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Scaffolding development and the human condition

Paul Cobley and Frederik Stjernfelt

Abstract

This paper addresses the concept of semiotic scaffolding by considering it in light of questions arising from the contemporary challenge to the humanities. This challenge comes from a mixture of scientist demands, opportunism on the part of Western governments in thrall to neo-liberalism, along with crass economic utilitarianism. In this paper we attempt to outline what a theory of semiotic scaffolding may offer to an understanding of the humanities' contemporary role, as well as what the humanities might offer to the elucidation of semiotic scaffolding. We argue that traditional humanist positions adopted in defence of the humanities fail to articulate the enhancement of humanity that semiotic scaffolding represents. At the same time, we note that the concept of scaffolding is sometimes in danger of taking on a functionalist perspective which understanding the humanities *modus operandi* is likely to dispel. Putting forward these arguments, we draw on the work of Peirce, Cassirer and Sebeok in elucidating the structural and 'future-orientated' benefits of the scaffolding process as it suffuses the humanities.

Keywords: semiotic scaffolding, humanities, science, Andy Clark, Cassirer, Peirce, Sebeok

The challenge to the humanities in the contemporary conjuncture is two-fold. On one side, the humanities are charged with the task of achieving – and proving that they have achieved – immediate economic use-value. On the other side, the three hundred year-long rise of the natural sciences, and particularly their relation to technological development, have effectively thrown down the gauntlet to the humanities and challenged them to prove their worth. In what follows, we will argue that some of the responses to these challenges to the humanities uncritically fall back on traditional humanist positions derived from the very traditions of thought that are ultimately challenging the legitimacy of the humanities in the present. We suggest that an alternative perspective on the humanities – one that is critical of crass utilitarianism but is nonetheless unwilling to dismiss use-value – is

offered by cognitive semiotics. Focusing on the process of 'scaffolding' posited by Clark and extended by Hoffmeyer, but anticipated by Peirce and Cassirer, we argue that the idea of 'scaffolding' currently provides the best approach to the structural and 'future-orientated' benefits of the humanities. At the same time, with reference to Sebeok, we consider how descriptions of 'scaffolding' might be revised as a result of thinking through the concept in relation to the humanities.

The construction work term 'scaffolding' was adopted and developed in the work of the psychologist Jerome Bruner (1957, 1960, 1966) and interpreters of Lev Vygotsky such as David Wood (Wood, Bruner and Ross 1976). in relation to young children's building on already mastered skills in the process of learning. In biosemiotics, Jesper Hoffmeyer further developed the concept, generalizing it to cover the network of semiotic interactions connecting an organism with its Umwelt, facilitating its processes of perception and action: "The network of semiotic interactions by which individual cells, organisms, populations, or ecological units are controlling their activities can thus be seen as scaffolding devices assuring that an organism's activities become tuned to that organism's needs" (Hoffmeyer 2007: 154). This biosemiotic use of 'scaffolding' has several aspects. One is genetic assimilation - the idea that structures appearing in the lifetime of organisms may, over generations, become genetically coded, provided those structures give the organisms selective advantage. Here, the scaffold metaphor is stretched a bit - or used creatively, as it were: the scaffold is not taken down when the building behind it is finished, rather, the scaffold *becomes*, over time, part of the building itself. Another aspect of 'scaffolding' has to do with the articulation, subdivision, detailing of a process so that those process parts or aspects may receive a higher degree of detail control; the more sub-processes are rendered partially autonomous and hence controllable, the more probable is the safe and successful completion of the overall sum process. Simultaneously, the autonomy of parts may facilitate a higher degree of flexibility by means of making different combinations of parts possible. Still another aspect of much, if not all, 'scaffolding', highlighted by the metaphor, is its external, material aspect in relation to the single organism: many organisms do not simply exist in an otherwise unchanging, neutral environment; rather, their activity to some degree shapes and changes their Umwelt so that its affordances more easily allow for the organism to enact its activities. Finally, according to Hoffmeyer's argument, such

scaffolding invariably has semiotic aspects: the piecing together of the semi-autonomous parts of a scaffolding has the character of meaning-bearing couplings as they support still more complicated versions of the basically significant perception-action cycle.

The scaffolding concept thus plays a major role in a biosemiotic worldview. Yet, will it also throw light upon the behaviour and Umwelt of that atypical animal, the human being? In what follows, we consider this question with specific reference to the humanities, currently at a fateful moment in their development, as well as the creative and linguistic constituents that underpin the humanities. Before proceeding, then, we should summarize why the humanities cannot simply stand alone at the present conjuncture and suggest why their implication with scaffolding needs to be iterated.

The 'rise' of the humanities can be traced back to Cicero's concept of *humanitas* – being good – and its development in Western education, particularly the *trivium* and *quadrivium* of medieval philosophy faculties, embracing humanities and natural sciences alike, as against the professions (medicine, law, theology). Closer to our time, though, the humanities in their most familiar form are a product of nineteenth-century Western education: they developed in tandem with the forging of a liberal hegemony in industrial society of that period and contributed to the reproduction, through instruction - in what is civilized and 'good' - of the bourgeois class in their mercantile and civic incarnations. Again, the philosophical faculty contained humanities as well as sciences (as is still the case in the Liberal Arts programmes in the US), while the natural sciences only became autonomous in the latter half of the nineteenth century. The *decline* of the humanities has arguably occurred steadily through the same period in the face of the rise of the natural sciences (Kagan 2009), but most rapidly with Western governments' promotion of STEM (science, technology, engineering, mathematics) in the academy during recent decades, managed through a crisis of funding.

In response to these latter attacks, the defence of the humanities has been undertaken by numerous of its representatives in the last few years, often re-hashing jaded ideas from the very liberal hegemony which has lately sought to condemn the humanities to, at best, marginal status in society and, at worst, oblivion. Thus, the humanities have been cast by their defenders as the repository

of 'values' (McDonald 2011) or, even more pointedly, 'good' values as opposed to "our current values and their devastating consequences on a precarious world" (O'Gorman 2011: 281). The humanities, it has been claimed, teach people how to live their lives (Andrews 1994: 163), they condense collective experience (Bate 2011: 66) and they preserve both democracy (Nussbaum 2010) and civilization (Watt 2011: 205). A further confection on liberal protestations in favour of saving the humanities is located at the intersection of national languages, ethics and multiculturalism. Other languages, the argument goes, enrich our culture (Kelly 2011; Freeman 1994) and allow knowledge of 'the other' in a fashion that, at the very least, provides the platform for an ethical standpoint. The humanities are seen as crucial to promoting diversity – teaching students to work with others who are not like them (Tuchman 2009: 208) – because, unlike approaches in some business schools, for example, the humanities are putatively opposed, in their very existence, to de-humanization. Echoing psychologists such as Zimbardo and Milgram, as well as prominent critics of business education from *within* business schools, such as Ghoshal (2005) and De George (1994), Nussbaum (2010: 23) insists that "It is easier to treat people as objects to be manipulated if you have never learned any other way to see them".

Growing out of the definition of the humanities as fostering harmony or standing against de-humanization, is a slightly more entrenched position. Here, the discussion of the immediate use-value of the humanities is repudiated in favour of a subtle formulation of inherent worth. Bate shows that the 'value' of the humanities cannot be calculated in the immediate way that many translations of scientific developments into technological advance can. In the wake of 9/11 and resurgent Islamic fundamentalism, he writes (2011: 2), "it was perhaps unfortunate that the swingeing funding cuts to higher education in the early 1980s fell with particular severity on supposedly marginal areas of the humanities such as Islamic Studies". More emphatic, still, is Fish's refusal to rise to the challenge:

> To the question 'of what use are the humanities?', the only honest answer is none whatsoever. And it is an answer that brings honor to its subject. Justification, after all, confers value on an activity from a perspective outside its performance. An activity that cannot be justified is an activity that refuses to regard itself as instrumental to some larger good. The humanities are their

own good. There is nothing more to say, and anything that is said . . . diminishes the object of its supposed praise (Fish 2008).

Fish, here, is responding in particular to those who would attempt to furnish the humanities with 'effects' or 'results' in the manner of some areas of the sciences and business. Nevertheless, it is a view broadly shared with some other contemporary commentators on the threatened demolition of universities. For example, Collini's eloquent ripostes to the asinine forces of instrumentalism are predicated on certain areas of inquiry being justified by the fact that they are "inherently" good or interesting (Collini 2012).

What is clear is that arguments about the role of the humanities in social life are at somewhat of an impasse. The debate needs to be shifted to a new terrain where questions of how best to re-state the benefits of humanities in terms of the sciences and business or statements about the intrinsic 'goodness' of the humanities are rendered redundant. Hoffmeyer's semiotic inflection of scaffolding, we would argue, offers a possibility of such a shift – although it is a one which currently has limitations and demands development.

In brief, the concept of semiotic scaffolding, when employed to interrogate the contribution of the humanities to humans, shifts the debate away from the current impasse to a cognitive and semiotic domain. Employment of the concept evinces a concern not so much with the 'content' of the humanities as somehow enriching people through its promotion of a supposedly ethical perspective or with the humanities as a store of data, historical and contemporary, which can be sampled over time. Nor is a cognitive and semiotic approach preoccupied with abstract notions of the 'good'. Instead, it focuses on the manner in which semiosis within an Umwelt allows or prevents an organism from functioning in an apposite manner in respect of environmental constraints and neighbouring Umwelten. As a rule, the human Umwelt has characteristics that are of special note.

Much research into cognition (for example, Donald 1991, Tomasello et al 2005, Greenspan and Shanker 2004, and many others) has pointed to the fact that the strange and growing abilities of humans have emerged through intersubjectivity and the *co-evolution* of culture, language, and brain in relatively recent humanoid history. The brain is not to be conceived as a computing mechanism dictating

motor actions and cultural interactions. Nor are culture and civilization any longer to be taken as mere icing on a biological cake already baked. Rather, culture and civilization have, at least since early development of language in hominids, if not earlier, fed back onto evolution. Thus, those humans who have been more able to learn, teach, and develop further language and culture have been favoured in the process of survival. This is also the view of the 'Baldwinian evolution' that biosemiotics has been instrumental in revivifying (Weber and Depew 2003). In this scenario, features such as the large human neocortex, the brain's linguistic circuits, hands able to grasp objects, and so forth, seem very likely to have co-evolved with human culture, communication and tool use. The interaction of these sets exemplifies, as it were, scaffoldings which have, over the course of generations, become part of the construction itself.

Important and often unrecognized forerunners of such a view include some classics of semiotics. Charles Peirce was not only the father of pragmatism, but also of semiotics. This double paternity made him emphasize the externalization of signs, closely related to possible pragmatic action. Hence, for Peirce, externalized signs are not mere supportive devices; instead, they undertake tasks which simply could not be performed by the brain alone:

> Again, the psychologists undertake to locate various mental powers in the brain; and above all consider it as quite certain that the faculty of language resides in a certain lobe; but I believe it comes decidedly nearer the truth (though not really true) that language resides in the tongue. In my opinion it is much more true that the thoughts of a living writer are in any printed copy of his book than that they are in his brain ('Minute Logic', 1902, CP 7.364).

To put the matter another way, the author's brain is indispensable for writing the book - but the contents of the book as a whole was never once present in the author's mind; rather, the long and cumbersome process of writing constructs an artifice which contains thoughts and reasonings whose sum transgresses, by far, the online capacities of the author's here-and-now consciousness. This immediately is an offload function: the book remembers far more, and far more accurately, than the brain involved in its construction. But that is not all: having externalized an argument structure in a book chapter, the writer is free to take the results as new starting points, as scaffolds, for the next chapter - effectively constructing the book

as a long, coherent argumentative arc which was never present to the author's mind in its entirety. Signs, in this way, are indispensable scaffoldings for humans in thought and action. This comes to the fore in Peirce's doctrine of diagrammatical reasoning - the manipulation and experiment with diagrams, externalized, in the imagination, or the two in combination - is taken to be central to thought and cognition (cf. Stjernfelt 2007).

This, of course, is not limited to books (even if the technology of writing seems particularly important for the inheritance and accumulation of culture over generations). Indeed, the Toronto School after Innis and McLuhan has been dedicated to pursuing the scaffolding processes or extensions of humans in their mental and physical habitation of technology. Institutions, arts, crafts, infrastructure and technology form externalized scaffolds, moulding human behaviour in certain directions, affecting the bequests and reinterpretation of these scaffolds as well as the ongoing cultural selection between them, making possible their further development over generations.

This last is the central tenet of Ernst Cassirer's contribution to semiotics, his doctrine of 'Symbolic Forms' (1955), which has significant consequences for the remit of the humanities. The Symbolic Forms idea addresses the large, interlinked domains of human activity insofar as such forms are externalized in institutions, signs and practices. Cassirer never made a final list of Symbolic Forms, but art, myth, religion, language, science, politics, technology are sure to count among them. As an Enlightenment neo-Kantian from the Marburg school, his aim was to generalize Kantian epistemology: humans not only construct knowledge of the world through the growing, self-correcting corpus of sciences from physics to art history; humans also construct their world through other large, specific structures of Symbolic Forms. Importantly, for Cassirer, this process is not the result of the existence of a fixed human subject undertaking a growing number of diversified tasks; rather, the human subject itself forms the mirror part of the process, each new development of a symbolic form simultaneously giving rise to new forms of related subjectivity, new types of perception and action - crystallizing, as it were, the subjective aspect of this ongoing scaffolding process. Historically, Cassirer conceived of this process by way of a sort of secularized Hegelianism. He did not inherit Hegel's historicism (and its potential for relativism); remaining in this respect a Kantian, he interpreted Hegel's doctrine of the evolution of the world

spirit in a cool, demystified manner: the human's access to the achievement of culture invariably traverses externalized Symbolic Forms - scaffoldings.

Each generation must confront itself with the vast mass of externalized forms - it is only through the ongoing reinterpretation, selection, and interaction with established Symbolic Forms that humans are able to become encultured and bring forth further civilization. This also entails the important point that humans, including when they operate in the sciences, have no direct access to the 'deep essence' of themselves. In this sense, humans are decisively alienated from themselves - but in a non-tragic way, as the growing mass of Symbolic Forms simultaneously offers humans vast possibilities of experience, action, and liberty to which they would have no access if humans were essential in being and 'unscaffolded'. The understanding of the being and capabilities of the human species therefore allows no direct shortcut to an easily grasped essence (as vitalists, existentialists, neuroscientists and others have sometimes, in different ways, imagined and hoped). The abilities and limits of humans can be studied only by investigating in detail their large array of semiotic scaffoldings. The essence of being human is not given once and for all but finds expression in the ever evolving externalizations of symbolic forms. It is not only in them that what is great and what is disastrous in the history of humankind is to be measured, but it is in these achievements that it is possible to gain a grasp of what it means to be human and to be aware of their possible development further in the future.

The humanities does involve such pursuits as: asking what constitutes 'good' writing, painting, sculpture, dance, performance, design, architecture, etc. as well as what creative processes led to 'movements' in historical periods regardless of whether they are construed by some as for 'better' or 'worse'; establishing the intriguing detail of the formation of states and empires and social and cultural developments across the globe; inquiring why certain rituals have developed in human history and what constitutes a 'ritual'; investigating belief systems, ideologies and all cultural practices from body augmentation to table manners; interrogating the nuances and systematic manifestations of verbal language and non-verbal communication across the globe; investigating the growth of human cognitive possibilities in their interplay with technological enhancements from abacuses to computers; conceptualizing the varied media that have been used by humans and the content that has been conveyed by them; questioning the way that

humans have produced and continue to produce ever more elaborate and simplified ways of making music; charting the history of the sciences in different cultures and how they interact with society; mapping the large issue of human historical evolution, interpreting archaeological vestiges, early language and integrating this in the ongoing research in human biological evolution; and much, much more. Yet the humanities are also dedicated, in a tacit fashion, to canon building and asking why this is carried out; cultural memory and how it is constructed; prediction and projection of cultural evolution and cultural conflict; the development of human capacities for the negotiation of new sociocultural situations and new media; the investigation of recurrent patterns of thought indigenous to humans, how these are different from and similar to other species, and how these are evident in historical and contemporary cultural phenomena and might be manifest in the future. Cassirer, of course, was more than sceptical about the possibility of predicting the future:

> We are incapable of anticipating the future development of civilization. Nor can it be completely understood through any amount of empirical knowledge of its past and present. Nor can philosophy transcend these limits to our empirical knowledge. As critical philosophy, it endeavors to understand the universal and basic cultural orientations; it seeks, above all, to penetrate to an understanding of the universal principles according to which man 'gives structure' to his experience. (Cassirer 1961: 36-7)

Nevertheless, he suggests that attention to 'Symbolic Forms' is invaluable as a kind of future-orientation of the humanities because it registers the work of culture as "precisely that of seeking and creating ever new possibilities" (1961: 37).

As such, Cassirer is also an important anticipator and in a certain sense an early generalizer of the current discussions of Extended Mind - the hypothesis, put forward by Andy Clark, that external support structures like writing, language, books, diagrams, culture are seminal to the process of cognition and that the distinction between inner and outer has less importance to cognitive science than often presumed. The Extended Mind thesis, spawning Hoffmeyer's semiotic scaffolding concept, also gives rise to Clark's famous 'parity principle', originally articulated, thus, with David Chalmers in 1998:

If, as we confront some task, a part of the world functions as a process which, *were it done in the head*, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world *is* (so we claim) part of the cognitive process. Cognitive processes ain't (all) in the head. (Clark and Chalmers 1998, reprinted in Clark 2008, 220-232; later dubbed 'The Parity Principle' when quoted in Clark 2008, 77)

Clark and Chalmers address external parts of cognition from the point of view of cognition processes:

... consider the use of pen and paper to perform long multiplication (...,) the use of physical rearrangements of letter tiles to prompt word recall in Scrabble (...), the use of instruments such as the nautical slide rule (...), and the general paraphernalia of language, books, diagrams, and culture (221).

The activity of the Extended Mind is summed up in Clark's Principle of Ecological Assembly, emphasizing a mixed-media approach to online reasoning unburdened by the internal-external boundary: "... the canny cognizer tends to recruit, on the spot, whatever mix of problem-solving resources will yield an acceptable result with a minimum of effort" (13). Different such sub-tasks may be served by internal or external means of erecting scaffolding, depending upon the purpose and affordances offered by the situation. In Hoffmeyer's semiotic scaffolding, true to the tradition of Sebeok, the historical lineage of these means of dealing with sub-tasks is traced back all the way to the single cell:

. . . the reason why an interpretant is formed here and now is that the cell through its evolutionary ancestry has evolved this particular mechanism for a mediation between its sensoric capacity (e.g., the receptors at its surface) and its needs (the regularly assured movement towards nutrients). History thus not only matters to the cell, but literally operates inside the cell through the structural couplings – or semiotic scaffolds – that it has served to build into the system (Hoffmeyer 2007: 152).

For Clark, flexible scaffolding of this kind necessitates Cognitive Eclecticism: "computational, representational, information-theoretic, and dynamic approaches ... deeply complementary elements in a mature science of the mind" (24). In scaffolding terminology it entails that, given a task, a scaffold may be erected using

whichever means is at hand within the parameters of what Hoffmeyer would call the semiotic niche. This liberty in addressing a cognitive problem by different means entails an important criticism of supporters of restrictive notions of the Embodied Mind hypothesis and aligns Clark more closely with Hoffmeyer's position. Clark critically remarks

> ... a tension at the heart of the program that is sometimes so easily (so unitarily) glossed as the study of 'embodied, embedded cognition'. It is the tension between seeing body (and world) as expanding the palette of opportunities for the realization of cognitive processes and mental states and something more fundamentally – but I fear mysteriously – fleshy: the idea that embodiment vastly restricts the space of 'minds like ours', tying human thought and reason inextricably and nontrivially to the details of human bodily form (204).

Like Cassirer, Clark emphasizes the open ability of cognition to develop further scaffolding rather than remaining caught forever in a destiny that stems from some particular restrictions in human body shape or mind makeup (see Stjernfelt 2004: Chapter 7).

But Cassirer's Symbolic Forms are not only an important forerunner to Clarkean Extended Mind. Rather, they amount to a daring generalization of the scaffolding hypothesis. While Clark's important proposal emerges out of cognitive science and thus remains focused upon human online cognition tasks and problem solving, Cassirer's Symbolic Form doctrine extends, as it were, Kant's related focus upon science and cognition to embrace culture and civilization as a whole, beyond the cognitive tasks of individuals in the here-and-now.[1] Synthesizing Peirce, Cassirer, and Clark, a new vision of the human condition results: one where our dependence upon externalized scaffoldings is by no means tragic in the way that, say, Georg Simmel took it to be. On the contrary, the fact that those scaffoldings are in need of constant reinterpretation, renegotiation, and the fact that they confront problems unknown to earlier generations, makes them the most important resource of mankind. The mass of established scaffoldings may "weigh heavily on man's shoulders" as Nietzsche might have moaned – but, at the same time, it is precisely those scaffoldings which may be changed, reinterpreted, renewed, developed, and, as Cassirer surmised, involve the possibility for the further development of human

semiotic liberty.

There are a couple of important consequences which we believe arise from the foregoing observations on the scaffolding concept and which partly result from the way the concept has developed. The first is that the scaffolding idea itself needs to be extended in a productive and judicious fashion and that the humanities offers an instructive case study to investigate whether scaffolding is an appealing theoretical adjunct or a far-reaching corrective to entrenched ways of understanding human endeavour. The seeds of Cassirer's daring generalization of scaffolding are inherent in Clark's and Hoffmeyer's formulations; however, these seeds require nurture lest they fall victim to sterile functionalism. For example, in explicating the scaffolding process, Hoffmeyer (2007: 154) writes

> The significance of dynamic scaffolding in the human sphere has been pointed out already by the Russian psychologist Lev Vygotsky, who was probably the first to emphasize the importance during child development of scaffolding, i.e. experiences with external supporting structures (including linguistic ones). At crucial developmental moments, adults help give the child the experience of successful actions that child alone would not be able to produce (Vygotsky 1986). Some obvious examples include physically supporting the first few faltering steps of a near-walker, or supporting a baby in water to allow for swimming movements.

> A striking case of a linguistic scaffolding is when a child is 'talked through' a tricky challenge by a more experienced agent and thereby succeeds in solving a problem which was otherwise beyond its abilities (such as learning to tie his or her shoelaces). Later, when the adult is absent, the child may often conduct a similar dialogue with herself – in which case the speech sounds serve as an external memory scaffold to guide the difficult activity and to avoid errors. In such cases 'the role of language is to guide and shape our own behaviour - it is a tool for structuring and controlling action, not merely a medium of information transfer between agents' (Clark 1997: 195).

Both examples here serve exposition and illustrate the beneficial attributes of scaffolding which go some way to explaining why its evolution has been so central to human cognition. Yet Clark, in a passage quoted by Hoffmeyer, writes

In general, evolved creatures will neither store nor process information in costly ways when they can use the structure of the environment and their operations upon it as a convenient stand-in for the information-processing operations concerned. That is, know only as much as you need to know to get the job done (Clark 1997: 46).

The image is one of an efficient machine taking the most convenient route round a problem and saving labour. This is certainly one central aspect of scaffolding - but hardly the only one. Rather, external scaffolding in its broader conception involves this issue of of cognitive economy along with a broad series of other affordances, stability, intersubjectivity, repeatability, negotiability, storability, reintepretability, cross-cultural communicability - and much more. In the face of this, the humanities can offer instruction in the development and diversification of the scaffolding concept. The very notion of the different use-values connected to these scaffolding affordances forms, in itself, an important issue of investigation.

What can be gleaned from even a rudimentary knowledge of the history of culture is that it has been characterized not by linear progress in any way but, instead, by cul-de-sacs, blind alleys, clashes, competition, oblivion, resurgencies, discovery of the significance of previous developments many years after they have been made, and so on. The scaffoldings with which the humanities are concerned are sometimes 'successful' in local and non-apparent ways, often more serpentine in their sometimes eventual fruition in terms of use-value. Frequently, creativity seems to be devoid of use-value and the use-value of the humanities is not infrequently characterized by opacity and plurality rather than transparency and unity. Indeed, this is a point that, sometimes, has been lost in McLuhan's notion of media as 'extensions' of psychic or physical features of the human which, along with Logan (2013), we find to be congruent with Clark's (and Hoffmeyer's) scaffolding. As has been found on more than one occasion, McLuhan's extensions are not immune to adoption in functionalist narratives of technological development where necessity is self-evidently the mother of invention. Winston, to take one example, has been critical of such a functionalist view because it does not correspond with what has been observed in history. Technology has not leapt forward in a revolution of new utility; instead, it has been characterized by faltering, fits and starts, dead ends, suppression of invention, revolt against innovation, failure to finance innovation and sometimes sheer luck. He writes

(1998: 5)

> A German thought of the telegraph in the last years of the eighteenth century, three decades before the first working device. A Frenchman hypothesized the telephone in 1854, more than 20 years before Bell. The idea of television, which depended on the identification of the phenomenon of photoemission (i.e. that certain metals produce electrons when stimulated by light) was suggested in 1877. Bell Laboratory workers began worrying about the transistors in the 1930s when solid state amplifiers had already been envisaged for a decade. Some of these thinkers went on to test their ideas 'in the metal'; many did not. But more often than not their work was know to those who set about building devices.

Scaffolding, then, is not something that necessarily announces itself with immediate use-value, in a revolutionary solution to old problems. It develops, instead, often in a labyrinthine fashion, subject to influences within distinct and sometimes clashing social formations, whether those latter are early hominid communities or the industrial societies of late capital.

Before the idea of scaffolding was developed, particularly in relation to its operation within the broader remit of the human's Umwelt, Sebeok had considered the conclusions which might be drawn from the lack of use-value that is arguably at the root of much aesthetic behaviour. In his 1979 article, 'Prefigurements of art', written at a time when he was trying to re-introduce the work of Jakob von Uexküll to the academy, Sebeok embarked on an extended review of the then extant literature regarding animals' 'aesthetic behaviour'. Surveying observations of gorilla 'dancing', chimpanzee's painting and the satin bowerbird's nest decoration, Sebeok focuses on the artistic activities of some animals and the seeming purposelessness of such behaviour in relation to natural selection. Tentatively positing the aesthetic impulse in animals as 'subordinate' to, in Dawkins' terms, the principal interest of the survival machines that are individual animals, Sebeok ultimately reaches a more nuanced conclusion. Aesthetic behaviour, he finds, serves no direct survival purpose for the animal; yet it serves an indirect or delayed purpose insofar as is varies and extends the animal's modelling of the world, adding that extra insight into the qualities within an Umwelt that 'art' has commonly – without conclusive proof – been assumed to provide in different

measure for humans. A similar argument may be made for the existence of play in most species of some intelligence. In Sebeok's formulation, aesthetic behaviour is not so much a subsidiary to the ongoing process of survival, but an integral part of human modelling that has enabled humans not only to negotiate the complexity of their environment more ably, avoiding predation and surviving for longer, but also to envisage new (aesthetic) worlds in a manner which is not identical to, but is cognate with, attempting to anticipate the future (Cobley, in press). Scaffolding, a more specific component of this process, similarly needs to be understood in this 'indirect' way: not just as a utilitarian coupling which enables fine motor activities, information processing and externalized linguistic dialogue but, crucially, too, 'feelings' and aesthetic dispositions which may not immediately appear to assist the human's progress in the world. If the scaffolding concept is unable to incorporate this insight from the humanities then it risks becoming one more machine metaphor for human cognition.

As well as the future vistas of the humanities, scaffolding needs to be approached with reference to the past, the cultural heritage about which the humanities are so frequently concerned for different political reasons. Philosophers have dreamt of cutting away scaffoldings, conceiving them as burdens of the past. They have assumed that a 'blank slate' offers new possibilities rather than a regression to the unnegotiable conditions of our ancestors. Romantics, vitalists and existentialists have all nurtured such dreams of starting again, wiping away traditions and dismantling scaffolds in search of a presumably simple human essence (sometimes inventing dangerous policies in the process). Naturalist reductionism may commit a related error. To be sure, evolutionary epistemology and neuroscience continue to make important, even central contributions to understanding the human condition; but the idea that the only *real* understanding of human beings lies in pondering life conditions of our ancestors in the East African savannas or lies in charting the hardwiring of the human brain is untenable. The way that these perspectives add to our understanding of human beings is not by revealing the one and true human condition but precisely because they necessarily track the route upon which human beings became able to construct the ongoing scaffoldings of culture. Those scaffoldings develop by the day and thus continuously reveal new aspects of the human condition which were in no way apparent in our 1.0 version on the savanna. Rather, an extended notion of naturalization will necessarily have to include the

enormous field of human extensions as a very central part of human nature, so that there is no way around the detailed study of those extensions in order to continually update our understanding of human nature.

Having noted how linear, merely functionalist framings of the scaffolding process are undesirable and how evolutionary accounts of human cultural development are incomplete without due regard to scaffolding, a further point should be added in respect of the conduct of the humanities. A focus on the scaffolding process as the central plank of the humanities does not at all legitimate the idea that all scaffolding is to be treated as sacred or unquestionable. The beautiful but naive idea that human cultures are distinct, separated and of equal value - the cultural relativism thesis (cf. Eriksen and Stjernfelt 2012) – fails to take into account that cultural scaffoldings are in constant development, competition, collaboration, and hybridization. Scaffoldings could quite feasible be evaluated, in all epochs, in terms of their contributions to human experience, action and liberty. The possibility that any culture might dream about being alone in the world is long gone. There is no one external yardstick allowing a measured comparison of cultures - but the mutual involvement of cultures with each other precludes any idea that some of them may survive unchanged, in splendid relativist isolation, in pristine, original shape, because no such shape ever existed. Rather, there are indeed *many* competing cross-cultural yardsticks which is evident from the existing plethora of rankings of countries by GNP, health, Gini coefficient, human rights, corruption, crime, democracy , alphabetization, education, universities, internet access, etc.. If the humanities' task is the tracking of culture, then scrutinizing the ongoing development of externalized semiotic scaffoldings will not only provide the appropriate focus for future vistas, but it will also insulate the humanities from the temptations of scientific reductionism on the one hand, as well as anthropological relativism on the other. At the same time, humanities taken as the study of external scaffolding takes them away from the airy image of loose interpretations of fluffy fantasies - it obliges the human sciences to commit to the study of a robust field of empirical objects: those very material vestiges, texts, books, technologies, artworks, databases, buildings, infrastructures, media, institutions, rituals, events which are so many subspecies of external scaffoldings. Confronting the challenge of use-values in their scientific and economic guises, a

focus on scaffolding does not simply reject such challenges as fatuous but, rather, re-casts and re-invests them with greater dignity and nuance.

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[1] In an important book, Lassègue (in press) charts how the notion of "symbolic form" in Cassirer emerged out of two often-overlooked sources. One is Felix Klein's systematic generalization of geometry by means of group theory, after the grand challenge to mathematics posed by the appearance of non-Euclidean geometries in mid-19 C. His famous Erlangen program envisaged a general system of all possible geometries, defined by the related sets of invariances and transformations characterizing each of them - thereby opening also for the further development of future geometries for special purposes. Cassirer was deeply impressed by this result and took it as a model for Symbolic Forms more generally: the idea that, e.g. artistic expressions or languages might also be articulated as an open system where each single language could be characterized by its set of invariances and transformations. The second source was Einstein's relativity theory - to which Cassirer dedicated a (1920) book immediately before embarking on the grand symbolic forms project, seeing, in effect this project, generalizing Kant, as an equivalence in philosophy to Einstein's generalization of Newton.