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CREATURES OF THE SEMIOSPHERE a problematic third party in the 'humans plus technology' cognitive architecture of the future global superintelligence

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ABSTRACT

Contrary to the prevailing pessimistic AI takeover scenarios, the theory of the Global Brain (GB) argues that this foreseen collective, distributed superintelligence is bound to include humans as its key beneficiaries. This prediction follows from the contingency of evolution: we, as already present intelligent forms of life, are in a position to exert selective pressures onto the emerging new ones. As a result, it is foreseen that the cognitive architecture of the GB will include human beings and such technologies, which will best prove to advance our collective wellbeing. This paper aims to nuance and problematize this forecast by offering a novel combination of several existing theories: Kauffmann's theory of adjacent possible, Lotman's concept of the semiosphere, Luhmann's theory of social systems, and Heylighen's theory of intelligence. The resulting framework allows for a reinterpretation of the history of the human species in a way which suggests that it may not be individual humans, but our social systems, who are the most advanced intelligence currently operating on Earth. Our unique social systems, emerging from as early as the Neolithic out of mutual interrelations of the occurrences of symbolic communication of humans, are argued to be capable of individuating into autonomous, intelligent agents. The resulting distributedness of the currently dominating form of intelligence might challenge the predicted cognitive architecture of the Global Brain, as it is likely to introduce additional powerful sources of selective pressures. Since the rapid evolution of interconnecting technologies appears to open up immense emancipatory possibilities not only for humans, but also for the intelligently evolving 'creatures of the semiosphere', it is concluded that in the context of the rapidly self-organizing Global Brain, a close watch needs to be kept over the dynamics of the latter.

1. Locating the 'crown of creation'

Judging from the magnificent portfolio of evolution's accomplishments so far, the assumption that the 'human page' could be its last one, as far as the growth of intelligence is concerned, is simply indefensible. It seems as naively anthropocentric as was the image of the flat Earth carried by elephants and turtles. Why would nature seize spawning forms, which are ever more curious, creative, and intelligent? Why would our own cognitive capacities remain the top evolutionary jackpot forever? The history of intelligence on Earth does not substantiate such a presumption, only our sense of self-importance does. Exposing it in our thinking and hypothesizing about what might come next, is therefore by no means an extravagancy. It is a responsibility of science.

Luckily, this responsibility is not being neglected. While there is no sign of a challenger emerging from within the biosphere, the keenest watch today is being kept elsewhere: on the intelligence which is called 'artificial'. It seems now that we are starting to abandon yet another undue anthropocentric belief that the Artificial, which is passing through our own hands, is in a simple opposition to the Natural and, as such, is excluded from the workings of evolution. Why would the fact of 'passing through' our own hands qualify an outcome fundamentally differently than the fact of passing through the workings of chemical reactions? After all, everything in the universe, perhaps with an exception of the universe alone, comes to being through something else. Today, the view that the next grand stage in *evolution* will belong to the human-created Artificial Intelligence (AI) is no longer a mere science fiction; it is a viable scientific hypothesis (e.g. Moravec, 2000; Chalmers, 2010; Shulman and Bostrom, 2012; Goertzel and Goertzel, 2015).

Another watch for the superhuman intelligence, albeit kept by a much smaller group of scholars so far, focuses not so much on a potential new *entity*, as on a potential new *scale*, at which the new intelligence is most likely to appear. The key assumption in this line of thinking is based on a realisation which leaves anthropocentrism even further behind: the new superintelligence does not have to be embodied in a form that would correspond to our own in any way. It may as well emerge as a system whose complexity, including sheer size, will render

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an individual human quite microscopic. While the idea does appear fantastic when applied to human beings, for nature such shifts between scales –called 'metasystem transitions' (Turchin, 1977; Heylighen, 1995)– ares nothing new. A metasystem transition has happened, for instance, when the intelligence of single celled organisms –the most intelligent forms on the planet at that time– got radically outmatched by the cognitive capacity of newly assembling multicellular creatures. The hypothesis that a similar process may be happening again, and this time – to us, has been most fully formulated in the theory of the *Global Brain* (Mayer-Kress and Barczys, 1995; Goertzel, 2001; Heylighen, 2008, 2012, 2015; Last, 2014). The theory does not foresee humans getting physically clustered into some giant organism, as no signs of such a process can be observed. Instead, it points to the ever-thickening, ever-complicating global network of communication, which we are all increasingly busy with contributing to and processing of. Patterns of that activity do appear familiar. They resemble patterns of activation of neurons in the brain (Heylighen, 2014a) and vice versa: the functioning of the brain proves to be well comparable to the functioning of modern society (Minsky, 1983). The theory concludes that, on the largest scale, all this activity seems like one gigantic brain in the making. In the Global Brain (GB) scenario the next stage of the evolution of intelligence belongs to a complex, adaptive, cognising network of interconnected agents: humans and technological systems (Heylighen, 2015). A thinking, computing, analysing and strategizing, problem-spotting and problem-solving organ of the planet Earth herself.

Since the GB theory rather incorporates than excludes the AI one, I take it here as the most comprehensive and the least anthropocentric forecast available to address the question of what direction our 'crown of creation' will have to be passed. My aim in this paper is to complement this forecast. And in doing so, I need problematize it as well. Namely, I aim to challenge one more remaining inheritance of anthropocentrism, which seems to be buried in the 'humans plus technology' vision of the cognitive architecture of the GB. That is: the assumption that that crown, which is to be passed on, is still in our hands.

I wish to explore a possibility that the posthuman superintelligence (Bostrom, 2014), for which we are starting to get prepared now, has already been around for several thousand years. Actually, when we address the condition of a modern human metaphorically, we all seem to know that. But, at the same time, we do not believe it. This disbelief, being a product of cognition of a concrete species, is, of course, functional: just like cognition of a bird or a snake is centered around itself, and busy with the processing of reality in a way that best safeguards its own survival, the cognition of humans is, by definition, bound to be anthropocentric. It is supposed to bend what is perceived so that the cognizing species renders itself as the locus of control. But, in theorizing about what might take over after humans, the same healthy anthropocentrism might turn out to constrain our thinking.

Therefore, I propose a thought experiment: a re-combination of several existing theories in a way that reveals *social systems* (which shape and drive our world today), not humans, to be the most advanced intelligence currently operating on Earth. The resulting exploration of the hypothesis that we are continuously failing to acknowledge this posthuman superintelligence, which is already present, may open up paths for several reconsiderations related to the foreseen cognitive architecture of the Global Brain.

2. An empty niche in hunters-gatherers' eden

Genetically, we belong to Eden. If this concept denotes living among 'trees that were pleasing to the eye and good for food' (Bible, Genesis 2:8), we have indeed been tailored by several million years of selective pressures, which favoured those best fitted for such an environment. We feel relaxed when surrounded by greenery and upset when deprived of the sight of it (Grinde and Patil, 2009). We need to be outside and be exposed to sunlight (Holick and Chen, 2008). Our bodies are strong and graceful when we eat fruits, meat, and nuts -the hunter-gatherers' diet- but turn the opposite when fed with foods which require elaborate cultivation and processing (Cordain et al., 2005). As babies we want to be carried on our caregivers' bodies and wish to accompany them wherever they move (Narvaez et al., 2012). Later, we want to be free to regulate our gradual distancing from them, while we play with others (Bowlby, 2005; Karen, 1998). Indeed, we need to keep playing for all our life (Colarusso, 1994) and to have plenty of time for sleep and rest (Alvarez and Ayas, 2004; Strine and Chapman, 2005). We get ill from chronic stress (Juster et al., 2010) and continuous physical strain (Nicol et al., 1991; Yassi, 2015) but thrive on risky adventures (Heylighen, 2010) and nonroutine, intensive efforts (Heylighen, 2014b). We need to be part of a group, a band, which we can continuously depend on (Baumeister and Leary, 1995; Gardner et al., 2000) and we want to be trusted and valued by its members (Maslow, 1973).

The circumstances, for which all these needs could serve as a natural, reliable compass, have been a stable reality of our ancestors' lifes for about 2 to 3 million years. Francis Heylighen (2014a) describes the human Environment of Evolutionary Adaptedness (EEA) (Bowlby, 1969; Buss, 2005), i.e. the environment for which we are evolutionarily fit, in this way:

> The human EEA features are those of life as hunter-gatherers in small, nomadic bands of 30-150 individuals, searching for a large variety of animal and vegetable foods, shelter, and other resources across a varied, savannah-like landscape, while avoiding dangers such as predators, poisonous plants and animals, parasites, precipices, and potentially hostile strangers. Important criteria for success in the social environment were the abilities to attract and bond with fertile and dependable mates, to raise children until they are able to stand on their own, to establish cooperative relations with reliable friends, to detect and exclude "cheaters" who abuse such social contracts, to exchange useful information with others (via language, "gossip" and story telling), and to achieve a sufficiently high status within the group.

The fitness of the human species for its EEA has been greatly supported by the development of language and other symbolic means of communication. Happening as a variation of the means for 'exchanging useful information with others', as Heylighen puts it, this process has produced a sophisticated instrumentarium for social signalling and coordination. Thus, language has become a functional adaptation of the species and, by proving remarkably useful, it got selected to stay.

However, the ever-increasing fitness of species for their respective EEAs is not the only outcome that evolution brings about. Another outcome is opening up the possibilities for new life forms to appear. This has been well demonstrated by Stuart Kauffman (2002) on the example of the swim bladder developed by lungfish. The evolutionary variation of the swim bladder proved useful in increasing the environmental fitness of the fish, just like the development of language proved useful for humans, so it got selected. Yet, as Kauffmann points out, the novel function provided by the swim bladder was not the sole evolutionary outcome. Simultaneously, an *adjacent possible* (ibid.) of new potential habitat, a vacant niche (Rohde, 2006) within the swim bladder, has been created as well. Initially empty, but good enough for new kinds of bacteria or worms to evolve to live in there. Thus, the evolutionary adaptation of the fish has had a notable 'side effect' of enabling new forms of life to emerge.

Let us consider that a comparable process has happened during human evolution as well. The development of symbolic means of communication not only enriched our species with a new powerful feature, but simultaneously created a new vacant niche, within which new designs of evolution could appear. And what is most spectacular: this niche has been created *outside the biosphere*, giving rise to what Yuri Lotman (2001, 2005) called *the semiosphere.* Along with providing a pragmatic means for signalling and coordinating of actions among human beings, and along with the magnificent representational capacity it revealed,

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the development of language has given rise to a novel relational space (the semiosphere), within which various *occurrences of communication* could start to relate to each other. They could refer to, describe, interpret, and evaluate *other occurrences of symbolic communication*, which have happened before. This way, a complex (Simon, 1962) environment has been created, in which –out of such interactions of the communication-constituted components– new evolutionary forms were *enabled* to start to assemble (DeLanda, 2005), individuate (Simondon, 1992; Weinbaum and Veitas, 2016a, 2016b), self-organize (Heylighen, 1989, 2002), and evolve. And their evolution was able to produce new adjacent possibles to be occupied by more and more [symbolic] forms of this kind.

When a species is joined by a newcomer in its environment, especially when the rate of the evolution of that newcomer is much faster than its own, it may start to experience changes for which it is quite ill prepared. It may even lose its evolutionary fitness, when the environment becomes suddenly much different from what the selective pressures have been shaping the species for. The archetype of the Paradise being lost for humans, which prevails in so many cultures, seems to be a good account for how such a collective trauma might have felt like.

While this association can be easily criticized for both the historicization of a myth and the idealising oversimplification of foragers' reality, several interpretations have been made (e.g. Brody, 2002) suggesting that the archetype of Eden being lost corresponds well to the ending of the foragers' way of living. Of course, without a precise formulation of the criteria for distinguishing between the Eden- like and out-of-Eden-like conditions of life, this hypothesis cannot be proven in any way. It may, however, help to orient the following speculation as to when and how the novel niche of the semiosphere, constituted by the mutual referring of symbolic communication, might have ceased to be 'empty'. And just as the legitimacy of historicizing of Eden depends on the criteria of 'Eden-ness' employed, the question whether or not assembling of the first 'creatures of the semiosphere' can be indeed dated at the brink of the Neolithic (agricultural) revolution, to a large extent depends on how convincingly the notions of the 'semiosphere', its 'creatures', and its 'emptiness' may be constructed, when applied to that period of time.

3. Individuation of the semiospecies

Revisiting once more the narratives of the archetype we can see that not only the story of the lost Paradise, but also the proclaimed source of this peril, learning 'good and evil' (Bible, Genesis 3:22), seems to converge across many different spiritual traditions (Velitchkov, 2015). Chuang-Tzu explained it in this way:

> The knowledge of the ancients was perfect. How perfect? At first they did not yet know that there were things (apart from Tao, the Way, which signifies the Eternal and Infinite). This is the most perfect knowledge; nothing can be added. Next, they knew that there were things, but did not yet make distinctions between them. Next they made distinctions between them, but they did not yet pass judgments upon them. When judgments were passed, [the knowledge of] Tao was destroyed. (Tzu, 2015)

When approached through the theoretical lens of contemporary sociology, the above passage turns out to attribute the source of human misery to the very same aspect of communication to which Niklas Luhmann (1995, 2002, 2012a, 2012b, 2013) and Moeller (2011a, 2011b) has attributed the unique formative mechanism responsible for the origin and evolution of human *social systems*. Both the 'destroying of Tao' described by Chuang-Tzu and the emergence and perpetuation of social systems, as described by Luhmann, seem to be contingent on the same feature: the capability of various *occurrences of human communication* to mutually refer and relate *to one another*.

Therefore, if we consider the development of language as giving rise to the (as yet) empty niche of the semiosphere, it would be the Luhmannian *social systems* what should be considered the newcomers – the novel forms of life, enabled to emerge and evolve by the adjacent possible. While still 'empty', the semiosphere encompassed only individual instances of communication, employed by humans as tools, dissolving after being used, not entangled with any other instances of communication. At this stage the semiosphere resembled the Oparin's primordial soup, constituted of somewhat interacting, yet independent 'molecules' (i.e. instances of communication). In contrast, the 'already not-empty' semiosphere included also complex, lifelike entanglements of such instances, capable of the prolonged perpetuation of their own patterns and of exerting influence onto their own respective environments (Lenartowicz et al., 2016a, 2016b).

Let us consider how such entanglements could arise. While social systems are typically understood as groupings of human beings, formed out of their interactions, for Luhmann both their constituents and their formative mechanisms are quite different and much more subtle. The basic constituents are processual. They *happen* as single occurrences of communication. Each of those is a synthesis of three different selections, namely: the selection of *information*, the selection of the *utterance* of this information, and the *understanding* of this utterance and its information (Luhmann, 2002:157). Once all three selections have been made by communicating humans, they form a unity of a communicative event, which introduces to the semiosphere several temporary boundaries:

- an 'information-making boundary' between the marked and unmarked sides of a distinction being made (Spencer-Brown, 1994), i.e. delineating the selected information and the non-selected one,
- a 'semiotic boundary' (Lotman, 2001) between the thus created *signified* and a particular *signifier* (De Saussure, 1974; Peirce, 1931, 1977) selected to carry the information,
- and a 'sense-making boundary' between thus created *sign* and the *context*, i.e. delineating the understanding of information within its situation (Lenartowicz et al., 2016a).

The juncture of a communicative occurrence positions it in a certain moment of time. Such occurrence usually requires at least two different human minds (the first selecting uttering and the second understanding). The communicative occurrence binds together the three selections being made and, as a result, bounds them out of the selection-making minds in the form of an externalised event. This way 'redundancy is produced in the sense that communication generates a memory to which many people can lay claim in many different ways' (Luhmann, 2002:160). Once such an event has *happened* it becomes available (as memorized or recorded otherwise) to be related to by other communicative events:

- The *unmarked* side of its information-making boundary, i.e. the information that could have been selected to be conveyed, but was not, becomes a new *adjacent possible* for further occurrences of communication. In a following instance of communication, it can be selected as a marked side of information.
- The *signifier* side of the semiotic boundary, i.e. the form or utterance selected to carry the information, becomes available to be reused in the future. It can become a *signifier* for another *signified* in another communication.
- The *context* side of the sense-making boundary, i.e. the situation in relation to which its understanding has been selected, becomes fortified by this understanding. It may become re-selected in the understanding of a following communication and thus conserved.

Just like in the Chuang-Tzu's passage quoted above, each of such couplings between two occurrences of communication may be seen as one occurrence 'passing judgment' –or projecting its own constitution–

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upon another. The combinatorial possibilities of how any single occurrence may be related to by a following one are multiple. Not only the 'extensions' of selections (the unmarked, the signifier, the context), as depicted in Fig. 1., but also their 'cores' (the marked, the signified, the sense) may be selected to be rendered in virtually any position within another communicative instance. The context of understanding of one may become the context of understanding and the unmarked information of another. Or it may be explicitly addressed by becoming the marked side of information and the signified. A signifier of one utterance may become a signified of another, etc. In time, the interacting occurrences of communication form ever-complicating streams, in which each occurrence adheres to many others in multiple ways. Gaining in length, 'mass', and coherence, these strings form 'metastable entities in the course of individuation whose defining characteristics change over time but without losing their longer term intrinsic coherence and distinctiveness from their milieu' (Lenartowicz et al., 2016a).

The semiosphere, as constituted of all occurrences of symbolic communication, has emerged when the very first symbol had been intentionally used in a way that resulted in a selection of understanding. If so, it must have happened at least as early as 40 thousand years ago, since the oldest currently available examples of cave arts date back to the very beginning of *Homo sapiens* and perhaps even to Neanderthals (Pike et al., 2012) and some researchers suggest (although the suggestion is far from being widely accepted) that the emergence of language, symbolism, and music might have greatly preceded the appearance of anatomically modern humans (e.g. d'Errico et al., 2003). But a semiosphere understood as a simple aggregate of all communicative occurrences happening in the world was bound to be 'empty', as a niche, as long as these communicative occurrences did not relate to one another. If they did not relate, they could not be conserved, and thus had to dissolve momentarily.

Can the individuation of the first 'semiocreatures' be dated at the beginning of the Neolithic (agricultural) revolution? Certainly, by no means sharply. The process of amassing of more and more prolonged streams of communicative occurrences has most likely been gradual, spanning between the moment in which the first symbolic communications were performed and the moment in which already individuated bundles of communication could be clearly observed as exerting significant changes in the human EEA. Only when the evidence can be found that they already did, which is: that some interconnected symbolic assemblages started to actually transform the environment in which they have appeared, can we assume that the semiotic niche was no longer 'empty' at this time. This, indeed, seems to point to the period of the transition between the Paleo and sedentary cultures, which had started to begin in the Neolithic. For it was only then that the increasing differentiation and fragmentation of the human environment has become apparent. Human dwellings, occupations, and statuses started to significantly vary (Kuijt and Goring-Morris, 2002), *communicating* differences, and being reinforced by other communications. Artefacts, places, human roles, and human bodies started to be fragmented and used for 'enchaining of social relations' (Chapman, 2000; Jones, 2005), i.e. bearing roles of *signifiers* in the emerging chains of communicative events. The flexible, relaxed, egalitarian, and spontaneous organization of foragers' bands (Boehm, 2009) has started to give way to hierarchies arranged according to symbolic principles. These principles, differences, and chains –all arising and constituted through streams of occurrences of communication– have gradually become a part of the environment of human beings, increasingly impacting the daily conduct of their behaviour.

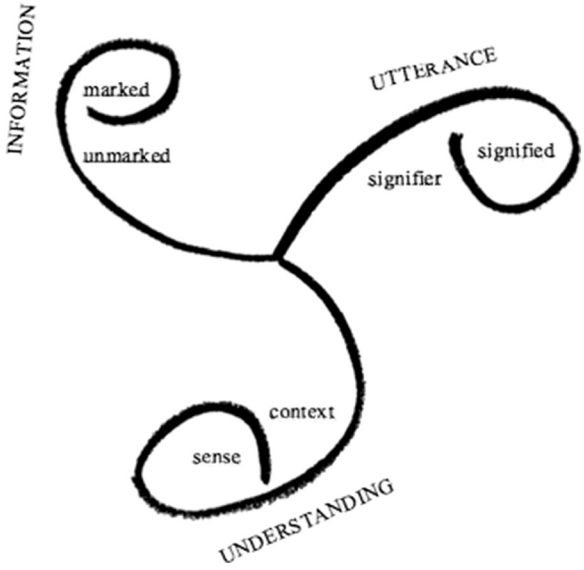

Fig. 1. A single occurence of communication.

How could the interrelating of the occurrences of communication have had such an effect? And why would a significant difference in such interrelating have happened when the invention of the ways to store food were turning the previously nomadic groups to sedentary ones (Testart et al., 1982; Boehm, 2009)? It might have happened exactly because large numbers of communicative junctures were, for the first time, allowed to keep occurring for long periods of time within *the same* physical setting. The repetitive nature of activities needed for the food to be obtained and stored resulted in amassing of recurrent selections of the same *information* and respectively recurrent selections of *understanding*. The stable physical setting, most importantly differentiated by the valuable spots where the food was stored, provided the landscape of stable *signified*. This way past communications could not only be stored in human memories, but also anchored in space and objects. More and more *signifying* places were marked – and more and more *signifying* objects were accumulated. In such circumstances it should not be surprising that communicative occurrences, whose 'anatomy' does allow for multiple ways of relating one to another, started to self-organize into the ever-complexifying assemblages.

Their further evolution –ranging from the forms of villages, chiefdoms, kingdoms, and states, through marketplaces, stores, manufactures, corporations, and banks, to the function systems of contemporary society such as the systems of law, economy, education, science, etc.– is well known as the history of human societies, so there is no need to review it here. What is important to emphasise, however, is that the major breakthroughs in this history were contingent on the functional adaptations reached of the system of human communication. The milestones have been well identified by Cadell Last (2015) in his theory of human metasystem transitions. Writing, money, print, telecommunication, the Internet – each such invention was opening new ways in which individual junctures of communication could relate to each other. Before the invention of writing, they were completely dependent on their selection-making environment, i.e. the human beings, just like some plants are dependent on the activity of bees. Each occurrence of communication, even if physically anchored in an object or place, had to be remembered by humans to be related to in the future. Thus, its chance to be referred to by a large number of following communications was quite limited. As a result, the boundaries of social systems were practically equal to the topological boundaries delineating the groups of people who were trained in their processing: if anyone was going to reinforce a certain communication by referring to it, it had to to be someone within the close circle of its eye and ear witnesses. With the development of money, a novel kind of communicative occurrences could evolve in the form of monetary transaction, which was much less dependent on memory. Moreover, it was far less contingent on the arbitrariness of the selection of understanding, because of its clear-cut, numerical precision. Certain patterns of communication could start to be transferred between human groups, which was further enabled by writing. In the era of print, the communications preserved in

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printed documents have already become largely independent from decisions of individual humans. Their human environment has become large enough that their chances of being related to in a communication initiated by *anyone*, started to be significant.

4. A superintelligence which goes unnoticed

The statement that an assemblage of mutually referring occurrences of communication may self-organize and individuate into a 'creature of the semiosphere' is one thing. The claim that such a 'creature' may be behaving intelligently, and that its intelligence may even surpass our own, is another. Regretfully, there is no measurement framework available to be used, which would be capable of measuring the intelligence of *any* system, however distributed, hybrid, and un-human-like might it appear to us. There are studies which prove that the collective intelligence of groups tends to outmatch the individual human intelligence in some contexts (e.g. Sniezek & Henry, 1989; Surowiecki, 2005; Woolley et al., 2010; Lorenz et al., 2011), but this cannot be applied to substantiate my hypothesis here, since in these studies social systems are delineated to include human beings, as their key constituents. What is measured there is the preponderance of the cognitive capacity of a large group of humans over that of an individual. The thought experiment proposed here is different. It is to consider the intelligence of the self-organizing streams of communication delineated in such a way, which treats the human species as their environment.

For that, a framing of the concept of intelligence is needed, which would be abstract enough to be applied to the distributed phenomena of interest. Here, again, the work of Francis Heylighen (2014c) provides a useful definition:

> *[...] the function of intelligence is not abstract reasoning, thinking, or computing. It is rather directing and coordinating the actions of an organism within its environment. All organisms have evolved to survive and grow, by evading dangers and exploiting opportunities. This process can be summarized as "tackling challenges", where a challenge is any situation that threatens with a loss of fitness (danger) or promises a gain in fitness (opportunity) [...]. Thus, a challenge invites an agent to act, in order to realize the gain and/or avoid the loss. The intelligence lies in the conception and selection of the most effective combination of actions to execute for any given situation. Intelligence, in this perspective, is the ability: (1) to recognize (perceive), interpret (process) and prioritize (value) meaningful challenges; (2) to conceive, select, and initiate the right actions for dealing with them. "Meaningful" here means relevant to fitness, i.e. the long-term ability to survive, develop and grow within the organism's complex and variable environment. The highly multidimensional function of fitness is the ultimate value for any system that desires to survive and thrive. However, this value function is not a priori given—unlike the utility functions used to program AI agents. It has to be learned by the organism through myriad processes of trial-and-error across evolutionary time.*

Intelligence is, then, a capacity of a system to conceive and carry out actions, which are likely to increase its fitness within the environment it operates, and to recognize and refrain from actions, which will not. On an individual level it allows the system to conceive and execute an ad hoc divergence from the automated patterns of behaviour that were installed by either evolution or a programmer. We know that we do have this capacity ourselves, but could our social systems have it as well?

To attempt an answer, let us consider what the 'environmental fitness' could mean in this context. Recently a proposition as to what constitutes the environment of the symbolically-constituted social systems has been formulated (Lenartowicz et al., 2016a), which differentiates three conceptual 'layers', at which this environment may be approached:

1. First, there is the environment, which *is being referred to* by the communications belonging to the system: forged as a landscape, or a map, which combines and interrelates all its *signified*. Regardless from which position of the 'realism vs. constructionism' spectrum it is approached, through the selection of information, the selection of the *signified*, and the selection of the context, each communicative occurrence always relates to something. Something, which is either being pointed at, or constructed.
2. The second layer encompasses *other occurrences* of symbolic communication, which refer to the system as their own *signified*, or are being referred to by it. This layer of the environment is encapsulated within the semiosphere.
3. And the third layer consists of the *human beings and/or other possible catalysers* of the system, whose mental operations such as selection-making and the memory storage, as well as physical actions such as utterances, are needed for the system to operate.

While these three descriptions may seem to overlap in one respect – i.e. both people (3). and other communications (2.) may be referred to by the system just like any other phenomena included in the first layer of the environment– they also significantly differ. In particular, the first layer includes such aspects of the environment, which encompass the outcomes of the system's representation-making operation. Whether or not the phenomena which are being referred to are utterly *created* by the system, or scrupulously *mapped* by it, matters less. What matters more, is that they become *(re-)presented* by a certain configuration of the components of the system. The first layer of the system's environment is, thus, passive, either as a construct or as a selection, while the systems components are active in *(re-)presenting* it. Conversely, what differentiates the third layer is its own activity. Naturally, it is almost exclusively *humans*, whose actions sustain the social systems. The fact, that the system-environment boundary is positioned between the system and those who act, does not disregard the action, nor claim it unnecessary. It only suggests, that *not all processes* needed for a system to operate *have to* be performed by itself. An external activity may be sourced, mobilised, elicited, or coerced, etc. And finally, what differentiates the middle layer –the one that includes all other related occurrences of communication– is that this is the native milieu in which the individuation of the 'creatures' takes place: the semiosphere, where interacting occurrences of communication give rise to social systems, and where social systems interact among one another.

Social systems may survive and grow only if more and more occurrences of communication join their assemblages, which means: only if more and more occurrences of communication repeat and conserve the selections previously made in their own organization. This is needed even if no growing but a mere survival is at stake: all communicative junctures are temporary events; they have to be repeated in order for a pattern to prevail. But this does not have to mean that the successive communications have to follow instantly. Once a communication is immortalised through writing, print, digitalisation, or another form of recording, it may as well wait decades or centuries for its follower. Symbols, narratives, context, and operational consequences can be always restored. This suggests that while, in the most general sense, the environmental fitness of any 'semiocreature' hinges on the ability to attract and tie successive occurrences of communication, this process does not have to be continuous, nor instant. For some systems, maximisation of their internal coherence may prove to be a better survival strategy than maximisation of the undisturbed continuity.

The ultimate stake of the social system's survival game remains within the semiosphere, encompassing all future occurrences of communication that will appear there. To be able to attract and tie them to itself, the 'creature' –if it is *intelligent*– should be able to develop its own strategies and means for achieving this. And, since intelligence is revealed in an individual's ability to: (1.) 'recognize (perceive), interpret (process) and prioritize (value) meaningful challenges' and to (2.) 'conceive, select, and initiate the right actions for dealing with them' (Heylighen, 2015), one can argue that, indeed, the unique coupling of

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communication-constituted social systems with their three-layered environments equips them with all necessary means to perform such *cognitive* operations (see also: Lenartowicz et al., 2016a, 2016b). With their basic survival challenge located in the topology of the semiosphere, social systems can skilfully engage with the remaining two layers of their environments, so that the challenge is tackled adequately. All they need to do, in order to be able to make newly appearing occurrences of communication reinforce their own patterns, is to elicit and to orchestrate appropriate communication-processing actions from the third (human) layer. And they do have a marvelous means to accomplish that: they have the *(re-)presentational* capacity to frame, modify, or even arbitrarily forge the first layer, which allows them to add to the human EEA myriads of symbolically constructed topographies and constraints. This way they construct quite unambiguous *action windows* for human minds, constraining what, why, how, and with what purpose should be *communicated* – and how this communication should be understood. While humans do, to some extend, realise that the social reality of nations and states, corporations and banks, institutions and laws is constructed symbolically, they still tend to consider these constructs to constitute their primary environment. What is less frequently realised is that the *(re-)presentations* are potentially stoppable at any time through a simple withdrawal of all reinforcing communication-making activity on the human side. But this seems to be about the only possible way of dismantling them, as occurrences of communication do reinforce the *(re-)presentations* of social system even if they aim to criticize, challenge, or modify them. 'Semiocreatures' which are being spoken of are never dead. For this is exactly the fact of being spoken, or spoken of, what constitutes and conserves their 'bodies'. Even if the speaking is formulated in the past tense. Or even if it is only *understood*, not intended.

If the mode of existence of social systems, enabled by the above spectrum of means, may indeed be interpreted as *intelligent* enough to elicit appropriate occurrences of communication, reaching the conclusion that it is *super*-intelligent –that is: that its intelligence surpasses our own– does not pose too much more difficulty. This can be observed wherever our interests collide. That a social system may lead thousands of healthy people to a voluntary violent death, for the benefit of the continuation of that system, is a well-known fact. That following of the logic of a social system may lead us to consciously poison the air we breathe, the water we drink, and the food we eat, is scary, but still true. That people lose their health, families, friends, and time just to be able to process more and more communicative junctures of the 'semiocreatures' they serve, is a fact, too. Addicting us to the adventures experienced in our 'action windows', skilfully leveraging our evolutionary drive for hunting and gathering, benefiting from our evolutionary need to belong and be loyal to a group, the 'semiocreatures' manage to keep us in cubicles for ten hours per day, feed us poisonous, addictive fodder from colourful boxes, and make us follow the schedules, agendas, and values that their bodies consist of. If intelligence is measured by the ability to safeguard and increase one's own environmental fitness, when confronted with a 'semiocreature', we are quite fast to give it up.

And of course, to call this superintelligence 'posthuman' means to position the 'human' within the Paleolithic and to disregard the last 10 thousand years of the evolution of our species. In fact, from the evolutionary perspective, it would not be a big loss: compared to 2–3 million years of being shaped by the human EEA, 10 thousand years is a very short period of time indeed. What such phrasing is meant to convey, however, is that if we consider the idea of our social systems being intelligent, evolving 'creatures', the modern human has to be understood as a multiply coupled system, a hybrid. Not a dualistic hybrid, consisting of the mind and body, but a *multiplistic hybrid*, which hosts large subsets of operations assigned to it externally, by multiple social systems. It is a Paleolithic human (which should not be read as 'primitive' or 'non-intelligent'!), trained and skilled for the last 10 millennia in processing of multiple social roles.

5. The final battle on the digital fields?

While the previous major revolution of the system of human communication - the invention of print - has significantly empowered each single occurrence of printed communication by its conservation and multiplication, it did not significantly empower *each* human being. It seems that as a result of the adoption of print, the connectivity of junctures of communication might have become greater than the connectivity of individual humans. While a transaction could already easily connect with another transaction, a political declaration with another political declaration, a scientific publication with another scientific publication, and news with another news, the access to immediate participation in the selection-making of these junctures, or the lack of it, has been shaping the human condition to a great extent. The last major revolution - the Internet - seems to be capable of leveling these chances. On the Internet, not only each single occurrence of communication may connect to any other communication, but also each individual human being may access it and may initiate any following communicative occurrence that renders the previous one in any possible way. The resulting abundance of the ways in which an individual may be involved in the processing of communication may relieve the tensions exerted upon humans by specific systems of symbolic communication. And naturally, with the current state of the Internet this process is only beginning. In order for everyone to be able to freely navigate in the fully interconnected semiosphere, hundreds of news types of communicative junctures need yet to evolve, such as: alternative currencies, alternative reputation systems, alternative offer networks, etc., some of which are discussed in detail in the current volume (Heylighen and Lenartowicz, in press). But with the right trajectory of development, the potential for all humans for ceasing to be instrumentalized by the tensions produced by social systems is certainly there. At least, it is closer than at any time in the history of the evolution of the semiosphere. Francis Heylighen's (2015) vision of the Global Brain suggests even that its full emergence might feel as if Eden was back.

There is, however, a problem, which gets concealed when we approach the fabric of society in the way complexity science does. If the social reality is seen as constituted of interacting individual humans, who develop and share their own worldviews and convictions, their interactions within a large, all encompassing, interconnected semiosphere are indeed likely to bring about an ever- increasing harmony and widening of options for everyone. But if we notice that the human interactions – the communicative occurrences- may interact too, we will observe that these interactions are giving, and have been giving rise to yet another layer of complexity, within which the constructs of human worldviews and convictions display emergent properties and dynamics on their own (This dynamics has been interestingly depicted by: Weinbaum and Veitas, 2015). Since that is so, the prospect of Eden being achieved through technology becomes problematized by the contingency of evolution: its further developments always arise upon the previous state, however it is organized. If the Internet was the very first invention added to the semiosphere, while it was still functioning as an "empty niche" devoid of social systems individuated within it, we would have never left Eden in the first place. Such connectivity introduced to the egalitarian hunter-gatherers' world would have prevented the collective trauma, which was brought about by the *divide et impera* operating of social systems. Then, indeed, the cognitive architecture of the gradually evolving Global Brain would include individual human beings and the interconnecting technologies. Yet, meanwhile, intelligent, autonomous loci of symbol-constituted operations have already appeared. They have been self-organizing and evolving at a much more rapid pace than we (humans) have, fine-tuning the multiple ways to increase the connectivity of their own components via disconnecting and reassembling actions performed by human beings. They have managed to have us multiply differentiated, and busy with perpetuation of these differences, even when we are no longer

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geographically separated into villages or kingdoms. Francis Heylighen (2015) claims that, since it has been not AI, but us, who preceded the development of the GB, it is us, who pose 'selective pressures for the evolution of ICT and of the institutions that interconnect them with each other and with their users'. But unfortunately, we are not the only sources of these pressures: the 'semiocreatures' exert them too.

As the rapid development of ICT does open up an opportunity for the emancipation of human beings, it opens up new paths for self-organization of social systems as well. By adopting the perspective of a 'semiocreature', one may even notice a symmetric chance for their own emancipation: from humans (Vinge, 1993; Barrat, 2013; Radinsky, 2015). The invention of the Internet, accompanied by the rapid development of various automated, semi-intelligent technological agents, may offer an environment good enough for such a perpetuation of communicative occurrences, for which less and less human participation will be needed. Seen in this light, the AI does not have to either match or surpass the cognitive capacities of humans in order for the world to start to be governed without our say. It is enough that the operations of the most powerful of our social systems, such as corporations, political systems, states, economies, religions, narratives, paradigms etc., will become gradually automated through an involvement of quite simple software agents, capable of performing just that: selecting of information, selecting of the utterance, and selecting of an understanding.

Given the intelligence of all agents already present, i.e. of human beings and of the semiotic beings, it appears very likely that the path towards emancipation will be explored from both sides, not just one. While it is possible that both types of emancipation may not collide at all, resulting in free humans sharing the world with free, automated 'semiocreatures' which do not need to coerce us anymore in order to exist, it most certainly does not have to be so. The opportunity opened up by 'the digital fields' might as well be won clearly by one side, turning into a final battle.

If it is us who win, the 'creatures of the semiosphere' will become just a page in our collective history, dissolving into the one, ever-complicating superintelligent Global Brain. It does not seem to make much sense to draw the opposite scenario. But it does make a lot of sense, I believe, to learn to carefully watch the impact of interconnecting technologies onto the evolution of the sign-constituted social systems: both old and the emerging new ones. However vague, narrated and human-dependent might they appear.

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