

Artificial Life and the Inhuman Condition

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Hannah Arendt, at the opening of her book *The Human Condition*, is led by reflecting on the launch of Sputnik into space to formulations concerning the desire manifested to leave behind the earth. She writes:

For some time now, a great many scientific endeavours have been directed toward making life ‘artificial’, toward cutting the last tie through which even man belongs among the children of nature. It is the same desire to escape from imprisonment to the earth that is manifest in the attempt to create life in the test tube, in the desire to mix ‘frozen germ plasm from people of demonstrated ability to produce superior beings’ and ‘to alter [their] size, shape and function’; and the wish to escape the human condition, I suspect, also underlies the hope to extend man’s life-span beyond the hundred-year limit.¹

In this passage Arendt connects the launch of Sputnik to a wide variety of phenomena classified by her as indicating an attempt to make life “artificial”, a project also described by her as indicating a wish to escape the “human condition”. In encountering this description the question prior to investigating the understanding of the notion of artificiality has to be what is meant by the designation “human condition”?

Perhaps somewhat surprisingly, in a book written with the title *The Human Condition*, Arendt nowhere systematically or with any precision describes what the term involves. The book is organized around three central axes: labour, work and action and it would be reasonable to assume that this

organization provides an implicit answer to the question as to what the “human condition” involves. In each case Arendt also wishes to connect the term she has chosen to broader vistas so that the “human condition” of labour is declared to be life itself, the “human condition” of work by contrast to be “worldiness” whilst action points fundamentally towards plurality as “*the condition*” of all political life (Arendt, 1958, p. 7.) To these general characterisations Arendt adds two further ones, both of which are worth recalling. The first involves a connection between the three determinations given and two elements of life:

All three activities and their corresponding conditions are intimately connected with the most general conditions of human existence: birth and death, natality and mortality. Labour assures not only individual survival, but the life of the species. Work and its product, the human artifact, bestow a measure of permanence and durability upon the futility of human life and the fleeting character of human time. Action, in so far as it engages in founding and preserving political bodies, creates the condition for remembrance, that is, history. Labour and work, as well as action, are also rooted in natality in so far as they have the task to provide and preserve the world for, to foresee and reckon with, the constant influx of newcomers who are born into the world as strangers. However, of the three, action has the closest connection with the human condition of natality; the new beginning inherent in birth can make itself felt in the world only because the newcomer possesses the capacity of beginning something anew, that is, of acting. (Arendt, 1958, p. 9.)

Two aspects of this passage are immediately worthy of remark: despite correlating the three elements thus far presented with birth and death, it is birth that is subsequently discussed whilst death is summarily abandoned as a topic. Within the work as a whole death never receives any thematic treatment whilst the miraculous possibilities opened by the fact of birth is given a seminal placing at close

of the section on action with a reference directly introduced here to the figure of Jesus (Arendt, 1958, p. 247). Allied to this strange elision of death, despite its being listed as one of the cardinal conditions of human existence, is the introduction of a hierarchy between the three elements introduced so that action is given a higher placing than labour or work as it has the closest connection with birth.

The second and last general characterization of the “human condition” that is worth pointing to is the fact that Arendt separates it from “human nature” on the grounds that there whilst the basic notion of the human condition is the stress on “condition”, the fact that we are *conditioned*, limited by circumstances beyond ourselves, no element of the present manner this conditioning takes can regarded as definitive for us or necessarily permanent. In thus decisively distinguishing her enquiry from those into essential characterizations that would fix a human nature Arendt makes clear an attachment on her part to a view of the human as constantly open.² It is the fact that Arendt does not determine the human by something pre-given in combination with the fact that the human is all the same conditioned that gives the broadest vista to her notion of the “human condition”.

Now that we have a general construal of what is entailed for Arendt by the “human condition” it is possible to interrogate what for her is involved in the notion that life is becoming “artificial”. In the citation with which I began this piece Arendt gives two different senses to the notion of artificiality: on the one hand she describes it as involving cutting the tie to nature whilst on the other hand she describes it as involving a wish to escape the human condition. These two formulations of the notion of the artificial are far from being equivalent. The first formulation of artificiality as “cutting the tie with nature” is of a piece with how Arendt describes work as work constitutes for her the “world” and world is hence something distinct from “earth”. From work emerges artifice as a product and the effect of the accumulation of these products is the creation of a “world” which in principle separates the human from the

“earth”. Hence artificiality in this construal is part of the human condition, not part of the escape from it.

If this notion of the artificial as involving a cutting of the tie with nature is hence part of the human condition, what can Arendt be referring to when she describes a notion of artificiality that involves a wish to escape the human condition? The answer to this question is connected to her distinction between work and labour. Whereas work is understood by her to involve the production of durable artefacts that constitute in their accumulation a new possibility, the possibility that she terms “world”, labour by contrast, understood as performed for the sake of “life”, is a type of activity that produces nothing durable but is rather aimed at satisfying needs, the product of labour is hence aimed at consumption rather than durable testimony. In this sense labour, unlike work, does not aim to constitute the embodiment of memory. At this point we can also a dissymmetry in Arendt’s construal of the three elements of the “human condition” as whilst work is connected to permanence and action to memory and history, labour is given only a relationship to survival. Hence of the three, labour is described in terms that distinguish temporality from historicity. Effectively, labour in not aiming at constituting the embodiment of memory has only a momentary sense. Since labour is comprehended as the activity that satisfies need, Arendt understands it as governed by necessity. Labour is essentially part of the human condition as being-conditioned expresses itself intimately in needing.

This characterization of labour helps to explicate further the understanding of how “conditioned” the human is. But the grasping of labour as governed by necessity also has historically prompted a response that helps to point towards the sources of Arendt’s notion of artificiality as involving an attempt to escape the human condition. The simplest response to the weight of need is to ensure that there are some who are placed entirely under the burden of it to vicariously embody it for those who can escape from it: this

justifies the institution of slavery. However, for Arendt, the institution of slavery introduces an escape for the slave-holders from an aspect of the human condition as now the burden of necessity is removed from them. In response the slave-holders can institute what she understands as the prime arena of action: politics. Because they hold slaves the masters are free. This freedom permits the arrival of the realm of action in the sense of giving an arena for action conducted according to norms, conducted that is, in accord with such virtues as honour and courage. The public realm emerges from slavery as its natural consequence but is also therefore itself entwined in the historical possibility not merely of history itself but of history as a process of departure from the human condition.

In extricating herself from the consequences of her own analysis Arendt points to the disappearance within modernity of the distinction between work and labour. Since this distinction permitted the arrival of monuments that inscribe memory within themselves by contrast with the pure reproduction of need it would appear that we are heading for a “consumer’s society”, a possibility envisaged by Arendt as being a society in which there is only the production of need, only the consumption of product and the loss of memory. The orientation of the modern towards this possibility emerges from the emancipation of labour in the sense that in the lenses of modernity the openness of politics to the labourer has taken place. The labourer is emancipated, it is possible for the one who produces only under the weight of necessity to enter the realm of freedom: politics.

The attempt to escape from nature can therefore be seen to be twofold in history: firstly, some force others under the weight of necessity and permit themselves to be free, second, all are brought into the realm of freedom. In the process of carrying out this emancipation of the slaves we witness the obliteration of the possibility of memory itself. This is how Arendt pictures this immanent tendency of the modern in what must count as one of the most vivid passages of the work:

Painless and effortless consumption would not change but would only increase the devouring character of biological life until a mankind altogether 'liberated' from the shackles of pain and effort would be free to 'consume' the whole world and to reproduce daily all things it wished to consume. How many things would appear and disappear daily and hourly in the life process of such a society would at best be immaterial for the world, if the world and its thing-character could withstand the reckless dynamism of a wholly motorized life process at all. The danger of future automation is less the much deplored mechanization and artificialization of natural life than that, its artificiality notwithstanding, all human productivity would be sucked into an enormously intensified life process and would follow automatically, without pain or effort, its ever-recurrent natural cycle. The rhythm of machines would magnify and intensify the natural rhythm of life enormously, but it would not change, only make more deadly, life's chief character with respect to the world, which is to wear down durability. (Arendt, 1958, p. 132.)

It is however something of a shock to realize that the vivid depiction of this "consumers society" is given in a chapter that begins by announcing a criticism of Karl Marx and to realize that for Arendt the consumer's society is the immanent tendency of Marx's theory as much as it is that of Adam Smith or John Locke. The rationale for this is clearly that within all these theories the commitment to the value of labour effaces the possibility of work and in each case opens a post-historical world where meaningfulness has vanished with the conditions for its production.

The attempted escape from the human condition emerges therefore from the attempt to abolish the artificial condition that work itself has constituted. Hence it is artifice raised to a second power that constitutes the attempt to escape the human condition. Under these circumstances production of memorialization is being replaced by the consumption of

non-durable products intended to satisfy need. Within this world the possibility of the public space of politics gets occluded and hence the pagan god of necessity re-enters in the guise of the realization of freedom. It is the presentation of necessity as freedom that marks the age that Arendt is describing as uncanny, an age in which life gets determined as something that is amenable in its deepest processes to technization. The description of this technization is partially given by Arendt in her account of such processes as the attempt to overcome the limit of life but whilst she refers to these processes they are not the basic parts of her analysis as this is rather focused concretely upon the transformation of production into consumption, a transformation that prevents the opening of the future onto anything other than a consumptive necessity.

Remembering Forgetting: The Promise of Futurity

Hannah Arendt's analysis is based on a set of oppositions, between freedom and necessity, work and labour, consumption and production and memory and occlusion, birth and death. Within these oppositions however is a central one: that between memory and forgetting. This opposition, whilst governing all the others, is not thematized by Arendt. This peculiarity of her analysis must be regarded as having decisive effects, effects that are related to the divorce of labour from history and the leaving aside of death in the course of her enquiry in favour of a miraculous placing given to birth. How has Arendt come to forget the questioning of how forgetting is itself possible? In remembering the possibility of forgetting I will attempt to rethink the course of her analysis hence enabling a focusing upon the very possibility of history itself.

In order to replay this enquiry I will turn from Arendt to the second of the three essays of Nietzsche's *Genealogy of Morals*. This essay, on "Guilt", 'Bad Conscience' and the Like" famously opens with the sentence: "To breed an

animal *with the right to make promises*—is this not the paradoxical task that nature has set itself in the case of man? Is this not the real problem regarding man?”³ To which Nietzsche adds the point: “That this problem has been solved to a large extent must seem all the more remarkable to anyone who appreciates the strength of the opposing force, that of *forgetfulness*.” (Nietzsche, 1887, §1.) The relationship between forgetting and promising seems to be the focus of this second essay but it is well to remember that Nietzsche states in his discussion of the *Genealogy* in *Ecce Homo* that each of the three essays of the former work have “a beginning that is *calculated* to mislead”.⁴ The stress in this citation from *Ecce Homo* falls on *calculated* suggesting that what is involved in this misleading opening of the essay involves a form schematic presentation that is patterned on the operation of measurement. This intriguing suggestion seems to be connected however to the theme of the first section of the second essay as here Nietzsche suggests that the development of the capacity to make promises requires the formation of what he terms a “*memory of the will*”, a memory that requires for its precondition that humanity itself must have become “*calculable, regular, necessary*” (*GM* II: 2). If we are being misled at the opening of this enquiry in a *calculated* manner therefore then the possibility of our being so misled is part of what the misleading opening seems to be describing to us. In what way is this concentration on the possibility of promising requiring a memory of the will misleading? In at least two respects: firstly, that Nietzsche’s real enquiry here concerns how the possibility of such a memory requires the formation of a certain sort of body, a body that operates according to rules that ensure behaviours in accordance with contract and secondly that the nature of memory itself is incorporated into a wider enquiry that is not initially announced: the enquiry into *conscience*.

The formation of the body that can be contracted is based however directly upon the insertion within this body of a new organ, an organ that is internal. Whilst this is the

argument of the second essay it is possible to see what might be meant by describing its opening as misleading when we remember that it is not until the 16th section of a 24 section essay, that is, after a third of the essay has been spent in “misleading” us that Nietzsche actually proffers his account of the arrival of this new organ as being based upon the turning-inward of instincts upon the human, thus constituting the possibility of a soul, a possibility described by Nietzsche as making possible a suffering of the human with itself, a suffering also described as the condition of an animal “taking sides against itself” (*GM* II: 16). Nietzsche’s portrayal of the birth of this phenomena is intricate and includes some key terms that I will subject to scrutiny:

This secret self-ravishment, this artists’ cruelty, this delight in imposing a form upon oneself as a hard, recalcitrant, suffering material and in burning a will, a critique, a contradiction, a contempt, a No into it, this uncanny, dreadfully joyous labour of a soul voluntarily at odds with itself that makes itself suffer out of joy in making suffer—eventually this entire *active* ‘bad conscience’—you will have guessed it—as the womb of all ideal and imaginative phenomena, also brought to light an abundance of strange new beauty and affirmation, and perhaps beauty itself. (§18.)

The nature of the implantation of the new organ that is given in “conscience” involves an imposition of a “cruel” and “uncanny” labour on the human by itself and from that this emerges the possibility of all ideal phenomena, including the highest aesthetic delights. Whilst this original story is presented in terms of a dual fiction concerning the first emergence of the human from the animal world through the emergence of land creatures creating the possibility of creatures that live through domination of their own kind the key element in Nietzsche’s account is that the arrival of the bad conscience is connected to the immense feeling of indebtedness that the present generation feels towards the past, an indebtedness that

emerges as the first form of contract. This contract is that the generations will prosper and found themselves as a people through their allegiance to their founders, founders that gradually take the shape of gods, a Lucretian explanation that sees the form of the gods as based on fear.

If the account of the human is that it is formed through the emergence of an internal organ that describes its relation to others through debt and that this debt becomes externalised in the form of a deity such that eventually the very core of the human body is formed through contracts that involve payment being inscribed to those who are not, who are no longer then slavery emerges not, as with Arendt, as simply the relationship between two sorts of classes or castes but actually as imbedded within the possession of a “soul” at all. Whilst this orientation of Nietzsche’s essay requires long preparation so that we will first be able to present the notions of promising and forgetting as our real targets what emerges clearly from Nietzsche’s second essay is that law precedes morality, that law is based primarily and consistently on measurement, that valuing is the same as measuring and that to be *calculated* is to be possessed of an internal organ that is bred within the bone, an organ we know as the “soul” and that this organ is what emerged as the precondition for the possibility of stable politics and as the basis therefore of states as such. Hence, whilst Nietzsche, like Arendt, focuses upon the ancient world as providing a basic picture of organization that is distinctly preferable to that of modernity, he also, like Arendt, has to present the artificiality of the human as operative in a two-fold manner. The first artificialization of the human is given in the formation within the human of an internal organ, this internal organ makes possible memory and forgetting by first making possible a labour of a distinctly different type to that presented by Arendt, a labour of the human upon itself. This self-labour of the human is what eventually produces through a practice of evaluation and measurement that is incessant the separation within modernity of humanity from its past: the time of nihilism in which the human no longer

finds its way about and the memory that was so painfully created loses its grip on the rationale for its being. The reason for this loss of grip is however concentrated for Nietzsche not in the occlusion of work by labour but rather in the emergence of the will to nothingness as the only effective will, a possibility that is however nothing other than the secret basis of the history of labour itself where labour is understood now to be the work on the soul carried out under pressure of the need to provide the human with a goal. In the perspective of modernity all such goals lose sense and henceforth the loss of orientation forms itself through the construction of behaviour around either the striving for “strong effects” (*decadence*) or the coolness of science. Within Nietzsche’s analysis however, as given in the *Genealogy*, the outside of this process is not visible. Both Arendt and Nietzsche therefore see the raising of artifice to a second power to constitute the creation within modernity of a condition that is no longer open to the possibility of the promise of the future. It is to attempt in conclusion to suggest that such a promise is located within the very formations that both Arendt and Nietzsche finally have only a reactive attitude towards that I will turn.

Futurity and the Memory of Tools

What both the models of Arendt and Nietzsche make clear is that the human is formed through a process of artificialization. The distinction between the analyses given by them in these terms is that Arendt thinks of the first form of artificiality as operative through the separation of some parts of the human from an essential aspect of the condition of being-conditioned and that this separation of some parts of the human creates a disjuncture between freedom and necessity a large portion of the human are forced under the yoke of necessity. With Nietzsche by contrast the formation of the internal organ that we term “conscience” and more broadly “consciousness” in general is the growth within us of something that makes

possible our subjection to ourselves, a condition only originally externalised in terms of types of person but which eventually creates rather a separation within each soul that leaves it to fight against itself. Whilst Nietzsche's portrayal allows much greater scope for psychology and ensures a different sense to labour than that allowed for within Arendt, the opening to the possibility of renewal is still understood through a miraculous recourse to the figure of birth, a recourse that in Nietzsche is figured from *The Birth of Tragedy* to the *Genealogy of Morals* through a notion of "reverse movement" within history being possible. This is what is involved in characterizing Nietzsche's response as still reactive despite the fact that there are moments when Nietzsche overcomes this attitude such as the important section of *Twilight of the Idols* entitled "In the ear of the Conservatives" where he writes:

What was formerly not known, what is known today or could be known – a *reversion*, a turning back in any sense and to any degree is quite impossible. There is nothing for it: one *has* to go forward, which is to say *step by step further into decadence* (- this is *my* definition of modern 'progress') One can *retard* this development and, through retardation, dam and gather up degeneration itself and make it more vehement and *sudden*: more one cannot do. - ⁵

Here, under the guise of advising others, one of the voices of Nietzsche frankly states the impossibility of the "reverse movement" conjured throughout his work, a motif similar in its persistence and difficulty to Arendt's idealisation of the notion of the "public space" in Periclean Athens. If the abandonment of such a notion is essential as it offers no more than a reactive picture to measure the present against, a picturing that partakes of the measurement that it is precisely used to voice a critique of, then the consequence of this should be, as this citation from *Twilight* suggests, that to push that there are effectively only two realistic strategies,

those of temporary “retardation” that permit, as this citation suggests, the emergence of more sudden and violent developments of the immanent tendency of the movement of history or, secondly, to immerse oneself within this immanent tendency in order to push it to its limit.

Whilst the second strategy was the one adopted by the young Lyotard in *Libidinal Economy* the first involves a relationship to the immanent developments that this is more characteristic of the work of Derrida. I will in conclusion suggest how the Derridean movement connects to the further artificialization of life and permits the possibility of a discernment within this movement of two kinds of development. Rather than cite Derrida initially however I wish firstly to deploy some motifs from the work of Bernard Steigler that I will in conclusion connect to the thinking of Derrida. Steigler presents a picture of the human as a technical complex that is in the process of self-overcoming and his analysis is given a strict summation in one dense and important paragraph that is worth citing in full:

The point is to focus on the originality of the epigenetic process that is put in place from the moment of the appearance of tools, insofar as they are conserved in their form beyond the individuals producing or using them. (The appearance of these tools, an actual nonliving yet vital memory, organized but inorganic matter, supposes, qua the vector and accumulator of past epigeneses, a singular epigenetic plasticity of the cerebral structure.) In nonartificial life, nontechnical, nonarticulated by the *différance* of *différance*, all summation of epigenetic events is lost for specific memory with the loss of the individual who was their support. In the case at hand, life conserves and accumulates these events. This conservation determines the relation to the milieu and the whole process of selection of mutations, notably those taking place at the cortical level. Consequently, the hypothesis can be formulated here, in apparent contradiction of the laws of molecular biology, epigenesis exerts a powerful counter effect on the reproduction of the species, channelling or conditioning an

essential part of the drive of selection. In this case, the individual develops out of three memories: genetic memory; memory of the central nervous system (epigenetic); and techno-logical memory (language and technics are here amalgamated in the process of exteriorization).⁶

The appearance of tools creates a new form of memory: this memory is not living but it permits the organization and orchestration of invention to be based on a support of previous incarnations that are the carved placing of ancestry. The accumulation and conservation of these memories is what permits the development of what Steigler here terms a “milieu” which is the exteriorization of the technical into life. This exteriorization creates what Arendt termed the “world”. In the constitution of artificial life this permits the creation of what “différance”, the structurality of delay and temporalization within the encounter with any environment. On the basis of this constitution of différance it is possible to constitute a drive that is not that of the process of evolution but is incarnated in the central nervous system, hence indicating a homology here between Steigler’s account and that of Nietzsche but which incorporates this process as the description now of language and technics in general. This constitution of a “inhuman” possibility that is inscribed *within* the human is the basis of the tool as such as Steigler precisely articulates when he writes:

If the individual is organic organized matter, then its relation to its environment (to matter in general, organic or inorganic), when it is a question of a who, is mediated by the organized but inorganic matter of the organon, the tool with its instructive role (its role qua instrument), the what. It is in this sense that the what invents the who just as much as it is invented by it. (Steigler, 1994, p. 177.)

The human thus finds itself apart from itself due to the conditions of its exteriorization. This marks the experience of humanity as “uncanny” caught between the life of the process of development and the development that is thereby

constituted as occurring through the mechanization of life-processes. Caught within this matrix the human organism and its environment come to mesh in the “worldliness” that Steigler terms “epiphylogenesis”. New memorializations are in the process of being constituted through the anticipation of new systems of invention that are inscribed within the developmental system in general. Within these new systems there is a tendency, the tendency that today takes the name of a research programme called “artificial life” to think of life in the general scheme of “programmability”.⁷

Whilst this orchestration of new memorializations is, on Steigler’s analysis, part of the developmental process of humanity into artificiality, there is still a key matter that is being left aside within the development that causes him concern. The human is for Steigler given its technical origin in a relation to death. The anticipation of mortality and the movement towards it involves the development of instruments of delay that have orchestrated the memorialization beyond any given generation. The mechanization that is artificiality raised to a second power is constituted for Steigler through the possibility of an end of death, the development of “life” that is not any longer governed by finitude.

If the immanent analysis of Steigler, unlike the vantage points of Arendt and Nietzsche, that promote a “critique” that is ultimately based on something beyond the process described, a “beyond” without effectivity in the constitution of artificiality, is rather focused on the technical itself as the basis of humanity then it remains to ask how Steigler’s approach can deal with the difficulty of the constitution of a second power that will, unlike Arendt, foreground death in order to constitute a newly inhuman condition that is no longer bounded by finitude? At this point it is important to recall Nietzsche’s description of the nature of the soul as divided against itself, finding its pleasure in the “cruelty” of self-torture. Whilst this self-torture can take the form of the destruction of the conditions of finitude hence ensuring that the future of the human is one that is inscribed in the

absolute destruction of the past and the entrance into the post-history that Arendt so eloquently describes there is still the openness within the technical complexification that is artificial life to the possibility of construing this future as insufficiently inhuman. This is what is behind the miraculous figures of birth mobilised by Arendt and Nietzsche and which is further promised in this concluding citation from Derrida:

There where man, a certain determined concept of man, is finished, there the pure humanity of man, of the other man and of man as other begins or has finally the chance of heralding itself – of promising itself. In an apparently inhuman or else ahuman fashion.⁸

Hence it is inhuman against inhuman.⁹ The key components of the other inhuman involve attention to precisely that which was left aside in the critical analyses of Arendt and Nietzsche: death, the immanent immersion into the processes of technization through them to constitute new forms of willed memory and the affirmation of the construction of this history through an attempt to aid it to self-comprehension as being, not misleadingly as Nietzsche suggests, oriented towards economies of memory and forgetting that permit *the promise* to emerge.

End Notes

¹ Hannah Arendt (1958) *The Human Condition* (The University of Chicago Press: Chicago and London), p. 2. Henceforth cited within the text as Arendt (1958).

² The closeness of this position to that of Arnold Gehlen is explicitly mentioned by Arendt in footnote 1 to p. 177 where however she distinguishes herself from him on the grounds that he is a believer in “biological necessity”. Since Gehlen’s position is however one that is intimately related to vitalism, this characterization is not fair to him. Cf. Arnold Gehlen (1950) *Man: His Nature and Place in the World* (1988 trans., Columbia University Press: New York).

³ Friedrich Nietzsche (1887) *On the Genealogy of Morals* (1969 trans by Walter Kaufmann, Vintage Books: New York), §1. All further citations given in the essay as (1887) and section number.

⁴ Friedrich Nietzsche (1888) *Ecce Homo* (as above), “*Genealogy of Morals: A Polemic*”.

⁵ Friedrich Nietzsche (1887) *Twilight of the Idols* (1968 trans. by R. J. Hollingdale, Penguin Books: Harmondsworth), §43.

⁶ Bernard Steigler (1994) *Technics and Time, 1: The Fault of Epimetheus* (1998 trans. by R. Beardsworth and G. Collins, Stanford University Press: Stanford), p. 177.

⁷ See Christopher Langton (1987) “Artificial Life” in C. Langton (ed.) (1988) *Artificial Life: The Proceedings of An Interdisciplinary Workshop on the Synthesis and Simulation of Living Systems Held September 1987 in Los Alamos, New Mexico* (Addison-Wesley Publishing Company, Inc: Redwood City.) Whilst Langton separates the programme of Artificial Life from that of Artificial Intelligence precisely on the grounds that the latter is based only on a computational model his essay is still based primarily on the notion of the “program”, a notion that is initially developed within genetics, subsequently utilised within computation and re-introduced on the basis of the artificial notion of it, back into life sciences. Hence Langton’s notion of “program” is itself the first emergence of the notion of Artificial Life, a history however that the researchers of this discipline seem ignorant of.

⁸ Jacques Derrida (1993) *Specters of Marx: The State of the Debt, the Work of Mourning, & the New International* (1994 trans. by P. Kamuf: Routledge: New York and London), p. 79.

⁹ For an argument that has the same consequences from different premises see J. F. Lyotard (1988) *The Inhuman: Reflections on Time* (1992 trans. by R. Bowlby and G. Bennington, Stanford University Press: Stanford).