

CAN INTELLIGENCE ESCAPE ITS TERRESTRIAL
PAST?:
ANTICIPATIONS OF EXISTENTIAL
CATASTROPHE & EXISTENTIAL HOPE FROM
HALDANE TO ČIRKOVIĆ

‘El sueño de la razón produce monstruos.’

– Francisco Goya

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Abstract: This article explores the history of resonant idea that intelligence is locked in a struggle to outpace its deepest past so as to vouchsafe its furthest future. That is, can *Homo sapiens* escape its passively inherited evolutionary heritage in order to actively build something more properly universal? The article traces this dramatic notion across various thinkers of the 1800s and 1900s, locating its genesis in the notion that the human is the creature who increasingly rejects the merely natural so as to rely on its own artefacts and artifice. Because it answers to purposeful values that outstrip purposeless and unintelligent nature, intelligence incrementally replaces the accidental with the deliberate and designed so as to increasingly come to reside in a world entirely of its own making. This, however, comes with its own risks. The history of thinking upon the risks internal to our progressively artificial world is recounted, before an retracing of some of the most dramatic visions yet provided of what humanity's longest-term future could be if we prove able to outmanoeuvre our contingent terrestrial heritage so as to deliberately fabricate for ourselves a resplendent future in the stars.

Keywords: SETI; Grand Futures; Futurology; Future of Humanity; Human Extinction; Haldane; Bernal; Chardin; Kant; Brandom; Blumenberg; Fermi Paradox; Post-Postbiological Evolution; Supercivilizations; Astroengineering; Tinbergen; Superstimuli; Bernal.

I

Immanuel Kant ([1784] 2007, 110) once wrote that the human is not ‘guided by

instinct or cared for and instructed by innate knowledge' but, instead, must 'produce everything out [it]self':

The invention of his means of nourishment, his clothing, his external safety and defense (for which nature gave him neither the horns of the steer, nor the claws of the lion, nor the teeth of the dog, but merely his hands), all gratification that can make life agreeable [...] should be entirely his own work. In this it seems to have pleased nature to exercise its greatest frugality, and to have measured out its animal endowment so tightly, so precisely to the highest need of an initial existence, as though it willed that the human being, if he were someday to have labored himself from the greatest crudity to the height of the greatest skillfulness, the inner perfection of his mode of thought, and (as far as is possible on earth) thereby to happiness, may have only his own merit alone to thank for it; just as if it had been more concerned about his rational self-esteem than about his well-being.

The human is the self-constituting animal. This is because—somewhere, somewhen, and somehow across the past ~50,000 years since the emergence of Behaviorally Modern Humans—this creature began to take itself to be *responsible* for its internal states and its worldly actions. It is this and this alone that, in the first place, grants the human an 'objective world'. To be human is to have a 'world in view' (McDowell 2009), in the strong sense of ownership that is earned through becoming *entitled* to such a status. Because the human has become assertorically answerable to what it holds to be objectively thus-and-so precisely inasmuch as it acknowledges the *obligation* to correct these assertions when they are proven unsound. (Note that this is 'accountable' in a richly normative sense: in that its meaning can only be grasped with reference to 'values'—concerning what *should* or *ought* to be so—that will always be semantically in excess of the mere 'facts' of what *has* and *does* happen (see Koons, 2019).) In this, we became creatures that actively produce ourselves inasmuch as we have become—to a non-trivial degree—accountable for *what it is that we are*. In this sense, ever since it appeared on this planet, *intelligence has always been in the business of artificializing itself*. This is because the human actively forges 'what it is that it is', and it is thus its own artefact (Negarestani 2018), rather than it passively inheriting the answer to this question from nature as a well-defined bundle of instincts. The human is an open question: an ongoing task of creation; not a finished creature. We are as much our own technological artefact as we are an evolved organism. And because the human produces itself in this way, in the sense that it holds itself accountable for

its own actions and thus actively fabricates what it presently is and what it will become, the human animal has a *history* rather than a mere *nature*.¹ As Nietzsche ([1887] 1967, 80) realized, ‘only that which has no history is definable’. We have a history because our definition is an open question. *But it is also because of this that we so much as even have a future.*

It is only because we have a history that we even began to come to care, across the long millennia, for our collective future, as a species, in its increasingly long-term sweep.

2

We have a history in that we increasingly come to apprehend ourselves as self-correcting animals who *cannot but* pursue ever more encompassing accountability for our model of ourselves and our objective world, and, through this apprehension, became increasingly able of self-constituting what it is that we are. And it is alone because we acknowledge that we have an open history in this way—rather than a completed nature—that we also came to acknowledge that the human species represents a *project* and *vocation* rather than a biophysical germline alone and, through this, we collaterally became answerable across the ages to the precept that our species-project can *triumphantly succeed* or *abortively fail*. That is, we came, across the long centuries, to care more and more for our future as a historical project; and, in the past few centuries, acknowledged that it may end in inglorious and irreversible extinction; and we came to care to the precise extent that we came to understand that our place within the future remains precarious.

It is this summons to responsibility, of coming to answer ‘the demands that the future makes upon us’ to emend a phrase of Reinhard Koselleck ([1979] 2004, 3), that drags our purview further and further into deep futurity within the present moment. Yet this temporal structure is also irreducibly a historical inheritance, one that we all necessarily derive from the upswell of our collective

¹ Robert Brandom (2009, 111) marks the ‘distinction between things that have *natures* and things that have *histories*’. ‘Physical things such as electrons and aromatic compounds would be paradigmatic of the first class’, he explains, ‘while cultural formations such as English Romantic poetry and Ponzi schemes would be paradigmatic of the second’.

past as a self-making species. That is, one is only able to acknowledge the human project of self-betterment because of one's placement within a wider history of human progress; yet this task of improvement thereby also remains constitutively incomplete and unfinished in the here-and-now; for, indeed, the 'Good' isn't truly the 'Good' if it isn't also pursuance of the 'Better'; such that it is because of our historical inheritance of a project of ongoing enlightening that we are even so much as even motivated (that is, obligated) to undertake ever greater responsibility for our precarious placement upon this planet.

Of course, this has reached an important threshold in our current moment. Residing in the opening decades of the 21st-century, we have our being within a 'culture of prediction' (Heymann et al. 2017) characterized by incrementally long-range and high-resolution models. There is a growing integration of the future into the present that, as Riel Miller (2018) declares, demands of us the aptitude of 'futures literacy'. By way of anthropogenic climate change, our horizon of moral culpability extends to indefinitely many future generations. Such reasoning reaches even more astronomical catchments when considering the 'opportunity cost' of delaying space colonization efforts (Bostrom 2003), given that a growing pantheon of existential risks face humanity as a planetary collective—from nanotech to supernovae, from pandemic to gamma-ray burst—such that it becomes our primary obligation to build 'existential redundancy' into our species-project by spreading across multiple globes so as to fulfil our duty of care to protecting the potential existence of possibly quattuordecillions of future human souls should we become spacefaring (Ćirković 2002).

Yet, in the longest-durational sweep of human history, it was only by progressively undertaking responsibility for ourselves and our values that we were summoned to these future-oriented tasks of planetary-scale prediction, macrostrategy, and global risk mitigation. Or, we only came to care about the future when we realized that our axiological values remain precarious within it, and this appreciation came from the oncoming awareness (beginning at the medieval inception of modernity and culminating during the ensuing enlightenment) that our moral values are entirely our entirely own responsibility. It came from the realization that, because our values are entirely the product of our own active self-election and not given to us or imprinted on us by

independent nature, they would not persist within widest cosmos independently of our ongoing championship and stewardship of them, such that, because of this, they remain entirely our own responsibility and correlatively demand our vigilant guardianship. It was this that first summoned us to care about our future (and, thus, the modernity-defining projects of prediction and preemption). Indeed, though the Ancients no doubt experienced calamities and natural disasters as tragic, they by and large interpreted them as the dictates of divine judiciary or personified fortuna. Inscrutable and cruel though the sentencing may be, it remained interpreted in moralized terms. Mental values were mingled with factual nature such that the true moral stakes involved in natural disaster could not be cogently articulated in a way that would meaningfully motivate anyone to take practical, prognostic, and preventative action. This is why rational prognosis did not exist in the ancient world, but divination did. Or, it is only by separating fact from value that one becomes concerned for potential fact of the end of all value and, thus, answers to the precept that one must *do* something about this threat. As such, it was only upon the nominalist awakening of the late Middle Ages—and its teaching that the cosmos does not necessarily have a structure that accords with our intuitive mental and moral categories—that there was first inculcated a semantic responsivity to nature's non-responsivity to our expectations and demands. And, as historicism took hold across the ensuing centuries, this catastrophic appreciation of nature's autonomy from moral structure and decree became tensed—at the modernity's growing edge—as looming disaster on the horizon. Following the mathematization of anticipation (due to the early modern consolidation of probabilism and calculus across the sixteenth-, seventeenth-, and eighteenth-centuries), the ambitious ideal of a project of combined social prognostication and planning took hold during the nineteenth-century before becoming institutionalized, bureaucratized and deputized across the twentieth (following the twin turmoils of the World Wars and their mass mobilization of state power). Indeed, it was during the interwar period that anticipation of the longest-term future of intelligence within the cosmos finally became widely available (that is, the notion of the human vocation of self-fabrication was extended beyond our planetary environment), and, having also come to an firm understanding that the self-constituting creature is *by its very*

essence also the artificializing and technologizing creature, so too did this anticipation of far-flung futurity and vocation become irremediably entangled with extrapolations *apropos* the perils and promises of unbounded automation at potentially cosmological scales. It is to this nexus of ideas that we turn our attention: to the anticipations of extinction and flourishing as a function of intelligence's vocation of artificialization and automation during the gestation of the atomic age.

3

But first, a comment on what it is to *have* a history. A history is here conceptualized as the product of *autonomous actions* rather than *heteronomous causes*. Autonomy supposes doing something *because it is right* in some important sense that extends beyond doing something merely because it accords with the parochialities and proclivities of egoism and self-interest or the contingent biases one inherits from one's personal upbringing and spatiotemporal locality (indeed, if one is acting purely because of one's desires then one is not 'free' but is truly a prisoner to their drive-states—such that 'freedom' genuinely is 'freedom to do the right thing'). Autonomy, in other words, is doing something in pursuance of a value (an 'ought' or 'should') whose shepherding content cannot be exhaustively captured by pointing to facts-of-the-matter alone (whereas heteronomy is doing something purely because of contingent facts rather than justifying reasons).

A history, then, is a history (in the sense pursued here of a progressive series of self-constituting efforts) insofar as it is the warp and weft of autonomous actions. Of course, we are not always doing the things we do for *edifying reasons*—in fact, we are most of the time failing our prerogative and acting perversely from heteronomous causes—but this is precisely why *we have a history* in the sense of an incomplete and open-ended task. That is, our perennial failures are no irrecoverable inditement on the content of the goals we fallibly pursue through time. However, those that do not appreciate this truth may accordingly become disillusioned with the very legitimacy of 'goals' as such. In line with this, Robert Brandom (2014) has recently identified 'genealogy' as the philosophical endeavor consisting in the attempt to reduce all of our autonomous reasons for saying and doing what we say and do to heteronomous causes. The main culprits are, of course, those masters of suspicion—Marx, Nietzsche, Freud, and more recently

Foucault—who attempt to explain away all justifying reasons as the effects of contingent causes throughout our past. The genealogist, that is, offers ‘natural histories of the advent of beliefs’: ‘[n]atural, causal processes of belief-formation are put in place of rational ones’ in order to unmask the ‘pretensions’ of rationality (Brandom 2014). In contradistinction to this approach, we have just put forth an argument for the emergence of humanity’s anticipation of long-term futurity as the product of a rational procedure and program (i.e. as something shepherded by the rational norm of self-betterment and self-improvement) rather than the blind effect of contingent causes. That is, we came to so much as even *be able* to think about long-term futurity as a product of our progressive undertaking of self-responsibility as a species across our history. We came to care about the future inasmuch as we assiduously cultivated the rational ability to act beyond—and, indeed, *in spite of*—our genealogical heritage as a biophysical germline of appetitive organisms so as to secure our future as a rational agency and community of autonomous selves.

For epistemological and semantic reasons that Brandom (2019) eloquently elucidates, the genealogist is wrong-headed in their reductive vision of history as a congerie and cascade of causes alone. But, still, it is undeniably also true that we humans remain *both* a historical project of ethical self-betterment *and* an evolutionary product of blind terrestrial evolution, such that we may always fail and the genealogical aspect of our nature (i.e. the fact that we are organisms with evolved, and thus unreasoned and unreasonable, dispositions) can still get the better of us. As Hans Blumenberg (2006, 550-1) liked to point out, it is for these reasons that humanity is the only animal that can existentially ‘fail’ itself. We are thus beholden to ‘*existenzrisiko*’ or ‘existential risk’:

Man is the risk-taking creature that can abort himself. [...] Now, the statement of ‘risks of existence’ applies to all living beings. With the difference, of course, that for humans the moment of riskiness refers not only to *naked subsistence* but to *success in life*. Only man can live and be unfulfilled. [Thus] it is precisely the fact that human civilization has begun to recognize the threat of existential risks that suggests that the human organism has ceased to participate in the biological trials

of the risks of existence through evolution.²

In other words, through *fabricating* itself—and manufacturing ‘*what it is that it is*’ through the designs and artifices of rationality—the human correlatively also becomes the unique animal that can *abort* itself. And, as ever with the self-fabricating animal, this is inseparably also a question of technics and technology. With the invention of automated warfare, and atomic fission, this capacity for abortive accident became scalable from the factory-floor to the earthly-expanse. For, as the thinkers we are about to explore all variously realized, the technological power to avert existential catastrophe is also the power requisite to trigger it.

4

Thus, the vocation of the self-constituting being is irremediably shot through with risk; indeed, it is *constituted* and *commenced* by this very risk-ladenness, inasmuch as acknowledging peril is what compels us to reason ever-better inasmuch as, at the limit, we acknowledge that, should we reason wrongly, we may never reason ever again. And, as is unavoidably the case in the activities of free (i.e. self-designing) beings, an ineliminable weight of this risk derives unavoidably from *ourselves* and *our own designs*. For, if this were not so, we would not be ‘sufficient to have stood, though free to fall’ (as Milton’s deity so auspiciously put it). Not only are we ‘responsible’ for averting natural disasters insofar as it is only by acknowledging this responsibility that we are in fact moved to do anything about them, but, more dramatically, our own artificialization and automation of ourselves and our environment in the pursuit of ever-ramifying self-improvement proffers for us novel risks of constantly extending severity and scope. And, though it is shot through with risk, this cannot be a justification to reject our oncoming task, because, as Hegel already understood (Pippin 2010), it is only *through* risking everything that an agent can truly say they are responsible for themselves, because it is only by jeopardizing our commitments that we correct incorrect beliefs so as to become increasingly responsible for ourselves and our actions and, thus, become ever-more justified in referring to ourselves with the epithet

² In this, the German intellectual deployed the term ‘existential risk’—or, something very close to it—decades before Nick Bostrom coined it in the context of futurology.

‘rational’.

And so, we are so much as even able to become concerned about our future as a species because we are beings with a history. We became concerned for the future because we are self-constituting creatures that, through the work of our ongoing history of self-constitution, come to take responsibility for themselves—whether through building ever-more-accurate theoretical models of reality or by fabricating technologies that may automate our practical will within it.

5

The idea of *Homo sapiens* as a self-constituting animal is intimately connected to the picture of it as the not-yet-decided being. This pairing goes back to Kant. Crucially, it has long been also positioned as the explanatory basis and root of our aptitude for prostheses and prospection, or, automation and anticipation. As the German philosophical anthropologist Arnold Gehlen (1904-1976) put it in 1940:

Man is an acting being. In a narrower sense, he is also ‘underdetermined’—he presents a challenge to himself. [...] Because man, dependent upon his own initiative, may fail to meet this vital challenge, he is an endangered being facing a real chance of perishing. Man is ultimately an anticipatory (*vorsehend*) being. Like Prometheus, he must direct his energies toward what is removed, what is not present in time, and space. Unlike animals, he lives for the future and not in the present. This disposition is one of the preconditions for an acting existence, and human consciousness must be understood from this point of view. Indeed, all the aspects of man, which should be kept in mind through the ensuing discussion, are actually elaborations of the basic characteristic of man—action. We shall see that many of the isolated statements about man are really developments of one basic point of view—that man represents Nature’s experiment with an acting being. (Gehlen 1988, 24-26)

‘Acting’ here entails automation and anticipation, prosthetic and prospection, *by its very definition*: for ‘acting’ means making yourself what you are—fabricating and forging yourself according to some plan—such that ‘the actor’ is at once its own technology and its own future.

This potent and persuasive picture of the human as the ‘not-yet-decided’ being goes back to Immanuel Kant (1724-1804) but also to Johann Gottfried Herder (1744-1803). Herder called us the ‘*Mängelwesen*’ or ‘creature of deficiencies’.

Nietzsche later called us the ‘not-yet-finished’ being. This is because the human organism remained underdetermined, underspecialized, and underdeveloped physiologically and adaptively: it is ‘no longer an infallible machine in the hands of Nature’, Herder (2002, 82) noted. But this inheritance of a lack of predetermined instinct is, of course, also positioned as precisely the key to humanity’s planetary success: because such underdetermination, as a lack of the claustrophobias of overspecialization, endows the human with a unique level of behavioral leeway and cognitive lability (Moss 2008). Modern biology continues to endorse this basic notion by citing the extravagant ‘neoteny’ of *Homo sapiens* (Gould 2008): the prolonged retention of childhood features later into adulthood, which, in delaying the developmental crystallization of brain-structure compared to other primates, prolongs the critical window of neural plasticity seemingly required for the uptake of unique features like languages with recursive grammar (Vyshedskiy 2019). (Which, undoubtedly, is also behind our unique capacities for foresight.) Yet, prior to modern scientific investigation into this thesis, the continental tradition of ‘philosophical anthropology’ has long championed this vision of humanity as the ‘not-yet-determined’ creature.

Central to this strain of thinking, the declaration of humanity’s biotic deficiency was also proposed as the veritable birth of technicity and the trigger behind automation. Or, humanity makes up for its deficiencies by shooting forth grand prostheses into the world.

6

Ernst Kapp (1808-1896) called this ‘organ-projection’, Paul Alsberg (1883-1965) called it ‘body-liberation’, Alfred J. Lotka (1880-1949) called it ‘exosomatic evolution’, and André Leroi-Gourhan (1911-1986) called it ‘exteriorization’, but the principle remains the same: becoming delaminated from particularized specializations and adaptations, the human ekes out an existence for itself by being forced to *invent* technologies, to *externalize* its bodily functions, to *automate* its means of survival, and thus to *artificialize* its environment.

The spread of humanity over the planet was accompanied by the creation of new (artificial) organs and coverings. The purpose of humanity is to change all that is natural, a free gift of nature, into what is created by work. (Fedorov [1906] 1990, 96)

So wrote the Russian cosmist Nikolaï Fedorov (1829-1903). Contemporaries spoke of the ‘psychozoicization’ (i.e. the artificialization) of the entire earth system as the exteriorization of human cerebral function. During the early decades of the 1900s, that is, American and Russian geoscientists, such as Joseph LeConte (1823-1901) and Aleksei Petrovich Pavlov (1854-1929), endeavored to baptize a newly-ascendant ‘Psychozoic’ or ‘Anthropogene’ era of terrestrial evolution (Biello 2017, 54-55): classified by the wholesale capture of the earth system in intentional activities. The human had assembled itself through its own labor so as to give to arational nature a rationally justified telos: and this purposive end was that of a fully artificialized earth, inaugurated by human civilization’s total sequestration of their home-planet’s energy flows. (This, of course, was the twentieth-century precursor to twenty-first-century propositions of an ‘Anthropocene.’) The forward-thinking geochemist Vladimir Vernadsky (1863-1945) and the Jesuit paleontologist-cosmologist Teilhard de Chardin (1881-1955) wrote of this as the addition of an entirely novel component to the earth system (in excess of the biosphere and lithosphere): the ‘*noosphere*’. Chardin, in his sweeping and ambitious *Phenomenon of Man* of 1955, wrote of this as the planet gaining a ‘new skin’ in the form of artificial reason and its automated products, whereby this ‘sudden deluge of cerebralisation, [this] invasion of a new [species] which gradually eliminates or subjects all forms of life that are not human, this irresistible tide of fields and factories, this immense and growing edifice of matter and ideas [seems] to proclaim that there has been a change on the earth [of] planetary magnitude’ (Chardin 1959, 183).

No longer automating and externalizing itself by outsourcing physical labor to Paleolithic tools, *Geist* now externalizes itself at a planetary-scale. Indeed, modern studies have estimated that what is now called the ‘technosphere’—the sum of all human-produced material within the earth system—now weighs around 30 trillion tons. Already in 1955, Chardin realized (1959, 183), indeed, that observant aliens would notice the earth not because of its biosignatures but because of its technosignatures (to use the parlance of modern SETI).

7

But the same lineage of thinkers have also long noticed that such automation

comes with trade-offs. The deficient creature, alienated from all instinct and fixed behavior, is expelled from all un-self-reflecting existential harmony into an increasingly artefactual, model-based, and de-semantified world of number and theory and symbol and formal languages (Floridi 2017), becoming solely responsible for its own subsistence and world-manufacture in the process. Science is the refusal of the inherited world in the pursuit of constructing of a better—albeit artificialized and alienating—one (Sellars 1962). Indeed, insofar as a creature is self-conscious and thus self-constituting it no longer ‘has’ a world without actively (that is, artificially and artefactually) constituting it for itself.³ ‘It must create a new equilibrium for everything that had formerly been so neatly arranged in its small inner world’, as Chardin (1959, 226) declared. The Jesuit orthogeneticist saw this as a miraculous gift but also a ‘formidable risk’ and burden—a ‘sickness’ of ‘cosmic gravity’ (232). But this is not all, for with the ‘increasing complication’ of the fully automated world-system, Chardin was acutely aware that ‘we are ever more threatened by internal dangers at the core of both the biosphere and the noosphere’. Or, in other words, risk escalation is internal to modernity’s own planetized apparatus of risk control and preemption. Yet, what ‘dangers’ lurk within? ‘Onslaughts or microbes, organic counter-evolutions, sterility, war, revolution’, Chardin ventures (274-295). And what could these ‘counter-evolutions’ be, specifically? Earlier, Chardin had prognosed the arrival of what we now call *synthetic biology* (Roosth 2017); that is, the automation and artificialization of life itself, or, in Chardin’s words, the ‘remodeling’ of biotic systems. He writes:

Of old, the forerunners of our chemists strove to find the philosophers’ stone. Our ambition has grown since then. It is no longer to find gold but life; and in view of all that has happened in the last fifty years, who would dare to say that this is a mere mirage? With our knowledge of hormones we appear to be on the eve of having a hand in the development of our bodies and even of our brains. With the discovery of genes it appears that we shall soon be able to control the mechanism of organic heredity. And with the synthesis of albuminoids imminent, we may well one day be capable of producing [a] new wave of organisms, an artificially provoked neo-life. (Chardin 1959, 250)

Presumably, such ‘neo-life’ could represent a usurping ‘counter-evolution’

³ Science, artificialization, and self-consciousness are all teleologically coincident.

(though Chardin's iron-clad telic optimism prevented him from such explicitness). Indeed, this particular notion of the 'risks' of intelligence's automation and exteriorization of itself has long been recognized.

8

It was, of course, Samuel Butler (1835-1902), already in 1863's 'Darwin Among the Machines', who posited that the automation of intelligence would eventually leave the biological human organism behind. Foreseeing in machinery the potential for 'an entirely new class of life', Butler (1872, 203) predicted that we would eventually become mere *pollinators* for the purposes of machine reproduction. Because in automation there is, as Marx ([1867] 1988, 23:128) had already noted, a reversal of 'subject & object' and 'means & ends'—a '*thingification of persons*' and '*personification of things*'. Butler merely extrapolated from this, nothing that 'even now machines will only serve on condition of being served, and that too upon their own terms':

How many men at this hour are living in a state of bondage to the machines? How many spend their whole lives, from the cradle to the grave, in tending them by night and day? Is it not plain that the machines are gaining ground upon us, when we reflect on the increasing number of those who are bound down to them as slaves, and of those who devote their whole souls to the advancement of the mechanical kingdom? [...] what an army of servants do the machines thus employ! Are there not probably more men engaged in tending machinery than in tending men? Do not machines eat as it were by mannery? Are we not ourselves creating our successors in the supremacy of the earth? (Butler 1872, 201)

Ultimately, he saw that the human organism would become the reproductive organ of the machine phylum, as 'the humble bee is a part of the reproductive system of the clover'. Almost a century later, the French paleoanthropologist André Leroi-Gourhan (1911-1986) extended this line of thought yet further, claiming that the contemporaneous 'exteriorization' of the 'human motor brain'—in the production of autonomously locomoting robots—represents 'the penultimate possible stage of the process [of automation] begun by the Australanthrope armed with a chopper':

Beyond [this], hardly anything more can be imagined other than the exteriorization of intellectual thought through the development of machines capable not only of exercising judgement (that stage is already here) but also of

injecting affectivity into their judgement, taking sides, waxing enthusiastic, or being plunged into despair at the immensity of their task.

Following Butler, Leroi-Gourhan ([1964-5] 1993, 248) foresaw that '[once] *Homo sapiens* [has] equipped such machines with the mechanical ability to reproduce themselves, there would be nothing left for the human to do but withdraw into the paleontological twilight'. Indeed, as automation graduates from physical labor to the labors of mind we must accept that our 'cerebral cortex' will itself also inevitably be externalized. He continued:

The human species adjusted with equanimity to being overtaken in the use of its arms, its legs, and its eyes because it was confident of unparalleled power higher up. In the last few years the overtaking has reached the cranial box. Looking facts in the face we may wonder what will be left of us once we have produced a better artificial version of everything we have got. (1993, 265)

Accordingly, the biotic human becomes nothing but a 'living fossil' within the newly ascendant technosphere—persisting only as a type of inertia of the past—whilst terrestrial intelligence accordingly buds off from the legacy system that is its biology. A 'paleontological twilight' of our own assembly, but one authored accidentally insofar as what innocently began as the furtherance of biological survival by way of machinic means clandestinely slides into the installation of mechanization as an end-in-itself (indeed, even the diehard optimist Chardin noted that we are 'discovering that something is developing in the world by means of us, perhaps at our expense'). A fossilization without necessarily dying. Yet we must 'go even further in exteriorizing [our] faculties', Leroi-Gourhan (1993, 265) resolutely declared: it is the very obligation of the self-constituting animal to reconstitute itself through operationalizing its endowment of underspecialization; its very nature is to artificialize itself, even if this means obsolescing its evolutionary legacy and becoming deracinated from its terrestrial ancestry. Indeed, remember, again, that the very definition of intelligence is capability to do what is right *in spite of* the contingent (that is, merely genealogical) placement of oneself within space and time so as to drift (no matter how fallibly and imperfectly) towards the nowhere and nowhen of universalizable justness. Talking, during the 1920s, of the artificialization of our bodies and minds that this will demand of us, the communist crystallographer and futurist J.D. Bernal (1901-1971) already anticipated that such dramatic 'changes' elicit 'conservative

feelings' of 'distaste and hatred'. Yet, perhaps, this is only the protesting voice of our ultimately reactionary filiation to our contingent evolutionary history talking—as a form of unreasoned parochialism, chauvinism, and bias—rather than any constancy to an ideal of 'intellection' or 'autonomy' progressively stripped of any remaining genealogical residue of unjustified and unjustifiable kinship to any contingently particular bloodline, biology, or, indeed, biosphere.

9

The German intellectual Hans Blumenberg (1920-1996), who also equated humanity's 'lack of adaption' to its 'capacity for foresight' and 'anticipation' ([1979] 1988, 4), took Leroi-Gourhan's paleontological twilight literally. He imagined some non-human paleontologist, many eons hence, discovering the remains of humans but not the remains, *per impossible*, of their technological empire. All the observer would see, of course, is a biped creature of no real note, not a creature that 'has transformed the world as no other living being has done in the billion years of life's history' (Blumenberg 2006, 582). (In this, we see that what we call 'the human' is no longer exclusively biological and has already become indistinguishable from its prostheses.) Reversing the thought experiment, Blumenberg imagines a future observer looking upon the fossilized human organism *alongside* the intact geological remains of its planet-girdling technosphere. What would our future scientist make of the strange fossil remains of a neotenic primate amongst these vast machines? Blumenberg noted that they would inevitably see the human only as a parasite living off the machinic phylum. 'Man likewise becomes a parasite within the technological sphere of life,' Blumenberg (2006, 590) declared. (Indeed, more recently, geologists (Zalasiewicz et al. 2017) have noted that if a future geologist was to categorize 'technofossils' as 'species', the variety of the technosphere would actually outnumber that of the biosphere—or, technodiversity has already overtaken biodiversity.) The human organism eventually erases itself: becoming the mere parasite of its ramifying prostheses.

Blumenberg based this reasoning on the fact that parasites gradually lose their 'equipment of self-sufficiency' (i.e. sensory and locomotor apparatus) because they piggyback off the inputs and influxes 'of the host organism'. This theory of parasitism-as-atrophy-of-individuation goes back to the invertebrate

zoologist Ray Lankester (1847-1929). He argued that parasitism caused once fully individuated organisms to phylogenetically degenerate into less individuated and more primitive forms. His model organism was the *Sacculina*, a genus of barnacles that parasitize crabs by attaching to their underside, castrating and sterilizing them, thus to hijack the crab's parental instinct by tricking the host into nurturing the barnacle as if this imposter was the crab's own egg-sack. Beginning life as a differentiated and metameric organism, the *Sacculina*, once it anchors itself to a host, degenerates into an undifferentiated and primitive pseudo-gonad. 'Any new set of conditions occurring to an animal which render its food and safety very easily attained, seem to lead as a rule to Degeneration': let 'the parasitic life once be secured', Lankester (1880, warned, 'and away go legs, jaws, eyes, and ears; the active, highly gifted crab may become a mere sac, absorbing nourishment' . Making the inevitable comparison to the increasingly automated means of subsistence and attendant levels of comfort spreading throughout the developed world, the parasitologist feared for the future of humanity: for, 'just as an active healthy man sometimes degenerates when he becomes suddenly possessed of a fortune', industrialized humanity could be becoming a mere parasitic appendage upon the technosphere. Could human intelligence perfect its world—through automating all its comforts—only to obsolesce into the 'paleontological twilight' by essentially removing the very stressors and drivers that motivate intelligence's evolutionary persistence? Lankester (1880, 60) pondered thus: 'Perhaps we are all drifting, tending to the condition of intellectual Barnacles'.

10

In 1927, the polymath biostatistician J.B.S Haldane (who, besides giving us the word 'clone', also coined the term 'ectogenesis' to refer to the process of automating human reproduction with artificial wombs) wrote an essay titled 'Possible Worlds'. Suitably enough, he therein compared humans to a race of 'thinking barnacles' so as to illustrate how our 'world-building'—i.e. our process of cognitively manufacturing an objective reality for ourselves—is constrained and canalized by our biology. The thought experiment involves illustrating how a race of sessile, yet sapient, barnacles would philosophize about their world, given their inherited sensory apparatus. Having established the rooting of one's

worldedness in one's biophysical hardware by way of this extended fable on the philosophical system-building of the 'thinking barnacles', Haldane (often the utopian futurist) moves to imply that, should we humans become able to artificially edit and intervene in our biology, then we will one day become empowered to 'look at existence from the point of view of non-human minds' (that is, should we choose to de-sanctify the biological category of 'the human' and technically seize the means of its world-production). This leaves us two options:

Man's little world will end. The human mind can already envisage that end. If humanity can enlarge the scope of its will as it has enlarged the reach of its intellect, it will escape that end. If not, the judgement will have gone out against it, and man and all his works will perish eternally. (Haldane 1972, 312)

Un another essay, Haldane (1937, 143) was stark: if humanity did not undertake a self-constituting hand in its own evolution, then it will either degenerate like the parasite or go extinct. He pointed to the barnacle: "The ancestors of oysters and barnacles had heads. [...] Man may just as easily lose his intelligence".

In an oncoming age of synthetic biology and robotics, biologist-philosophers will no longer be constrained to interpret our world but will have to undertake an active hand in changing it. (Haldane, it should be no surprise, was a dedicated communist.) For then we would truly become entitled to the title of 'self-fabricating animal'. Crucially, this diagnosis of dilemma between human self-obsolence and self-transcendence comes in an essay on the inevitability of eventual human extinction should we not branch out into outer space; yet, as Haldane makes very clear, such extropian exodus will require the total reengineering of our organism. Indeed, the essay, suitably entitled 'The Last Judgement', relays the story of a far-flung future wherein our descendants have branched or undergone speciation. It is recounted from the perspective of the posthuman descendants who have left Earth and have undertaken the task of artificializing their anciently inherited simian biology in order to become progressively answerable to intelligence's cosmist task. The parable revolves around this successor species observing, from the new home on Venus, the inevitable extinction of their Earth-bound human progenitors. This is because the humans of Earth, having refused the call to reengineer themselves, have

instead focused their technologies on the achievement of ‘individual happiness’ and on the automation of a state of utopian satiation, such that they essentially rarefy and subtilize themselves out of existence. Embodying Lankester’s fears, intelligence’s own success over its environment again here leads to its downfall: having eliminated the ‘pain sense’ in the pursuit of comfort and having retained the human-form for parochial reasons of anthropocentric aesthetics, the old-world inhabitants focus their biotechnic powers on horticultural pleasantries rather than human reinvention—or, they cultivate appealing aesthetics rather than pursue practical science—such that they come to contemplate ‘the death of their species with less aversion than their own [individual demise], and no effective measures were taken to forestall the approaching doom’ of their kind (Haldane 1927, 300). They can see their extinction coming (in the form of a decaying moon orbit) but do nothing to stop it. Becoming Lankester’s intellectual barnacle, human civilization essentially self-obssolesces: in stagnating in its own success over its immediate environment, happy to pursue preternatural pleasures rather than reengineering itself in the pursuit of further frontiers, it removes its very motivating conditions of existence such that it goes willingly and gently into the cosmic night. In this parable, we realize that ‘survival’, for ‘the human’, extends beyond mere biological persistence; ‘the human’ is not surviving unless it is thriving, or constantly surpassing itself; such that the pursuit of biotic persistence alone paradoxically leads to its self-obsolence. Again, as Hegel argued, it is only in being willing to risk one’s life—and putting one’s organic existence entirely on the line—that one can truly be recognized and acknowledged as a fully rational agent compelled by just reasons rather than organismic drives. The same applies to the ‘survival’ of the human species; inasmuch as we are not just a biological germline but a self-transcending project, our ‘survival’ lies somewhere beyond mere persistence.

In another essay, ‘Man’s Destiny’, Haldane (1937, 145) was even more explicit:

unless he can control his own evolution as he is learning to control that of his domestic plants and animals, man and all his works will go down into oblivion and darkness.

J.D. Bernal ([1929] 2017, 42), a close friend of Haldane, shared this sentiment:

Normal man is an evolutionary dead end; mechanical man, apparently a break in organic evolution, is actually more in the true tradition of a further evolution.

A few decades earlier, Fedorov ([1906] 1990, 97) had similarly declared that if we fail in this task of interplanetary diaspora and relentless reinvention then we have nothing left to do but become ‘passively fossilized in contemplating the slow destruction of our [planetary] home and graveyard’. For Haldane (1927, 309) it was clear: in ‘the outer planets the human brain may alter in such a way as to open up possibilities inconceivable to our own minds’; or, in other words, we have seen nothing yet when it comes to the ‘possibility space’ generated by the *Mängelwesen*’s coming to answer its calling as the truly self-constituting creature through unlimited technification of itself. Yet in the expedient present—in the here-and-now where everything that will have been is decided—the creaturely *Homo sapiens* is ‘only a little freer than a barnacle’, Haldane (1927, 279) noted. We are little better off than his thought-experimental crustacea. Our ‘bodily and mental activities are fairly rigidly confined to those which have had survival value to our ancestors during the last few million generations’.

11

Only five years prior, in 1922, the American endocrinologist Louis Berman, in his book *The Glands Regulating Personality*, had expanded Butler’s fears of the biological human’s oncoming supersession in the face of greater intelligences:

Just as certainly as man has arisen from something whose bones alone remain as reminders of his existence, we are persuaded that man himself is to be the ancestor of another creature, differing as much from him as he from the Chimpanzee, and who, if he will not supplant and wipe him out, will probably segregate him and allow him to play out his existence in cage cities. (Berman 1922, 12)

This vaticination, of course, sounds like today’s predictions on the risks of future artificial superintelligence. Yet Berman, like Haldane, was also prescient in noting that, in the face of accelerating technological progress, the true threat may not truly come from the fully artificialized future but from its deepest evolutionary past. In line with Haldane’s comments on our ‘rigidly’ inherited habits, Berman noted that life ‘has blundered supremely, in, while making brains its darling, forgetting or helplessly surrendering to the egoisms of alimention’. Life becomes ever-more endowed in its faculties of cunning but remains ever beholden to the brute instrumentality of ‘alimention’ such that the former

becomes merely the empowerment of the tragedies of the latter.

So [life] has spawned a conflict between its organs, and a consequent impasse in which the lower centers drive the higher pitilessly into devising means and instruments for the suicide of the whole.

Ramifying our intelligent means of achieving our organic ends just empowers the disastrous reach of our organismic stupidity. Again, as Chardin later explicated, the species doesn't simply artificialize the earth—and automate its planetary environ so as to bring it under predictive control—without in the process breeding ever more novel perils. Or, the more complexified our planetary apparatus of computation becomes, the more complexities there are to compute, such that technoscience's project of prediction breeds its own unpredictabilities. (Look to the digital computer: emerging during World War II as a technology of anticipation, it has, in many ways, only made our world more intractable—opening up previously unanticipated vistas of conflict in the arena of cyberwarfare.) 'The fully enlightened earth radiates disaster triumphant', after all—as Adorno & Horkheimer ([1944] 1997, 3) wrote, two decades after Berman, at the tail end of the second conflagration of global war during the century. Writing in the aftermath of the first (and looking to the onward-rolling automation of the means of murder), Berman (1922, 13) darkly declared:

As War shows plainly to the most stupidly gross imagination, the germs of our own self-destruction as a species saturate our blood. The probability looms with almost the certainty of a syllogistic deduction that such will be the outcome to our hundreds of thousands of years of pain upon earth. In face of that, speculations upon a comet or gaseous emanations hitting the planet, or the sun growing cold, become babyish fancies.

The sleep of reason produces monsters. This sentiment persists today. Note the 2012 comments of the transhumanist utilitarian David Pearce (2012):

I think the single greatest underlying risk to the future of intelligence life isn't technological, but both natural and evolutionarily ancient, namely competitive male dominance behavior. [...] For the foreseeable future, all technological threats must be viewed through this sinister lens. Last century, male humans killed over 100 million fellow humans in conflict and billions of nonhumans. Directly or indirectly, this century we are likely to kill many more. But perhaps we'll do so in more sophisticated ways.

Almost a century prior to Pearce, Berman filled in the question of what

‘sophisticated’ might mean. The endocrinologist proclaimed that our extinction would likely arrive from the impending ‘use in the next War’ of synthetic pathogens and weaponized pandemics. And so, the gravest risk to our species is that the fully automated future lubricates the recidivist return of our deepest past in the form of amplifying and empowering humanity’s most ancestral inclinations. Exteriorizing our encephalon also entails externalizing (i.e. granting disastrously concrete reality to) some of our eldest demons. Can our progressive history outpace our evolutionary genealogy? Berman (1922, 13-14) wasn’t hopeful:

The memories of the cold lone fish and hot predatory carnivore who were our begetters, may haunt us to the end of time [because they will set in motion] the self-and-species murdering inventions and discoveries that are apparently destined to slay us.

The fully enlightened earth radiates disaster, indeed. Evolutionarily ancestral urges—not the modern technologies that focus them—may be the ultimate existential risk.

12

Despite already being announced in preliminary form by the thinkers above, the behavioral basis of this notion was first made scientifically explicit in the 1950s by Nikolaas Tinbergen (1907-1988) through his ground-breaking work on ethology. Tinbergen (1951) noticed that evolutionarily-inherited instincts could be ‘hijacked’, so as to become damaging rather than utile to the organism, when the stimulus that triggered the behavior was sufficiently exaggerated beyond its evolutionary context—whether such hyperbolism happens by way of parasitic impersonation or artificial fabrication. Tinbergen called this ‘supernormal stimulus’. He noticed that animals prefer the hyperbolic simulacra to the ‘real thing’ if the former is suitably supernormal: for example, cuckoo chicks exhibit exaggerated versions of the cues that illicit parental care in their warbler hosts to the detriment of the host’s actual offspring; or, infamously, jewel beetles waste time and energy attempting to mate with discarded beer bottles whose reflections resemble more intense versions of the carapaces of their female conspecifics.

Of course, we humans—having comprehensively automated our means of survival and artificialized our environment—now live almost entirely in a world

of supernormal stimuli (Mackay, 2017): whether semiotic, narcotic, pornographic, culinary, and doxastic. Hence the hypermodern plagues of the fully enlightened earth: escapist isolation, opioid epidemics, porn addiction, skyrocketing obesity, fake news. Already in 1898, doctors were commenting that we were tending ‘towards living to eat instead of eating to live’ (Gillespie 1898, v). Indeed, it was supernormal products (from sugar to cinema) that industrial automation enabled that have, over time, caused our species to increasingly divert its resources (its ‘mannery’) toward facilitating the procreation and reproduction of the ‘species’ of the incipient technosphere. Industry is our *Sacculina*: diverting our resources to the siring and rearing of an entirely new machinic phylum. Means and ends reverse as our ancient instincts become hijacked for the end of constructing a planetary as our ancient instincts become hijacked for the end of constructing a planetary film of machinery and artifice. Are we drifting the direction of the jewel beetle?

Blumenberg (2006, 590), in propositioning that *Homo sapiens* increasingly ‘becomes a parasite within the technological sphere’, spoke of the dwindling ‘reality-contact’ (*Wirklichkeitskontakt*) of our species in its ratcheting pursuit of supernormal replacements for the strife of the real. Like Lankester’s parasite, an atrophy of the ‘organs of self-sufficiency’ is undergone—both in somatic terms and in terms of spirit. Indeed, already in 1966 (just over a decade after Tinbergen’s breakthroughs), the sci-fi author J.G. Ballard (1966) wrote of his contemporary moment as one wherein ‘the fictional elements in the world around us are multiplying to the point where it is almost impossible to distinguish the “real” and the “false”—the terms no longer have any meaning’. As we exteriorize our encephalon, at increasingly planetized scales, any meaningful distinction between ‘natural’ and ‘artificial’ progressively collapses. We increasingly live in a world of our own making. Yet, in the form of superstimulus hijack, this planetary-scale artificialization—achieved through automating our means of alimentation—comes with its own endogenous risks: basically, the more we externalize our cerebrum the more it becomes seized by our ancestral limbic system; the more we lurch into the technologized future the more we become entrapped in our genealogical past.

Haldane, all the way back in the 1920s, had anticipated the existential risk of

superstimuli in his parable of the ‘Last Judgement’: depicting a future humanity that becomes so immured by the pursuit of cultivating supernormal artefacts and luxuries that it drops out of concrete existence entirely. Much more recently, the AI researcher Eliezer Yudkowsky (2007) has picked up on this theme, musing that ‘[p]erhaps the demographic collapse of advanced societies happens because the market supplies ever-more-tempting alternatives to having children, while the attractiveness of changing diapers remains constant over time’. He talks, darkly, of the capacity for the human species to market itself out of existence. This fear, manifesting as the concern that such dynamics may be a fatal vulnerability ‘baked into’ intelligence itself, likewise extends to discussion of AIs: Steve Omohundro (2008) writes of the potential for an AI to pursue ‘counterfeit’ rather than ‘genuine utility’, to hack its own goal-system so that it damagingly pursues artificial forms of success rather than the real thing. He pictures a chess-master AI that, instead of playing actual games of chess, merely increments its internal counter of ‘games won’. This is exactly the same as human drug-addicts pursuing superstimuli. Indeed, a fear amongst futurologists has long been the capacity for humans to become ‘wireheads’: beings who pursue virtual bliss to the detriment of their material existence. Bernal ([1929] 2017, 68-71), once again, had already come to this conclusion in the 1920s, writing that the ability to edit emotional states would be ‘excessively dangerous for human beings’—because we would prefer artificial states of ‘ecstatic happiness’ to the hardships of reality. His only hope was that ‘the man of the future’ will ‘have discovered that happiness is not an end of life’. He wished that ‘we may, in time, come to live to think instead of thinking to live’.

13

Bernal’s own 1929 masterpiece, *The World, The Flesh, and the Devil*, put this knife-edge drama between evolutionary past and promised future centerstage, with each member of the title’s troika presenting an obstacle to humanity’s mission of materially asserting itself at increasingly galactic levels. (Bernal, that is, anticipated Nikolai Khardashev and Freeman Dyson’s later notion of largescale astroengineering projects with his proposal that advanced civilizations eventually become ‘stellivores’ by harnessing the power of suns (see Vidal 2016).) The first obstacle (‘The World’) represented inorganic nature, the second (‘The Flesh’)

represented human physiology, and the third ('The Devil') represented our psychological drives and libidinal architecture. With this latter, Bernal ([1929] 2017, 55-57) limns a dialectically deadly struggle between psychologically 'primitive forces' and the 'super ego', wherein humanity may become satiated by sufficient automation of its environs such that it luxuriates in self-created inertia and thereby becomes stagnant 'until it is destroyed by cosmic forces'. 'This may be closer than we think (if it is not already passed)', the crystallographer warned. Indeed, 'it would seem that the present time is a very critical one for the evolution of human desire': because the reengineering of libidinal drives may itself now be within our reach, such that we may escape potential lock-in of the rut of supernormal stagnancy, and be led 'to the stars'; because the human, as the self-constituting being that is concerned with thriving rather than merely surviving, will have aborted itself to the extent that it does not 'need a real externalization in the transforming of the universe and itself'. Indeed, in Haldane's (1927, 301) vision of the future, the posthuman descendants of extinct humanity declare that they owe their capacity to outmaneuver their evolutionary-genealogical history 'to the presence in our nuclei of genes such as H149 and P783c, which determine certain features of cerebral organization that had no analogy on earth'.

Of course, in the joint vision of Haldane and Bernal, the conservatism of the human-as-organism may refuse this opportunity and condemn the project of the human-as-vocation to abortive failure. '[W]e hold the future still timidly', Bernal ([1929] 2017, 81) wrote,

but perceive it for the first time, as a function of our own action. Having seen it, are we to turn away from something that offends the very nature of our earliest desires, or is the recognition of our new powers sufficient to change those desires into the service of the future which they will have to bring about?

Haldane and Bernal's compatriot, H.G. Wells (1866-1946) famously proclaimed that 'civilization is a race between education and catastrophe'. Perhaps it would be better to say that it is race between our deepest past and our promised future: between the most-ancestral atavisms of evolution and the further-flung prospect of progress. A few decades later, during the height of the Cold War, the systems theorist and architect Buckminster Fuller (1895-1983) echoed this powerful sentiment. He augured that the 'comprehensive introduction of automation everywhere around the earth will free man from

being an automaton and will generate so fast a mastery and multiplication of [energetic] wealth' that we will be enabled to leave this 'spaceship *Earth*' so as to 'be swiftly outwardbound to occupy ever greater ranges of universe':

Within decades we will know whether man is going to be a physical success around earth, able to function in ever greater patterns of local universe or whether he is going to frustrate his own success with his negatively conditioned reflexes of yesterday and will bring about his own extinction [...]. My intuitions foresee his success despite his negative inertias. This means things are going to move fast. (Fuller 1963, 362)

Regardless of Fuller's 'intuitions' regarding earth-originating sapience, it was only a decade earlier that Enrico Fermi had asked why other, elder species that had accomplished such 'outwardbound' expansion were not easily visible. After all, we are relatively late-coming as a terrestrial planet on the galactic scene. This, of course, is the Fermi Paradox. ('Why do we not see spacefaring exocivilizations?' the question goes. And the answer is often: 'perhaps this absence tells us something troubling about our own future'.) More recently, *supernormal stimuli* have been conscripted as explanans for the eerie silence of outer space.

In a recent paper entitled 'The Intelligence Paradox: will ET get the metabolic syndrome?' (Nunn, Geoffrey, and Bell 2014), a team of metabolic scientists point to the skyrocketing annual clinical costs of obesity across the developed world, whilst comparing this to NASA's budget per annum. The latter is dwarfed by the former—by an eyewatering order of magnitude. The authors argue we may *already* be spending too much on healthcare, because of our addiction to supernormal food, to afford to go to the stars. We are becoming too obese, as a species, to leave our planet: we are already allocating too many of our resources to palliation. By way of evoking dietary superstimuli of our artificial world, they point to a potential 'Intelligence Paradox' that is generalizable across exo-biospheres and thus is the explanation for the cosmic silence first noted by Enrico Fermi in 1950 (Jones 1985). As Nunn, Geoffrey and Bell sum up their own recently-proposed explanation for Fermi's question:

Throughout evolution the need to adapt has been driven by a stressful environment, suggesting that if intelligence ever evolved to a high enough level, it would alter the environment to remove the stress. This would thus remove the

driver for further development of intelligence and adaptability (and hence longevity). However, if it reached a high enough level, it may well also fulfil the original [thermodynamic] driver of life itself: acceleration of entropy. Thus, it is possible that mankind, or ET, may be reaching a point where the original driver for entropy is still occurring through technology, but the individual driver for intelligence and adaptability has been removed. The universe could be playing a very cruel joke on us. (2014, 9)

The technosphere is our *Sacculina*: it uses us as midwife and surrogate—as its avenue into existence—hijacking our resources and efforts at the cost of our own health, fertility and reality-contact; yet once we have installed its dissipative regime, we are no longer required, and our intelligence inevitably senesces into the twilight. Indeed, it has been commented (UoL 2016) that the ‘technosphere can be said to have budded off the biosphere and arguably [is now] parasitic on it’. Tragically, Lankester’s fears about intelligence’s self-cancelling fate may apply not exclusively to terrestrial humanity but to *all* galactic intelligences across our astrobiological landscape. Indeed, as others (such as the astrophysicist Milan M. Ćirković (2018, 222-228) and the evolutionary psychologist Geoffrey Miller (2006)) have pointed out, our modern overconsumption of supernormal artefacts extends far beyond the culinary all the way to the doxastic; when talking about ‘post-truth’ we are really talking about *alethic superstimuli*. It may just be the case that any sufficiently advanced intelligence, in its reckless endeavor for artificialization, gives up all remaining ‘reality-contact’ such that it subtilizes itself out of existence. As Berman (1922, 14) had already understood in the 1920s:

Life begins as a quivering colloid, goes on to painfully build a brain, which automatically refines itself to the point of discovering and using the most efficient methods of destroying others, and by a boomerang effect, itself. Fate!

14

And yet, what if resolute intelligence *can* outpace its flawed past? what if it can outmaneuver is genealogical anchoring to somewhere and somewhen so as to move towards nowhere and nowhen? Bernal ([1929] 2017, 46), of course, had imagined this *sloughing off* of our unjust and contingent heritage as the drifting towards a more rationally justified alternative:

Bit by bit the heritage in the direct line of mankind—the heritage of the original life emerging on the face of the world—would dwindle, and in the end disappear

effectively, being preserved perhaps as some curious relic, while the new life which conserves none of the substance and all the spirit of the old would take its place and continue its development.

And, to accomplish this—whilst avoiding the supernormal traps of the ‘intelligence paradox’—Bernal ([1929] 2017, 68) was aware that we would need to edit the very structure of desire itself:

The immediate future which is our own desire, we seek; in achieving it we become different; becoming different we desire something new, so there is no staleness except when development itself has stopped.

Fascinatingly, he saw that this would necessarily lead to the eventual sequestration of our libidinal and carnal impulses by the aesthetic goals of disinterestedness. As far-future humanity becomes more and more empowered over its surrounding environment at ever-increasing (and eventually galactic) scales, Bernal ([1929] 2017, 66) prognosed that what had once been called ‘sexuality’ will inevitably be entirely refitted and rerouted so as to become a pure and disinterested artistic impulse toward human expression through the editing of the very nomic structures of nature itself. Sex turns into art whilst cosmic nomology becomes the expressive medium:

The cardinal tendency of progress is the replacement of an indifferent environment by a deliberately created one. As time goes on, the acceptance, the appreciation, even the understanding of nature, will be less and less needed. In its place will come the need to determine the desirable form of the humanly-controlled universe which is nothing more or less than art.

Nature would no longer be something to be understood, but something that we make. Art would no longer be mimetic but cosmogenic. ‘[T]he motions of stars [...] could be directed’ by aesthetic judgement, Bernal forecast. In line with this, he anticipated that a demiurgic post-humanity—whose ‘new life would be more plastic, more directly controllable, and at the same time more variable’—would eventually become *utterly indistinct from its own cosmic environment*. As an interesting counterproposition to the pessimistic proposal of some astrobiological ‘Intelligence Paradox’, the Polish futurist Stanisław Lem (1921-2006) proposed precisely this ‘Indistinguishability Thesis’ as an optimistic explanation to Fermi’s silence: all appropriately ancient (that is to say, sufficiently advanced) exocivilizations are not visible to us because they have, through their own

mightiness in the endeavor of automating their environment, essentially become indistinguishable from the surrounding cosmos itself. We do not see them because they are ‘already everywhere’: *the laws of nature are their artefacts* (Lem [1971] 1981, 525).⁴ Though mind-bending, this thesis is now entertained as a serious proposition. Ćirković refers to the idea as ‘post-post-biological evolution’ and speculates upon entire planetary ecosystems and galactic structures utilized as the computational substrates for the cogitations of vast hyper-intelligences. As Chardin (1959, 286) anticipated, ‘[c]onsciousness would thus finally construct itself by a synthesis of planetary units’. As the limit case of self-constitution, *intelligence here no longer artificializes nature but naturalizes artifice*—which, surely, is the omega point of all automation.

15

Yet, in the here and now, we remain limited humans; weighted down by a history of self-interestedness and impiety; and, as such, we are always liable to fail. This, however, is our precisely our fate as the creature that is its own creation. Accordingly, our path to the stars, as Bernal ([1929] 2017, 68) wrote, ‘will always be a very critical process’:

The dangers to the whole structure of humanity and its successors will not decrease as their wisdom increases, because, knowing more and wanting more they will dare more, and in daring will risk their own destruction. But this daring, this experimentation, is really the essential quality of life.

It is a task we cannot refuse. We recognize our history as a project that makes striving for our future meaningful, yet we can always fail this calling inasmuch as we are creatures with a delinquent genealogy as much as a self-forged history.

Can the philosophical barnacle outpace its past so as to secure its future?

⁴ Bernal ([1929] 2017, 79-80) imagined a cosmic post-humanity, having split from terrestrial humanity, retaining ‘the old mankind’ in something that now equates to the ‘Zoo Hypothesis’ explanation to Fermi’s Paradox (see Ball 1973): ‘Mankind—the old mankind—would be left in undisputed possession of the earth, to be regarded by the inhabitants of the celestial spheres with a curious reverence. The world might, in fact, be transformed into a human zoo, a zoo so intelligently managed that its inhabitants are not aware that they are there merely for the purposes of observation and experiment’. And, *if this is even minimally plausible, what is to say that we are not already in such a zoo?*

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