more, the transhumanist ideology fosters.

---

18 See also [PEN 14]: “I believe that the power of Big data is that it is information about people’s behavior instead of information about their beliefs. It’s about the behavior of customers, employees, and prospects for your new business. It’s not about the things you post on Facebook, and it’s not about your searches on Google, which is what most people think about, and it’s not data from internal company processes and RFIDs. This sort of Big data comes from things like location data off of your cell phone or credit card, it’s the little data breadcrumbs that you leave behind you as you move around in the world”.

New urban ecologies, from “smart cities” to security driven urban policies, are rapidly developing. They raise profound issues as they constitute the anthropological and political bedrocks on the basis of our societies, organizations, thought collectives and the subjectivation processes.

The intensification of this movement, the rise of hybrid territories and the extension of “becoming indoors” [SLO 13] at the very core of what is expressed, are particularly visible in cities like Dubai where (in Mike Davis’s words) [DAV 07] Albert Speer and Walt Disney are merged into odd lines of flight, which we ride between “the anarchy of choice and Disney-fication” (William Gibson). All this increasingly deepens the “milieus” of our lives, our living environments, and relies on the production and exploitation of data.

Smart cities are growing in other areas of the planet, too, as exemplified by the *Scientific American* when it lists various aspects of a smart city: reduction of its ecological impact and energy optimization; smart management of flows and transportation in the city; creation of services that renew the relations of inhabitants to their city and also transform the modes of social interaction; deployment of armies of sensors that feed database complexes essential to the optimal management of the public action: “truly smart cities will emerge as inhabitants and their many electronic devices are recruited as real time sensors of daily life. Networking the ubiquitous sensors and linking them to government databases can enhance a city’s inventiveness, efficiency and services”<sup>19</sup>. In there, data are the majority population.

Several notions, embody the way this urbanization process is infused and born by the digital fold. The notions presented below are the expression of interwoven and hybrid policies, actions and governances.

First of all, there is the notion of cybercities. It puts the emphasis on governance, on control of territories and milieus, relying especially on data capture and on the implementation of specific infrastructures. It also focuses on cybercriminality and involves traceability and identification, which can develop as far as military control of cities. Amongst others, Stephen Graham, in his paper “When Life Itself is War: On the Urbanization of

---

19 See *Scientific American*, September 2011, and especially “The Efficient City” by Mark Fischetti.

Military and Security Doctrine” particularly clearly links digital urban life to militarized control strategies.

The notion of “digital cities” rather emphasizes the modes of representation of cities in their relatively immersive nature (in the realm of simulated cities, one finds avatars, the cities of Second Life, Sim City, 3D). It highlights the connecting interfaces of urban environments and hybrid territories that are, if not massively, at least partly, digital. The third notion, that of “intelligent cities”, focuses on the principles of intelligibility of cities and on the (relatively) collective conditions of intelligence production under the dominion or networks, infrastructures, protocols and citizen assemblages. In other words, all that nurtures the distributed quality of intelligences and cognition, thus complicating the task of governing cities (whether in a polycentric manner or not). It includes processes such as crowdsourcing, bottom-up apparatuses of deliberation and collaboration, etc.

The last, most fashionable and probably most important notion is that of “smart cities”. Its various incarnations aim at “optimally” and ecologically managing cities, energy flows, populations, information, mobility, etc. Even in this seemingly inoffensive and energy transition-supported notion of “smart cities”, there is, because of the anthropotechnical and political control of our urban “associated milieus” it relies on, a problematic “constructal” purpose<sup>20</sup>. This is indeed in the field of urban management that the generalized digitization of everything is most advanced and extended, expressed by the digitization of grounds and buildings, energy flows, movements of population, etc. This is therefore the main locus of the political tension between big data, open data (OD) and algorithmics. This tension relentlessly comes out in our research as central and very

---

20 The aim of constructal theory is to find the ideal form of a system, that which provides an optimal yield. One easily understands how, applied to human societies, it naturally becomes an ideology of total control wherein creativity must be eradicated as it is a source of change, of alteration... See, for example, on constructal theory and its application to the engineering world, the works of André Bréjean, an engineering Professor that specializes in thermodynamics. (What does “optimal” mean, in that context or even in any context? What about an “optimal” that would evaluate our very existence, how we experience ourselves through our becomings? “Optimal” in Leibniz’s calculating God’s perspective? “Optimal” in the opinion of the engineers of the *Conservatoire National des Arts et Métiers*? “Optimal” according to the algo trading algorithms? Optimal according to the rules of the Three Great Books?)

problematic, whereas a constant ideological propaganda enforces a positive understanding of it on the population, enhancing its positive aspects with what often are mere slogans like “open cities, intelligent cities” or, in the best cases, express present utopias. In any case, this immense field of transformation is being experimented globally.

However, constructal theory keeps repeating and expecting that cities would not be truly intelligent before its inhabitants, their applications and interfaces are finally coupled and become tireless “real time” sensors of daily life activities. To achieve this goal, omnipresent, everywhere-distributed sensors must be connected into a network that feeds the databases of the governing apparatus, in order to improve the inventive qualities of cities and urban worlds, the efficiency of their services. The growing importance of environmentalist territorial policies bears with it the rise of the “open data power”<sup>21</sup>. The latter presents itself as the new horizon of city policies, playing a significant part in an almost infinite data production context and in the invention of the appropriate processing apparatuses that summon the open source, alternative energies, etc.

“The vast amount of data that is emerging is the starting point for making efficient infrastructure programmable so that people can optimize a city’s daily processes. Extracting information about real-time road conditions, for example, can reduce traffic and improve air quality. The potential for developing more of this kind of efficient infrastructure is vast and a good fraction can be unleashed through smart systems. It is thus no surprise that many large corporations, such as IBM, Cisco Systems, Siemens, Accenture, Ferroviaria and ABB, are setting their sights on the urban space” [RAT 11].

Now may be the time to think beyond the dream sold by smart cities, beyond the fantasies of optimized our ways of being in the world in terms of energy, climate, mobility, with respect to our expanding cerebralities, under a democratic plain would be “cleared” of any developing differentiation of the uneven potential becomings of relatively closed/open local networks that form more or less tree-like, a centered structures (such networks are based on negotiation protocols and translation modes that are more or less arbitrary); now may be the time to think beyond the inequalities that arise

---

21 <http://datasciencseries.com/blog/download-open-data-power-smart-cities>.

from this sleepless, self-legitimizing algorithmic regime. Now may be the time, lastly, for smart cities designers to leave room for urban and existential chaosmosis, the cracks in the digital walls, the freedom of DIY and the rise of underground worlds.

In a way, we think that smart cities will only be inhabitable when they leave room for what could be called an “anti-smart word”. Without such openings, they might spur forms or resistance involving the emergence of new pioneers of chaos.

Because, walking in the footsteps of Jean-François Lyotard, big data are an integral part of the “legitimation by power [...] the latter legitimizing itself like a system tuned to optimize its own performance. Indeed, this sort of control on context is precisely” what the alliance of algorithmic methods and big OD promises. One could say that the performativity of a policy increases proportionally with the quantity of information it has about its associated milieu. “Thus, the growth of power, and its self-legitimation, are now taking the route of data storage and accessibility, accessibility, and the operativity of information” of data [LYO 79]. All this leads to a kind of urban machine endowed with some stupid intelligence.

This evolution embarks with us, so to speak, on a galley journey, leaving captaincy up to a divinely digital hetero-organization. Once again, it may time for us to be more deeply concerned by that alliance. We should be more consistently questioning the roots of the association of the insomniac capture of digital, behavioral, socio-semantic and spatio-temporal traces with the desire of prediction taken as a categorical imperative, as well as with the scientific paradigm of Jim Gray and Chris Anderson who see it as the radiant future of thought... Unless it becomes a future of Yawning Heights [ZIN 76, ZIN 78].

Admittedly, although the coupling of the digitization of cities and the Internet of Things certainly generates a major transformation of the environments of intelligence, this transformation must be understood as the advent of a body of learning techniques and “forums”. Colin McFarlane advocates “a conception of learning based on three processes: translation, or the relational distributions through which learning is produced as a social-material epistemology of displacement and change; coordination, or

the construction of functional systems that enable learning as a means of linking different forms of knowledge, coping with complexity and facilitating adaptation; and dwelling, or the education of attention through which learning operates as a way of seeing and inhabiting the world". He then considers "this conception of learning in relation to tactical learning, i.e. the resources marginal groups use to cope with, negotiate and resist in the city..." [FAR 11].

One can also understand the current changes by considering the hybrid and rhizomatic processes [DEL 87] that shape urban networks. The city can be seen as the expression of a kind of topological conversion of brain worlds in which the intelligences of the city are situated in an  $n$ -dimensional territory, dominated by relentless folding of which they are both the expression and the expressed. Brain cities again coupled in the immense interplay of interfaces and their proliferation differentiation.

Far from the Big Data of control and from the pathological "constructal" push, there are forces that play with and evade the new regimes of desire, forces that crisscross the cities in cryptospheres, labyrinths of secrets, "semioglyphes". These forces are the heart of the motions and lines of flight of thought.

The approach that consists of thinking such flows and regimes in terms of states of various stabilities and ephemeral quality is called an "exology" by John Weissman (when applied to the city): "The exological is ecological insofar as the ecosphere is also a cryptosphere, a hall of mirrors and infinite labyrinth of secrets, light and darkness: and this duplicity, this infinite complexity, this fractality and fragmentarity is present in physical-ecological systems as well as economic, sociological, psychic, etc." [WEI 12].

These points are important because they replace a whole body of psychological energies, which are far from any equilibrium, at the heart of the becoming urban intelligence, thus contradicting the "smart" embodiments that trust the center stage.

### ***1.5.1. Open Data (OD): a heterogeneous movement, the contribution to novel forms of knowledge in question***

Let us mention here some factors that led to the elaboration of the OD movement. The fact that concerns pertaining to what is called the "open data

movement” rose to the forefront is one of the consequences of the exponential growth of the knowledge, information and data that are produced, exchanged and that circulate on digital networks. OD is one aspect of the struggle between the various productive forces that depend on knowledge and significance of semiotic control. Using Marxist terminology, OD is the manifestation of the emergence of new relations of production.

The history of “data” as the instantiation or embodiment of the fundamental relation between knowledge and power, a relation in which the evolution of the political is at stake, is nevertheless a long history. Let us signal a few of the most recent landmarks to keep in mind, such as the co-emergence, during the 21st Century, of the nation-state and statistical rationality. Desrosières [DES 10] published a major contribution on this subject.

Earlier in this book, we mentioned that the very question of digital data began becoming increasingly significant during the end of the 1950s and the beginning of the 1960s, when large databases began to be developed in order to store data of scientific, business, financial, etc., interest. Very rapidly, strategical data bases of scientific research publications were implemented, with scientific policies and scientific governance aims. The beginning of the 1960s was in fact the years when the United States began to equip itself with the first devices and methods to globally evaluate the production of scientists to monitor its internal dynamics and attempt to discern new routes for research. This policy quickly raised the main issues involved with the exploitation of large documentary collections. Presently, databases of companies and patents underwent the same evolution.

The means of semiotic control, derived from the digital sphere, thus became a pressing issue. Many methodologies of various sophistication were imagined to provide the necessarily means of knowledge extraction, and the reflection gained momentum to eventually produce the new fields of research called Scientometry and Infometry<sup>22</sup>. From this point on, the paradigm clearly shifted from “knowledge access” to “knowledge

---

22 See: Xavier Polanco Aux sources de la scientométrie, Dossier Solaris, No. 2, 1995; Michel Callon, Jean-Pierre Courtial, Hervé Penan, La scientométrie 1993; Paul Wouters “Aux origines de la scientométrie. La naissance du Science Citation Index”, Actes de la recherche en sciences sociales 4/2006 (no. 164) , pp. 11–22.  
[www.cairn.info/revue-actes-de-la-recherche-en-sciences-sociales-2006-4-page-11.htm](http://www.cairn.info/revue-actes-de-la-recherche-en-sciences-sociales-2006-4-page-11.htm).

production”. In the beginning of the 1990s, an “open” movement gained momentum in the fields of software creation, dissemination of programs and scientific publication. It constituted the tangible, experimental milieu in which political and organizational questions could be put back on the agenda because they were attached to the relatively agonistic variation of the modes of data and knowledge production, circulation, exploitation and consumption. Powered by the free software and open source movements and by the archive initiative, new models were able to challenge the excesses of a seemingly limitless development of property rights. They attempted and still strive to loosen the authoritative grip capitalist forms of intellectual property rights hold on the dynamics of collective intelligence, innovation and creation. On this account, the works of Lawrence Lessig, Richard Stallman, Steven Harnad and Paul Ginsparg are seminal<sup>23</sup>.

Advocating forms of free agreements to collective property, relying on the productivity of parallel work practices and on the adaptivity of bottom-up modes of governance, these movements play a central role in the positive transformation of creation processes. In an anthropological and political perspective, they contribute to transforming the culture of democratic deliberation into a culture of controversy and to inventing novel modes of governance that are polycentric and varied.

The conditions in which knowledge and information are produced, circulate and are exploited are not only affected but also intensely discussed. The economic and juridic models are constantly challenged by new agents, new demands, practices and uses (GNU for free software, creative commons and OD commons are significant actants of this field).

Lastly, there are rapidly growing emergent technologies that enable new “distributed” ways of making, collecting and redistributing data in information flows. These technologies are developed hand in hand with the miniaturization of interfaces and with the multiplication of ever-more elaborated software applications.

---

23 [http://fr.wikipedia.org/wiki/Lawrence\\_Lessig](http://fr.wikipedia.org/wiki/Lawrence_Lessig), <http://www.stallman.org/>, <http://www.openarchives.org/>, <http://archivesic.ccsd.cnrs.fr>, <http://arxiv.org/>.

The whole of this movement thus forces the centralized, “top-down” modes of governance to compete or coexist with a-centered, distributed and “bottom-up” models. However, since these models establish relatively co-determinating relations, new political fronts appear.

To understand the “open data” movement, we should focus on these short and long stories in order to ground the phenomenon in a tangible reality. Otherwise, we could let the OD movement remain an ethereal notion, suspended in a void that would make it appear as a radically new thing, disconnected from any associated milieu, from any “memories”. What this movement creates is not written on an empty, fresh white page. From its very beginning, it comes entangled in the web of all the social-political dimensions of knowledge – power relations. It is inseparable from the individual and/or collective social-cognitive asymmetries and from the asymmetries of appropriation of writing technologies and intellectual technologies in general. Of course, the irruption of digital memories and of new intellectual technologies enables the emergence of new utopias, whether they be tangible or not. Desires of transformations of the political economies of knowledge, desires and projects of transformations of the art of creating value or “values” arise from this irruption. But these trends are only the latest figures drawn on the historical background of anthropological heterogeneses in which cognitive forces, creative forces and political desires have always confronted themselves.

In many countries, the “open data” movement, together with the so-called “Open Government” movement, has gained momentum to the point of becoming, at the international level, a political gauge and a measure of the efficiency of administrations. “Public” data, that which pertains to States, regional authorities, administrations or other organisms whose data can be considered of “public interest”<sup>24</sup> have seen their first prescriptive policies formulated at the beginning of the 21st Century (although, in France, free access to administrative documentation enshrined us in the law since

---

24 In France, the Macron law demands that companies that provide public services of transportation publicize online, in a free and open format, all the details of their schedules (times and stations served). The Lemaire law, at the beginning of 2016 however nuanced this obligation for the SPICs and EPICs (SNCF (train service) and RATP (parisian subway)) whose activity are subject to commercial competition.

1978<sup>25</sup>). Open Government programs, embodied, for example, by the 2009 Obama administration, consider that OD is one of the three pillars of the approach (the two others being citizen partaking to political life and the implementation of methods to enrich the collaboration of local authorities). In these programs, the “transparency” motto is essentially linked to “open data” [LAS 10]. According to the Open Knowledge Foundation and the World Wide Web Foundation, governmental OD pertains to the following domains: election results, geography maps and Land Registry, postal codes, finances (budgets, spending and public procurements), legal texts, national statistics (demography, employment, economy, offenses), companies, public services of transportation, health, education and environment<sup>26</sup>. A city or a county must also provide information on cultural facilities, heritage, air quality, urban planning, etc., which further expands the domain of possibilities<sup>27</sup>. In other words, all the domains of public activity are subjected to the injunction to “free the data”, commanded to hop on the “data driven” train, on a global scale<sup>28</sup>.

Investments and returns on investments are expected to be huge. For example, in Europe in 2001, the commission announced that it adopted a strategy for OD. According to the communication, the “overall economic gains from opening up this resource could amount to €40 billion a year in the EU”<sup>29</sup>. Also in 2011, McKinsey, an American consulting firm, expected OD to generate several trillions of dollars worth of value creation, including the private sector. However, despite the plethora of slogans and communication elements, we should not forget the many barriers that hinder

---

25 Law no. 78-753 of the July 17, 1978 about the right to access administrative documents. Even the 15th article of the declaration of human rights (Déclaration des Droits de l’Homme et du Citoyen) states: “Members of society have the right to demand that any public agent accounts for his administration”.

26 <http://index.okfn.org/>, <http://www.opendatabarometer.org/report/analysis/implementation.html>.

27 Each country has a different legislative framework, therefore particular themes may be subject to legal obligation of openness or not.

28 See the 2013 and 2011 McKinsey reports on Open Data and Big data.

29 Communication from the Commission to the European Parliament the council, the European economic and social committee and the committee of the regions, Open data, An engine for innovation, growth and transparent governance.

See also: <https://ec.europa.eu/digital-single-market/en/open-data-portals>.

the data opening trend [CAR 14b]. Although several works highlight the potential impacts of OD on the transformation of public action, many others conversely detail the limits of this movement and even document its first disappointing achievements [GUR 11, KIT 14, MOR 14].

The way this movement unfolds is sometimes paradoxical, as it does so with the framework that challenges the role of States as centralized regulating bodies (Welfare State) in ways whose radicalism depends on, in broad terms, whether one considers the case of the United States or that of Europe. Interestingly, we see that in the United States, the OD movement is developing in parallel with a strong push to irrevocably impose the Market State.

The great significance of these issues become undeniable when we consider OD as a major political-economical question, a major strategical subject. Similarly, in France, for example, regions, counties and cities gradually provide increasing amounts of various public data to the general population, with various exploitation methods.

This opening process involves data coming from science, the legal system, socio-economy studies. It also involves addressing systems (such as geographical signaling systems that provide the locations of places and events), as well as data pertaining to climatology, geology, agriculture, arts, etc.

Such governmental initiatives<sup>30</sup> are numerous in the democratic countries and also emerge elsewhere. They strengthen the drive to experimenting and thinking about collective intelligences, how they operate and develop abilities to reflect on themselves. They encourage us to explore the capacity of collective intelligences to unfold models of production and diffusion of knowledge that are less centralized and increasingly a-centered (and even bottom-up). These complex issues are key, as they will end up determining the future becomings of open and fluid societies.

---

30 [http://fr.wikipedia.org/wiki/Open\\_Government\\_Initiative](http://fr.wikipedia.org/wiki/Open_Government_Initiative), [http://en.wikipedia.org/wiki/Open\\_source\\_governance](http://en.wikipedia.org/wiki/Open_source_governance), <http://www.whitehouse.gov/open>, Open Government Partnership: <http://www.opengovpartnership.org/>.

OD materializes the demand that territorial authority delegations and governments provide some public data to citizen in order for them to “for example reuse them in specific services or applications”. Data pertaining to fields of demography, economy, tourism, transportation, cultures, environment, etc., can therefore be published and made accessible (in various formats). All the domains that contribute to the description and management of territories are potentially involved.

The State and its various ministries, the institutions and public companies, the regions, cities, the public service concession holders, etc., all these agents are required to act in response to this movement and to the local, governmental or European Union demands of OD, while maintaining an appropriate and protective trade-off between what pertains to personal data and private life and what is a “common good”. The opening of digital records and public domain databases, the developing of new records about an increasing number of domains of the public sector is a movement that must negotiate with the production of novel types of memories and records in civil society because a line must be drawn between private and public (therefore open) data. The understanding of the issues that the OD movement raises is thus made more complex by this negotiation, while the official discourse celebrates transparency as a core virtue of democracy.

We believe that we urgently need to deconstruct this celebration of transparency. Furthermore, “real-time environmental data bases” are being developed in several places, on the basis of a distributed data collection methods involving disseminated sensors carried by parts of the publics and groups of citizens. For example, the ecological bikes of Copenhagen City perform such a distributed sensor scheme. These bases of a new type are linked to sustainable development, environmentalism and the new scientific methods of digital empiricism (Gerard Berry, Jim Gray), as well as to matters of security.

What is called “crowdsourcing” refers to a whole diversity of processes, which should be analyzed more deeply. Crowdsourcing is a method that aims at tapping into new sources and resources, into resources that are non-institutional, ad hoc, and that partake to the production of knowledge or sometimes to their management. These sources sometimes involve processes of data capture and collection that are relatively simple and passive (when

one acts as a “consenting” sensor), and sometimes involve more active processes of project definition, processing and exploitation that can in turn involve relatively creative innovation processes, linked at various levels to the local conditions and collective assemblages. How agents are involved also happens very diversely. From volunteering to remunerated work, the models of collaboration can take forms of various complexities. For example, a participant can consent to not only provide, via his mobile phone and during a given time period, the data about his whereabouts but also to qualify it [CAR 14b].

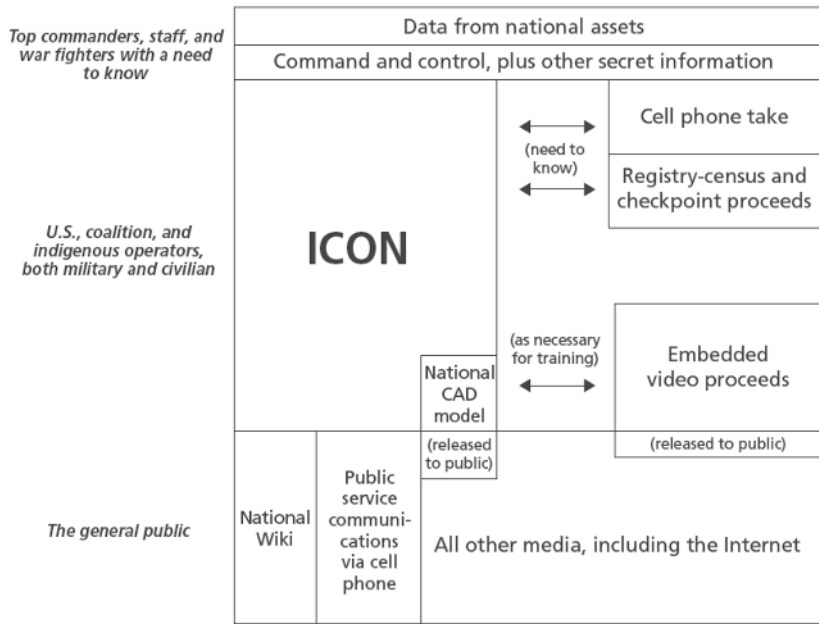
In the context of a growing trend to the popularization of science and attempts to raise awareness and involve an increasing number of citizens in the complex process of scientific co-construction, making the said citizens be vectors of the collecting of information (and even of more complex information production) is a developing strategy: everyone knows about crowd-sourced projects in astronomy and environmental sciences. It is sometimes difficult to evaluate the impact this trend has on the spreading of scientific culture and on the development (in a scientific perspective) of reflectivity. Moreover, a growing number social–technical controversies nowadays arise as the crisis of rationalisms unfolds, which complicates the measure of the effects of scientific crowdsourcing. In a similar perspective, how experts relate to the “layman” word is also being transformed. For example, groups of patients demand to share knowledge and information with doctors, to voice their opinion and propose their own approach to ailments. Although they challenge the knowledge power of doctors, the latter can take advantage of these demands and tap into this “non-specialist expertise” and into the data produced by monitored collection programs. There are numerous examples of this type of experimentation.

Let us mention another example, as it sheds an interesting light on the scale of issues that OD raise.

OD, open sources and data mining are also involved as essential elements of military strategy and “counterinsurgency intelligence”. In the case of operations abroad, for example, the implementation of digital networks, digital communication apparatuses and local data bases is a major pillar of the strategy. Developing tactical-operational strategies in the semiotic sphere is fundamental in order to better control the anthropological, cultural and

societal dimensions of the conflict or the operation being carried out. This was for instance the aim of the ICON project in 2000 (Figure 1.1).

**An Access Architecture for ICON**



RAND MG595/1-S.2

**Figure 1.1.** *An image of the Icon project of the Rand Corporation*

That is how, since the publication of the report<sup>31</sup>, there is a steady effort in furthering research about means of controlling political and anthropological dimensions of conflict and insurgency fields, especially by strategically leveraging the opportunities opened by data proliferation. Such strategies naturally rely on the cultural and political records of the digital space, i.e. the “open data”, as well as on the deposits of collaborative

31 Martin C. Libicki, David C. Gompert, David R. Frelinger, Raymond Smith, “Byting Back Regaining Information Superiority Against 21st-Century Insurgents”, Rand Corporation, 2007.

knowledge constituted by digital social networks of all sorts, which are steadily growing<sup>32</sup> [JUA 07].

Similarly, the multiplication of OD sources and exploitation methods are strongly attached to the increasing security and to the development of military urbanism [GRA 12].

To trace the whereabouts of the citizen–consumer–soldier is indeed the core of control and intelligence society. The infrastructures that support urban life development – although they are often overlooked, considered as normal as long as they keep functioning – are generally central to political violence and the contemporary military doctrine. Data collection involves the military and police force in association with evermore sophisticated algorithmic devices.

The “open data” movement is thus a chance, in its various manifestations, to politically re-negotiate the power – knowledge relationship to transform collective intelligences and liberate the circulating flows of knowledge. Now is also the time to elaborate new criteria to measure the economic and political impact of OD within the context of ecologies of the environment, psychologies and culture, which are themselves subject to the conditions and constraints of capitalistic markets.

The “open data” movement would therefore improve its credibility if it would tackle a specific issue about access to datasets: it consists of open access routes that realistically take into account the actual uses, social-cognitive practice, political economies and constraints that come with the production of novel types of knowledge and know-hows.

Nowadays more than ever, the digital divide echoes cognitive divides. This resonance generates the rise of agonistic narratives and creative forces, even on the basis of the “doxic immanence field”, in Philippe Mengue’s words [MEN 09]. There are sharp differences in the abilities to use or write on the basis of digital data and in the abilities to produce them. Very

---

32 J.M. Noyer, B. Juanals, “La stratégie américaine du contrôle continu De la “Noopolitik” (1999) à “Byting Back” (2007): une création de concepts et de dispositifs de contrôle des populations” ([http://archivesic.ccsd.cnrs.fr/sic\\_00292207/fr](http://archivesic.ccsd.cnrs.fr/sic_00292207/fr)). See also: counterinsurgency FM 3-24, David H. Petraus, James F. Amos, respectively Lieutenant General, U.S. Army Lieutenant General, paper 9 11 U.S. Marine Corps Commander Deputy Commandant U.S. Army Combined Arms Center Combat Development and Integration.

discriminating mechanisms filter that is able to extract new knowledge from data, which is able to reuse this knowledge and feed it back to the general circulation and production machine. For “open data” to have positive outcomes, we need to think of an education of and by citizens with regard to the pervasive influence that digital and computational practices have on the societal world. This necessity is becoming, day by day, more evident and pressing.

### **1.6. Coupling OD/big data/data mining**

The OD movement must also reflect its articulation with the spreading of intellectual technologies and software that aim at the intelligent handling of data in order to foster individual and collective creativity. It must therefore cope with the necessary task of accompanying the development of the social-semantic web, democratic interfaces and the learning processes they imply.

That everything becomes algorithmic can be seen as a social-cognitive and political-anthropological issue. In that perspective and in Deleuzian terms, it opens to novel mechanisms that may striate the metastability of collectives, thus threatening to let elaborate control societies emerge that would make democratic regimes mutate “out of themselves”. It also opens itself to mechanisms that may produce new smooth spaces in which to revive the cognitive conditions essential to hybrid intelligences.

Among other things, becoming algorithmic partly renews the process of actualization of new cerebral states and opens novel analogical freedoms in the interstices. However, we must repeat that it does not necessarily mean that, on the basis of the becomings of the technogenesis – sociogenesis coupling, the desire for control and mastery (the most common desire of the world!) would not use the automation of several politico-cognitive tasks, tasks that are attached to modes of governance of populations, to totalitarian ends.

The deployment of digital writings and networks therefore causes, in both the public and personal realm, a transformation of memories, publication mechanisms and ecological niches that are the conditions of our lives and existence. This is planetary and it affects, although with significant

differences and inequalities in its actualization, our anthropologies, social and social–cognitive practices, subjectivities and identity processes.

New political economies emerge, attached to new libidinal economies. On the basis of new reticular dimensions, a new onto-ethology of individuals is being deployed. The collectives of thought and work are being recomposed. Contrary to often heard and read nostalgic critiques, we are not facing a loss of connection, nor a thinning out of our associative abilities or of what binds and ties us to each other. No, we are facing a transformation, the advent of something different, which involves the saturation of all this, and in which an essential part of the question of the future of our becomings and of the alteration processes, the becomings of open societies, is at stake.

The world increasingly appears as a vast realm of relational systems, in which new cartographies are necessary for those who want to inhabit it. This indeed echoes the relatively pronounced evolution of “the Political” toward a generalized experiment in which the means and the performative procedures problematically prevail over the ends, be they political or ethical. Great ecological (social, mental, environmental) crises stem from the transformation of the anthropotechnical, economical, cognitive, organizational, military, etc., mechanisms. They arise mostly under the conditions of the digital perspective and its associated technical and scientific becomings. Such crises in turn intensify these transformative tendencies and processes. There are bio-political and psycho-political becomings, then, that develop into new, previously unseen shapes.

One thus understands why so much effort is made to develop a semio-political thought about interfaces [NOY 11, LAZ 06]. Throughout the texture of intelligence societies, threaded on the basis of an ever-extending, increasingly intrusive ictology<sup>33</sup>, a specter is haunting the new modalities of work, existence and governing – the specter of traceability. This generalized interfacing and therefore normalizing strategy is one of the major pillars of the contemporary transformation of the governmental essence, especially when it is understood in the framework of the “becoming Empire” as defined by Negri and Hardt [NEG 00].

A relative weakening of centralized control systems is indeed visible, in parallel with the strengthening of distributed systems of control and

---

33 Louise Merzeau, <http://archivesic.ccsd.cnrs.fr/docs/00/48/32/94/PDF/CITES-MERZEAU.pdf>.

intelligence that are immanent to the production system of networked urbanity. These vast and complex systems of a centered networks are managed in a multifractal mode that involves many recursive loops and local rules implemented on increasingly elaborate digital machine interfaces.

At all scales, from intranets to globalization processes, there are transformations happening, shifts from the Nation state to the Market state (in the framework of the attempt to establish, forcefully and rapidly, a global market), shifts from traditional forms of sovereignty to new decentralized and relatively complex forms (in which the privatization of the most regal functions, including that of war machines goes unfettered). These shifts result in the semiotic and software issue which is of major politico-strategic importance. Those who can extract and exploit the graphs that emerge from the (individual or collective) digital traces gain a superior standpoint within the political, libidinal and strategical economies. He who is able to exploit the variations and differences in speed of the writing systems, he who masters the variations of meme<sup>34</sup> combinations, an essential part of the social-political becomings of the modes of intelligibility and the processes of subjectivation, this one gains a dominant position in the production, circulation and consumption of knowledge.

### **1.7. The semantic web as intellectual technology**

In the framework set out above, the notions we call Open, Big and Small Data are entangled in the nexus of major social–cognitive and political tensions. They also involve significant epistemological debates that question, for example, the power of digital empiricism, statistical algorithmics, which challenge the dominant position of theory with regard to the significance of its speculative dimensions and of its conceptual modeling. In 2008, Anderson [AND 08] remarked that: “At the petabyte scale, information is not a matter of simple three- and four-dimensional taxonomy and order but of dimensionally agnostic statistics. It calls for an entirely different approach, one that requires us to lose the tether of data as something that can be visualized in its totality. It forces us to view data mathematically first and establish a context for it later. [...] There is now a better way. Petabytes allow us to say: ‘Correlation is enough’. We can stop looking for models.

---

34 See note 19.

We can analyze the data without hypotheses about what it might show. We can throw the numbers into the biggest computing clusters the world has ever seen and let statistical algorithms find patterns where science cannot” [AND 08]. This opinion has since been critiqued with good reason. Later on in this book, we will elaborate on this.

Other questions come up in the fields of Human and Social Sciences. At the core of these paradigmatic issues, we find the measure of the evolutions of digital writings, especially in the form of what is called the semantic web or social-semantic web. We also find questions about the nature of ontologies<sup>35</sup>. Such writing is, once again, at the forefront of change. The control and development of digital memories fully partakes to what Jean-François Lyotard called, in 1979 already, “legitimation by power [...] the latter legitimizing itself like a system tuned to optimize its own performance. Indeed, this sort of control on context is precisely what generalized algorithmic methods promise. The performativity of an enunciation increases proportionally with the quantity of information one has about what it refers to. Thus, the growth of power and its self-legitimation now uses the production, recording, accessibility and operability of information” [LYO 79].

However, as Yannick Maignien writes [MAI 09], the digital revolution is both the subject and the instrument of the contemporary development of social and human sciences. Data exploitation, production of novel types of knowledge, new forms of expression that mostly target the general audience, new ways of accessing data, free (social-political) usage... These new practices force the OD movement to tackle the issues of traces, data and text corpora processing. The issues raised are of cognitive nature and therefore pertain to scientific work, but they are also of political and economical nature, because “value” production also involves costs.

For example, the notion of “Open Content Mining”<sup>36</sup> is currently increasingly attracting attention within the “open” publishing movement as well as in the framework of private publishing.

---

35 In the semantic web sense.

36 <http://poynder.blogspot.fr/2012/06/new-declaration-of-rights-opencontent.html>; especially the interview of Peter Murray-Rust by Richard Poynder (2012).

In other publications ([http://archivesic.ccsd.cnrs.fr/sic\\_00759618](http://archivesic.ccsd.cnrs.fr/sic_00759618)), we have detailed how the movements of “the Open”, OD and data mining are connected. Data mining is itself central to the process of commodification of data, knowledge and semiotic domains in the regimes of market economies. For example, the French regional authorities deal with OD on the basis of their institutional heritage, in a “top-down” stance. This framework only allows them to think the political, economic, cognitive and cultural subject of OD from a single point of view: for them, the issue of OD mainly concerns the processing of data access and distribution. They temporarily leave the management of metadata untouched, although this management cannot be separated from the issue of organizational and institutional inter-interopability<sup>37</sup>.

Metadata is thought of in terms of access, in a paradigm of internal performativity of the institution assemblages. So far, no attention is paid to the social–political dimension of innovation or to the question of how to renew democratic practices. Writings, interfaces and document engineering policies are nevertheless influenced by actual conditions, but up until now, the regional and local administration prioritize, as one of their main axis of work, the normalization of the data catalogs of OD portals. They in fact propose a late (and necessary) equivalent to what the Dublin Core was for the web. The project, however, progresses fast and should soon reach issues and questions such as: “what to do?”, “what for?”, “to which ends create these metadata?”.

To interconnect and intelligently process, data are becoming an essential part of OD management. To achieve this, the conditions in which software and applications are created and disseminated must be openly thought about. Here also, strong lines of tensions are drawn between the liberal (and even neo-liberal) paradigm and the various ways of imagining the commons, all the more that the modes of creation and selection of uses as well as the desires of intelligence are not only diverse but also often competing or even conflicting. To conceive commons in the paradigm of multiplicity or in that of unity becomes an opposition between a-centered and centralized modes of governance. The work of Ostrom is still a major reference on this account<sup>38</sup>.

---

37 [http://fr.wikipedia.org/wiki/Données\\_ouvertes\\_en\\_France](http://fr.wikipedia.org/wiki/Données_ouvertes_en_France).

38 E. Ostrom, *Beyond Markets and States: Oolycentric Governance of complex economic systems*, Nobel Lecture.

Metadata and the semantic web must therefore be designed without preconceptions with respect to the optimality of organizational forms, especially because the criteria and ends of such an optimization cannot be easily determined. So, the various models of semantic or social-semantic web must be evaluated in the light of the organizational plasticity and combinatorial grammars they enable.

The worst that could happen would indeed be to essentialize the writings and methods, to developed closed ontologies, whereas we live in times when what governance models need is to develop their processuality and the heterogeneity of agents, practices, criteria and ends. They need to open bridges to foster differential relations between microworlds and macro-worlds. What “reusing data” means is a renewal of the definition of the process of work and the struggle for new democratic forms and new forms of creativity. This is a pretty tall order. In a first phase, let us sum up the essential elements: the main standards published by the W3C are called RDF, OWL and SPARQL. Several tools have been developed for these standards. The RDF-based approaches, such as the linked OD or “LOD Cloud” follow its predicative nature and are but one way to apprehend some types of data exploitation to design various processing methods on a data corpus.

There are many different perspectives on the world, and these perspectives are not necessarily unifiable. Being aware of this heterogeneity should be sufficient for ontology and metadata designers to take a reflective step back and avoid falling for the urge (one of the most common temptation of the world) to define writings and standards from a totalitarian and simplistic viewpoint. That is one of the reasons why paying great attention to the works of the “Government Linked Data Working Group”, whose mission is to “provide standards and information that will help governments, worldwide, to publish their data in the form of efficient and functional “Linked Data”, thanks to semantic web techniques”<sup>39</sup>, is important.

Similarly, the Simple Knowledge Organization System defines a data model that allows the sharing and combination of knowledge organizing systems via the web.

---

39 [http://www.w3.org/2011/gld/wiki/Main\\_Page](http://www.w3.org/2011/gld/wiki/Main_Page) – see also the LOD2 initiative of the European Union: <http://lod2.eu/Welcome.html>.

As we have mentioned before, the “Open” approach, from its very beginning, involved a shift from the paradigm of access to that of knowledge production-circulation under new conditions. This shift highlighted how essential metadata are to increase the quality and power of inferences that can be made in order to extract knowledge or processing methods such as statistical processing, thus enabling the exploitation of structured, semi-structured or unstructured heterogeneous data, etc. Later on in this book, we will explain how the processes subsumed under the phrase “data mining” are essential to our understanding of the reuse and exploitation of data to our apprehension of the production of novel visibilities and of Value creation. This is why we think that a global reflection on OD cannot separate the following different dimensions and think them apart: the multiple dimension of data mining, the various types of intellectual practice, social-cognitive conditions of usage, citizenship, consumption, the definition of elites... Individuals, organizations and communities, all these bodies experience the opening of data with their own social-cognitive apparatuses, which they support and elaborate according to the political, economic and ethical ends they purport.

This leads us, once more, to the “limits of the current situation: a data-oriented web with a clear line drawn between the fields of social sciences and that of new technologies”. Pierre Levy has been considering for a long time the recasting of this divide with the help of a metalanguage (Ieml). This metalanguage would enable the creation of the conditions of an “intelligent” navigation through heterogeneous domains and ontologies. In other words, it would enable its agents to inhabit translation or contact zones in which cognitive practice and the work of thinking can be carried out. His aim is to develop the conditions of reflexivity required for thinking collectives to be used as instances of their own reflective work.

This constitutes a context that can naturally be extended to include the political economy of marketing, the economy of security, urbanization, sustainable development, the extension of the means of semiotic control... In this context, data mining has become a new “great narrative”, an underlying but blinding discourse that tends to control the structuring and shaping of the world. Human sciences, marketing and economy, strategic and military aspects... all these data mining actualizations, all these modes of intelligibility spurred alliances that sometimes bear dangerous implications, fostering profiling techniques and inducing strategies of prediction, performance and preemption.

To set up a continuous control of the political, strategic and economic realities and of psycho-politics is a temptation that more than ever feeds on these new trends to develop its insomniac rationalizations. Data mining is the backbone of this shift from societies of control to society of strategic intelligence or “sousveillance”.

Some constitutive elements of the limited but seminal open model need to be recalled here. The Open Archive movement brought about the ideas that now force us to think about the so-called OD, Big Data, Linked Data, e-Science, data mining, Algorithmics and relate them (they are constitutive of the various aspects of the transformations of intellectual work processes of the modes of governance and political economies, which are attached to collectives intelligences). These relations are home to a twofold practical research effort. On the one hand, there is the question of how to improve and structure these immense stocks of data (various traces of, for example, behavioral data, all types of documents, scientific and financial data), in order to extract knowledge from them. On the other hand, there is the question of the exploitation of semi- or non-structured data with the same aim.

How, then, to exploit these vast amounts of heterogeneous data to extract knowledge and know-hows, analyses and results that can be reused by other agents? Such approaches are knowingly difficult to design, they involve combinatorial languages that should enable the creation of “ontologies” in a manner that allows them to strike creative relationships. The fact that various ways of modeling social-cognitive behaviors, contents to use and their associated products is undeniably a complex and significant matter. It challenges and undermines the attempts at creating the conditions of a would-be universal combinatorial model (IEML<sup>40</sup> is a very significant example of such attempts). At present, the notion of modularity seems inescapable and singular approaches seem to be the most efficient in a perspective of a multiplicity of models.

The diversity within OD is increasing and differences between various elements are widening, while OD is becoming central to political economies of knowledge and collective intelligences. These tendencies will induce a paradigmatic shift in the domains of ontologies and/or onto-ethologies and especially in the conditions that preside over their production. For reasons

---

40 <http://www.ieml.org/french/elements.html>.

pertaining to the preservation of the openness of our societies and to the possibility of sustaining healthy controversies at all levels, we believe that it would be beneficial not to remain tied up in limiting traditional perspectives. We should emancipate ourselves from the gray zones of elementary metadata and over-generalizing ontologies, which are designed under the essentialist, predicative logic inherited from the limitations and waking dreams of symbolic artificial intelligence<sup>41</sup>.

Ontologies that are developed in a top-down approach under conditions that translate the interests of only a small number of groups and collectives cannot claim to be prescribing the way the world should be, even if their elaboration is a relatively necessary step. As the world is increasingly complex, as the heterogeneses that constitute it throughout diversify, developing, with a “bottom-up” strategy, local, specific ontologies appropriate to the specific applications, software and algorithms that are implemented on the basis on the diverse data sets becomes essential and even vital to the semantic web. The next generations of cognitive architectures, in other words the next intellectual technologies (writings, interfaces, cartographies), must (should) allow some users to become themselves relatively powerful agents, precisely within the cognitive assemblages.

Developing the semantic and socio-semantic web entails designing metadata according to the inferences and exploitation we aim to make with the data at hand, according to the research programs and usage we foresee. What we call “reuse” must therefore be understood in a largely extended sense: usage in different contexts, exploitation, invention of new data and novel knowledge, in order, once more, to create value.

From the design of metadata to the elaboration of ontologies that are at least partially interoperable, even if such elaborations are automatically or semiautomatically performed, profound issues are involved. What is at stake is not only the creation of value, as we said before, but also the various ways

---

41 Douglas Hofstadter, *Godel, Escher, Bach, An Eternal Golden Braid*, 1979 (French: *Les brins d'une guirlande éternelle*, Editions Interéditions, 1985). See also *Ontologies pour le Web sémantique (Ontologies for the Semantic Web)*, Jean Charlet, Bruno Bachimont, Rapahël Troney spécifique 32 CNRS / STIC, *Web sémantique, Rapport final*, Éditeurs Jean Charlet, Philippe Laublet & Chantal Reynaud V3 – December 2003, Charlet.

we apprehend intellectual work, and how we imagine and practice open and democratic societies.

Can we overcome this normalizing tendency? To which extent? Can we at least leave these normalized systems open to the introduction of metadata that are able to renew the types of knowledge produced? These questions undoubtedly draw out a battlefield on which to fight for democracy and intellectual freedom. In this perspective, the open source and open archive initiative movements sketch the bases of the ideas underlying the political, economic and scientific debates to come. The “commons” paradigm and the private property application programming interface (API) paradigm, their hybridizing, are thus currently the subjects of intense debates<sup>42</sup>.

We must keep in mind that the metadata issue, especially within the framework of OD, cannot avoid questioning its relations with the evolution of the modes of social classification, the social and doxic indexing paradigm. How do they, how will they relate? Will users be allowed or able to insert their own metadata, under which protocols and with which freedom? The web indeed evolves toward the possibility for each and everyone to publish, tag, classify, etc. Social “bookmarking” continuously increases and open “tagging” systems, known as folksonomies, bloom.

Folksonomies are a great potential source of semantic richness. This emergent, ascending (“bottom-up”) approach to collaborative knowledge

---

42 In terms of free software, the situation is complex. In our opinion, François Bourdoncle accurately summarized it on the basis of his experience as co-founder of Exalead: “In our domain, free software are mainly used on online website by publishers who need to add search functionalities to their software but do not wish to spend any of their added value by using our service. When the search functionality is not too strategical, however, they turn to us. We for example have agreements with societies that develop messaging archives: the vumes to process are so important that the costs of the IT stock they would need to implement a free software solution would be prohibitive.

This is in fact an economic choice between make and buy. Free software is not a miracle, despite what one might dream of. One does not simply download and press the “enter” key. If a company wants to integrate a free software into its programs and ensure ist synchronization with dozens of modules, it needs to hire a dozen of engineers, who come at a cost. Free software solutions therefore have pros and cons like any other proprietary competitor would. For internal applications, customers usually choose to call a software produer who will be in charge of ensuring the seamless integration of the software solution they bought.” Lecture in the Ecole de Mines de Paris: EALEAD NEUF ANS APRÈS, (Exalead, 9 years later), by François Bourdoncle, co-founder of Exalead, 23d of September 2009.

resources was soon rightly seen as an approach that could overcome several thorny difficulties that knowledge management practice struggled with.

The exploitation of folksonomies, together with semantic web technologies, although less simple than what one initially imagined, are now seen as an essential step in the evolution from “Web 2.0” to “Web 3.0”. Relatively complex research is devoted to create and develop new indexing and description modes. Metadata production, including that of folksonomies, is the core of the concerns of those who wish to develop a socio-semantic vision of the Internet, who wish to influence the relations between a “Web of documents” and a “Web of data”. Research is being developed along several axes of which we provide a few examples below.

In the case of OAI-ORE (Open Archives Initiative Object Reuse and Exchange), “the aim is to produce standards for the description and exchange of web resource aggregates”.

These aggregates, once named “compound digital objects”<sup>43</sup> can combine parallel resources made of texts, images, videos and data. Such standards aim at making visible the rich content of aggregates and to make it usable by applications that handle their storage, exchange, visualization, reuse and conservation”<sup>44</sup>. So called “Web 2.0” communities and the advocates of the semantic and socio-semantic web are very interested in such user-created metadata.

## 1.8. Towards understanding onto-ethologies

The “tagging” approach, which relies on users autonomously indexing documents because of computerized apparatuses, is interesting because it

---

43 Later on in this book we will detail how, within the great transformation of documentation, these “compound digital objects” are mirrored by “non-unequivocal, N-perspective relational compounds” that constitutes a document of hyper document in the digital realm.

44 OAI-ORE is designed to overcome the barriers found between different storage facilities, to develop a new generation of functionalities and transversal tools. In this perspective OAI-ORE advocates the standardization of the description of the relations between digital documents. By relationships between documents, they for example mean how the various versions of a document relate, or the aggregation of various documents such as the images of a web page or all the chapters of a book. Online: <http://www.openarchives.org/ore/1.0/datamodel>.

eases the exploitation and organization of one's own resources. It is a (relatively informal) mode of distributed indexing and classification. Let us not forget that Internet indexes and folksonomies are developed by communities of indexers that cooperate throughout the web. Resource lists are in line with the logic of the classification schemes that are characteristic of librarianship, but they do not claim that the patterns they comply with are imbued of any sense of universal disciplinary organization or of any form of theoretical legitimacy. "Resource indexes compiled by communities of volunteers unceasingly grow in size and numbers. They contrast with indexes like that of, for example, Yahoo. Where Yahoo uses employees to index documents under the authority of managers and with explicit referencing policies, the process of social indexing deployed by these communities relies on modes of control situated somewhere between that of Wikipedia and the more hierarchical ones of 'Open Source' communities. Virtual community members can control and modify the classification at levels whose importance and criticality grows according to their reputation levels. They can add branches in domains where they have acquired enough 'authority', delete descriptions written in the 'notices' by less well-known contributors, etc." [ZAC 07]. The pros and cons of folksonomies have been extensively debated. The "tagging" activity, as a doxic (and partly intuitive) means of indexing, benefits to cooperative practices of various agents.

The lack of "a minima" tag organization, their heterogeneity weakens the potential benefits of folksonomies, as, for example, they limit their simple reuse and intercommunity exploitation.

These issues are reasons why not only designing standards but also proposing methods that enable the exploitation and sharing of sets of "tags" is a task that should be undertaken. There currently exist several approaches, some of which are already being used while others are being developed. These approaches are either based on semantic methodologies and formal rules paradigms (like the subject verb predicate paradigm of RDF schemes), or on statistical linguistic approaches inspired by mathematical linguistic research or clustering techniques (coming, for example, from the field of infometry)<sup>45</sup>.

---

45 For example, there are methods involving associate words et term co-occurrences frequency measures. On this subject, see [COU 90].

The SCOT program (Social Semantic Cloud of Tags) is an example of this first type of approach. It aims to describe the structure and so-called “semantic” relations of a set of “tags” in order to improve their social-cognitive use. Such approaches rely on the fact that “tagging” processes involve people (agents), resources and “tags”. From a general point of view, as we mentioned before, the conceptual framework and the tools of the semantic web are already in charge, on the basis of several analyses of social networks, the representation and exchange of items of knowledge in digital social networks. They use formats like RDF, query languages such as SPARQL, RDFS and OWL<sup>46</sup>. Folksonomies can in fact be exploited using graph theory in order to detect user groups and major emergent themes. Another line of research work extended the SPARQL language to expose the semantic connections and pathways between RDF resources. New routes of investigation about “tag ontologies” must also be mentioned.

These new types of ontologies are interesting because, among other characteristics, they integrate aspects of “speech acts”, which are attached to tags or rather to “what we do when we tag”. They allow any resource to become itself a tag, reusing works that were carried out to solve the “identity crisis” of the semantic web. They underline the semiotic nature of the relation between tags and resources: “beyond what one does with the sign, tag semiotics is a matter of what the sign performs as a sign itself, these two dimensions complementing each other”<sup>47</sup>. Other ideas try to take into account the communicational practices “of organizing short-lived interactions between distant users while proposing representations, which

---

46 The SPARQL language is a set of specifications that define the syntax and semantics required to query and manipulate content from RDF databases on the Web or in an RDF store. It also defines the possible forms of query results. SPARQL is adapted to the specific structure of RDF graphs, leveraging the triplets that constitute it. See online: [<https://www.w3.org/2001/sw/>]. RDF Schema, or RDFS is a knowledge representation extensible language. It provides the building blocks for the definition of ontologies or dictionaries that structure RDF resources. Web Ontology Language (OWL) is an XML dialect based on an RDF syntax. It enables the definition of structured web ontologies. The OWL language is based on research on descriptive logics.

47 Communication of Alexandre Monin: an ontology proposed by David Laniado from the Polytechnic University of Milan, Freddy Limpens of the INRIA, and Alexandre Monin, helped by Thomas Lörtsch and Ricardo Tasso. See also the account of the VoCamp organized by the Inria, September 2009 [<http://vocamp.org/wiki/VoCampNiceSeptember2009>].

often are of visual nature, of the so-created social networks”. Such approaches advocate a more pragmatic approach to informational and communicational processes, considering linguistics in a more open manner. We believe that they are very interesting because they challenge the hegemony of formalisms inspired by Tim Berners-Lee’s “cake”<sup>48</sup>, whose efficacy is dependent on a “semiotic closure” that entails reducing and standardizing the field of behaviors and practices. Again, how do those that act and speak for OD and wish to make new, more appropriate types of intellectual and social practice situate themselves?

Other stances can in fact be held up. They take into account the sociology of practice and usage, as well as the phenomena of co-construction of intelligences. This approach precisely aims at making “syntactically formal languages” efficient. The issue here is to design methods to represent such weakly formal semiotic and socio-cognitive structures in such a way that their weakly formal nature would enable a strongly pragmatic approach. This is why we believe that there is a pressing need to develop critiques and debates over the elaboration of such new alphabets, their grammars and the constraints that affect their combining. There also is a pressing need to imagine new “non-documentary” approaches to the production of open and dynamical onto-ethologies<sup>49</sup> in order to bring back to our awareness the fact that writings are evaluated and emerge on the basis of the creativities and inventions they open up, on the basis of the new combination modes they carry within and of the many new hermeneutics they enable.

Folksonomies that use statistical approaches and methods based on, for example, co-words analysis<sup>50</sup> let particularly appear, in their processing, the

---

48 The Semantic Web infrastructure is often described as a “cake”, the cake of Tim Berners-Lee.

49 Conceptual ethology means, in our understanding, the diagram or field from which specific concepts emerge. These are concepts that can be considered as singularities that consist of the weaving of other concepts, percepts, affects, relatively heterogeneous writings and of various combination constraints.

50 Ciro Cattuto, Dominik Benz, Andreas Hotho, Gerd Stumme, Semantic Analysis of Tag Similarity Measures in Collaborative Tagging Systems, arXiv:0805.2045v1, 2008. Research on the semantic-based co-word analysis, Zhong-Yi Wang, Gang Li, Chun-Ya Li, Ang Li, Akade'miai Kiado', Budapest, Hungary 2011. For a more general perspective, see the body of works on associate wordanalysis and on fractal approaches to the co-elaboration of knowledge. See also [MUT 01].

combinatorial modes mentioned above. Such methods are based on principles of similarity and co-occurrence. They show that “tagging” practices display patterns akin to those found in traditional indexing methods, and that these patterns are quite predictable [KIP 08]. Moreover, the fact that so many folksonomies are developed, that they are heterogeneous and even often not inter-operable, call for the analysis, with a similar rationale, of phenomena that overlap across “tag spaces”, especially in collaborative environments [OLD 08].

This is why we should be looking for the definition of “onto-ethologies” rather than for that of ontologies. Onto-ethologies express the social-cognitive structures that corpora carry within, the translations and processuality at work in the very core of communities. We must understand the technical aspects of the “structuring” (formalization) as well as of the filtering of texts and documents in the light of a double constraint. On the one hand, we must be able to process whole populations of digital texts that may always recombine or transform; on the other hand, we must elaborate tools for the intellectual, social-cognitive exploration and exploitation of these populations, tools to represent their constitutive cognitive processuality, which fosters their analogical, associative and combinatorial capacity, on several levels of organization.

For the creative insertion of OD in the digital world to be a success, we need to invest in this increase in reflexivity that, in our opinion, results from the possibilities such tools open and from the associated emerging cartographic practices, be they doxic or scientific. Either OD will enable us to exist within the world as free beings, or it will solidify into something that will partake, as an allegedly unaware accomplice, to the continuation of polemological power relations.

In that perspective, what does the phrase “to open data” mean? Let us consider the example of the Open Archive. The Open Archive provides access to collections of articles or documents produced by people active in the research domain. Its service is based on the digital corpora of a scientific community and on the automatic and semiautomatic data-processing software mentioned above. This apparatus is representative of the associations, associative networks, aggregations and selection modes, constraints and combination modes as well as of the social modes of

transmission and selection of such constraints. It applies on the heterogeneous assemblages of researchers, laboratories, texts, journals, themes and concepts. In order to “open data”, we need to be able to update one’s knowledge of the new research fronts, the influencing networks and the systems that emerge to translate, overlap or percolate notions, concepts or themes. The representations must include networks of agents, networks of citations and references, co-citations<sup>51</sup>, the modes in which texts and their associated contexts are repeated, altered as well as the graphs of concepts. The aim is to provide researchers with new means of orienting themselves in the various perspectives, thus enabling a better management and navigation across points of view and the increase in associationist capabilities. In other words, it should enable the ability to relate what at least partly constitutes the structural conditions in which we as researchers become visible, conditions that will always be bounded and particular. This is the profound signification of what we call new cartographic practices, and it should spark off the creation of novel types of interfaces<sup>52</sup>.

These approaches raise many issues, as they sometimes seem to rely on an exaggeratively essentialist understanding of interactions and usage, whereas they apply on the lives of populations, on the multiplicities of assemblages as... metastable multiplicities.

These issues also draw attention to the various ways we can attempt to describe and represent hypertextual digital memories and attempt to create meaning from them. They stress the need to show that plurality – according to contexts and corpora, usage and practices – is required in the ways we conceptualize the types of writing we need to inhabit the multiple social-cognitive space times. The various web structuring approaches are not fundamentally incompatible, and an appropriate understanding of plurality is a requirement to develop OD usage as well as their desires.

---

51 Issues pertaining to the field of citations are complex. See, for example, [DER 90, COM 79]. See also [VAN 01, HIG 01, WOU 99, CRO 98, LEY 98].

52 We have already mentioned the “memetic” trend, which, within a similar perspective, generates research based on an evolutionary understanding of the replications and lives of “memes”, which are described as semiotic entities or as ant form relational compound. But then, what is it for local authorities and public institutions, as well as for those who will gain access, to “open data for new visibilities”? Which new types of reflectivity will then develop and affect usage and social-cognitive practices?

We thus favor an open approach that would consist of thinking about the differential relationships between different understandings of the semantic web and that would involve precise characterization of their articulations and articulation levels. Such a stance holds dissensual life at the heart of the democratic habitat, as an essential condition of its perpetuation and deepening.

Public sector OD epitomizes the role narratives and slogans have in the construction of an irrepressible desire for data. From a very general perspective, OD advocates free access (and provides the services that enable it) to some public data, for users to develop uses and ways of exploiting them unfettered by patents, copyright or other control mechanisms. This is a very simple definition. Ever since the very beginning of its development, the web fostered a “free” access to documents of heterogeneous nature. This was indeed the original, foundational intent of the creators of the Internet network, who developed it on the basis of a specific model of scientific activity: a mode in which the “free” production and circulation of knowledge optimizes creativity and innovation drives. Although the irenic and simplistic aspects of this model may rightfully be critiqued, the project was developed on the basis of this first, general idea. Moreover, the so-called “Internet of data” (now with its associate the Internet of objects) may be seen – under specific economic and political conditions – as the convergence of several mechanisms that lead to a shared goal: the spreading of data in both the private and public spheres and the “intelligent reuse of data independently from their original digital context” [NOY 12].

Nowadays, tension keeps mounting, to put it sharply, between the advocates of a philosophy of open resources (the web as a smooth space) and those advocating a proprietary approach (the web as a striated space).

This dichotomy however lacks nuance and needs to be refined, as it makes it too easy for us to be “tossed about from the Charybdis of the market and individual property for all and the Scylla of bantustans of primitive communism hailing the new accumulation evangiles” [MOU 10]. New digital records are open every day, as well as public domain databases. New types of records are constantly created and implemented in new sectors that pertain to this very public domain. Parallel to this explosion of available public data, whole sections of civil society are creating new types of open,

public but non-institutional records. This sometimes difficult cohabitation can be confusing for those who try to clarify their understanding of the issues raised by the OD movement, which hails transparency as a cardinal virtue of democracy. The evaluations tasks that emerge in France because of a legal background of injunctions and compulsory regulations<sup>53</sup> also become more complex. In fact how can we evaluate the completion of aims such as: “to develop transparency and democracy”; “to make the action of local institutions and elected representatives more readable”; “to provide meaning and to make knowledge emerge”; “to enrich the knowledge of local regions and territory”; “to promote the reuse of data by the research industry, the education system and journalism”; “to promote the development of innovating services”; “to develop citizen empowerment”, etc.?

These objectives are far reaching and their evaluation would require far more than counting how many datasets were liberated, how many applications were developed or how many APIs were queried or downloaded. Currently, most of the gauges of public administrations merely provide information about the “activity” of the OD apparatus, but they fail to provide any relevant information about the transformative social processes that might result. The notion of transparency (dominated by a broadcasting engineering perspective) has been extensively used and exploited by now, but one realizes that transparency is not convincing enough for the data owners or managing bodies, which remain skeptical. In order for OD to become desirable, other stances and actions are necessary. Many project leaders acknowledge this lack of enthusiasm: in France, the explicit voicing of a desire (from representatives, CEOs or inhabitants) has not been a salient aspect of OD initiatives. The initiatives were rather carried out as experimentations, and supported by rationalizing narratives of political and managerial flavor.

In our opinion, what is at stake is a true, drastic change in the political economy of territories. In a context where centralized governance systems

---

53 The law of the 17th of July 1978 already required that data be accessible on demand and acknowledged the right to access public information in France. In 2014 the Commission des Finances de l’Assemblée Nationale decided that reforms about open data (access and reuse of public data) would have to be debated in the parliament. See also the PROJET DE LOI *pour une République numérique*, (Project of law for a digital Republic) that was recorded in the Presidency of the National Assembly on the December 9, 2015.

are to various extent losing their grip and in which decentralized or a-centered modes of governance are rising, questions about this transformation could be asked, in crude terms, as follows: “How can open data, or at least some of its forms, transform the modalities of public action and enable the advent of an ‘active milieu’ different from the current conditions, which are dominated by “constructivist planification”?. This would imply reimagining evaluation protocols, discarding the inherited activity measures, in order to truly make a reflective effort to invent new measures with other methods... How indeed would one understand the impacts of OD on territories, citizens and the relationships the latter establish with the former, as well as, on the way, apprehend these relationships, if one lacks the truly social – technical, anthropological and political surveys or proper knowledge of the lifecycles of data? What could we possibly understand without means of apprehending the heterogeneous practices, the long networks and the complex assemblages that constitute the nature of the studied subject?

### **1.9. Marketing intelligences: data and graphs in the heat of passions**

The key role of marketing in the search for consumerist metastability was never explained more accurately than by Sloterdijk.

In Chapter 37 of *In the Interior of Capitalism*, entitled “Mutations in the Pampering Space”, he strongly insists on the fact that: “That ‘things’ from the world of belonging do not remain untransformed in their transition to the world of options is in fact mirrored in countless nervous reflections (...). If buying, selling, renting, letting, borrowing and ending are operations that affect all aspects of life in the Great Installation, it is inevitable that the accessibility of things through monetary mediation will produce a corresponding world feeling. First of all, one experiences an immeasurable increase in accessible objects, and last of all, the convergence of the world interior and the spending power space – with consequences on the status of the devices surrounding us on a daily basis”[SLO 13].

Sloterdijk then goes on: “One can now understand why way of life that weakens allegiances and reinforces options lead to a psychopolitical rearrangement of clientele in the comfort spheres of the Western and Westernized world” [SLO 13, pp. 206–208]. This rearrangement, by the way, becomes radical when neuromarketing embodies it into its bold attempt

to naturalize the “consumerist-brain”. Because of such an attempt, we have to face the issue, or rather to bear the brunt of the question asked by C. Malabou: “What can we do to prevent the consciousness of the mind to coincide with the spirit of capitalism?” [MAL 04].

Bernard Stiegler also sharply criticizes capitalism. According to him, marketing’s goal is to “take power on the individual’s psyche in order to lead to instinctual behavior. This capture is obviously destructive. Desire is channeled to industrial means, but to accomplish it, the libidinal energy must be bypassed with all its apparatus because it is produced at a second level as it is not a primary energy. Primary energies are to be found in urges, instinctual pulsions” [STI 12].

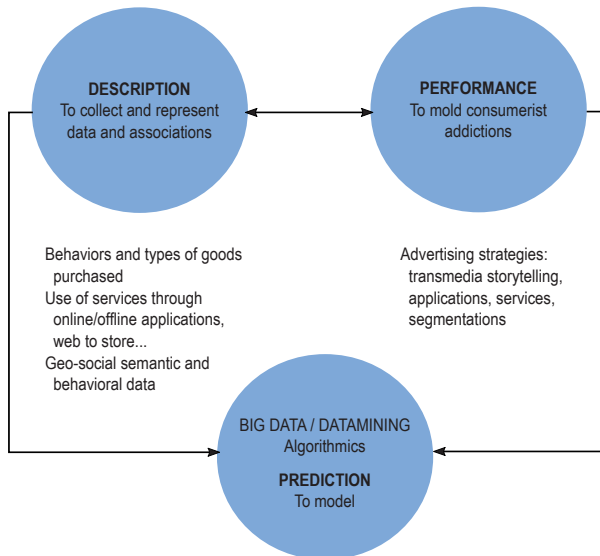
Marketing, data-mining and geo-localization have therefore allied themselves on the basis of these core transformations. They of course come with techniques of generalized traceability, which relentlessly feed behavioral and socio-semantic traces. The recent advent of techniques to precisely geo-localize opens further possibilities of enrichment and interpretation of traces. The diversity of interfaces and associated applications ensure the structural coupling of various modes of existence, each of which is bound to a specific territory. Smartphones and other roaming interfaces are in charge of the transitions and connections from the interior of the world to the assemblages of vast relational systems.

All these new developments encourage the exploitation and evaluation of assemblages. Many such projects are seeking a kind of trace quality certification system (about judgments and user occurrences), in order to provide ever more advice services with regard to consumer choices, whether it be about products, shops, or daily facilities (localizing a shop, evaluating shops and services in the neighborhood)... These projects leverage the irresistible rise of geolocation techniques, with its soon to come precision revolution, while in the same time progressively filling gigantic databases that, coupled with appropriate and powerful algorithms, will soon enable the development of a kind of “geo-socio-semantics” discipline. This new research field will qualitatively unveil (collective or individual) assemblages that will enrich the environment of advanced marketing policies, in line with a renewed, complex perspective on relationships with territories.

Such a technical research effort can be understood as a life-size experiment, which could lead to novel governance models. These could be

of territorial nature or hybrid, coupled with decentralized and polycentered models. In other words, they could be designed according to the scales of the relational systems that determine the actants under study, and how they relate. Such assemblages, together with social-demographic and economic meters, as well even as data about other types of informational flows, could in time bring about modes of intelligibility and organization of territories that are yet unseen. Such modes would be complex and include dimensions about the subjectivities that constitute them. They could for example revive the issue of “address” in a context of the digital territorialization, which results in entangled territories. They could also foster elaborate models to striate the desire regimes that are attached to the dynamics of the previously mentioned “description – performance – prediction”. Such models could be the basis of a governance similar to that of Philip K. Dick’s Minority Report [BER 11]<sup>54</sup>.

So we think this movement as a threefold process: Description/Performance/Prediction.



**Figure 1.2.** *The threefold description/performance/prediction process*

54 For the concept of preemption in the field of strategy, see also [HAR 10].

This trinity creates an unprecedented semiotic production and organization mechanism. It aims to elicit addiction(s) in the metastability of consumerist collectives that must (with others) sustain the political and religious order of the merchant world, ensure its continued creation, the endless pursuit of consumerist ends.

Within this framework, predictive assemblages (and their desires) are an essential apparatus, immanent in the hybrid collective metastability mechanism. As a central element, it presents itself “arched”, keeping a tight grip on the “auto-fabrication” of the human – post – humans with their associated milieus.

As a nexus, the consumerist individual is threaded with the object relations that converge to or/and that leave from him or her and with the transactions he or she agrees to. The individual therefore is the expression of a relational complex written in the digital stratum. Interfaces, as we mentioned before, are an essential part of the apparatus, therefore the issues about relational technologies and applications are determinant. They support exchanges between territories, translate and redistribute digital flows of information and socio-semantic elements of any nature. These interfaces and relational technologies are the ones that enable rich existential universes as well as the emergence of new modes of existence.

In a sense, they can be seen as the “existential clutch”. Marketing forces therefore increasingly obsessively edge their way into them, in order to get hold of a dominant position in their production. The new regimes of desires are being determined in this negotiation and whether there is a space, or rather which room there remains for other types of regimes is already a burning issue, the terms of a conflict with the hegemonic tendencies of marketing.

The core goal is then to ever better know the consumers to gather evermore data about their identities, behaviors, tastes, past purchasing patterns, etc. Algorithms extract knowledge in increasingly elaborate bottom-up approaches, build graphs and cartographies of the associative networks that constitute the onto-ethology of the customer, determine customer relationships, cross-check and intersect data and available information immediately or in due time. They thus enable to invent relevant

advertises and enunciations, discourses that can shape and perform desires and subjectivities. In this context, the “wisdom of crowds” [ORI 09, SUR 04], the collective intelligences of usage, the complexions of passions of customers as well as the forms of trade objects are focusing most of the attention [BOU 10].

The web represents, as we pointed out before, a gigantic network of systems of hierarchical classification and evaluation of information, a network in which judgment discourses and reputation play an essential role. It is of course also an endless resource for (not only) marketing strategies. This raises several issues.

The Internet stratum, with its networks and research interfaces, help raise the profile of various emergent phenomena. Collective knowledge emerges as well as assemblages of judging discourse and utterances. These emerging semiotic elements transform with time, altered by several factors, along with their trajectories across cultural and economic worlds of varying heterogeneity and according to the networks and apparatuses through which they are expressed and circulate, a circulation that itself alters them.

Well known is the fact that this is one of the reasons why linguistic and statistical analyses were developed, in order to extract, with varying degrees of precision, semantic dynamics and semiotic regimes from large quantities of utterances, texts, documents as well as sound and images.

The history of these linguistic research developments is well known. It involves lexicometry and infometric studies, as well as works about “data mining”, “opinion mining” and “sentiment analysis”. These fields of research are very much appreciated by economic sectors such as e-reputation, influence networks visibility optimization, analysis of the modality of that visibility. In short, all practices that involve analyzing narratives and their inherent conflicts are attractive to marketing.

To obtain such bodies of knowledge, the main agents use a multiplicity of approaches and resources. They, for example, call on to Internet users to evaluate products, companies, organizations and services; they then evaluate the expertise of these users; they use systems of recommendations and collaboration between Internet users; they leverage crowdsourcing practices, which make humans serve computer systems, etc. [ABI 12].

More generally, “information” and “opinions” can be found on the web, not only on social networks, the various forms of microblogging and on customer experience websites etc., but also on the websites of the traditional printing press (despite their historical orientation toward factual information, “they have turned to social-based journalism since the advent Web 2.0”), on commercial and institutional websites, portals and community sites that investigate content sharing practices....

But so-called “relational” digital social networks are only a part of this sweeping movement of transformation of the “plane of immanence of the doxa”. Beyond the mass networks in which communities deploy themselves, aggregate and converge via the narratives and transactions of which they are both the expressed and the expression, one can see that the expression space is progressively differentiating itself into various different subspaces. We can discern that digital networks host complex becoming minority phenomena. This is a very significant evolution. Many types of competing social networks emerge are already in operation or are being implemented. They aim to quench the emergent thirst, with ad hoc developments, for specific aggregation patterns attached to a demand for confidentiality, both in the short term and long term. We thus currently observe the convergence and reinforcement of tendencies on the basis of a common involvement in the sharing of practices, narrative modes, levels of knowledge and specific “memetic” attractors.

Beyond all these digital developments, the most important is to grasp and think the articulation between digital and non-digital. In an in-depth analysis, it must be understood as the structural coupling of the digital and non-digital milieus, in other words their co-determination. The reterritorialization mechanisms pushed by marketing tendencies via, for example, the geolocalization frenzy are increasingly powerful. They actually mean the “complication” of territories and practices, and have significant consequences on political economies, on libidinal economies and on the “complexion of passion of individuals” and their affects, across the merchandizing of objects and services.

Marketing forces, in short, aim to ever deeper influence the molecular and molar assemblages at the roots of customer relationship. To achieve this, they relentlessly increase the level of details of the description of

customer relationship ecologies in order to increase the control they have on it. To do so, they use information that digital “big data” is meant to provide.

In this perspective, data mining has become a new “great narrative”. It attempts at structuring and molding the world in general and specifically the regimes of desire, the pulsionnal regimes that are necessary to the continuation of consumerism. With data mining, marketing forces continuously develop new profiling techniques that feed the famous “description – prediction – performance” trinity, reaching out to the dream of “preempting” even the figures of desires and the becomings of subjectivities.

The urge to create a continuous control of an economic and consumerist reality more than ever echoes (and most certainly serves as a political apparatus terrain of experiment) the various forms of psychopower, the strategies of neuropower and even more radically what some American strategists (in another perspective) called, as soon as 1994, “neocortical war” [SZA 94].

This is the reason why marketing forces realize that they must somehow dig deeper into the analysis of the practices and transactions that social networks foster. Indeed, in these social networks: “In this context of the epochal trend towards individualistic life forms reveals its immunological significance: today [...] it is individuals who [...] break away from their group bodies as carriers of immune competencies [...] to disconnect their happiness and unhappiness from the being-in-shape of the political commune. We are now experiencing what is probably the irreversible transformation of political security collectives into groups with individualistic immune designs” [SLO 13, p. 153].

Social networks indeed provide an extraordinary milieu for experimentation, in which we play out the opposition of collective and commons against the rise, with aggregates, of “The axiom of the individualistic immune order gained currency in populations of self-centered individuals like some new vital insight: that ultimately no one would do for them what they do not do for themselves. The new immunity techniques [...] presented themselves as existential strategies to ‘societies’ of individuals in which the long road to flexibilization, the weakening of ‘object relationships’ and the general authorization of the disloyal or reversible

inter-human relationships had led to the ‘goal’, to what Spengler rightly prophesied as the final stage of every culture: the state in which it is impossible to decide whether individuals are diligent or decadent” [SLO 13, p. 154]. On this battle field, marketing forces claim to be a reference point, a trustworthy third party, an apparatus that proposes directions in this jungle of desires, instinctual urges and addictions by means of overexposing the logics of usage and their criteria and discourses of overexposing the doxic plane of immanence. The claim that their evaluation mechanisms, viral and mimetic mechanisms and wisdom of stupidity examples can serve as landmarks.

As François Bourdoncle writes “Every time, the logic of usage prevails. The same piece of information (a comment on a blog, for example) can be structured in various ways according to how one wants to use it. Therefore, the writer of the piece of information is clearly not in position to know or predict all the uses his written production will be put to”.

All this is in line with the general trend described by Sloterdijk, in which “a lighter form of subjectivity, let us say the postmodern ‘user self’, is beginning to replace the more ponderous form of subjectivity, the ‘educated self’ of the Modern Age”. “The user is the agent who no longer needs to become an educatedly formed subject, as they can ransom themselves from the burden of gathering experience. The word ‘ransom’ refers to the relieving effect that homogeneous forms of content items of information grant their user as soon as they no longer need to be acquired through time-consuming training but can simply be ‘retrieved’ after a brief introduction to the corresponding techniques” [SLO 13]. Overabundance in the Crystal Palace means that access to everything that exists in the form of merchandise is greatly eased.

Marketing works as a claim to be providing valued cartographies of usages and their attached discourse utterances, as a claim to be proposing a partial reflectivity on them in order to ever revive consumerist desires and the much celebrated confidence. That confidence is a potent narcotic indeed to the point of potentially being able to bring about the pacification that some have been dreaming of.

The designers of such apparatuses thus have to negotiate with two opposing logics: “(...) a normative or ‘top-down’ logic, promoted by the

advocates of the semantic web, which ensures interoperability and easy analysis but involves significant costs for its implementation; and a ‘bottom-up’ logic of emergence, promoted by business industries (Google and Exalead) and web experts, which ensure the universality of the applicative domains (including all the information, whether structured or not, and all the uses, whether anticipated or not) at the cost of the ease of implementation” [BOU 10].

He who is able to extract and exploit the graphs built on the (singular and /or collective) digital, semantic, behavioral and geo-localized traces, this one is in a dominant position within the political, libidinal and strategical economies, i.e. within the marketing field. Value extraction and graph theory are intimately related. He who is able to exploit the temporal regimes and the trajectories (the relatively complex navigational strategies and procrastination analyzed by “clickstream” research) that surround the decision to buy or not, this one is in a dominant position to predict consumerist patterns and even to achieve the performance of urges.

At the core of this marketing field of operation, we find out that the economy of attention is at stake. “The reproduction of our abundance societies is shifting its focus onto a new kind of scarcity: Up to now, material resources constituted the scarcity object that economists studied, greedy as they were in their attempts to “give” us more goods to consume; nowadays, attention time is becoming the main appropriation object, the epicenter of the conflicts that rage across our data-saturated (cultural) economies” [CIT 12].

Geolocalization and the reterritorialization of semantic and behavioral digital data are gaining momentum, despite the tale we were told of deterritorialized data that could be thought of independently from the entangled territories of the world (the well-celebrated, void riding, digital identities!). This complexifies the nature of consumerist assemblages.

In the digital fold of the world, through the interfaces and back-and-forth weaving of territories, geolocalization practices resonate with, in tight interaction, the relational geographies of the trajectories, navigations, wandering and roving on the Internet stratum. The so-called “clickstream marketing” initially worked on such cartographies. Now, coupled with other types of cartographic practices, it will enable new hermeneutics, as we have

mentioned before. This ability to evermore precisely determine the geographical location of individuals or groups and of objects involved in transactions or relations is significantly affecting marketing practices and conceptions.

For the time being we can simply describe this evolution as unfolding along four interacting dimensions: geolocalization, orientation – disorientation, navigation, temporalities. The first dimension reterritorializes, the second is the expression of behaviors in the topological, relational space of the Web, the third refers to the types of progressions one can trace in the nonlinear, hypertextual and almost chaotic digital space and the fourth one refers to exploration rhythms, to ratios of speed and slowness in exploration times or decision times.

This is how an increasing number of geospatial and semantic ontologies develop. This development is a means to satisfy the need to model, analyze and visualize multimodal information, for the latter is the only type of information that can provide integrative approaches encompassing spatial, temporal and thematic dimensions as well as informational, cognitive and semantic categories. Similarly, a growing number of studies investigate the decision-making mechanisms of consumers via their online purchasing behavioral patterns. The aim is to look into how the various online decision-making mechanisms used by consumers influence the complexity of their purchasing behavior. The ends of all this, as we mentioned earlier already, is to elaborate increasingly efficient predictive models.

### **1.10. Personal data: private property as an open and unstable process**

At first sight, stubbornly insisting on protecting so-called personal data seems entirely legitimate. For some, this insistence is even the central, absolute axiom of the political and democratic reflection that remains after the immersion in the digital and performative environment.

But, depending on the perspective in which it is thought of, this notion may not necessarily be relevant to democracy. Of course, upholding the notion leads to distinguishing “personal data”, “private domain”, “visibility and invisibility regimes”, of course it implies redefining the liability or,

conversely, immutability of zones of secret and the role of cryptic objects and, of course, it entails knowing who controls their production and dissemination, but these questions must be investigated in a pragmatic, differentiated, negotiated and open manner. In the perspective of industrial production, this even is an emergency. As François Bourdoncle states [BOU 14], “This law is a law of exception that dates back to 1978, when in France there were hardly more than a few dozen mainframes and, here and there, one small database. Nowadays, with the advent of ‘big data’, one cannot go on requesting this mandatory authorization from the National Commission on Informatics and Liberty prior to any data collection. What we need is an appropriate law whose logic enables validating a project on the basis of its industrial ends, or of the processes involved. For example: would an insurance company be allowed to take into account the speeding patterns of a driver-client, recorded by the sensors of his car, to evaluate his fees?”

We should actually endeavor into an even more pragmatic approach. In other words, we should not refrain innovation and adaptive evolutions. We should not hinder anthropological and political innovation. François Bourdoncle’s example is illuminating this question because it refers to insurance policies and fees, grounding them on the concept of behavioral prediction(s) and on its supposedly natural doxic legitimation. Actual bad drivers must pay up.... This kind of principle, if applied systematically, bears with it dangerous implications that are easy to foresee.

Let us assume that “pragmatic” means “negotiation” of the validating logics of not only industrial processes. This implies that we need to be more ambitious and to bring hitherto overlooked processes on the game of Go that democracy consists of: the “processes of judicial and collective individuation”, understood as the temporary agreements that grant this or that status to this or that data or dataset in the process of knowledge and value construction–circulation–transformation. In any performative society, whether “personal data are an anomaly” is a question that deserves a lot of attention. Several means of analysis, several influential forces and several strands of resistance try to elaborate, collaboratively and conflictingly, answers to that question.

*One of these means consists of imagining apparatuses that redistribute knowledge production and help the general audience appropriate data*

*mining technologies*. The aim there is to improve the diffusion of intellectual technologies, so that various heterogeneous collectives may use them to develop distributed creative socio-cognitive activities at various levels of organization. This would foster the “bottom-up” development of “data-management” practices. In other words, the local, varied and heterogeneous agents would, too, be able to extract knowledge and data from the processes of creation, adaptation, social and environmental innovation, etc.

This would also mean that these collectives, which come in various sizes, would keep a tight grip on the processes of social and political definition and elaboration of the digital empiricist narratives. They would be in control of what this large-scale acquisition of data involves. They would maintain an intimate relationship with the narrative modes, their extension, their evocative powers and with the anthropological labyrinths they open. This is the context in which we must pay attention to the obfuscating techniques and models, because they could prove to be powerful resistance techniques to the generalized surveillance–sousveillance [NIS 11]<sup>55</sup> paradigm.

So, we suggest thinking and acting, if not toward taking data mining and algorithmics from the hands of the great molar machines (it would be illusory to believe we could steal the tools of such masters as the scientifico-political, imperial or postimperial grabbing machines of the marketing or health systems, etc.), at least toward working on the dissemination and spreading of multiple micromachines of local data extraction, small navigation and connection machines and handcrafted writing–reading machines. In other words, we should strive to create the conditions of the emergence of molecular, techno-political counter powers.

One could also look for ways to make the great machines adaptable to the small apparatuses. The former would thus open themselves to the renegotiation of their techno-political position and status and, why not, even prepare their own dismantlement. This could actually be a strategic line that the public OD movement could further: to promote, in specific economic forms, the dissemination of applications or elements of applications that could be exploited or combined by various individuals or groups. This would entail designing formations in a manner that would be more consistent with

---

55 On the notion of sousveillance, see [MAN 03, QUE 10].

the algorithmic becoming of societies. Such a strategy would consist of creating conditions enabling basic agents to use apparatuses to resist the concentration of the means of production and extraction of knowledge to fight the curbing of cognitive ecologies. Indeed, in the status quo, cognitive ecologies are restrained by the non-dissemination of microtools for data mining, cartography, etc. We must aim to nurture all that faces, confronts, bypasses, wraps or undermines the continuation of the dominating apparatuses that promote specialization of knowledge and the consequent professional monopolies and asymmetric data access and reuse. And even if we managed to make recursive loops proliferate, loops that would breed reflexivity and open wide the possibilities of counter powers... This would be but one step in the long march ahead.

In 1972, the anti-Oedipus proposed ways of creatively resisting that go beyond disseminating relatively simple, small-scale noomachines. They consist of calling on to machinic innovation, which indeed is central to what some call noopolitik [ARQ 99], others noopolitique (Bernard Stiegler) and others even “neocortical war” (US-Army).

Agents and powers are immersed in the all-encompassing process. They are therefore irremediably confronted to the democratic, political, strategic issue of thoroughly understanding the nature of the following relationship: how does the dissemination and dispersion of new intellectual technologies relate to the genesis, within the social fabric, of novel power relations based on the knowledge-power apparatuses that emerge from the digital folding of the world?

They must understand how the differentiation and dissemination processes relate to the economic and strategic expansion enabled by the renewed transformations that collective intelligences make possible.

For example, new “socio-cognitive habitats” could be set up to host the controversies inherent to any becoming brought about by collectives to build the conditions in which we can openly be “in the milieu” of political, economical, judicial, scientific and religious narratives born by digital networks (which do not emancipate by the sole magic of their digital network nature).

One must, on the contrary, come to terms with the fact that digital networks may rather set up new forms of control and rigidity that operate at

an “anonymous, non-human, a-signifying and material” level. Moreover, since there is not a strictly binary opposition between centralized and decentralized networks, we must understand that they operate as “rogue swarms” as much as “mainframe grids”. This understanding should help us be aware of the constraints they impose on open systems in the perspective of democracy.

The co-functioning modes are difficult to fully understand, because we deal with complex hybrids, which can be both a-centered and centered, with norms distributed all over and with interfaces that do stimulate the required recursive loops, but with varying degrees of conviction.

The question of interfaces and software applications, as well as the possibility of access (if only partially) to the data banks, to produce new data and knowledge becomes a strategic issue. It is central to the definition of the coming democratic assemblages.

Let us now slightly shift our point of view and consider collective intelligences in the perspective of companies and more generally in organizations.

The socio-political scope of interfacing regimes is, as we have seen, essential. This specific context is not different from other environments in that the modes of actualization of control societies as well as of surveillance societies, understood against a background of transforming production relationships, force us to think the evolution of semiopolicies, which unfold and incarnate themselves into increasingly heterogeneous apparatuses. We thus have to develop a polemical stance toward the emerging means of semiotic control. We need to propose a better understanding of the processes of capitalistic seizure that, in Deleuze and Guattari’s words, are now the “epitome of semiotic operation” [DEL 87].

The “machinic interfaces” are central to differentiation of the transformation of reticular economies and to the transformation of the processes of semiotic seizure. The variation of the technogenesis/sociogenesis couplings is realized under the criteria and constraints of liberal political economies, which leverage socio-cognitive, passion-based or libidinal economies. The latter can be of various levels of complexity. Last but not least, although it is usually not sufficiently analyzed, machinic interfaces play an active role in the transformation of work temporalities as

well as in the transformation of the relationship between speed and slowness, which in turn may “deteriorate our experience of time” in digital network environments.

From Koselleck to Virilio and Luhman<sup>56</sup>, these transformations have been considered as issues raising from the compression of the present and the acceleration of sociotechnical change. The latter, in their perspective, is perceived as “an acceleration of the rhythm of experiences and action-orienting expectations, and as a shortening of the time periods that could be defined as pertaining to the present, in the various spheres of functions, values and actions” [ROS 10]. One must however be careful neither to abusively take for real nor to essentialize the notion of acceleration and deceleration, of speed and slow. One would then miss the intensive dimensions of time and events that are necessary to understand the struggles and resistance in the tensed battle field in which companies are relentlessly fabricated [GUA 81, LAT 12].

### **1.11. The figures of the network**

Nowadays, we know too well, as we experience it daily, that the network is everywhere and all the time present as an intelligibility and an organization principle but also as the central black box. The figures of the network are indeed proliferating. We meet the network as a concept and encounter networks as apparatuses, as territories, as organizational modes or as politico-strategic actants on any possible substratum.

Within the networks, maps and graphs are continuously being made. One finds nodes and edges. One measures links, evaluates connectivity, stabilities, metastabilities, resilience and plasticity or on the other hand brittleness and rigidity. And, as we said already, the performativity of networks is constantly valued.

Networks can be classified according to a complex geology of underground networks and surface networks. They measure up to the “infinite mafia networks”.

---

<sup>56</sup> On this, see [ROS 77] and [VIR 86].

One details their differences, against the infinities of numbers, agents and actants. One venerates them or hates them which, at the end of the day, boils down to the same.

Omnipresent in the great change that is currently happening, the network, whether projected on an imagined reality or used to shatter essentialist discourse, is the hot bed of theoretical reflection, the new home of organizational production and the focal point of the issue of collective becomings. In the network, various lines of thought intersect. Notions like these of milieu, territory, relation, topology, or even trial meet in the concept of network. Several theoretical fields diffuse through the network idea. One finds it at the core of the Latourian associative thinking, in translational sociology, in Burt's sociology, etc. In many ways, networks reflect the "rhizome" concept of Deleuze and Guattari's philosophy. Networks also play a part in software and documentation issues, in the algorithms of corpus linguistics. All these roles imply that the network is a significant player in political and geopolitical issues.

Indeed, Guattari incidentally signals that to confront this "Hegemon" we need to know how "The means of conceiving an alternative outcome, an escape from machinic enslavement by Integrated World Capitalism, may still be nurtured. The problem is: does this mean that a-signifying<sup>57</sup> semiotics simply and only obey a network form and thus resistance dislodged from it

---

57 Felix Guattari: "The whole fabric of the capitalist world consists of this kind of flux of de-territorialized signs – money and economic signs, signs of prestige and so on. Significations, social values (those one can interpret, that is) can be seen at the level of power formations but, essentially, capitalism depends upon non-signifying machines. There is, for instance, no meaning in the ups and downs of the stock market; capitalist power, at the economic level produces no special discourse of its own, but imply seeks to control the non-signifying semiotic machines, to manipulate the non-signifying cogs of the system" (Molecular revolution F. Guattari 1984).

Also in Felix Guattari and Gilles Deleuze: "Unlike signifying semiotics, a-signifying semiotics recognize neither persons, roles nor subjects. While subjectation concerns the global person, those highly manipulable subjective, molar representations, "machinic enslavement connects infrapersonal, infrasocial elements thanks to a molecular economy of desire". The power of this semiotics resides in the fact that they permeate the systems of representation and signification by which "individuated subjects recognize each other and are alienated from each other", in *Semiotic Pluralism and the New Government of Signs*, Homage to Félix Guattari, translated by Mary O'Neill, 2006.

must take its form and is, in fact, determined for the network is hegemonic (another master signifier) – for even the state is thought to be an organizational and political network [CAS 00a] – and the multitude is a distributed one [HAR 04], too?” This is a troubling issue.

We are then facing various network forms that are both differentiated from each other and hybrid. The forms vary according to the actants that constitute the network. They are expressed in two modes. The first is mainly centered, hierarchical, distributed of a fractal and even multifractal type (at the organizational and ideal – ideological level, and at the level of norms, rules, routines, interfaces and boundary objects that are immanent to production mechanisms); the other one is mainly a-centered, distributed, of a multifractal type [ROS 74]. The issue of interfaces and connecting devices is crucial in both modes but in our opinion, more so in the second case, that of a-centered, “swarm” systems.

Indeed, companies rely on assemblages of networks that the digital work environments try to exploit and manage. These assemblages are organized (to an unprecedented level) in interwoven strata, levels and territories. The rigidity versus plasticity tension that runs through these networks, although it depends on the associated milieu that constitutes their condition and substratum, is expressed by the tension between what is called the *rogue swarm* (a rough, unstable swarm) and the *mainframe grid* (a tightly structured, stable network). Thus assembled, the forms, levels and territories are linked by multiple pathways and recursive loops of varying quantity. These connections all rely on relatively elaborate information systems.<sup>58</sup> In this perspective, regardless of the specific figures a network is embodied in, the software question, that of connectors and interfaces, is crucial. In the case of a-centered or “swarm” systems, it is even more important. One could even consider that, in the administration of the process of work and organizational and collective networks, the network form is less essential than the “machinic interfaces” between the agents/actants of info-cognitive flux and between hypertext memories.

---

58 We study the issue of interfaces in our short analysis of the “swarm collective intelligences”, in the context of our examination of the question of contemporary encyclopedism. Generally, interfaces are, in the digital fold of the world, the main synaptic population (adaptors, connectors, pointsmen-cartographers of human and non-human actants, semiotic blocs).

The scale at which we need to investigate writings has changed while, every day, new constraints have had to be deployed on the assemblages and semiotic microworlds inhabited by the actants.

The interfaces also regulate the vicinity interactions in massively topological, relational spaces. In order to exploit the complexity of collectives as efficiently as possible, we need to be able to elaborate high levels of descriptions as well as to combine, part-automatically, writings. To do so, we must rely on the diffusion (according the various techno-political and juridical criteria) of machinic interfaces endowed with efficient apparatuses to filter, index, search, contextualize, map, annotate, as well as with software to process data and create hypermedia writings. More, the networks must be endowed with mechanisms to protect and distribute data and knowledge, and we know that these mechanisms are the bone of contention of many a harsh and complex political-juridical battle.

This is why we think that the notion of “meme”<sup>59</sup> is useful to refer to the great variety of informational and semiotic blocs that partake to these combinations.

Writings, routines, memories, synchronization, resonance, convergence and coordination have always been central to the functioning of complex collective entities and to the process of work, including (in specific perspectives) the process of intellectual work.

### **1.12. Machinic interfaces: social subjection and enslavement**

The forms of network organization are therefore based on novel “machinic interfaces” under massively distributed heavy constraints. These constraints are local and seem to apply more autonomously in strongly a-centered networks than in centered networks.

Interfaces are therefore very rich “milieus” in which, according to Lazzarato, relations between “social subjection” and “machinic subjection”

---

59 (See note 19) and [DEL 00].The term *meme* originated with Richar Dawkins’ 1976 book *The Selfish Gene*. It is the “gene” sounding shortening of Ancient Greek *mimeme* (imitated thing). Dawkins also chose this word for its similarity with the French word “mème” (same) also it has a different etymology. Memes were presented by Dawkins as cultural entities that could replicate similarly to the genes of biological evolution.

processes are negotiated. From this perspective, we see how interfaces regulate and define the combinations between two types of processes: On the one hand, processes of semiotic overcoding of social subjection of cerebralities on the basis of signifying semiotics (these are semiotics in so far as they are molar political operations of individuation) and, on the other hand, non-representational processes of machinic subjection on the basis of a-signifying semiotics.<sup>60</sup>

The notion of machinic subjection is a complex one. The issues attached to new types of reflectivity about access to the conditions of socio-cognitive practices are especially difficult to tackle.

Of course, a-signifying semiotics operate as synchronizers and modulators of the preindividual and preverbal components of subjectivity. They operate affects, perceptions, emotions, etc. like parts, components or elements of a machine (hence the machinic subjection). But, in the context of cognitive work and mass intellectuality [MAR 58], they also operate as synchronizers of conceptual fragments of cerebrality, operating memes and their assemblages like parts, components or elements of a cerebral machine.

How, then, can we rely on these new black boxes, on automatic protocols that, often long before any cognitive activity, have become the sole agents in

---

60 In “Semiotic Pluralism” and the New Government of Signs Homage to Félix Guattari”, translated by Mary O’Neill, Maurizio Lazzarato writes: “The semiotic components of capital always operate in a dual register. The first is the register of “representation” and “signification” or “production of meaning”, both of which are organized by signifying semiotics (language) with the purpose of producing the “subject”, the “individual”, the “I”. The second is the machinic register organized by a-signifying semiotics (such as money, analog or digital machines that produce images, sounds and information, the equations, functions, diagrams of science, music, etc.), which “can bring into play signs which have an additional symbolic or signifying effect, but whose actual functioning is neither symbolic nor signifying”. This second register is not aimed at subject constitution but at capturing and activating presubjective and preindividual elements (affects, emotions, perceptions) to make them function like components or cogs in the semiotic machine of capital” [LAZ 06].

In [GEN 08], we read “Guattari thought that miniaturization was a means for capital to endow individuals with apparatuses that could manage their perceptions by connecting them to the machinic phylum of general audience technology, which addicts them crazy to self-prescribed trips... Such a productivist dope inserts subjectivities in a-corporeal networks. To detox from them usually requires disconnection”.

charge of the fundamental, primary functions of sorting and classifying? How to make informed choices or at least find a balance between what seems to be a kind of *cogitatio caeca*, a blind activity, and what we believe to be rational cognitive reflection embedded in socio-cognitive practices.

Machinic interfaces moreover give “ontological consistency to something that happens between two heterogeneous strata involved in coding or semiotic expression. These strata have protorelationships of alterity which are, on the one hand, ontogenetic, with all that surrounds them and contribute to maintaining their existence and, on the other hand, phylogenetic, with all the machinic interfaces that came before and with all the virtual protorelationships that will come after” [GUA 91].

In the digital milieus of work and organization, all this is expressed under the constraints of procedural performativity and economic performativity. This is precisely against these constraints that users can potentially desire new conditions of individuation [SIM 07, STI 04].

So, what are the leads to this capacity to reclaim autonomy, confront and actualize the machinic subjection and enslavement regimes that cognitive workers endure? This is a difficult question.

Machinic interfaces define and feed the internal and external pragmatics of the social – technical machines and organizations, in our very extensive meaning (not only that of classical writings, search engines, cartographic devices, automatic indexing, metadata production and management, publishing software, natural language and non-exclusively linguistic semiotic processing, blogs, wikis, but also that of artificial skins, biotechnical prosthetics, etc.).

They translate, filter and determine the types and numbers of possible connection and relations within the autopoietic system constituted by each specific apparatus or organization.

They also serve as mediations, such as membranes that regulate the evolution of the system – environment couplings and are involved in the filtering of the environment events that will activate specific internal states

within the organization, be they beneficial or not<sup>61</sup>. They also define or provide consistency to interstices, zones of indetermination, motion or boundary erasure, which fill the existential territories of work. These zones and interstices continuously disrupt and upset, across molar organizations, the administrative and corporate desires of collective intelligences, desires that consumes themselves trying to always striate the libidinal energies and economies. They mediate the passage between the network's internal pragmatics or digital work environments and external pragmatics that come from other networks, other space times of work that are relatively autonomous in comparison with the growing dominance of the former. This is where resistance and social-political creation can come in full play.

These simultaneously technical, cultural, social, economic and cognitive transformations are under way. It must be said that this open situation in which the economy and society are mutating raises many issues not only about individual freedom but also about research and creativity.

### **1.13. Collective intelligences and anthropological concerns**

One of the major challenges we will have to rise to in the future is the necessity to respond as creatively as possible to anthropological concerns, climate change, biodiversity issues, as well as to the novel forms of production, the new productive relationships and their industrial consequences. Challenges are also set by issues related to energy transition, bio-politics and ethics of access, by the questions of cultural diversity and the renewed definition of what “personal data” is. The challenge also consists of finding ways to disseminate intellectual technologies to serve as counter powers in a data-centric society that is based on wide socio-cognitive disparities.

We therefore need analysis models and conceptual frameworks that rise up to this challenge. We need design methods and common use principles

---

61 According to Pierre Levy: “A machine is *interfacing* and interfaced. It translates, betrays, folds and unfolds the flux produced by the upstream machine. It is itself made of translating machines that divide and multiply it, make it heterogeneous. The interface is the “foreign policy” dimension of the machine, enabling it to integrate new networks and to process new flux”, in “Plissé fractal ou comment les machines de Guattari peuvent nous aider à penser le transcendantal aujourd’hui” (The fractal Fold, or how Guattari’s machines can help us think the transcendental today), *Revue Chimères* No. 14.

that all users recognize through the establishment of collective intelligences of usage of a new type. In order to apprehend the scale of change in our modes of intelligibility, we must also reach an understanding of the various ways in which “signifying semiotics and their linear power phrases” can combine with super linear a-signifying automated processes. Indeed, this is currently happening.

In this perspective, in the context of this anthropological extension, the digitalization of the Sign, which has been ongoing for the past 50 years, makes the need to escape the imperium of signifying linguistics more pressing. Since they come with globalization, a-signifying semiotics are central to the fabric of the capitalist world and even of the world as it is. We need (and we have already explicitly insisted on this necessity) to fully apprehend the role played by these a-signifying semiotics. In line with Guattari, the mathematical sign machines, the scientific, musical and technical compounds... all “the a-signifying machines or semiotics, although they “keep” relying on signifying semiotics, only use them as devices, as instruments of semiotic deterritorialization that (then) enable semiotic flux to establish new connections with the most de-territorialized material flux. They force the signifying to work as a “tool”, without co-operating with it on the same level, neither semiologically not symbolically; this way, a-signifying semiotics do not depend on the good semiological form, although they use them to communicate in the manner “required” by the dominant systems”.

This anthropological process increasingly radically expresses the complex intermingling of human and non-human agents. This implies that we build ourselves a specific hyperpragmatic reflection that would be able to account for the heterogeneity of narratives and enunciation regimes, all the more that we are now immersed in the complex structures of the “Internet of Things”.

Such hyperpragmatics cannot be based on linguistics or on the imperium of the linguistically signifying, as Guattari describes it [GUA 12].

We need to build ourselves a framework of intelligibility and find means to enable the emergence of such pragmatics. They are the only tools we will have at our disposal to deal with the coupling of linguistic and semiotic pluralisms with their associated micropolicies.

This is why we are so adamant about Deleuze and Guattari's notion of "collective assemblage of enunciation". The notion allows a better apprehension of the modes of communication between the linguistic and the non-linguistic. It then becomes possible to say that "an assemblage of enunciation does not speak "of" things; it speaks on the same level as states of things and states of content" (see *A Thousand Plateaus*). To do so, we need to be able to exploit pragmatics that are non-exclusively linguistic. Pragmatics, then, that display two components: the first could be called *generative*, since it corresponds to linguisticization and semiotization modes, the second is the *transformational* component, non-linguistic and a-signifying.

Here, again the Guattari and Deleuze approach resonates with that of Bruno Latour: "Recently there has been a tendency to privilege language. For a long time, it was thought to be transparent and alone among actants in possessing neither density nor violence. Then, doubts began to grow about its transparency. Hope was expressed that this transparency might be restored by cleaning language as we might clean a window. Language was so privileged that its critique became the only worthy task for generations of Kants and Wittgensteins. Then, in the 1950s it was realized that language was opaque, dense and heavy. This discovery did not, however, mean that it lost its privileged status and was equated with the other forces that translate and are translated by it. On the contrary, the attempt was made to reduce all other forces to the signifier. The text was turned into "the object". This was "the swinging sixties" from Levi-Strauss to Lacan by way of Barthes and Foucault. What a fuss! Everything that is said of the signifier is right, but it must also be said of every other kind of entelechy. There is nothing special about language that allows it to be distinguished from the rest for any length of time" [LAT 88].

Latour highlights several enunciation regimes on the basis of the following definition: "enunciation, as the sending of messages and messengers, is what enables us to remain present, to be, i.e. to exist", although this definition is, according to him quite unrefined<sup>62</sup>. One of these enunciation regimes, then, is

---

62 Bruno Latour, *Petite philosophie de l'énonciation Pour Paolo à la mémoire de notre amie commune Françoise Bastide* (Small piece of philosophy of enunciation for Paolo, in memory of our common friend Françoise Bastide): "This is the only ontological postulate we will need: we set out from a continuous and risky existence – continuous because risky – and not from an essence; we set out from the act of being present, not from permanence".

of particular interest for the matter that concerns us here. Indeed, among the regimes that focus on the quasi-object (be it technical, fictional or scientific), the technical regime is an important one.

“What is a quasi-object? This is not – this is not mainly – a sign. This is the enunciator being displaced into another body, a dissimilar body that stands still even when the enunciator withdraws away, a body that speaks to the target of enunciation while holding it still. This is the main characteristic of technical enunciation”, according to Bruno Latour. “The trick of the technical thus consists of shifting the milieu of interaction. The interaction that once consisted of two similar bodies grappling with each other becomes the interaction of dissimilar bodies. In the wake of this trick, in the subtle weaving of human and non-human, we find what I would call plaits, or combinations. As humans, we have been forming combinations with non-humans for a long time now, this is how we keep being present. This is probably even how we became human”<sup>63</sup>. And the Internet of Things world (the world of “the Internet of everything”) undoubtedly creates an unprecedented complication of this weaving task<sup>64</sup>.

This is why, in the alliances and alloys of enunciation regimes and semiotic regimes, “This very specific trick (the enunciation regime of the technical) leaves marks on the grappling mechanisms, interfaces, impacts, grasping, both of human bodies and of non-human assemblages. However, since in this regime the enunciator withdraws to let the quasi-Thing perform its signifying work alone, we (therefore) must track down the tenuous marks that enable the continuation of such an absence”<sup>65</sup>.

This marking has now become explicit, and explaining it clearly has become the main task of analyzers of digital becomings and NBIC. This explicitation is in some ways the carving of reflectivity into the flesh of writings and mediations, thickness of skins, interfaces and plasma of data. It

---

63 Bruno Latour, *Petite philosophie de l'énonciation Pour Paolo à la mémoire de notre amie commune Françoise Bastide* (Small piece of philosophy of enunciation for Paolo, in memory of our common friend Françoise Bastide).

64 We are still in the limbo of a new Renaissance, in the sparkling creation of novel forms, while polycentric powers still resist, in a flurry of new collective assemblages of enunciation and of micro-noo-machine-led cerebral guerillas. Admittedly, a struggle of uncertain outcome.

65 See footnote 63, above.

also hosts renewed “differends”, because the intelligence aggregates, which seamlessly thread through its framework, silently giving substance to the world surfaces, are, if not radically contingent, at least subject to a process of cerebral, neo-natural selection<sup>66</sup>.

### 1.14. Toward a new encyclopedic state: first overview

Within the framework of the globalization processes, the great anthropological transformation under ways requires us to collectively think – in line, again, with F. Guattari [GUA 89, GUA 92] – social ecology, mental ecology, environmental ecology and to face the current bio- and psychopolitical becomings. The main lines followed by technological advances from the second half of the 20th Century are now resonating with each other.

The three aforementioned ecologies are in crisis, and the question is asked of the possibility to make new modes of existence emerge, in the context of changes that affect internal processes of differentiation within the systems or relations between beings [BAT 86, BAT 77]. This, more than ever, requires we questioned what affects the condition of a new Renaissance, on the basis of the transformation of the knowledge systems, whether that knowledge be of religious or scientific nature.

In this context, the question of the mind is essential. We need to be searching for one or several “Noopolitics”<sup>67</sup> that may help the setting up of new material and ideal conditions in order to prepare a specific Renaissance.

---

66 This is why we must describe cultures and intelligences in ways that enable the exhibition of parameters that vary within cultures, so that we can build, with these parameters, a space in which to configure the strict or adaptive, stable or evolutive rules of cerebrality within its productivity. This way, the adaptivity of cultures and intelligences might be able to foster ecological niches of various degrees of fertility, in which intelligence might grow. In the cognitive domain, the Internet stratum may enable both an understanding of the offsprings of cerebralities and a compass to explore the depths of virtualities, into which we are inexorably drawn. But nothing is less certain.

67 Here, we understand “Noopolitics” in Bernard Stiegler’s sense. In other words, as “Politics of the mind” associated with “psycho-power” as the central locus of nowadays’ political anthropology. We also understand it like John Arquilla and David Ronfeldt: “noopolitik” is a notion opposed to “Realpolitik”. Here, it applies to the redefinition of power relations in the domain of geopolitics and strategy, on the basis of collective intelligences and conflicting subjectivities.

That renaissance should be specific in so far as it should enable us to face the crises and challenge mentioned above. The question of the mind is influenced throughout by the transformation of writing systems. This is not a question of a Renaissance in a technologist perspective. On the opposite, the question is how to approach it on the basis of the changes in the “cortex-silex coupling” [STI 94], in the perspective of the impacts of the adoption of new “brain–intellectual technologies coupling” [NOY 95] on the thought collectives and relational compounds. The development of the anthropological stratum is now an important part of our associated milieu, and it is as important and even more important for us to focus on creativity (in the sense developed by [WHI 79]) than to focus on innovation. The importance of this focus on creativity is steadily growing. If we are to prevent morbid symptoms from developing, thinking creativity in terms of some requisites is a pressing need. The various issues attached to the evolution of knowledge organizations, the various incarnations of the web and of its becomings as well as the transformations of the socio-cognitive systems are all inseparable from the intensive carving of thought collectives. The conditions of the development and propagation of what could become the sketch of a temporary stable form of open and processual general knowledge are emerging, if tentatively. This is of major interest for those who endeavor to outline the shape an open rationality to come, one that would both express and be expressed by cultural, philosophical or religious dissonances, which come from the “unequal development” of the specific type of rationalism one finds in the techno-scientific sphere of the west.

One possible question would be: which type of knowledge system is now developing on the basis of the scientific and technical spheres and their attached rationalities? Referring to Bertrand Saint Sernin’s analysis “Will knowledge as a whole keep on being presented as an aggregate of specialized subjects whose internal relation are bound to remain vaguely defined? Or, on the contrary, is its organic unity becoming visible? In the former scenario we will at best obtain a classification of the scientific domains; in the latter, we will get a system of knowledge. Both scenarios have their promoters: in the past, Mach and Duhem advocated for the first approach; the second is supported by, for example, Cournot and Whitehead”<sup>68</sup>.

---

68 B. Saint-Sernin, *Le rationalisme qui vient*, Gallimard, 2007.

Relying on our experience and on the understanding we now have of our Western Renaissance, the issue could be formulated, from a different perspective, in the following words: which conditions would enable us to overcome issues such as the explosion of knowledge or the dispersion and transformation of boundaries? To “overcome” would mean in our case to find a new way to “encyclopedize” knowledge in order to think about the intermingling of relations, writings, concepts, perspectives and translations in a way that would enable us to think, in the beautiful phrase of M. Bitbol, “within the world” and its large system of internal relations [BIT 10]. Today, memories and writings are tipping into the digital universe. Although very unequally, hypertext networked memories are developing. This could at least enable an overview of the dynamics of relational compounds and knowledge either acquired or in a process of production.

But encyclopedism is nowadays “fragmented” [JUA 07, NOY 14], and in order to think it and elaborate it we have to come out further from the discourses of essence, monovalent ontologies and bivalent logic, which are the inherited building blocks of our cultures. The new encyclopedism must now be understood as one of points of views and processes, as one of morphogeneses. It must be reflexive and multifractal, able to provide access, at least partly, to the conceptual ethologies that constitute it and to the world of internal relations that make it alive.

In this context, how to further our emancipation from the “great divide” between the two cultures: on the one side, the scientific and technical and, on the other side, the arts, humanities and social sciences?

How to think, under the constraints of creativity, the relational systems of thought and the immanent relativity of each determination? How to raise the levels of our descriptions of these relations, as these levels of description are tied to increasingly complex schemes, while simultaneously using self-simplifying mechanisms such as black boxes (writings, specific combinatorial assemblages, interfaces) in order to be able to creatively use these thought collectives as instances of their own operating?

Still, in the context of fragmented encyclopedism and in that of the heterogeneses of thought and of the world, how to conjugate complexity and simplicity... [BER 10]. Such questions are but examples of specific ways to investigate the development and the profound issues at stake in the networked digital hypertext memories, in the writing systems and their

attached interfaces, in short in the new emergent conceptual onto-ethologies<sup>69</sup> [ALL 93, NOY 10].

The becomings of the encyclopedic question will be further detailed later on in this book.

This creates a hazy horizon that arises simultaneously from the interior of the world and from fluctuating finitudes. Through it, in any way, we observe and perceive that many lines of flight are being drawn and bring the inherited, stubborn and obsessive dialectics to their ultimate tension or breaking point.

There are concerns and creative attempts about these new conditions. They involve several fields of reflection: classifying thought (new classifying mechanisms: relational cartography), the evolution of the analogical and abductive question, the new interlacing of combinatorial semiotics that take the fragmentation of the expression substance into account, the new operating relations between speed and slowness, the new open and contextualized information retrieval devices, the new cartographic practices, the search for semiotic apparatuses that would enable a type of working on heterogeneous ontologies or onto-ethologies. These concerns and creative attempts, together with the fashionable buzz words such as Web 2.0 or Web 3.0, truly express the current reorganization of the ecology of mind and the modes of production of knowledge.

The current modes of production and circulation of knowledge raise three major issues. The first one is about the attention we must pay to the tension

---

69 More precisely, Chapter III on onto-ethologies: This non-Galilean science is the one in charge of “Bringing to light the chaos in which the brain is itself immersed as a knowledge object, (p. 203 fr) emerging along uncertain connections and rhizomatic figures causing individuations and bifurcations. Beyond cognitivism, then (because cognitive science, as a Galilean science of thought, faces the same difficulties as those plaguing the Galilean sciences of nature (p. 50, fr)), contemporary representations of thought and the latest knowledge about the brain (as an uncertain nervous system) will have to constantly cross-validate each other”. The question then becomes that of an ethology of thought that would be able to trace the unknown furrows that all new creations draw in the field of the fertile brain, be they creations of concepts, of functions or of sensations: new connections, new fertilizations, new synapses... Like a material metaphor for what brain biology is itself discovering, and not without influencing the onto-ethological nature of the concept. We use “onto-ethology” in a more pragmatic sense.

between stable and metastable knowledge or even unstable knowledge, when it is produced far away from equilibriums, in zones where dissensus and indetermination are ripe.

### 1.15. Controversies and boundaries

We live in times of controversies and divergence. The second issue is about the differential relations that arise between scientific knowledge evaluation regimes, thus about the management of perspectives and cognitive practices. How do all these vary? The third issue is about the management and representation of processes and morphogeneses that express the dynamics and “conceptual ethologies” that constitute the fluctuating or stable “associated milieu” of knowledge.

This milieu propels the issue of boundaries to a critical point where they must be considered as fluctuating zones, as the intersections of trajectories, issues and concepts.

Since they enable the partial exposure of the processual dimension of research-originated documents, the new publishing apparatuses<sup>70</sup> should also enable the apprehension of the novel boundary zones. In this perspective, the most elaborate representation we are looking for is that of morphogeneses. Such a representation should express the dynamics and local concepts that constitute the (more or less fluctuating) associated milieu of knowledge that itself both expresses and is expressed by research documents. The increasing differentiation of the types of circulating documents in fact unveils the various fields of knowledge, the disciplines and research communities as they constitute themselves. Note that the three phrases we used are not equivalent, as they refer to assemblages that are different from one another. Their rules of operation, their normalizing and constitutive processes, as well as the way they build and constitute “boundaries as subjects” do vary.

This is why each scientific assemblage, in its discipline form, has to become reflexive when it tries to further its theorizing (and politicizing) of the question of boundaries. They sometimes consider the latter as an apparatus to filter and control knowledge, which entails the risk of erring into what could be called *autoimmune diseases of disciplinary bodies*:

---

70 See, later in this work, the notion of “documentary processuality”.

*scholastics, dogmatism, lack of reflexivity.* The very conditions in which these boundaries are constituted nevertheless demand that they endorse processual aspects, which can trigger increasingly heterogeneous assemblages.

Since boundaries are omnipresent, critical research about science involves making them evolve into zones of creation and transformation. Under the pressure of the new modes of writing and digital memories, the boundary zones develop permanent and complex movements. They involve territorialization, deterritorialization, reterritorializations, decontextualization and recontextualization.<sup>71</sup>

Research and thinking work must then take into account, on the basis of these zones, the fact that they progressively, increasingly acquire value as themselves, and therefore become complex actants of the reflective question.

In order to access these zones, bearing in mind the increasing fractal aspect of research fronts, the new encyclopedism must face what appears as an important challenge: to increasingly clearly highlight and represent dissensus.

The boundary zones end up acquiring enough relative autonomy to establish combinatorial relationships with novel or renewed “cognitive eco-assemblages”. They do not belong to what they separate anymore. They widen the gaps in which ways are paved for new imaginations, new becomings and conceptual, scientific worlds.

---

71 Here, we use Deleuzian/Guattarian concepts. They not only involve physical, geographical and historical territories, but also territories of the mind, the mental territories or territories of thought. By creating new milieus, the “digital noo-machines” trigger new processes of capture and coding... of flux of memory and informational flows, of writings. In short, territories of the intellect emerge, which are built on the basis of the new milieus. Leaning on such territories, very closely reflecting them, deterritorialization movements can deploy themselves and undo, at least partly, what the previous territorialization had elaborated. This mechanism ensures that thinking remains possible, emancipated from the stifling dough of what could become a homogenesis. “De-territorialization is a process that frees content (in the form of a multiplicity or of a flux) from total encoding (of form, function or signification) and makes it ride a line of flight”. (Robert Sasso, in *Vocabulaire de Gilles Deleuze*, 2003). Reterritorialization consists of making a new territory on something else “reterritorialization (is then put by Deleuze/Guattary), as an original operation, does not express a return to the territory, but rather these differential relations internal to D (Deterritorialization) itself, this multiplicity internal to the line of flight” (*A Thousand Plateaus*, p. 509).

We are not merely speaking, here, of studying the disagreements that can potentially develop between disciplines that would each attempt to think the other. Beyond this, we rather speak about more or less labile research fronts that emerge when “One realizes they must tackle, with their own means and to their own ends, an issue similar to one raised in another discipline” [SAS 03]. This is when communities and fields of knowledge confront each other, take risks and stage battles that are as many chances to test the resilience of disciplinary assemblages. These conflicts reveal interdisciplinary hesitations, open new ways that go beyond the internal pragmatics constitutive of the disciplinary fields and communities. So, we can expect the new encyclopedic modes to enable us to inhabit the assemblages where scientific or conceptual conflicts develop; a universe in which divergent actualization phenomena should proliferate.

This why we advocate for the digital publishing modes to be endowed with new publishing functions [NOY 05]. In our opinion, the most fundamental functions are precisely these that should enable the cartography of socio-cognitive dynamics, controversy zones and the transversal processes that not only operate at the core of scientific and research work, but also are essential to political intelligences.

This is why we undoubtedly must pay a growing attention to the intellectual technologies that tackle these issues.

Many pieces of work consider the “controversial co-construction” of knowledge as essential to provide access to the diversity of perspectives and highlight the benefits of conflicts. For example, the Center for Sociology and Innovation has been, for more than 20 years, leading research on the subject. On the basis of the sociology of translation, the research applies (among other applications) to developing software that enables the cartography of internal dynamics of scientific research fields and, with it, unveils their socio-cognitive structure [VIN 91].

We have mentioned how important this research is for the field of digital scientific publishing, in a time when a vast movement of open archives is emerging [NOY 05]. In our opinion, it must be more radically involved in the development of functionalities that will enable it to become a major player in the field of fragmented encyclopedism. This involvement must be particularly assertively expressed in fields such as the semantic or

socio-semantic web, where a large part of the future of encyclopedism is currently being determined.

Novel writing modes and what happens within their development must therefore be observed in the light of these types of issues. Any memory or writing apparatus is defined by what it does or can do with what thought collectives and the cultural world make of it.

The task is then to inhabit this new ecology. According to Deleuze [DEL 88], this ecology considers variations and trajectories, considers the *concepts* as processes and events and the points of view as relations. In other words, it takes into account the relativity immanent to any point of view, according to the conditions of socio-cognitive procedures, in their material, scriptural, linguistic, semiotic, human, non-human or desiring form.

Hence, by the way, the necessity of a renewed understanding of documents whereby they are seen and processed as “relational compounds”, as flux and events. Relational compounds being determined by the powers of their connectivity and by their power as attractors.

Each document is a variety of relations, associated with combinatorial capacities. It is defined by the more or less stable compound of relations of which it is both the expressed and the expression. In other words, we could say that a document is an ecology considered with its boundaries + “n points of view” that express the history of its outside, meaning the folds and unfolds that keep transforming it. It is the offspring of the coupling of its internal ecology and of its external ecology, of the mating of what converges to or is captured by it with what comes out of it. This is why the phrase “relational compound”, correlated with a true intellectual energy, seems, in our opinion, to account for the transformation.

In this perspective, the extension of the analysis of the promoters of an autopoiesis [VAR 89], within the thought collectives and machinic interfaces that come with them, would also be very interesting<sup>72</sup> (because the specter of

---

72 “An interface gives ontological consistency to something happening between two heterogeneous strata involved in coding or semiotic expression. These strata have proto-relationships of alterity which are, on the one hand, ontogenetic with all that surrounds them and contribute to maintaining their existence and on the other hand, phylogenetic, with all the machinic interfaces that came before and with all the virtual proto-relationships that will come after” [GUA 91].

traceability is haunting the new modes of work, the new modes of existence and the new modes of governmentality).

Let us point out that all this entails a generalized strategy of interfaces and therefore of norms. This constitutes a major principle of nowadays governmentality, especially when thought in the frameworks of the “becoming empire” as defined by Antonio Negri and Michael Hardt. We are indeed currently experiencing a general weakening of centralized control systems, in parallel with a strengthening of control and surveillance systems immanent to the distributed network system of production. Let us furthermore notice that these large multicentered networks are managed in a multifractal mode, involving many recursive loops and local rules implemented by increasingly elaborate digital machinic interfaces.

At all scales, from intranets to globalization mechanisms, forms are drastically shifting. There is the current transformation of Nation States into Market States (in the framework of the attempt to establish, forcefully and rapidly, a global market), shifts from traditional forms of sovereignty to new digital traces and avenues or to decentralized patterns and territories (in which the privatization of the most regalian functions, including that of war machines, goes unfettered). These shifts result in that the software issue is of major politico-strategic importance.

In this perspective, it is useful to recall Negri and Hardt’s analysis, which they developed in “Empire”, a volume which has now become a major reference.

In their work, the authors develop the idea according to which, “in the imperial framework, administration becomes fractal and aims to integrate conflicts not by imposing a coherent social apparatus but by controlling differences” (...).

Four principles are operating here. They are both the expression and the expressed of elaborate bio-psycho-politics, leveraging soaring modes of digital writing, an expanding ichnology [MER 09]. This ichno-politics is itself leveraging digital memories and the powerful intellectual technologies they are coupled with, together with multiterritorial geolocalization systems.

In other words, we speak about systems that encompass digital territories and essential territories with their subjectivation processes, their libidinal

economies, at various scales. The production of digital empiricisms is of course humongous (Big Data).

“A first principle that defines imperial administration is that in it the management of political ends tends to be separate from the management of bureaucratic means”. “In the imperial regime”, they write, “bureaucracies (and the administrative means in general) are considered not according to the linear logics of their functionality to goals, but according to differential and multiple instrumental logic. The problem of administration is not a problem of unity but one of instrumental multifunctionality”.

The second principle is the following: “to the extent that administration is singularized and longer functions simply as the actor for centralized political and deliberative organs, it becomes increasingly autonomous and engages more closely with various social groups: business and labor groups, ethnic and religious groups, legal and criminal groups, and so forth. Instead of contributing to social integration, imperial administration acts rather as a disseminating and differentiating mechanism”. The third principle states that “administrative action has become fundamentally non-strategic, and thus it is legitimated through heterogeneous and indirect means”. These three principles are, according to the author themselves, rather negative.

We therefore need to understand why it functions. Negri and Hardt define the fourth principle as the “positive” aspect of imperial administration. “The unifying matrix and the most dominant value of imperial administration lie in its “local effectiveness”. And “local economy is a fundamental condition, the sine qua non of the development of the imperial regime (...). Consent to the imperial regime is not something that descends from the transcendentals of the good administration, which were defined in the modern rights states. Consent, rather, is formed through the local effectiveness of the regime”.

The effectiveness–performativity is incarnated in particular in the proliferation of interfaces that ensure the multiplication of recursive loops and their differentiation. Relational cartographies, variations of speed and slowness relationships, variation of “meme” combinatorics... operate at the core of the socio-political question of the modes of intelligibility and

subjectivation processes. This approach, as we will see later on, resonates with swarm intelligence approaches and a-centered organizations.

### 1.16. The milieus of intelligence and knowledge

Similarly to our understanding of intelligence as “always-already machined”<sup>73</sup> and collective, we can consider knowledge as “always-already machined” and collective. The “milieus” in which knowledge unfolds and grows have radically changed in the past few centuries. These milieus, as we mentioned before, are collective assemblages of enunciation coupled with collective equipment of subjectivation [GUA 12], thus forming tangible assemblages that are necessarily heterogeneous. To put it in a nutshell, they are composed of increasing numbers of writing systems, storage modes, boundary objects, transmission and repetition modes and substances of expression. The numbers of actants and types of actants that constitute these milieus are increasing. This is a complex matter, which concentrates an ever-larger portion of the energies of the societies engaged in the intensive development of the technical and scientific spheres.

Knowledge (and its production) is increasingly often seen as heterogeneses and complex nomadologies. The question about the new production, circulation and consumption (hereafter PCC) modes of knowledge, which the term “organization” is meant to summarize (this is still far from being the dominant understanding in the mainstream body of reflection on organizations), is asked in its deeper dimension in that perspective: how to make livable, thinkable, the ecology of divergences, of points of view, the ecology of the double constraints that carry the weight of, on the one hand, the fragmentation and singularization of knowledge and, on

---

73 See, for example, Bernard Stiegler, Bruno Latour and Edwin Hutchins. Taking these collective dimensions to the forefront has become common after a body of major works were published in fields like anthropology of knowledge, knowledge ethnology as well as by the ever-growing part of neuroscience that is interested in the technical cortex/body/mediation coupling. Thought collectives, intelligence collectives have, since the middle of the 20th Century, entered a new era. More precisely, it started after the Second World War. These collective intelligences are co-evolving with the transformation of the process of work. Informational and communication infrastructures that can be quite elaborate, as well as new modes of memory, are immanent to these processes.

the other hand, its integration in relatively large trans-disciplinary assemblages? Researchers then tend to “become” sorts of (more or less complex) transit zones within the administrative, economico–scientific circulations of knowledge.

*Here, we need to precisely detail what we mean by knowledge, which is not the same as thought.* Their difference and relationships have to do with slowness and speed, acceleration and slowing down.<sup>74</sup> Let us refer here to the blazing pages of Deleuze’s “What is philosophy?”<sup>75</sup> [DEL 94] “The image of thought retains only what thought can claim by right. Thought demands “only” movement that can be carried to infinity. What thought claims by right, what it selects is infinite movement or the movement of the infinite. It is that that constitutes the image of thought (p. 37). In a way thinking is “to give consistency without losing anything of the infinite is very different from the problem of science, which seeks to provide chaos with reference points, on condition of renouncing infinite movements and speeds”.

Thought is not tree like, it rather is rhizomatic.<sup>76</sup> But it continuously deploys itself from narrative apparatuses and (non-exclusively linguistic) writings of machinic assemblages.<sup>77</sup> These assemblages slow it down and stabilize it. They are more or less complex hybrids of trees and rhizomes in very heterogeneous combinations. Among these combinatorial compounds, formal thought is but one particular case, despite its powerful quality.

The differentiation of types of memories (short and long term) and the variety of temporal intervals and interstices are determinant. Furthermore,

---

74 The question of mediation is central to the variation of the brain/world couplings. (see J. M. Noyer, *la conversion topologique cerveau-monde*, MEI, No. 21).

75 “The plane of immanence is not a concept that is or can be thought but rather the image of thought, the image thought gives itself of what it means to think, to make use of thought. It is not a method, since every method is concerned with concepts and presupposes such an image. Nether is a state of knowledge on the brain and its functioning (...) Nor is it opinions held about thought, about its forms, ends, and means, at a particular moment...”

76 See Rhizome, Introduction to *A Thousand Plateaus* (Deleuze, Guattari), tr. Massumi.

77 We refer here not only to semiotic and non-semiotic assemblages, but also to tangible collective assemblages with their “ethological and ecological (...) esthetic, fantasized (...) dimensions. In short, all the “regimes of semiotization”.

the status of interfaces is essential to all the recursive processes at all scales. It is also essential to temporalities and cognitive rhythms and for the elementary processes of reading and writing. Information sciences, together with others, could be central to these issues. It could apprehend the variations of internal cerebral states (or intelligences) activated by events coming from cognitive ecologies.

Thought therefore deploys itself against that, but also adhering closely to it, and can be defined as the permanent recapturing of speed and slowness relations, of the infinite movement, of the highest speeds. “In the wild” recapturing, meaning in the interstices that both are made available to thought and dug by thought itself. Thought opens interstices with its relentless “coups de force” against the slowing down of the production of knowledge.

To try to know to which extent the currently emerging modes will accept or enable a partially augmented resonance with the infinities of thought is a very difficult quest. The question may even have no sense.

We keep wondering, however, about the effects of the changes in PCC<sup>78</sup> modes. Which impact will have the new speed and slowness relations between memories, reading and writing practices? How will the new relations between interstices, spaces empty or full, the cuts and links in a digital context and the infinite speeds aimed at by concepts, affect all that happens on or from the boundaries of subcognition [HOF 88] and of chaotization processes [GUA 88, DEL 91]?

### **1.17. Which criteria for writings?**

Writings are evaluated and imposed on the basis of the potentials of creation and invention they open of the new combinatorial modes they bring about as so many possible hermeneutics. If we were to try to establish a number of requisites or demands from which to evaluate what the new intellectual technologies bring, one of the most interesting approaches would be to start from the renewed tension between the tree-based and the rhizomatic visions of the pragmatics that produce knowledge.

---

78 PCC: Production, Circulation, Consumption.

The ideal and material assemblages that produce knowledge must stimulate the concrete application of some fundamental cognitive practices. They must stimulate reflexivity and critical work on the conceptual reference frameworks that partly determine the structural conditions of visibility of science and the scale of its intelligibility. We then need to investigate how the latter (cognitive practices) affect the former (ideal and material assemblages). Beyond the fundamental practices, we need a detailed account of what varies or is modified in order to extract a basis for criteria. Let us review some important points that we have, at least partly, mentioned above.

First of all, there are the combinatorial constraints, the ways in which they are socially or collectively transmitted, their metastability and the substances of expression on which they operate. The number of constraints varies according to the considered semiotics.

Implied by this first point, there then is the capacity to increase and multiply the numbers of relations, in parallel with the growth of indeterminate zones and interstices. This feature is of fragile nature because, beyond some thresholds and under hyperconnectivity conditions, a tension, or even a double bind can grow. One cannot deny that increasing the associative, analogical capacity as well as the potential for potentially heterogeneous connections between data, problems, and models is essential. However, overdensifying networks of relations and connection entails the risk of transforming the would-be rhizome into a homogeneous, suffocating paste. To avoid this pitfall we need interfaces, black boxes, self-simplifying processes to create holes, lines of flight and permanently rip open the void. Conversely, we need to take care not to let emergent writings and the automatization of socio-cognitive tasks deteriorate contingency, language indeterminism, conditionality, descriptive shifts, etc.

In this context, analogy and abduction are subjected to renewed work.<sup>79</sup> How do the new intellectual technologies influence the power of analogies?

---

79 C.S. Peirce (1903), *Lectures on Pragmatism* [held from March, 26. to May, 14 at Harvard University]. MSS 300-316; EP II: 133–241; HLP; CP 5.14–212; in part in SEM I: 431–462. EP II, pp. 531f.) [PEI 97]. Pierce proposes a canonical model with the following formula: “The surprising fact C is observed; but if A was true C would be natural, unsurprising. So, there are grounds for the for the suspicion that A might be true”.

For example, how do they influence the capacity to make the abstract component of a description slip from one domain to another? How do they affect this central “slippery” quality (we here walk in the footsteps of Douglas Hofstadter) [HOF 79, HOF 88, HOF 95]? At the individual and collective level, what is the impact on the establishment of connections that “occur sideways, without regards to causality”, although they “are also essential in so far as they enable us to situate facts in a perspective – to compare what really exists with what, in our perspective, could have happened or might even happen still”?<sup>80</sup>

### Confusions

Prior to more elaboration on this matter, we would like to draw the reader’s attention to some confusions that may lead to misunderstandings. In particular, we would like to insist on two misconceptions: the confusion of the various types of constraints of writings of the strata on which their productivity is at work (at scales at which they become “heterogeneous performances”), and therefore the confusion of the powers that can create empty spaces and lines of flight between their various logical levels of intervention and the full spaces of significations they produce.

This kind of confusion can make one fail to take into account the differences and their effects on the operating of combinatorial constraints and on the co-operating of various automatic behaviors. This in turn leads to exaggerating the importance granted to the notion of “loss”.

There is no loss of essence in the movement of inventions of writing and form, and there is no loss of essence in the automation of cognitive functions (we have been unceasingly losing things, neural connections, artifacts, from the

---

80 Here, we can point out the growing significance, in science fiction related video games but also, more generally, in the vast domain of speculative science fiction and Uchronies, of counter-factual approaches. According to Quentin Deluermoz and Pierre Singaravélou, “the counter-factual method comes in a variety of forms: from uchronia – the telling of an alternate history by means of an imagined story, for example in a novel to econometry – a statistical reasoning method the most well-known example of which was developed by the American economist Robert Fogel: if the railroad never existed, how different would the economic growth of the US have been? There are many other examples. We were more interested in the question of possibilities: potentialities, unrealized futures, futures of the past...” In *Journal Libération*, 12 February 2016. On this, see also [REN 88] and [DEB 15].

dawn of times). There instead is a complication of the conditions of creativity, including the conditions of simplicity, an increasing complexity in the capacity to create void, empty spaces, interstices, lines of flight, to provide smoothness, to alter perceptive systems, to complexify analogical processes (including artifacts and semantic as well as semiotic blocs).

The current development of analogical pluralism is a good example of this trend. Analogical pluralism is currently rapidly growing. It is a process that operates in the whole spectrum of substances of expression and in all the sensualist regimes. Its metamorphoses are numerous, as well as its transformations. Furthermore, the analogies are counter produced by the relations produced by the substances of expression, their physical constraints, their grammars and modes of transmission. They therefore operate according to transformation systems in milieus that are, to various extents, heterogeneous. They cross and even dissolve, to various degrees again, what one may call the barriers of “expressive species”.

Algorithmic capacities play a significant part in the reinforcement of such analogies, in the reinforcement of abductive processes, of which Peirce (followed by Bateson<sup>81</sup>) rightly thought they were of crucial importance, and in the exploration of the dynamics of the various perspectives. “This lateral extension of abstract components of description is called *abduction* (...) The very possibility of abduction is a little uncanny, and the phenomenon is enormously more widespread than he or she might, at first thought, have supposed. Metaphor, dream, parable, allegory, the whole of art, the whole of science, the whole of religion the whole of poetry, totemism (as already mentioned), the organization of facts in comparative anatomy – all these are instances or aggregates of instances of abduction, within the human mental sphere” (p. 142).

---

81 G. Bateson, in *Mind and Nature; A Necessary Unity* (1979), Charles S. Peirce made of abduction the sole element of the inferential dynamics of thought: “A mass of facts is before us. We go through them. We examine them. We find them a confused snarl, an impenetrable jungle. [...] But suddenly, while we are poring over our digest of the facts and are endeavoring to set them into order, it occurs to us that if we were to assume something to be true that we do not know to be true, these facts would arrange themselves luminously. That is abduction [Lectures on Pragmatism held from March, 26 to May, 14 at Harvard University]. MSS 300-316; EP II: 133–241; HLP; CP 5.14–212; in part in SEM I: 431–462. EP II, pp. 531f.)” [PEI 97].

Algorithmic becomings are processes that provide, in Deleuzian terms, new smooth spaces, processes that renew the cognitive conditions that are central to hybrid intelligences. Similarly, the so-called “machine learning” and “deep learning” approaches can free our minds from some cognitive tasks. At an even deeper level, algorithmics, machine learning and deep learning create the new conditions in which great varieties of data can be processed, thus opening new holes in the processes of actualization of novel internal cerebral states. They, once again, enable renewed interstitial analogical freedom.

We know that, according to Whitehead<sup>82</sup>, “Life lurks in the interstices of each living cell and in the interstices of the brain”. Following Isabelle Stengers in her essay “Thinking with Whitehead, a Free and Wild Creation of Concepts” [STE 11]. “If life lurks in the interstices of each living cell, we may say just as well that the singularity of living societies, what justifies them as such, should be called a ‘culture of interstices’” [STE 11, p. 328]. The more numerous and complex the couplings brains/mediations/interfaces are, the more numerous the produced interstices are, thus augmenting the nurtured intelligences.

### **1.18. Collective intelligences of usage and doxic collective intelligences: the status of short forms**

We therefore believe that we should take into account conceptual and methodological notions that arise from the research and development of a “non-exclusively linguistic general narrative practice”. In the context of generally developing “digital humanities” and the implementation of algorithms appropriate to highlight the networks of actants that constitute such assemblages, such an awareness should enable a renewed thinking of multilingualism. The question of multiplicity would then be situated within each language, within each semiotic system, which would thus be seen as a substratum ceaselessly crisscrossed by complex heterogeneses: language and semiotics seen as metastable universes ridden by “variation”. We briefly showed that beforehand.

In this ubiquitous perspective, to investigate linguistic and semiotic pluralism in the context of the proliferating configurations of audio, textual and musical short forms are especially useful.

---

82 A. N. Whitehead, *Process and Reality*, Simon and Schuster, 2010.

The status of short forms, micronarrations and their life cycle has been central to the “theologico-politico-cognitive” question of the subjectivation processes. Indeed, this question is theologico-political as well as cognitive. Knoepsel [KNO 94] reminds us that: “during the Middle-Ages and as late as the Renaissance, the Bible and classics such as the *Metamorphoses* of Ovid were used as compendiums of examples that were meant to be inserted into the religious meta-narrations through allegory-related hermeneutic strategies. We still have these compendiums nowadays, the only difference being that they are to be found within a much larger reservoir of electronic information”.

The digital and cognitive fractures nowadays echo each other more than ever. Narratives (of languages and semiotics) and creative forces strike conflicting relationships. These generally agonistic relationships are visible in many fields, including the doxic plane of immanence, in the words of Philippe Mengue.

What we see in the Internet milieu is that “Opinion cannot be reduced to a fossilized, congealed, debased thought resembling a fallen creative thought. For there simply is no such thing as the opinion. Opinions are always multiple, they carry with them various interests and ways to tell them, as well as various affects, also related to these interests. The smaller narrations (in which languages and semiotic regimes are enjoying ‘a sabbatical’) are spontaneous formalizations to phrase what is happening to humans: their fears, hopes, sense of humor, disbelief... In short, their resistance to powers and propaganda. The People is rebellious, sarcastic. Despite its misfortunes and misery, it is able to tell into being the means of its struggles, victories, refusals and of what it consents to. Nothing is lost on this account, despite the common opinion of large segments of the intellectual and artistic elite” [MEN 09]. Of course, some reservations must be considered: such a doxic plane of immanence should not itself be “essentialized”, or idealized; the forms of the “differend”, which proliferate all the way to the extremes of reptilian languages, should be measured.

The doxic plane of immanence is both the expression and the expressed of heterogeneses that cover a wide spectrum. They range from the wisdom of crowds to their stupidity, [SUR 04, ORI 15, LIP 15], from the creative introduction

of differences into the repetition to idiotic, stifling repetition and from the propagation of emancipated psychological powers to that of enslaved psychological forces.

The current proliferation of short forms is actually a very rich subject for those interested in the political metastability of collectives, and in preserving this metastability. Short forms also play a major role in the domain of knowledge circulation, in the diffusion of new models. They are central to many cognitive processes. They are the locus in which the alchemy of languages, semiotics, semantic blocs and “memes” is somehow in a wild state or even in states pertaining to witchcraft. It would be especially interesting to pay specific attention to the role the short forms play in the metastabilization and convergence of collectives.<sup>83</sup>

For instance, researchers commonly assume that the analysis of swarm intelligences in the context of human societies can only be based on *the modeling of undifferentiated agents* (with random variations), with models akin to those used for the behavioral analysis of insects. We think that this assumption is erroneous.

### **1.19. Collective intelligences, self-organization, “swarm” intelligences**

The milieus of intelligence are becoming increasingly complex. New types of writings, mediation and intellectual technologies are developing. These transformations force us to recognize that during the past few years the efficiency of a-centered forms of organization have improved in previously unseen magnitudes. People are increasingly aware of the importance of so-called self-organization and network interaction phenomena. Let us recall the brief definition of “collective intelligence”, proposed by Pierre Levy a few years ago: “An intelligence that would everywhere be distributed, constantly valued, synchronized in real time, an intelligence which would result in the effective mobilization of skills”.

---

83 Amongst others: Liu Bin; Terlecky. Peter Bar-Noy. Amotz Govindan. Ramesh, Neely. Michael J. Rawitz. Dror: Optimizing Information Credibility in Social Swarming Applications. IEEE Transactions on Parallel & Distributed Systems; June 2012.

History vividly shows us that intelligence is “always-already” machined and collective. We already know of the long actualization of the structural brains/mediation/milieus couplings, which are immersed in epiphylogenetic history.

Nowadays, a very high threshold of complexity seems to have been reached. The forms of the relational, the interactive, the hybrid, which are the conditions of intelligence and which rely on a diversity of writings, on a previously unseen semiotic pluralism, on numerous regimes of perception and enunciation, on powerful external memories... are increasingly explicit. Within this stew, the relational and interactive regimes that function independently from a central instance or in an a-centered manner do hold an important position.

In their famous article entitled “Automate asocial et systèmes acentrés” [ROS 74] (asocial automaton and a-centered systems), Rosenstiehl and Petitot highlighted the importance of a-centered systems and advocated a “language of a-centerism”. In their approach, they highlighted some characteristics of (organizational) tree-like structures: “In any system, an individual regulates his moves according to his or her only active “neighbors”, in other words, those able to communicate directions to him. In a hierarchical system, his only active neighbor is his hierarchical superior; an individual is therefore completely unaware of the actions of any of his alter egos who dwell on the same level. In a hierarchical system, the transmission channels are preestablished: the tree-like structure precludes the individual, who must fit in a specific spot, to perform a functional role. The only exchangeable individuals are those of the same level and the transmission channels are dual: they only connect individuals whose functions are different”.

They contrasted this model with that of societies qualified as “fluid”, the most simple example of which being the swarm of mosquitoes: “Each individual of the group randomly moves until it sees all of his fellows in a same half-space; it then hurries back into the group. Stability, here, is ensured ‘catastrophically’ by a barrier, a threshold of discontinuity in the behavior of each individual”. They pointed out that, in such a cloud, “Each individual regulates his moves according to his occasional neighbors, who all are his alter egos”. furthermore, the neighboring relations are fluid and no network preexists individuals; all individuals are exchangeable and the

regulation that ensures the stability of a system requires a certain statistical density of individuals”.

More generally, we think in the permanent in-between, this zone bounded, on each side, by these two modes. Nowadays, the organizational forms as a whole increasingly rely, for their definition, on notions of hybridization whereby these modes are, to various extents of complexity and asymmetry, hybridized.

We all have seen how simplified models of insect societies can help account for the processes and conditions of emergence of structure and order independently from any central instance.

The two authors write: “We have proved that contrary to the belief that numbers generate either disorder or uniformity, that an efficient coordination can be established throughout an a-centered community of individuals with limited memory, even if they are arbitrarily many. But our article on this subject in the *Communications* journal aim much beyond this point. Let us look at natural a-centered systems like an anthill or a termite mound. Termites build structures with sponge shapes, ants smoothen surfaces as described by Chauvin<sup>84</sup>. These are undoubtedly manifestations of a-centered systems. Clearly, no single ant possesses the “plans” of the anthill, it is a construction site without an architect. But the anthill cannot be summed up in a single ant, it cannot either be recorded into any finite state automaton, whichever its complexity”.

They go on: “This is where reality shines light on one of the main characteristics of a-centered systems: activities performed locally by individuals (be they words, ants, or crowds of humans) cannot be recapitulated in a central memory, because, as we often say, they are of qualitative nature”.

More works about the notion of collective intelligence in insects are worth mentioning. For example, works led by Deneubourg<sup>85</sup> [DEN 77], or the seminal research of Brooks<sup>86</sup> on distributed robotics.

---

84 R. Chauvin, *Traité de physiologie de l’insecte: les grandes fonctions, le comportement, écophysiologie*, éd. INRA, 1949, rééd. 1958 et *Vie et mœurs des insectes*, éd. Payot, 1956, *Le monde des fourmis*, éd. Plon 1969.

85 See [BON 94].

Here, recalling the importance of Rodney Brooks' work could be useful. In particular, we should remain aware of the influence it had on research about the origins of language and communication, learning processes of children and learning in general<sup>87</sup> [BRO 02, KAP 06, KAP 07] including in the development of video games.

As explained by Vidal in an excellent article<sup>88</sup> [VID 11], researchers attempt to model and study “A mode of behavior of players that is very similar [*to that mode of behavior they wish to model elsewhere*]. The architecture of most such games is designed to, in fact, provide the player with a succession of new environments for him to discover and adapt to in order to react as appropriately as possible to the challenges he will face. This for example means that players must learn to predict the consequences of the initiatives they take whilst playing if they want to be able to reach their expected goals. Then, when the player proved enough mastery of the environment, a new one is presented. Thus, the process of learning is similar to that of the robots that robot researchers develop. The success of these games precisely depends on the optimal degree of difficulty that designers manage to reach: the game must be difficult enough to challenge the player and stimulate his motivation but it also needs to remain doable in order not to discourage him or her, and this, at any level of player expertise. This is precisely this type of psychological economy that Luc Steels mentioned as

---

86 Rodney Brooks: Cambrian Intelligence: The Early History of the New AI, 1999; <http://www.automatesintelligents.com/labo/2000/mar/brooks.html>; Beyond Computation, A talk with, Rodney A. Brooks [https://edge.org/conversation/rodney\\_a\\_brooks-beyond-computation](https://edge.org/conversation/rodney_a_brooks-beyond-computation) See also: Artificial Life and Robotics <http://isarob.org/journal/> and Artificial Life <http://www.mitpressjournals.org/loi/artl>, as well as Peter N. Kluger, Robert E. Shaw, Kim J. Vicente, Jeffrey Kinselle Shaw, “The role of attractors in the Self-Organization of Intentional systems”. In this article, the authors study phenomena that are referred to as self-organization in the realm of social insects: how dynamical attractors play a part in the process that leads the building of the habitat. This process involves more than 5 millions insects in the recursive movement of the several modes that partake to the construction of the habitat: “radiom depositing → pillar construction → arch construction → dome construction → random depositing → ... and soon”. They call “the self-organization of intentional behavior”. Their work includes discussions about “the germ-determinacy which may be used to express several central concepts of ecological psychology that have proven difficult to formalize”, in Cognition and the symbolic Processes Edited by Robert R. Hoffman and Davis S. Palermo.

87 See also [CSI 90].

88 <http://ateliers.revues.org/8787>.

particularly important in robotics. Inspired by the works of Csikszentmihalyi, he named the idea the “autotelic principle”.

If we shift our focus back on human collectives, the “cultural-behavioral-artifactual memes” [DEL 00] operate as constraining apparatuses of stabilization and equilibrium (they function like the gluons of particle physics do). They enable individuals to regulate their behaviors and neighboring relationships without needing networks to preexist.

In that framework, the combinatorial productivity at work in collectives not only results from a system or a centralized body of rules and procedure, but also emerges from a decentralized process in which each meme “locally reduces” the choices during the construction of the collective as well as during the phase when the metastability of processes and becomings is maintained. *Such memes and their associated interfaces* therefore have a catastrophic correction function in the sense of René Girard. Networks are stabilized by the interplay of all the memes and their local conditions of application, which also include procedural rules. The local constraints are therefore increasingly elaborate (this is the function of the evolution and modes of selection of “memes”, of social transmission according to the system–environment relationship (in the sense of Von Foerster-Varela)). If one recognizes this increase in elaboration, we understand that the a-centered, swarm mode of operating of collective intelligences cannot rely solely on undifferentiated individuals. On the contrary, it must be able to uphold the differentiation of norms, local constraints, perceptive, cognitive and behavioral singularities... Such systems are, of course, more chaotic than traditional swarm systems. At some scales, devastating emerging phenomena of instability and violence of various extents can occur frequently. But these phenomena are but the flip side of the coin, the price to pay for increased resistance to disorder, increased resilience and adaptability, and therefore for preserved, improved conditions of creativity. Of course, it entails a risk of crisis that can even degenerate into collective dementia. The past centuries are ripe with examples of such crises.

Thought collectives and collective intelligences of all sorts also are the expression and expressed of large relational and communication systems whose operation involves many actants, ever-distributed conditions and constraints and pragmatics, as well as varied interactive regimes. We have already detailed the latter in this book.

Nowadays, we pretend to be discovering the reticular, swarm aspects of collective intelligence, although they have a long and ancient history. We explicitly focus on them nowadays because the latest forms of complex intelligence and collectives require increased reflexivity. This explicating is also rooted in a school of thought that seeks to found anew the social-cognitive practices around the notion of “Commons”<sup>89</sup>. They seek to question and attempt to redefine the hybrid becomings of the modes of governance of populations, the contributive economy and the assemblages of knowledge production.<sup>90</sup>

In the framework of performative societies, there is a strong and pervasive tendency to seek to optimize such hybrid forms, to set them on their point of equilibrium or imbalance. This happens depending on the nature of such forms and on the “anaphoric instauration” in Etienne

---

89 On this, we can read: *Governing the Commons: The Evolution of Institutions for Collective Action*, 1990; *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective*, 1993; *Rules, Games, and Common Pool Resources*, 1994; “A Behavioral Approach to the Rational Choice Theory of Collective Action: Presidential Address”, American Political Science Association, 1997, in *The American Political Science Review*, 92(1): 1–22, 1998; Hess, Charlotte and Ostrom, Elinor (ed.), *Understanding Knowledge as a Commons: From Theory to Practice*, 2007; *Linking the Formal and Informal Economy: Concepts and Policies*, edited with Basudeb Guha-Khasnobis and Ravi Kanbur, 2006; *Beyond Markets and States: Polycentric Governance of Complex Economic Systems* *American Economic Review*, 100(3), 2010 and especially Charlotte Hesse and Elinor Ostrom, (Ed By) *Understanding Knowledge as a Commons, From Theory to Practice*, MIT Press, 2006 “Knowledge in digital form offers unprecedented access to information through the Internet but at the same time is subject to ever-greater restrictions through intellectual property legislation, overpatenting, licensing, overpricing, and lack of preservation. Looking at knowledge as a commons—as a shared resource—allows us to understand both its limitless possibilities and what threatens it”.

90 B. Stiegler: “Let us assume that an economy of contribution is a noetic form of pollination, and that this noesis is carried by the traces we call tertiary retentions. If we remember that these are *pharmaka*, we then must understand this allegory from a pharmacological perspective. To do so, we need to concentrate on ants and their pheromones, especially in the way they were modeled in a specific cognitive science domain called artificial life, as a specific example of multi-agent model”.

On “Noetic pollinization” we direct the reader to Yann Moulier Boutang’s “The Bee and the Economist” p.128: “The pollination metaphor is only a specific illustration of a generalized phenomenon which we call the contributive economy of knowledge production and life in general” See B. Stiegler’s comment the conclusion of “Automatic society: 1- the Future of Work. Noetic Pollination and Neganthropocene”.

Soureau's words.<sup>91</sup> This depends on the constraints and their social transmission on the requisites of the manufacture of consent and/or divergence. This also depends on the conditions in which creativity can be renewed (for instance by various types of innovation), which itself is required to ensure the continuation and possibility of becomings. Balancing on the alternative of either the "reduplication" of a metastable state or the search for a new type of productivity, collective intelligences must therefore encompass in their thinking the conditions of a reflexivity that should be able to envision new types of emergence, whether in the ideal or material sectors. But conversely, they need to leave room for processes or recreation/alteration, while simultaneously grounding their power to maintain their own being. In that alternative, we see again how consensus and dissensus cohabit in variously conflicting manners in order to ensure the dynamics of the thought–action.

We are thus facing elaborate constructions in which the writing systems, memories, normalizing processes, the black boxes that manage the simplicity–complexity relations and the interfaces are central to the interactions in charge of the moving of ideas and concepts. They cause the weaving of trajectories and induce percolation–translation–transformation phenomena within the trajectories themselves. Within the intelligences we focus on, populations of actants (i.e., populations of human/non-human couplings) are involved in the production of forms of non-descript chains of semantic units and various grammars. To do so, they summon very varied cognitive and perceptive processes.

From this perspective, short forms and micronarrations (short "memes"), when coupled to the insomniac commentary, display several functions or characteristic. We think it useful to remind them to the reader.

In general, such forms are foremost characterized by "closure". Closure means that short forms are always localized, and respond or strive to a state that is always unique. This closure, however, remains relative. It does not determine the end of the processes of interpretations, connections or

---

91 Etienne Souriau, *Les différents modes d'existence*, followed by "Du mode d'existence de l'œuvre à faire". Presentation by Isabelle Stengers and Bruno Latour, Collection: *MétaphysiqueS*, 2009.

transformations in which the form is involved, reenacted or created. The forms can be stable and subject to repetitive uses or they can conversely be very labile, in many ways. They have a fundamental function in the propagation of psychological powers, forms (audio, visual) and semiotic energies. They are home to powerful percolations. They open to what could be called “open formations”. They also have some sort of subversive power, an instability which is a cause of concern for the powers that be.

On the contrary, they can be coupled to saturated semiotics, and used as means of power and control... Saturating time by ways of stitching moments together in an ever-precarious patchwork of instants. The stitching is done by the insomniac commentary, in a relentless work of gluing.

The short forms of journalistic media are a typical example. The ceaseless, almost pathological commenting work can be seen in that case as the colonial occupation of the mind, of attention. It operates by the deprivation of lines of flight, the deprivation of silence, the deprivation of any grasp on the relations of speed and slowness as the locus of political struggle.

Silence, here, is perceived as a worrying breach, a dangerous hole in the wall-continuum of occupation, a failure of the permanent mobilizing of psyches in order to maintain the aforementioned metastability.

But collective intelligences insist on their being. They nowadays keep “becoming”, under the conditions set by such short forms that constitute what we could call their “plasma”.

## **1.20. Short forms, relinkage, relaunching**

Micronarrations have never been as needed as they are today (not considering scaling issues). They are needed to ever-overcome the hiatuses, the holes in the relational space-times and ensure the continuity of collectives. In other words, they support the solidity of what binds together, ensures and maintains. Such short forms carry with them the tension of relinkage, anaphoric instauration, their own stability. In fact, nothing is less certain than their stabilizing, pacifying power. At the end of the day, Lyotard says, “At bottom, one in general presupposes a language. A language

naturally at peace with itself. “Communicational”, and perturbed for instance only by the wills, passions and intentions of humans. Anthropocentrism. In the matter of language. The revolution of relativity and of quantum theory remains to be made. No matter what its regimen”.

Indeed, when we face the fear of the void, the relentless return of the issue of the “Differend” to come, the question is that of the linking, the preservation of the metastability of pulsions and energies in non-destructive zones. “How can we link it?” is a question that comes with every uttered sentence, every micronarration and even maybe any narration? How can we link in a way that prevents the disagreements from rising to extremes?

“And this question proceeds from the nothingness that ‘separate’ one phrase from the following. There are ‘differends’ because, or like, there is Ereignis.<sup>92</sup> But that is forgotten as much as possible: genres of discourse are modes of forgetting the nothingness or forgetting the occurrence, they fill the void between phrases. This “nothingness” is, nevertheless, what opens up the possibility of finalities proper to the genres. If the manner of linking were necessary (filled in), there would not be several possible modes, no void would leave room for that causality exerted from afar, namely, “final causality” [LYO 88].

### **1.21. Insomniac commentary as a catastrophic correction of short forms**

The insomniac commentary is in charge of attempting to control the chaos inducing processes born from the short forms, between the short forms. This is a Sisyphean task because the saturating work of the commentary is essentially and radically incomplete and this incompleteness bears with it the germs of its ultimate demise. One would, however, be fully legitimate in arguing that this work of control through the proliferation of

---

92 Ereignis: “De l’événement même”, see M. Heidegger. See also G. Guest’s commentary, published in no. 21 (March 2005) of the Journal *Ligne de risque*, invited by Yannick Haenel, François Meyronnis and re-edited in the collective volume *Ligne de risque (1997-2005)*, Editor Yannick Haenel; François Meyronnis, in the collection “L’Infini”, Gallimard, Paris 2005.

“commentaries” is a last resort condition for the practice of democracy, the worried and feverish hermeneutic activity of an open society.

This insomniac hermeneutics, which thus bears the “instauration”, can become poison. It can suffocate the possibilities of freedom of operation of altering processes, the freedom of cuts and breaches to loosen the grip of what is. It can suffocate the freedom of non-ordered alteration of the reference frameworks, the freedom of becoming beyond, over the dominating oligarchies of priests and experts. Such oligarchies usually rely on financial, industrial, religious, scientific oligarchies that maneuver within the docile doxa... To end up producing a sort of sterile consumption.

In any case, in the larger perspective of digital networks, short forms augment and quicken the eventful and hazardous aspects that are inherent to any discourse or narrative form. In a digital context such as that which Twitter carved out, such questions are so-to-say brought to the burning point. The distress of control pervades the whole scale of things, from the molecular to the molar levels.

Most of the research on Twitter is very clear on this. One acutely feels the anxiety lurking around, in cargo pants as well as in evening dress. One sees a sort of generalized discourse of erethism fill up the digital stratum. It develops, assuming the shape of insomniac *mise en abymes* of polemic commentaries that attempt to control, with success ranging from uncertainty to sovereignty. In any case, the production and continuation of such commentary practices require a lot of energy and an intense semiotic productivity.

As signaled by Foucault [FOU 71], the procedures of control of discourse include the commentary, which nowadays can be subjected to the telling of its own life, of its trajectories of alteration-creation, of its insertions into specific assemblages.

“We’re moving toward control societies that no longer operate by confining people but through continuous control and instant communication”. And “You ask whether control or communication societies will lead to forms of resistance that might reopen the way for a communism understood as the

“transversal organization of free individuals”. Maybe, I don’t know. But it would be nothing to do with minorities speaking out. Maybe speech and communication have been corrupted”<sup>93</sup>.

The immense rustle of the short forms of the digital stratum captivates the marketing, socio-linguistic and mathematical linguistic fields because they always seek vast corpora from which they hope to make emerge, with the help of statistical algorithms and on the basis of the infinite variations that are inherent to languages and writings, new models to develop a deeper understanding of these very languages and regimes of signs. One of the main issue consists of differentiating the discourses “which are said in the ordinary course of days and exchanges, and which vanish as soon as they have been pronounced; and those which give rise to a certain number of new speech acts which take them up, transform them or speak of them, in short, those discourses which, over and above their formulation, are said indefinitely, remain said, and are to be said again” [FOU 71]. There is doubtlessly a permanent struggle to detect the fragments and textualities, the textures and “memes” which, bound to specific assemblages, will so-to-say open to a fertile (non-sterile, at least) commentary activity.

How to detect, within commentaries, what is properly salient or pregnant with meaning? Teaching this question could be seen as an essential task of the educational system. It is a matter of reading–writing in a such spaces, which always are in a process of saturation, with new intellectual technologies. It also is a matter of taking seriously the “bottom up” collective intelligences of usage, even if they manifest themselves irregularly and in very differentiated manners, in their interwoven strands of cognitive forces, affective and even magical energies...

The Twitter proposition therefore is an opening to a new pragmatics of networks. The writing constraints of Twitter introduce new relations of speed and slowness in the game of writing and communication practices. These new relations also concern the stability and metastability of communities (whichever their size).

---

93 Gilles Deleuze, *Pourparlers* 1972–1990, 2003.

## 1.22. Twitter as a Markovian Territory: a few remarks

The question of the relations of speed and slowness is a complex one. Most of the Twitter-based communications are made on a non-final mode, which is nevertheless not devoid of order. For this reason, one could say that the linguistic and semiotic interactions between Twitter actants are, to some extent, Markovian<sup>94</sup>. The elements of this Markovian field are themselves as-signifying, the writings deployed on them being rather “transcursive”: writings that, in other words, operate “on live reality”. Communication pragmatics is semirandom, “a mixture of chance and dependency that enables to think order without aligning one’s thinking on a continuity or succumbing to disorder”<sup>95</sup>.

But Twitter (since it comes inscribed in larger assemblages of writings and pragmatics) runs through territories that also run through it, discursive, narrative territories in which elements are essentially signifying.

---

94 We know that Markov studied random phenomena in which words of a linguistic chain such as a sentence depend mostly on the words coming immediately before them, not on the words at the beginning of the chain or sentence. Gilles Deleuze thought that Markov processes were very important. Markov chains are both different from absence or order and from discontinuity. In the Deleuzian understanding, in Markov chains, the order is semi-random. He wrote: “ We borrow the expression ‘relinking divided up’ from Raymond Ruyer, who uses it to characterize the famous *Markov Chains*: these are distinguished from both determined linkages and chance distributions; they concern semi-accidental phenomena or mixtures of dependency and uncertainty. Markov was, at the beginning of the century, a pioneer of information theory. As a mathematician and a linguist, Markov wrote several articles on probability computation, which formalized his models of “chain probabilities”, now called “Markov chains”. Such models enable the understanding of the influence prior states have on the current state of a given system. In a nutshell, this method characterizes systems and apparatuses whose likely states depend on one or several anterior states, but not on the whole past of the system. In a linguistic framework, one can model the succession of words in this way. In a sentence, words occur in a mixture of chance and dependency, as semi-random processes. See in (*La genèse des formes vivantes*, Flammarion, ch.7). “They correspond to Markoff’s scheme: they are ‘partially dependent’ successive draughts of semi-accidental linkages, that is, relinkages”, in Chapter 8, *Cinema, Body and Brain* (Note 36, p. 277, in *l’Image-Temps*, Editions de Minuit).

95 Gilles Deleuze et Felix Guattari, *Anti-Oedipus*, University of Minesota Press, 1983 (translated from the French by Robert Hurley, Mark Seem and Helen, R. Lane: *L’Anti-Œdipe*, p. 45–46, Editions de Minuit, 1972), *Cinema 2, The Time-Image*, University of Minnesota Press, 1989 (translated by Hugh Tomlinson and Robert Galeta from the French *L’image temps*, Edition de minuit), et Raymond Ruyer, *La genèse des formes vivantes*, Edition Flammarion, 1958.

Despite the writing constraints, the interacting microblobs are in constant relationship with potentially denser semiotic macroblobs (with, for instance, the use of Internet addresses). Such relationships introduce, in the heart of this type of probabilistic or semirandom pragmatics, slowing down and surging phenomena of semantic processes led by signifying chains that are endowed with strong causality and/or ends.

For example, here is how a Twitter contributor, in fact a journalist of *Le Monde Diplomatique*, a monthly high broad newspaper in France (<http://mondediplo.com/>), describes her usage and perception of Twitter: “I began tweeting about three months ago. It made me understand how this tool works and the various usages one could have of it. Some of these usages were quite far from what I was interested in. For example, I don’t intend on disclosing information about my daily activities, neither the time I wake up nor the content of my meals. Nevertheless I think it is an interesting tool for three reasons: to share the reading of articles or texts that seem worthy of being spread (limiting myself mostly to articles written in English and French); to shed light on information which is not or hardly broadcast by the official press and which can sometimes interest a wide audience and sometimes only experts; to inform about the debates I am involved in, especially about themes tackled in ‘Nouvelles d’Orient’<sup>96</sup>. Twitter uses must therefore be studied as a function of the assemblages of enunciation and the machinic apparatuses in which they are included. Thus, they must be interpreted through the lenses of the differential relationships between summoned memories, their attached social-cognitive practices and the types of interfaces involved.

From this perspective, miniaturization and therefore the mobility of interfaces are fundamental evolutions. The short forms and agile practices they support and promote are then in charge, in a distributed manner, of the preservation of the metastability of collectives. They ensure the function of linking things together like semiotic or temporal shifting in devices that operate all the way to non-digital strata and therefore widen the possibilities of adapting to neighboring actants. They thus all contribute to what could be called the “catastrophic” metastabilizing of collectives, ranging from “vanishing communities” to more stable groupings that carry on for longer timescales.

---

96 See also the very humorous article of Margaret Atwood, “Deeper into the Twungle”, *The New York Review of Books*, March, 12, 2012.

The miniaturized interfaces therefore assume a decisive role in the synchronization processes, while leaving open the processes of diachronization and the possibilities of becoming as emissions of singularities and bifurcations... This, for the powers that be, who are obsessed with the continuous control of flux and of political, anthropological and cultural reality, is a strong double bind constraint.

This is why there is some sort of Twitter obsession. We are obsessed by its potential, a might originating from the boundary zone between two processes, between the propagation of micromodels and micronarration, on the one hand, and their alteration along varying timescales, on the other hand.

In this zone, communication pragmatics and various levels of cognition and subcognition mix with each other, intermingle, are made and unmade according to all scales and substances of expression. This is also a zone in which the various abilities to introduce differences into repetition confront each other and in which the statistical emergence of mental phenomena works on signifying semiotics and opens lines of de-territorialization in assemblages that can be perceptive, cognitive, scriptural etc....

Since linguistic and semiotic pluralism unfolds in the center of this new “milieus”, we need to equip ourselves with new modes of intelligibility. We believe it essential to start from the “collective assemblages of enunciation” and to think of identity as a process, and language community as an incompleteness in process of production.

