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Heidegger and the Question Concerning Biotechnology

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Abstract

From the mid-thirties onwards, Martin Heidegger occasionally speculated about the future possibility of artificially producing human beings. What is at stake in biotechnology, Heidegger claims, is the imminent possibility of the destruction of the human essence. It is unclear, however, how Heidegger can substantiate such a claim given that he consistently denounced attempts to define human *Dasein* as a living being to which a higher capacity such as reason or language is added. This paper will argue that, in this sense, Heidegger took the radical challenge of biotechnology both too seriously and not seriously enough. Too seriously, because it is unclear why he would fear the annihilation of *Dasein*'s essence if he is convinced that this essence is not related to man's biological equipment in the first place. Not seriously enough, because Heidegger at the same time remained convinced that even the most intrusive interventions in the human body will not be able to disrupt *Dasein*'s ontological essence.

I. Introduction

> *Τέχνη can merely cooperate with φύσις, can more or less expedite the cure; but as τέχνη it can never replace φύσις and in its stead become the ἀρχη of health as such. This could only happen if life as such were to become a technically producible artifact. However, at that very moment there would also no longer be such a thing as health, any more than there would be birth and death. Sometimes it seems as if modern humanity is rushing headlong towards this goal of producing itself technologically. If humanity achieves this, it will have exploded itself, i.e., its essence qua subjectivity, into thin air, into a region where the absolute meaningless is valued as the one and only 'meaning' and where preserving this value appears as the human 'domination' of the globe.*[1]

Heidegger wrote down these prophetic words as early as 1939. One can therefore only admire his lucid appraisal of the possibilities lying dormant in the

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[1] Heidegger (1998), p.197.

scientific project of his time, the realization of which must have seemed but the most paradigmatic case of science-fiction. It is true that considerable progress had already been made in the domain of what we today call the life-sciences which probably allowed Heidegger to engage in these speculations about a future biotechnological revolution in the first place. In his essay "Overcoming metaphysics" he refers, for example, to the pioneering research of the 1938 Noble Prize winner in chemistry Richard Kuhn, which, he suggests, "already opens up the possibility of directing the breeding of male and female organisms according to plan and need,"[2] and he adds that "[s]ince man is the most important raw material [*Rohstoff*], one can reckon with the fact that some day factories will be built for the artificial breeding of human material (…)."[3] Moreover, in his Heraclitus seminar with Eugen Fink Heidegger speaks about the coercive steering of genes in cybernetic biology.[4] And in one of his Le Thor seminars he argues that what is most disturbing today is the "transformation of biology into biophysics," which will bring about that "the human can be produced according to a definite plan just like any other technical object."[5] With the advantage of more than seventy years of hindsight, we know that techno-science still cannot actually industrially produce "human material," let alone entire human beings, but it would be unfair to simply brush aside Heidegger's speculations on the basis of his clearly oversimplified description of the actual technical procedures involved. Indeed, we have meanwhile witnessed the emergence of technologies that allow us to manage reproduction such as IVF and artificial insemination and while it is already possible to transform embryonic stem cells into other kinds of cell tissue for therapeutic purposes, it will very soon probably also be possible to grow stem cells into complete organs that can be used to replace damaged ones. However, while the curative potential of these technologies is almost unanimously hailed as a positive achievement of contemporary techno-science, this is certainly much less the case with technologies for reproductive cloning and genetic enhancement. The possibility to intervene in the human genome and to 'improve' the constitution of the human body and mind inevitably raises questions not only about its technical feasibility, but also and especially about its moral permissibility.

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[2] Heidegger (2003), p.106.
[3] Ibid.
[4] Heidegger and Fink (1993), pp.12-14.
[5] Heidegger (2003), p.55.

The dangers the opponents of comprehensive genetic engineering invoke to prevent these technologies from being further pursued are manifold. They range from the increased risks of deformations and miscarriages that might result from experimentation on humans and, later on, from the technology's actual implementation, to the prospect of a world populated by a uniform type of human beings, to the fear that mankind will be divided into a small enhanced elite and a large non-enhanced underclass. They consequently urge governments to adopt regulations that bring the development of intrusive biotechnologies to a halt. The main question is, of course, where the threshold lies between the appropriate and inappropriate use of biotechnology.

Starting from the recent discussion between Jürgen Habermas and the advocates of the liberal eugenics about the permissibility of genetic engineering, it will be argued that the advocates and the adversaries of comprehensive genetic engineering actually share a number of assumptions about ideas of 'life,' 'nature' and 'technology' that prevent them from thinking the challenge that is presented by the current biotechnological revolution in a sufficiently radical way. Subsequently I will turn to Heidegger's writings and suggest that his philosophy of technology allows us to think the question of biotechnology in a more fruitful way, but that, ultimately, he takes the radical challenge of biotechnology both too seriously and not seriously enough. Too seriously, because it is unclear why he would fear the annihilation of man's essence in a future biotechnological epoch if he is convinced that this essence is not related to man's biological equipment in the first place. Not seriously enough, in the sense that by arguing that the danger of biotechnology is that it challenges us to *understand* ourselves as organic material, Heidegger at the same time remains convinced that even the most intrusive interventions in the human body and mind will disrupt man's ontological essence.

II. The Grown and the Made

One of the most curious side-effects of the current biotechnological revolution is that the literary genre of science-fiction suddenly gained an unexpected credibility. Aldous Huxley's *Brave New World* remains exemplary in this respect. Although many of such literary speculations about humanity's biotechnological future are dismissed by scientists as products of an imagination gone wild, there is every reason to take dystopian fictions like these seriously.

After all, most of the technologies Huxley described in his novel, like the use of psychotropic drugs and artificial insemination, are currently available while others, like comprehensive genetic engineering, will very likely become available in the near future. In his essay *The Future of Human Nature* Jürgen Habermas gives two additional reasons why we should pay close attention to even the most speculative predictions of this kind. First, there is always the risk that the ever increasing speed of scientific discoveries will take society by surprise and render it hence impossible for decision making bodies to put a stop to certain developments once they are on the verge of being implemented in clinical settings. Second, the mere expectation that more far-reaching possibilities will become available in the not so distant future has already effected a radical uprooting of "deep-rooted categorical distinctions which we have as yet, in the description we give of ourselves, assumed to be invariant"[6] and this awareness alone "might change our ethical self-understanding as a species in a way that could also affect our moral consciousness."[7]

From a political perspective, decision making bodies are confronted with the paradoxical challenge that they have to enact clear cut regulations regarding technologies which at the same time radically destabilize the conceptual distinctions upon which our normative frameworks are grounded in the first place. Nowhere is this destabilization more disquieting, Habermas suggests, than in the case of the seemingly obvious distinction between "the nature we *are* and the organic equipment we *give* ourselves,"[8] between "what is *manufactured* and what has *come by nature*,"[9] or in its ancient Greek formulation, between entities which are engendered by *tekhnē* and those which are engendered by *physis*. The ethical significance of the distinction between the grown and the made, Habermas argues, is that it is intrinsically connected with the morally proper modes of action one should adopt when dealing with entities pertaining to one of these two ontological realms. In contrast to inorganic entities whose inert nature makes them freely available for technical-instrumental interventions, the auto-regulated nature of organic entities severely restricts the modes of action one should impose on them. Referring to Aristotle's description of the various attitudes one should adopt when dealing with organic entities, Habermas gives

[6] Habermas (2003), p.42.
[7] Ibid.
[8] Ibid., p.22.
[9] Ibid., p.46

the examples of the peasant, the doctor and the breeder who should respectively cultivate, heal and select the entities which are entrusted to their care. Only these 'therapeutic' modes of action are responsive to the inherent dynamics of self-regulated organic entities. Since Habermas ultimately wants to argue that "the genetic foundations of our existence should not be disposed over,"[10] he thinks that only a revaluation of an Aristotelian distinction between modes of action could yield specific guidelines to determine where the boundary lies between a negative eugenics, which Habermas considers permissible and even ethically binding, and a positive eugenics, which he thinks should be legally banned on the basis of a "right to a genetic inheritance immune from artificial intervention."[11] The difference between a negative eugenics and a positive eugenics is that in case of the former genetic interventions are only carried out to prevent or cure genetic defects, while in case of the latter they are aimed at enhancing man's genetic make-up. The problem, Habermas concludes, is not genetic engineering as such, but only its use beyond the traditional logic of healing.

While the vivid memory of Nazi Germany's experimentation with eugenic policies probably explains why Habermas is so determined to set out clear boundaries between a positive eugenics and a negative eugenics, in the Anglo-Saxon world the discussion about genetic enhancement has taken a different direction. Here, the main issue is to show that in contrast to the 'old eugenics' or 'authoritarian eugenics,' the 'new eugenics' or 'liberal eugenics' holds out the promise to drastically increase the individual's freedom to design how her future and that of her offspring will look like. As one of main proponents of the liberal eugenics Nicholas Agar argues, while the old eugenics "sought to produce citizens out of single centrally designed mould, the distinguishing mark of the new liberal eugenics is state neutrality."[12] In Agar's view, the mistake of 20th century eugenics was that it was a state directed enterprise which sought to coercively improve the genetic stock of the population in the direction of a 'healthier' or 'superior' race. Proponents of the liberal eugenics think that it should not be centrally decided which direction these improvements should take, but that it is up to the individuals themselves to choose which genetic traits they want to give to themselves and to their children.

[10] Ibid., p.22.
[11] Ibid., p.27.
[12] Agar (1998), p.137.

Agar wonders, for example, whether Habermas's distinction between a negative eugenics and a positive eugenics does not also unwittingly reproduce certain politico-normative presuppositions. It seems indeed an impossible and even a dubious task to draw up an 'objective' list of physical and psychical characteristics which should be considered defective and which in Habermas's view would consequently be eligible for genetic therapy. In Agar's view, the inability to draw a solid boundary between healing and enhancing is paralleled by the inability to make a clear distinction between a positive eugenics and enhancement of the human by modifications of the environment. Agar sees for example no difference between increasing a person's intelligence by genetic intervention or by providing her with an excellent education and consequently argues that opponents of genetic enhancement generally overestimate the role of genetic factors and downplay the role of environmental factors in the shaping of an person.

Agar's argument that there is no substantial difference between genetic enhancement and socialization obviously poses a problem for Habermas who maintains that there is a fundamental difference between the manipulation of 'subjective nature' and the manipulation of 'objective nature.' Habermas argues, however, that the liberal eugenics tends to ignore the embodied perspective of the programmed person herself and does not take into account that genetically modified humans would be refused the possibility to respond to the demands that are imposed on them by their creators. Knowledge of the fact that one's dispositions, talents and bodily characteristics are genetically programmed will inevitably have consequences for one's self-understanding and it will more in particular transform intergenerational communication into an unidirectional imposition. While the parents' efforts to modify the environment of their child to steer her development into a certain direction might be subsequently met by her by developing a revisionary self-understanding, the possibility to change one's life history is cut off for the child when it concerns modifications of the genome.

Slavoj Žižek has, however, pointed out a striking paradox in Habermas's reasoning. If Habermas fears that modification of the human genome will decisively alter the fundamental parameters guiding man's self-understanding and, more specifically, that it will deprive man of his inalienable right to possess a genetic inheritance immune from intervention by another person, then he is basically arguing that man can only retain his freedom and autonomy by leaving

the distribution of man's dispositions to the contingent processes of nature. The paradox obviously being that, henceforth, "autonomy can only be maintained by prohibiting access to the blind natural contingency that determines us, that is, ultimately, by limiting our autonomy and freedom of scientific invention."[13] What would, in Habermas's view, deprive a person of his or her freedom, Žižek argues, "is, paradoxically, the very fact that was hitherto left to chance becomes dependent on the free decision of another person."[14] The argument that human beings can only experience their freedom with reference to something which is not at their disposal only makes sense if this gifted aspect is *truly* out of man's reach. If this is not the case, then it seems that Habermas is arguing that the only way for man to maintain his sense of dignity and autonomy is by committing himself to an illusion.

When asked in his famous posthumously published *Der Spiegel* interview what is exactly wrong with technology given the many benefits it offers to mankind, Heidegger indignantly replied:

> Everything is functioning. This is exactly what is so uncanny, that everything is functioning and that the functioning drives us more and more to even further functioning.[15]

In Heidegger's view, the danger of technology, including biotechnology, is not that something might go terribly wrong, but, quite the contrary, that everything will actually function smoothly. Heidegger would not deny that genetic engineering could indeed provoke certain factual dangers, but for him this is not what is most disquieting about it. The most threatening prospect would precisely be that the human genome could be modified without any undesirable side effects. In that case, Heidegger predicts, man would have transformed himself into an entity that could hardly still be called human. However, this does not mean that Heidegger would side with critics, such as Habermas and Bill Mckibben,[16] who argue in favor of a legal ban on germ line intervention, but do allow for somatic gene therapy. Since he rejects the commonly accepted view that technology is a means to an end, he thinks it is a

[13] Žižek (2004), p.126.
[14] Žižek (2006), p.307.
[15] Heidegger (1993), pp.105-106.
[16] Mckibben (2003), p.127.

metaphysical illusion to believe that one can control the development of technology through regulations. Man is not the master of technology. Just when he believes he can control and regulate technology, it may turn out that he is simply its most docile servant.

Now, if technology is not a means, then it is impossible to secure an impartial position from out of which one can pass judgment on it. In this respect, Habermas seems to succumb to a curious perspective fallacy when he challenges the de-differentiation of eugenics and socialization by arguing that it erroneously "presupposes a leveling out of the difference between the grown and the made, the subjective and the objective."[17] It does not make any sense to reject biotechnological intervention by arguing that it will uproot some of our most fundamental beliefs, because it seems that such an intervention will precisely render meaningless the distinction between what is 'natural' and what is 'artificial.' In a biotechnological future this distinction will be performatively abolished, so to speak. And it would consequently be self-deceptive to continue to use this distinction as a point of reference for judging the totally new reality that is looming on the horizon. As Slavoj Žižek puts it:

> [D]oes the very fact of the possibility of biogenetic manipulations not retroactively change the self-understanding of ourselves as "natural" beings, in the sense that we now experience our "natural" dispositions themselves as something "mediated," not simply as something immediately given but as something that can be in principle manipulated (and is thus simply contingent)?[18]

To argue that genetic intervention will destroy the 'naturalness' of man presupposes that man had a 'natural essence' in the first place. But this assumption is precisely what the possibility of genetic modification radically puts into question and consequently cannot be wielded as an argument against it.

The liberal eugenics, on the other hand, relies on the same *petitio principii*, but arrives at the exact opposite conclusion. Because it also conceives technology as a means, it expects to find the human unscathed on the other side of the biotechnological threshold. It assumes that genetically enhanced humans will possess the same goals, aspirations, and dreams as their non-enhanced

[17] Habermas (2003), p. 50.
[18] Žižek (2004), pp.125-126.

predecessors, but with this decisive difference, that they will be better equipped to actually achieve them. Heidegger exposed this fallacy as early as 1967 in a lecture for the Greek Academy of Arts and Sciences.[19] The essence of modern science, Heidegger argues, reveals itself in the victory of the scientific method over science, because it is the method that determines in advance which phenomena are experimentally accessible and which ones are not. For Heidegger the victory of the scientific method manifests itself pre-eminently in what was at the time considered to be the science of the future, namely cybernetics. Cybernetics – from the Greek *kybernētēs*, steersman – only accepts the reality of information flows between different systems and subsystems. Significantly, it does not differentiate between organic and inorganic systems. In cybernetics it is assumed that both are steered by the same basic principle, namely the feedback loop of information. It is by applying these principles to the study of the human body, Heidegger argues, that the life sciences discovered that the germ cell contains the information that regulates the living character of human beings [*Das Lebendige im Leben des Menschen*], their "life plan" [*Lebensplan*], so to speak. It is by gaining access to this information that "one day we will be able to techno-scientifically produce and breed human beings."[20] However, the problem with this biotechnological future as projected by what Heidegger calls "futurology" [*Futurologie*] is that it is merely a "stretched present" [*eine verlängerte Gegenwart*]. Biotechnology remains a project of the epoch of subjectivity, but it strangely enough ignores the fact that its accomplishment will actually nullify the distinction between subject and object.

III. Dasein and Life

The fundamental weakness of all arguments against comprehensive genetic engineering seems to be that they unreflectively accept the view that man's essence is ultimately grounded in his genetic constitution. Once this has been conceded, it can indeed be argued that genetic intervention will dramatically change our *present* understanding of what a meaningful existence entails, but it cannot be maintained that it will deprive existence of meaning *as such*. As Žižek remarks: "Who knows what this 'posthuman' universe will reveal itself to be 'in

[19] Heidegger (1983), pp.135-149.
[20] "Aus seine Kenntnis gründet man die sichere Aussicht, eines Tages die wissenschaftlich-technische Herstellbarkeit und Züchtung des Menschen in der Griff zu bekommen." (Ibid., p. 143.)

itself'?"[21] Heidegger seems to be an exception in this regard. Although he also considers genetic engineering to be a imminent danger for the human essence, he nevertheless consistently rejected biological determinations of the human essence. He remained convinced that the metaphysical tradition erroneously defined man as a natural entity to which some higher capacity such as speech, reason or a soul is added. According to Heidegger the essence of man is his receptivity to Being which he calls 'being-in-the world,' 'ek-sistence,' or 'transcendence:'

> Ek-sistence can be said only of the essence of man, that is, only of the human way 'to be.' For as far as our experience shows, only man is admitted to the destiny of ek-sistence. Therefore ek-sistence can also never be thought of as a specific kind of living creature among others.[22]

Is Heidegger saying that man does not belong to the realm of nature? Or even that he is not a living creature at all? Such a position would even exceed religious dogma in anti-Darwinism. For Heidegger, however, the burden of proof does not rest with those who, like himself, challenge what he calls "zoological definitions" of the human, but with those who claim that the essence of man is somehow grounded in 'life.' Man or Dasein is not 'life' plus something else added to it. Rather, 'life' is Dasein from which something is subtracted. As Heidegger puts it in *Being and Time*:

> Life, in its own right, is a kind of Being; but essentially it is accessible only in Dasein. The ontology of life is accomplished by way of a private interpretation; it determines what must be the case if there can be anything like mere-aliveness [Nur-noch-leben]. Life is not a mere Being-present-at-hand, nor is it Dasein. In turn, Dasein is never to be defined ontologically by regarding it as life (in an ontologically indefinite manner) plus something else.[23]

In *Being and Time* Heidegger argues that Being-in-the world is Dasein's essential way of being, its most basic state. Hence, what apparently has to be

[21] Žižek (2006), p.195.
[22] Heidegger (1977), p.228.
[23] Heidegger (1962), p.75.

subtracted from Dasein to arrive at an understanding of what 'life' means is 'world.' In *Being and Time* Heidegger does not undertake such an attempt. On the contrary, he argues that Dasein does not have access to such a thing as 'pure life' since our understanding of the entities that surround us and of the entity that we are ourselves is necessarily mediated by the world. The world constitutes the horizon of our understanding of entities behind which we cannot penetrate. Likewise for the concept of a 'pure nature.' The conception of natural beings that are somehow independently present as present-at-hand objects derives from a more originary understanding of entities that are ready-to-hand, namely tools and objects of use:

> The wood is a timber forest, the mountain a rock quarry, the river a hydraulic force, the wind 'in the sails.' When the 'environment' is disclosed, the 'nature' thus disclosed is encountered too.[24]

The same for animals. Although it is admitted that animals are not merely artifacts or automatons, as Descartes still maintained, in Heidegger's existential analytic animals are entities that appear within the everyday world of Dasein as merely useful for this or that purpose: as leather for shoes, as power source, etc. The idea of a living being as such can only arise when one makes abstraction of this more original 'worldly' encounter.

Apart from a telling remark that animals simply perish, never properly die as Dasein does – of which Jacques Derrida will make much[25] –, *Being and Time* remains otherwise silent on the question of the being of life. This should not come as too great a surprise. *Being and Time* was written with the explicit intention to reopen the question of Being as such. Any attempt to determine the being of particular regions of entities such as life can therefore only be successful after this more fundamental issue has been properly addressed. However, merely three years later, in *The Fundamental Concepts of Metaphysics*, the question of animal being becomes a central one for Heidegger. The guiding threat of Heidegger's argument in this lecture course is constituted by three theses: the stone is wordless, the animal is world-poor and man is world-forming. Note that *Being and Time*'s conceptual framework still determines the relationship between these theses. Life is only considered to be

[24] Ibid., p.100.
[25] See Derrida (1993).

accessible through a subtraction of world from Dasein: the animal is "poor in world." Hence, as Heidegger reasserts his earlier claim, "*[t]he essence of life can become accessible only if we consider it in a deconstructive fashion*."[26] Heidegger will conclude that the essence of the animal consists in being "captivated" [*benommen*]. The animal is trapped in its environment by the ring or circle of its drives and instincts. This implies that it has access to the entities that penetrate its circle of instincts, but that it can only react to these entities, never truly act in relation to them. Heidegger avidly describes an experiment of the biologist Jacob von Uexküll, during which a bee is brought in front of a cup of honey. It appeared that the bee continued to suck up the honey even after the bee's abdomen was cut away and the honey visibly streamed away behind it. According to Heidegger, this experiment convincingly shows that the bee does not recognize the food *as* too much food and that it can only continue its instinctual activity. What is withheld from the bee is the ability to apprehend the honey *as such*. Since the animal is completely captivated or absorbed by the entities that constitute its environment, it cannot let an entity be what it is. This phenomenological possibility to reveal an entity in its being is reserved for Dasein only. Dasein being world-forming implies that he always already moves within a horizon of meaning or what Heidegger calls a clearing (*Lichtung*) of Being on the basis of which entities present themselves *as* this or *as* that.

It remains, however, unclear how Dasein's possibility to reveal entities as such relates to what is biologically given to him. Does it not find its condition of possibility there in the sense that it surely cannot be denied that Dasein's ek-sistence or being-in-the-world must somehow be grounded in his physical constitution? For Heidegger this is not at all obvious. On the contrary, he maintains that ek-sistence is more original than the body and owes nothing to it. In sense perception, for example, we do not first register 'raw data' such as noises or sounds to which we subsequently apply the categories of understanding as to finally arrive at a meaningful representation. Such a hylomorphic detour is totally unnecessary. Phenomena immediately present themselves *as* this or *as* that:

> What we 'first' hear is never noises or complexes of sounds, but the creaking wagon, the motor cycle. (…) The fact that motor-cycles and

[26] Heidegger (1995), p.255.

> wagons are what we proximally hear is the phenomenal evidence that in every case Dasein, as Being-in-the-world, already dwells *alongside* what is ready-to-hand within-the-world. (…) Dasein, as essentially understanding, is proximally alongside what is understood.[27]

Hence, it is understanding which makes possible hearing, not the mere 'natural' fact of being endowed with ears. Heidegger maintains the priority of understanding over bodily sense perception to a point where it almost becomes absurd, even claiming that faculties are more original than physical organs: "We do not hear because we have ears, but we have and are able to have ears because we can hear."[28] Biological organs merely register what on a more fundamental level has already been actualized by the faculty of understanding.

It should be more than clear, then, that Heidegger attempts at all costs to counter the modern tendency to define the essence of man in biological or physiological terms. Such an approach may have its rationale, but it also seems to deprive his critique of biotechnology of any meaningful content. Because why would he consider biotechnology a threat to man's essence if this essence is not related to man's biological equipment in the first place? Such a critique seems to be in keeping with the reaction of the Catholic Church to cloning and genetic engineering: If man's essence, his soul, is really immortal, then why oppose biotechnological interventions on the perishable body? The answer is that Heidegger understands the notions of 'nature', 'life' and 'technology' differently. To really understand why Heidegger dreaded the coming of a biotechnological epoch we must consequently turn to his re-interpretation of the ancient Greek notions of *physis* and *tekhnē*.

IV. The Essence of Biotechnology

"Technology is not equivalent to the essence of technology,"[29] Heidegger writes at the beginning of his seminal essay 'The Question Concerning Technology.' Almost everything we thought we knew about technology – it is an inert, neutral means utilized by man – may well be 'correct,' but it is certainly not 'true.' To understand why these characteristics do not determine

[27] Heidegger (1962), p.207.
[28] Heidegger, (1979), p.247.
[29] Heidegger (1977), p.4.

technology in its essence, Heidegger's claim has to be placed against the backdrop of his interpretation of the ancient Greek notion of *tekhnē*. *Tekhnē* does not refer to the production and utilization of tools and machines, but to a kind of knowledge, a know-how.[30] Heidegger explains this through an interpretation of Aristotle's theory of causality which, crucially, also seems to be the source of the broadly accepted conception of technology as a means. As is well known, Aristotle posits four causes: the material cause, the formal cause, the final cause, and the efficient cause. Conventional readings of Aristotle take this to imply that technology involves man as efficient cause imposing form upon inert matter to his own end. According to Heidegger, however, such a reading is completely un-Greek. What later centuries called 'cause,' the Greeks called 'aition,' 'that to which something else is indebted.' That 'something else' is the artifact, the end result of *tekhnē*. The moderns think that only man is responsible for the production of the artifact. He is supposed to be the one who controls the production process from A to Z. The Greeks, however, understand this process differently. For the Greeks man isn't the pivot in *tekhnē*, but merely one of the four aitia, which implies that *tekhnē* is not a means to achieve a freely chosen end, but a process of co-creation involving all four aitia leading to a coming into being of what is not yet a being. In Heidegger's words, *tekhnē* "lets what is not yet present arrive into presencing."[31] *Tekhnē* is a mode of *poiēsis*, a bringing-forth. This leads Heidegger to a final conclusion. As a mode of *poiēsis* *tekhnē* lets something which is concealed come into unconcealment: *tekhnē* is closely related to what the Greeks called *alētheia*, truth. It is through the know-how involved in *tekhnē* that man is able to grasp truth, which for Heidegger is nothing less than the truth of Being.

What about modern technology? Modern technology is also a mode of revealing, but no longer a bringing-forth, a *poiēsis* leading to truth, but a challenging-forth [*Herausfordern*] that "puts to nature the unreasonable demand that it supply energy that can be extracted and stored as such."[32] In modern technology Being or what he in this context calls "the real" is reduced to a standing-reserve [*Bestand*] of energy that can be stockpiled and used to serve man's subjective needs. Through modern technology humanity seems to be

[30] "Technē means neither art not technology but a kind of knowledge, the knowing disposal over the free planning and arranging and controlling of arrangements." (Heidegger (2000), p.18.)
[31] Heidegger (1977), p. 10.
[32] Ibid., p.14.

finally able to realize Bacon and Descartes' project of making itself master and possessor of nature. Heidegger questions this anthropocentric view. What appears to install humanity in a position of absolute mastery over the natural world is actually something that has been donated to it: we are only able to reveal Being as mere raw material ready for exploitation by modern technology because Being has already revealed *itself* to us in this form. Modern technology is not a human accomplishment, but a sending of Being. In Heidegger terms, it is a destining [*Geschick*]. Such a revelation of Being that challenges man to, in turn, challenge nature is what Heidegger calls *das Gestell* [*enframing*]. Now, not only does man lack control of the revelation of Being at work within modern technology, but man is himself profoundly subject to that revelation. Here we finally arrive at an answer to the question why Heidegger considers biotechnology a threat to man's essence:

> When destining reigns in the mode of Gestell, it is the supreme danger. (…) As soon as what is unconcealed no longer concerns man even as object, but does so, rather, exclusively as standing-reserve, and man in the midst of objectlessness is nothing but the orderer of the standing-reserve, then he comes to the very brink of a precipitous fall; that is, he comes to the point where he himself will have to be taken as standing-reserve.[33]

In the age of modern technology, and even more so in the coming age of biotechnology, man himself is challenged or revealed as a standing-reserve of genetic material to be exploited by the life-sciences. It should be noted, however, that the entire discussion is once again played out on the level of understanding. The danger of biotechnology does not primarily consist in concrete empirical threats posed by technical interventions on the genome, but in the threat that we will *understand* ourselves as bio-genetic entities that can be manipulated at will. This is what is dangerous about biotechnology, not the fact that we will actually use these technologies to modify the genome. This is why Heidegger would probably say that the discussion between Habermas and the liberal eugenics about the permissibility of genetic engineering is besides the point. Both sides already presume that man's essence is grounded in his genetic constitution and in that sense the damage has already been done:

[33] Ibid., pp.26-27.

> The actual threat to man does not come in the first instance from the potentially lethal machines and apparatus of technology. The actual threat has already affected man in his essence.[34]

In Heidegger's view, such a tacit agreement between the advocates and the critics of genetic enhancement would merely demonstrate that the *Gestell* has become hegemonic and dictates the terms in which the discussion is to be pursued.

On the one hand, then, man is so thoroughly in the grip of the illusion of absolute sovereignty over Being conjured up by the *Gestell* that he is hardly able to recognize that it is still a mode of revealing of which he is merely the recipient:

> he does not apprehend *Gestell* as a claim. (…) he fails to see himself as the one spoken to, and hence also fails in every way to hear in what respect he ek-sists, from out of his essence, in the realm of an exhortation or address.[35]

On the other, the *Gestell*'s total monopoly over the process of revelation blocks off all other possible revelations of Being, including *poiēsis*:

> Where this ordering holds sway, it drives out every other possibility of revealing. Above all, the *Gestell* conceals that revealing which, in the sense of poiēsis, lets what presence come forth into appearance.[36]

In the end, then, the *Gestell* not only excludes all other possible revelations such as ancient *tekhnē* but it even occults its own status as a revelation and the ontological structure of Being as a process of revealing. In other words, the *Gestell* simply becomes synonymous with "what is."[37]

Now, despite Heidegger's extreme pessimism regarding man's possibility to extract himself from the hegemony of the *Gestell* he still mentions a "saving

[34] Ibid., p.28.
[35] Ibid., p.27.
[36] Ibid.
[37] Ibid.

power." If the *Gestell* denotes Being in its current guise, then this means that it is also a revelation bestowed upon man, rather than one created or imposed by him. In fact, Heidegger already said at the beginning of the essay that it is only by thinking the "ambiguous essence"[38] of technology as a disclosure granted to man by Being, rather than an empirical technical instrument in the hands of a free subject, that man is able to receive the possibility of a "free relationship"[39] to modern technology. Since we know that for Heidegger the essence of technology consists of it being a mode of revealing, this implies that such a free relationship can only be attained by retrieving the original meaning of *poiēsis*:

> Revealing is that destining which, ever suddenly and inexplicably to all thinking, apportions itself into the revealing that brings forth and that also challenges, and which allots itself to man. The Gestell has its origin as a destining in poiēsis.[40]

Why, however, after first arguing that the *Gestell* blocks *poiēsis*, does Heidegger now see the *Gestell* as itself poetic in origin and why, moreover, does he even credit it with containing the "saving power?"

At this point it becomes necessary to turn to Heidegger's interpretation of the pre-Socratic notion of *physis*. *Physis* does not correspond to the domain of entities that we call 'nature,' which is merely a metaphysical interpretation of it, but names an ontological concept that is prior to any particular process that may take place like the growing of a tree, because it refers to the event through which particular entities originally receive their essence. In other words, *Physis* is nothing less than the original disclosure of Being itself. In the *Introduction to Metaphysics*, for example, Heidegger says that "*physis* is Being itself, by virtue of which beings first become and remain observable."[41] More specifically, Heidegger defines *physis* here as "what emerges from itself, the unfolding that opens itself up, the coming-into-appearance in such unfolding, and holding itself and persisting in appearance – in short, the emerging-abiding sway."[42] Furthermore, Heidegger explains that for the Greeks *physis* also included some of the concepts to which that notion is traditionally opposed such as soul

[38] Ibid., p.33.
[39] Ibid., p.3.
[40] Ibid., pp.29-30.
[41] Heidegger (2000), p.15.
[42] Ibid.

(*psychē*), position (*thesis*), law (*nomos*) and, more importantly for our theme, even technology (*tekhnē*). As Heidegger will repeat in *The Question Concerning Technology*:

> [N]ot only handcraft manufacture, not only artistic and poetical bringing into appearance and concrete imagery, is a bringing-forth, *poiēsis*. *Physis* also, the arising of something from out of itself, is a bringing-forth, *poiēsis*. *Physis* is indeed *poiēsis* in the highest sense.[43]

If *poiēsis* is the *non*-technological essence of technology which we should retrieve from oblivion if we want to free ourselves from pervasive modern technology, it is because it achieves its highest form of expression in *physis*. Both *tekhnē* and *physis* are modes of *poiēsis*, but since *physis* is *poiēsis* to a higher degree the poietic revealing of *tekhnē* can only be understood from the vantage point of *physis*. Why *physis* has priority over *tekhnē* Heidegger explains in his essay on Aristotle's *Physics*. In keeping with one of Aristotle's basic principles that to know is to become one with the thing known, Heidegger attempts to explain the difference between *physis* and *tekhnē* by examining the things that are revealed through both modes of *poiēsis*: natural things (*physei onta*) and technical things (*tekhnē onta)*. The most basic quality of a natural thing is that it is in movement (*kinesis*) or, in other words, that it has the tendency to change from something into something (*metabolē*). Hence, for Aristotle movement does not only mean change of place, but also growth and diminution, alteration, and generation. Technical things, however, are *also* moving beings, but usually we encounter them in a state of rest as that which has been produced and is now ready to use. Aristotle will thereupon argue that technical entities nonetheless differ from natural entities insofar as they move differently: while natural things contain within themselves the source (*archē*) of their movement, technical things have no impulse to change arising from themselves.

We need not to go into the minutiae of Heidegger's Aristotle interpretation. Let it suffice to say that the reason why Aristotle is such an important interlocutor for Heidegger is that his theory of *physis* is at the crossroads of the truthful account of the essence of *physis* in pre-Socratic philosophy and its later

[43] Heidegger (1977), p.10.

metaphysical determination that will culminate in the *Gestell*. In Heidegger's view, the moderns have turned the ancient Greek understanding of the relation between *physis* and *tekhnē* upside down in the sense that in the age of the *Gestell* it is believed that it is in technology that *poiēsis* achieves its highest form of expression. In modernity Being is no longer the "emerging-abiding sway" of *physis*, but is reduced to inert matter or standing-reserve passively awaiting technical formation by man. Heidegger says, for example, that defining living beings as organisms actually boils down to interpreting them as "artifacts that make themselves."[44]

Aristotle could be said to be the inspiration of such a technological understanding of Being because he tried to explain the self-emerging sway of *physis* in terms of matter and form. Heidegger therefore attempts to read Aristotle's form/matter distinction in such a way that it remains faithful to the pre-Socratic view that *physis* is superior to *tekhnē*. Why is this so? Firstly, because matter (*hylē*) and form (*morphē*) belong together necessarily in *physis*, but only incidentally in *tekhnē*. Wood is necessary for a tree, but incidental to a table, which could also be made out of iron for example. Moreover, in contrast to the bringing-forth of technical things, in which the form must first exists in the mind of an external agent prior to production, in the generation of natural things no such external help is required. If they did require outside assistance, Heidegger remarks, "this would mean an animal could not reproduce itself without mastering the science of its own zoology."[45]

Secondly, because in *tekhnē* matter and form belong together only incidentally, technical things have no impulse to change arising from themselves, *except* insofar they are also always partly made out of natural things. A wooden bed will eventually rot not because it is a bed, but because it is made out of wood. The imposition of a form by an external agent in *tekhnē* does not destroy the original complicity of form and matter in the natural things that form the basis of technical things. This is an important argument for Heidegger because it shows that *physis* is necessarily prior to *tekhnē* and thus that the movement characteristic of *physis* will always eventually overpower the movement of *tekhnē*. For the ancients, then, *tekhnē* does not consist in imposing a preconceived form on inert matter, but in a mode of poietic disclosure that operates in accordance with the poietic *self*-disclosure of *physis*:

[44] Heidegger (1998), p.195.
[45] Ibid., p.222.

> *Tekhnē* is a mode of proceeding against *physis*, though not yet so as to empower it or exploit it, and above all not to turn use and calculation into principles, but, on the contrary, to retain the holding sway of *physis* in unconcealment.[46]

Man is not the master of nature, but merely assists the embryonic process of coming-into-appearance that is already underway in *physis*. Such an understanding of technology and nature sounds, of course, quite alien to modern ears. It implies, for example, that the production of a wooden table doesn't involve a carpenter imposing a subjectively chosen shape to a indifferent piece of wood, but that the wood, the *hylē*, already contains the potential to disclose itself as a table and that the carpenter is only there to 'assist' the wood to show itself as what it potentially already is:

> The change of the appropriate wood into a table consists in the fact that the very appropriateness of what is appropriated emerges more fully into view and reaches its fulfillment in the appearance of a table and thus comes to stand in the table that has been pro-duced, placed *forth*, i.e., into the unhidden.[47]

Now we are sufficiently prepared to return to the fragment we quoted at the beginning of this article:

> *Τέχνη can merely cooperate with φύσις, can more or less expedite the cure; but as τέχνη it can never replace φύσις and in its stead become the ἀρχη of health as such.*

It is not the doctor or the engineer who causes health by their technical skills, but the emerging-abiding sway of *physis*. Medicine or biotechnology merely determines the conditions for the body's self-emergent health to reassert itself, but ultimately it is always *physis* which heals.

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[46] Heidegger (1994), pp.179-180.
[47] Heidegger (1998), p.218.

> *Sometimes it seems as if modern humanity is rushing headlong towards this goal of producing itself technologically. If humanity achieves this, it will have exploded itself, i.e., its essence qua subjectivity, into thin air (...).*

If man decides not to follow the leads that *physis* provides and declares himself to be the master of *physis*, then he is on the verge of losing his essence. Note, however, that Heidegger says that man will then have exploded his essence qua *subjectivity*. Man will no longer understand himself as an autonomous subject because he will become aware that he is much less placed in a situation of mastery over nature by technology than he is subjected to the imperatives of technology. It is for this reason that Heidegger claims that the saving power only arises when the danger is at its highest.

But can man also lose his ontological essence qua *ek-sistence*? Can he abandon his relation to Being? It seems not. For, as we have seen, also as the servant of technology man merely responds to the call of Being that claims him to challenge Being as standing reserve. Even if man would be completely genetically modified, this would not really affect the core of his being because his essence is not grounded in his biological constitution, but in his ek-static belonging to Being. What is uncanny about technology, Heidegger says, is that "calculative thinking may someday come to be accepted and practiced as the only way of thinking."[48] But modern technology as calculative thinking is still a mode of thinking and as such remains responsive to the self-revealing of Being.

In the final analysis, then, it appears that in Heidegger's view biotechnology is not so dangerous after all. It might well be the case that the life-sciences will reduce man to a homeostatic biogenetic entity, but for Heidegger one thing remains certain: "Man will never become a machine."[49] His ek-static essence renders such a transformation simply impossible. Through biotechnology man could temporarily suppress the emerging-abiding sway of *physis*, but in the long run *physis* will always prevail. In a sense, then, Heidegger is very close to Habermas who also argues that what is at stake in biotechnology is the blurring of the boundaries between the grown and made. But contrary to Habermas, Heidegger remains convinced that man will never lose the ability to discriminate

[48] Heidegger (1966), p.56.
[49] Heidegger (1994), p.37.

between what is engendered according to *physis* and what is engendered according to *tekhnē*:

> Differentiating between what appears of and by itself from what does not appear of and by itself is a χρίνιν [*krinein*, to decide or to separate] in the genuinely Greek sense: separating out what is superior from what is inferior. Through this "critical" ability for differentiating, which is always decision, the human being is lifted out of mere captivation by what presses upon and preoccupies him or her and is placed out beyond it, into the relation to being.[50]

In other words, man can neither lose the potential to discriminate between the grown and the made, nor the potential to recognize that the former is far superior to the latter because man actually *is* nothing other than this potential, the entity which exists in the form of *potentiality-for-being*.

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