

## T&F PROOFS NOT FOR DISTRIBUTION

# 10 How we never became posthuman

## Homeostasis as conflict from Claude Bernard to Norbert Wiener

*Daniel Nemenyi*

The voices that speak the cyborg do not speak as one, and the stories they tell are very different from the narratives that Wiener struggled to authorize.

(Hayles 1999, p. 112)

None has since made as sustained a critique of Norbert Wiener's cybernetics as did N. Katherine Hayles back in 1999 with *How We Became Posthuman* – let alone one so productive. Sure, she was hardly alone in putting matter back into information; after all, “Proud to be flesh!” was the tagline of that moment's home of techno-critical writings. Posthumanism stands, as Cary Wolfe (2010, p. xv) would put it, not for that “‘after’ our embodiment has been transcended”, but rather “in the sense that it opposes the fantasies of disembodiment and autonomy, inherited from humanism itself”. Of course, Donna Haraway (1991) had already established a posthuman field of critical inquiry through and beyond cybernetics. But Hayles was the major cartographer of the generation. She drew the map. She showed how we got there.

Supposedly. This chapter offers an immanent critique of the journey she outlines, in particular her initial movement as concerns the concept of homeostasis – which figures for Hayles the first of four roughly consecutive “constellations” which lead to the posthuman – and the natural philosopher Wiener, ‘father’ of cybernetics. By ‘immanent critique’ I do not mean combing through for contours and details which are missing, the mistakes that need be refined. Maps by definition privilege certain things while obscuring others (see Chapter 11 in this volume). I mean finding what its ordering principles and effects are, in a broadly Foucauldian sense: what it does; what the schema, distinctions, and orientations privileged by the cartographer produce; not only what they render seeable or knowable but what they occlude and render invisible (Foucault 1970). My contention is that there is a cybernetic theory of power, organisation, and subjectivity which Hayles's famous cartography draws over, a theory that would seem incongruous and anomalous were it to be presented without first doing and undoing that which first renders it heteroclitic, and that this ghostly theory remains contemporary and ever more urgent. The journey charted by *How We Became Posthuman* embarks from the identification of a specifically *American* (as opposed to British) variant of information theory that is based on the work of Claude

DOI: 10.4324/9781003157021-13

## T&F PROOFS NOT FOR DISTRIBUTION

*How we never became posthuman* 161

Shannon and takes as its model his mechanical “mouse” which “learned” to navigate a maze. Productively, it reads this as expressive of an initial historical formation which Hayles calls the “homeostasis seriation” in which prevails the *modus operandi* of returning to the disembodied clean abstractions of *ideas*, not messy and blurry *bodies*. And, curiously, it finds this “seriation” embodied not by Shannon, but by Wiener.

Wiener’s (1961) seminal *Cybernetics: Or Communication and Control in the Animal and the Machine* (first edition 1948) conceived the organic and technical, the physiological and physical, the neurophysiological, psychic, and linguistic, according to a single servomechanical, teleological, and communicational vocabulary. For Hayles, it opened up for humanity not merely an interdisciplinary field of research but a transdisciplinary universal solvent that scorched away its own boundaries, opening it up to the posthuman ‘cyborg’ connected to all beings. Wiener’s reaction to his creation was, for Hayles, “a horrified withdrawal” (Hayles 1999, pp. 87, 108). It is true that Peter Galison (1994) had already fixed minds on a Manichaean aspect of Wiener’s science; but Hayles not only incorporated this Manichaeism into her argument, she transcended it. The cyborg Wiener pioneered but fled from was that which would have dissolved his own autonomous, anxiously haphophobic, liberal individual humanism. Wiener (1947) may have pumped his opposition to the military’s appetite for cybernetics as the Cold War took hold, but in turning away from his invention’s capacity to fuzz the sharply bounded identity of American masculinity he was ultimately a fellow traveller of the patriarchal system which produced what Helen Caldicott would so memorably call “missile envy” (Caldicott 1984).

Wiener, Shannon, and the American crowd around the Macy Conferences (which discharged cybernetics throughout the sciences) were, for Hayles, reluctantly the first wave of “how we became posthuman”. Two further waves were necessary to sweep humanity fully to its shores. Each fulfilled the denied potential of the previous one, though like the concept of the posthuman itself Hayles’s historiology refuses autonomy and conventional linearity. Each “wave”, for Hayles, constitutes the blade of a “seriation”, a “pattern of overlapping replication and innovation” (Hayles 1999, p. 10). While it climaxes another wave has already pulled out from underneath.

The seriated series goes: (1) homeostasis, (2) reflexivity, (3) virtuality. As “constellations”, each concentrates theories and discourses upon a core configuration or network, and overlaps historically with the next. As “*rival* constellations” each commands a certain gravity and establishes borders, albeit overlapping ones; the emphasis on homeostasis at Macy ensured that the tensions of at least the constellation of “reflexivity” were “kept under control” (8). This is to say, ‘homeostasis’ reinscribed the boundaries which cybernetics had begun to pry open, falling back to the old liberal configuration of subjectivity – the autonomous, self-directed, self-possessing individual – instead of pushing through them. Together with Wiener, Hayles develops this argument by means of Shannon – the two founders of information (or communication) theory focused on sequentially in chapters three and four of her book. If the final wave constitutes posthuman

## T&F PROOFS NOT FOR DISTRIBUTION

162 *Daniel Nemenyi*

subjectivity, then the first, that for which Wiener and Shannon were responsible, is liberal individualism's autonomous human. This is to say that the concept of the posthuman cannot, according to Hayles's own logic, stand to judgement on its own discrete ground. It not only invokes the compromised initial wave of Wiener and Shannon but depends for its legitimacy on the accuracy of its characterisation. To draw on a term from computing, we might say that posthumanism is a 'fragile' concept: carried away from its logical context, it breaks (Lamport 1994, p. 22).

This chapter seeks to show such a break. Through an immanent critique of Hayles's first seriation, 'homeostasis', and then a reading of homeostasis through its genesis and transmission from Claude Bernard to Walter Cannon and then to Wiener himself, I shall attempt to show how the journey faltered from the outset. We never became posthuman; we became humans enmeshed in an infinitesimal conflict, and Wiener first sounded the alarm. (For other perspectives on post-humanism, see Chapters 8 and 17 in this volume.)

### Claude Shannon had a little mouse

He called it a "sensing finger"; his audience at the eighth Macy meeting of 1951 and thereafter called it a "tin mouse" or a "mechanical rat" (Pias and Vogl 2016, pp. 474–479, 496, 616). Shannon's mouse was a machine capable of "solving a maze" by trial and error. Autonomously, teleologically (474), and with a faculty of memory, it "learned" the route through the maze and, once learned, could zip through even modified mazes without butting its face into walls again. For Hayles, Shannon's mouse embodies the concepts at stake in the homeostasis seriation. The mouse, or "Theseus" as it appropriately became known in the media (Kline 2015, pp. 50–52), was received less as a model of actual zoological behaviour than a model of a theory of learning (51), and as such, for Hayles, the "Platonic back-hand" was struck. By attempting to represent not material reality but "the clean abstractions of logical forms", these models ascribed ontological priority to abstract notions and rendered material reality but a poor copy, a noisy simulacrum, a "blurry and messy instantiation" of an ideal Real. Worse, as pioneers of the digital computer, they followed this up with a "Platonic *forehand*", casting the simple ideal into a simulated world, complex and multiple in its own right (Hayles 1999, pp. 12–13; emphasis added). They thus rendered the living body redundant, "superfluous flesh", since its computer simulation was a more perfect form. The double hand, Hayles writes, signified "a new variation on an ancient game, in which disembodied information becomes the ultimate Platonic Form" (13). Wiener's (in)famous epithet "information is information, not matter or energy" signified, she argues, "the triumph of information over materiality" (51; Wiener 1961, p. 132).

Theseus represented this because its goal was stable: always a 'cheese'. Lacking said cheese, it succumbed, as Shannon put it, to "a vicious circle, or a singing condition" – a positive feedback loop – returning to each square and headbutting walls over and over (Pias and Vogl 2016, pp. 474–479). Overloaded with memory but lacking a goal, Shannon agreed that Theseus became "neurotic" or even

## T&F PROOFS NOT FOR DISTRIBUTION

*How we never became posthuman* 163

“psycho” such that an “antineurotic circuit” was necessary to rescue the robot – a sort of electroshock therapy which abruptly short-circuited its episode. To follow Bernard (1949), if health is the ‘normal’ state of an organism and pathology is ‘abnormal’, then in lacking a goal Theseus languished in a morbid condition. Its health depended on its capacity to reach a preconditioned target, and in its vital need for such stability it is an archetypical model of ‘homeostasis’, a vital necessity to “a return to normalcy” (Hayles 1999, p. 69).

This argument is peculiar on multiple counts. For one, it relegates the discoverer of homeostasis (Bernard) and the coiner of the term (Walter Cannon) to a cursory footnote (294). Further, it analyses homeostasis by means of a chapter on Shannon (ch. 3) rather than Wiener (ch. 4), which is odd, given the scant evidence that Shannon invested much interest in homeostasis, while for Wiener it was an absolutely central category, both personally – through his relationships with Cannon himself and his co-author, the Mexican neurophysiologist Arturo Rosenblueth, to whom *Cybernetics* is dedicated – and intellectually, Wiener having published directly on the subject and having depicted cybernetics as furnishing to it “a parallel discussion of living and mechanical feedback mechanisms” (Wiener 1951). Shannon, by contrast, was famously tempering of the enthusiasm for exporting information theory to other domains (Shannon 1956). So perhaps Hayles focuses on Shannon for her chapter on homeostasis because she considers Theseus to be an exceptional model of homeostasis? Certainly, she situates the ‘homeostasis’ at stake at Macy to be an idealised immaterial constellation and thus one distinguished from the biological tradition from which it derives. However, its choice is hardly arbitrary. It would seem her reasoning is based in Shannon’s information theory’s identification of entropy with information, whereas Wiener, inconveniently, identifies information against entropy and with change. Hayles writes,

Privileging signal over noise, Shannon’s theory implied that the goal was a preexisting state toward which the mechanism would move by making a series of distinctions between correct and incorrect choices. The goal was stable, and the mechanism would achieve stability when it reached the goal. This construction easily led to the implication that the goal, formulated in general and abstract terms, was less a specific site than stability itself. Thus the construction of information as a signal/noise distinction and the privileging of homeostasis produced and were produced by each other.

(Hayles 1999, p. 63)

On Hayles’s account the goal of homeostasis is not a place or a thing, but a condition: stability itself. To lack such stability, Theseus demonstrates, is to become psychotic. In this sense Shannon’s information theory has, Hayles argues, a “conservative bias” that “privileges stasis over change”. This very ‘stasis’ implies ‘homeostasis’, and such conservative ‘homeostasis’ signifies the first seriation. To firmly establish homeostasis’s conservative, (neo)liberal implications, Hayles connects this reading of ‘homeostasis’ to Otto Mayr’s theory that the modern concept of self-regulation was invented along with the concept of a self-correcting “hidden

## T&F PROOFS NOT FOR DISTRIBUTION

164 *Daniel Nemenyi*

hand” of capitalism, and a liberal theory of sovereignty regulated by “checks and balances” (86–87). A historian of clocks and servomechanisms, Mayr’s writings strive to explain the abrupt return in eighteenth-century Britain of self-regulating machinery. Mayr (1971) argues that a shift in the spirit of the age away from authoritarian, centralised, mercantilist governmentality was an essential precondition for James Watt’s invention in 1788 of the device that regulated the load of his era-defining steam engine, the ‘governor’, which Bernard considered the mechanical model of homeostasis (Bernard 1949, p. 121) and Wiener Hellenised into ‘cybernetics’. This shift was towards a “feedback loop”, generalised, via David Hume and Adam Smith, into such economic phenomena as the price of labour, the balance of supply and demand, and the self-regulating size of working populations and international trade. Liberal governance, Mayr (1986) would later argue, enshrined an equivalent feedback loop into political systems. Homeostasis in its governmental modality is self-regulating free market fundamentalism: so, in essence, does Hayles accuse. Where was the intervention of the movement’s “rebellious scientist”, she asks in the following chapter of *How We Became Post-human*. Wiener was “complicit” rhetorically, critically, and libidinally (Hayles 1999, p. 87). *Rhetorically* because, with his “tendency to use the plural”, he adopted the universal voice of “capitalist imperialism” while speaking for the “privileged few”. He performed what Donna Haraway (1988) called the “god trick”, which asserts authority over objective reality by gazing down at the world from the disembodied eyes of military satellite. *Critically* because he projects the values of “militarism”, “alienation”, “manipulation”, “betrayal”, “oppression”, and “death” onto the self-regulating machine’s other, the “rigid machine”, thereby externalising what is essential to cybernetics itself. And *libidinally* because his lifelong “estrangement from flesh” was such that, turning again to Haraway (1999, p. 85), he could not but withdraw from the “‘pleasurably tight coupling’ between parts that are not supposed to touch”: the boundary-dissolving ‘cyborg’ in the mirror that he conceived and, apparently, homoerotically desired. He sees the human as a “permeable membrane” exquisitely “interpenetrated” by the universe but retreats to the stable old chastity belt of liberal individual humanism (Hayles 1999, pp. 109–111). Such “erotic anxiety” drove him to “control” flows of information to individual, autonomous, and decontextualised systems. In his rhetorical assumption of an objective perspective, his critical externalisation of the ethical problems of cybernetics and his libidinal refusal to give up bodily isolation, Wiener clung to the old business-as-usual of autonomous liberal subjectivity. His very self embodied the conservative homeostasis expressed by Shannon’s mouse.

### **Rather a queer sort of thing**

Hayles’s analysis is tight, effective, and affective. It relegates homeostasis to a historical artefact. It sets up ‘homeostasis’ to peak and crash before the next constellation, ‘reflexivity’, takes over. With it are plunged Wiener and Shannon, while the seriation of ‘reflexivity’ gives rise to the British cybernetician Donald MacKay’s purportedly more embodied and contextualised information theory. However, her

## T&F PROOFS NOT FOR DISTRIBUTION

*How we never became posthuman* 165

framing of homeostasis and Wiener – and Shannon, for that matter – should raise eyebrows. It sets Wiener up to fail by means of an argument built on Shannon’s information theory rather than his own. While Shannon identified information with entropy, Wiener opposed the two. Information, for Wiener, signifies that which is different and *uncertain* – the opposite of that which is expected and conservative. For Wiener, to be stable is to constantly adapt and evolve. Hayles bypasses the entire genealogy of homeostasis as it actually entered cybernetic discourse through Cannon, Rosenblueth, and then Wiener himself, and she seems unperturbed by what the implications of this might be: notably, that the original concept of ‘cyborg’ – coined in 1960, the very year when Hayles construed homeostasis to have ceded prominence to the next constellation (Hayles 1999, p. 7) – may have itself been robustly *within* the homeostatic constellation, a rephrasing of a concept active already in Wiener’s writings. We might say that Hayles herself plays a certain “Platonic underhand” by developing a theory that serves to furnish a convenient historical narrative which itself transcends the actual text before her, and then presents that in place of the text itself. What might an immanent reading of homeostasis look like, and what is the ‘cyborg’ at stake therein?

Let us recall where the word ‘homeostasis’ originated, and its significance for Wiener’s cybernetics. In 1926, Cannon devised the word ‘homeostasis’ to designate the “coordinated physiological reactions which maintain most of the steady states in the body [that are] so complex, [and which] are so peculiar to the living organism” (Cannon 1929, p.401). He conceived the neologism carefully. ‘Homeo’, from the Greek *homoio*, to indicate “like” or “similar”, with their connotations of degrees of variation, distinguishes from the “fixed” and “rigid constancy” of ‘*homo*’, that which is “same” (Cannon 1929, p. 401). Hence, homeostasis was opposed to stiff rigidity prior to Wiener; he did not constitute it himself as, to use Hayles’s word, “alien”. He inherited the opposition. ‘*Stasis*’, to indicate a condition of immobility and stagnation that is “so peculiarly physiological”, warrants distinction from the “relatively simple” division of mechanics known as ‘statics’, which is concerned with physical systems whose “action of forces” totals a certain balanced rest (401). ‘*Homeo*’ relates to the elastic similarity of an organism’s inner world, while ‘*stasis*’ signifies its relation to the world outside as a condition of imbalanced forces in action. In such a way does ‘homeostasis’, originally with Cannon, name the telos of every organism: not because it is identical to itself, but because it maintains a steadiness despite considerable variations in the world around.

While Cannon named the concept, he did not discover it. He made this clear in the accreditation to the French translation of his seminal *The Wisdom of the Body* (1932): “The central idea of this book, the stability of the inner medium of the organism in higher vertebrates, is directly inspired by the precise views and deep understanding of the eminent French physiologist Claude Bernard” (quoted in Langley 1965, p. 2; Cannon 1929, pp. 399–400): that is, the Bernard for whom “all the vital mechanisms, however varied they may be, have only one object, that of preserving constant the conditions of life in the internal environment” (Bernard 1973, p. 149), and for whom the very telos of “higher” organisms is to maintain what Cannon would come to name ‘homeostasis’.

## T&F PROOFS NOT FOR DISTRIBUTION

166 *Daniel Nemenyi*

Bernard summarised the principle of homeostasis, discovered no later than 1859, in a now oft-cited epithet: “*La fixité du milieu intérieur est la condition de la vie libre*” (“The fixity of the internal environment is the condition of a free life”) (quoted in Langley 1965, p. 4). The higher organism is not merely situated within an environment; it *consists of* an “inner environment” which must *contend with* its external environment as a condition for its existence. According to Bernard (1949), the inner environment – “*milieu intérieur*” or “*milieu interne*” – is active, an “inner mechanism” or even “vital force” (though not to be confused with “*élan vital*”). Cannon even translated it as “fluid matrix”, since it constituted for Bernard “the totality of the circulating fluids of the organism”: riverine networks ferrying nutrients and refuse to and fro, themselves under the “control” of agencies which keep them “remarkably constant” (Cannon 1939, pp. 37–38). This could be a description of a global economy with its networks of cargo vessels, capital, and internet packets automatically regulating trade. Indeed, Cannon would argue that the “body politic” is governed by a certain degree of homeostasis. It has a fluid matrix composed of flows of cash and debt, as well as “canals, rivers, roads and railroads, with boats, trucks and trains, serving, like blood and lymph, as common carriers” (314–316). A healthy body politic would leave its constitutive mass of physiological bodies free to live enriched lives. However, nations and economies today merely exhibit “*some indications* of automatic stabilizing processes”; they remain “unstabilized” and as yet immature, subject to further evolution (311; emphasis added). There is here an implicit assumption of normative categories of what it would be for a society to be correctly governed in the first place, as if this were not a matter of contestation (Canguilhem 2012, p. 70). As we shall see, this is not a sense of governance attributable to cybernetics as conceived by Wiener. But what it does transmit to cybernetics is the idea that homeostasis is, to use Cannon’s word, a process of “learning”. Hence, as per the title of Cannon’s opus, there can be a “wisdom” of the body. This homeostatic “learning” is the root of the ‘machine learning’ which originates among Wiener and other early cyberneticians.

So, according to the original definition of ‘homeostasis’, an organism is an individual. But this does not make it an island or, as Margaret Mead and Gregory Bateson would have it, a box with discrete inputs and outputs, “cut off” from the “whole circuit” that constitutes the wider world like a computer scientist’s object of study (Mead, Bateson, and Brand 1976): the kind of circuit – readily quantifiable since extracted from context – that Hayles identifies with ‘homeostasis’ as opposed to ‘reflexivity’. Though Mead and Bateson adamantly distinguish Wiener’s cybernetics from this restricted perspective, and though Hayles’s discussion of their conversation quotes them doing so, she passes by the point without comment, as though it does not affect her argument (Hayles 1999, pp. 74–75). The problem with Hayles’s account here is that, from Bernard to Wiener and on, homeostasis conceives of individuals as ineluctable negotiators of their environment, never “cut off”. The ‘stasis’ of homeostasis precisely signifies this relation. Specifically, ‘stasis’ signifies an agonistic relation, a reciprocal opposition – its roots derive in the Greek for ‘civil war’, ‘sedition and rebellion’ (Agamben 1998;

## T&F PROOFS NOT FOR DISTRIBUTION

*How we never became posthuman* 167

Vernant 2000, p. 168). Bernard (1973, p. 129) was categorical about this: for him, “[l]ife is conflict”. The individual organism is never detached from its context, and negotiating constantly with the forces outside is a necessary condition of the possibility of its existence. Autonomous separation, as Hayles portrays it, is impossible. In Cannon’s words, “[t]he highly developed living being is an open system having many relations to its surrounding” (Cannon 1929, p. 400). Bernard (1973) thus establishes four possible ways to resolve the tension of an organism in an inhospitable cosmos: it adapts, hides, hibernates, or dies. For this conflict does *not* entail a “warfare against the cosmic conditions”, Bernard writes, “but on the contrary”, and at best, “by an adaption, an accord with them”. In contemporary parlance we would call this “adaption” or “accord” ‘resilience’. But not all beings, Bernard construed, were capable of it. “Constant” or “free life” is the classification Bernard gives to “higher animals” whose internal environment is capable of self-regulation, or what Cannon would call ‘homeostasis’. Bernard constructs a hierarchy of beings on the basis of those that are capable of homeostasis and those that are not. This hierarchy is intrinsically political, allowing Bernard to place all organic life on a spectrum bracketed by, in his words, “freedom” and “domination”. A “constant life” is a “free life” because it is “not subject to influence by the external environment”. Homeostasis allows it not only to survive a hostile environment but to live freely within it. By contrast, an “oscillating life” (a snake, a spider) is a slave; it “remains so *chained* to [its external conditions] that it is *subject* to all their variations”. But most powerless of all is a “latent life”, which is “dominated by external physico-chemical conditions, to the point that all vital manifestations can be *arrested*”. The capacity for homeostasis determines an organism’s capacity equally for freedom and control (130–151; all emphases added).

### Cyborgs are divisive

Wiener, Rosenblueth, and Julian Bigelow’s inaugural cybernetic paper, “Behavior, Purpose, Teleology”, pulls down the boundaries of Bernard’s three categorical distinctions and opens up a continuous and infinite schema to place all beings according to their capacity for homeostasis; or, rather, their capacity to *learn* it (Wiener *et al.* 1943). They map onto homeostasis the engineering vocabulary of “feedback”, originating in the invention by Howard Black of the stabilised amplifier nine years prior: specifically, according to Black’s formulation, stable, self-correcting, and “negative feedback”, as opposed to overcompensatory and unstable “positive feedback”; like Shannon, whom Black preceded at Bell Labs, he calls the latter “singing” (Black 1934). To Black’s vocabulary, Wiener, Rosenblueth, and Bigelow add Cannon’s depiction of homeostasis (now “negative feedback”) as a process and outcome of “learning”. For them, as for Cannon, on the one hand homeostasis has been “learned” by warm-blooded animals by means of natural selection, which is to say that evolution itself is the process by which a species “learns” to better regulate itself, and as such that homeostasis is itself a process of “learning” (Cannon 1939, pp. 22–23). On the other hand, the capacity for an



## T&F PROOFS NOT FOR DISTRIBUTION

168 *Daniel Nemenyi*

individual organism to perform homeostasis not just on what *has already* occurred but what they have learned to *anticipate will* occur is itself, for an individual, a process of learning to become more self-adjusted to a world, as well as the outcome of that self-adjustment (Cannon 1929, p. 419). The founding cyberneticians then map Cannon's theory of learning onto the machine, transcending Black's analysis of the negative feedback amplifier – and all analyses of self-regulatory machines written in the wake of James Clerk Maxwell's (1868) "On Governors" – since their object not only self-regulates but improves its self-regulation. Theirs is a 'learning machine' understandable according to the same – now universal – conceptual schema as an organism (or species) that learns. As such, cybernetics was born.

Wiener and his co-authors' particular machine was their pioneering Second World War Anti-Aircraft Predictor: a system that could not only track an aircraft's flight with a steady aim, but continuously fed its path into an algorithm that would churn out increasingly accurate predictions of the plane's future location, with the goal being to fire a missile at its imminent position rather than its ever-passing present one. They extended this analysis to a cat that pounces on its prey's "extrapolated future position", unlike a snake that strikes at a frog "so fast" that it attacks its position directly, without anticipatory feedback; without "learning". We might say that such "learning" constitutes a 'meta-homeostasis', a 'homeostasis of homeostasis', since at stake is the capacity to regulate the capacity for self-regulation itself: to learn ever better to learn. With greater learning comes greater control, greater freedom. *But at whose cost?* For, in a direct break with Cannon – and no less with Mayr and therefore Hayles – Wiener did not consider the body politic to be partially or even potentially homeostatic. Rather, he considered it to be precisely "*anti*-homeostatic" (Wiener 1961, pp. 160–161; emphasis added). He derided as "simpleminded" those who believe the "hucksters" who say that "free competition is itself a homeostatic process", that the market will regulate itself for the "common good" if left to its own devices (61, 159). Whereas Hayles claims that Wiener champions a liberal, coherent, rational subjectivity which made him retreat from the cyborg, in reality it was because he balked at the embrace of cybernetics by the state, the military, and capitalism that, as historian Ronald Kline (2009) argues, he retreated into a medical sub-field of cybernetics concerned with what he called "artificial chain of homeostasis" (Wiener 1951, p. 66) – or, as it became more popularly known, 'cyborg'. In this concept we find Wiener's analysis of power, which looks little like that attributed to him by Hayles.

Recall that Cannon considered capital and transport flows to constitute the capillary routes of the body politic's *milieu intérieur*. For Wiener, it is the flow of *communication* which performs this function among social organisations. The same is true for non-human organisms: "How then does the beehive act in unison, and at that in a very variable, adapted, organized unison? Obviously, the secret is in the intercommunication of its members" (Wiener 1961, p. 156). And it applies to humans, too, with large social organisms bound by such media as newspapers, books, television, radio, post, theatres, cinemas, schools, and churches (160–161; Wiener 1954, p. 18). Every socius is constituted through its "possession of means

## T&F PROOFS NOT FOR DISTRIBUTION

*How we never became posthuman* 169

for the acquisition, use, retention, and transmission of information” (Wiener 1961, p. 157). Certainly Cannon promoted the idea that messages from the nervous system autonomically control an organism’s homeostasis towards a single end, and Wiener accepts this on the level of biological organisations. However, with the experience of the Anti-Aircraft Predictor behind him, Wiener acknowledged something radical that Cannon did not.

On the level of human social relations, messages can be arbitrarily addressed to their recipients (unlike a beehive, where this is fixed). This means that humans can constitute arbitrary organisations, regardless of relatively fixed characteristics such as race, nationality, employer, family, sex, and so on, simply by virtue of exchanging messages and knowledge with one another in pursuit of a common end. For what is homeostasis in general but an organisation collaborating through communication on the common goal of its own stability? Societies are thus, for Wiener, labile and shifting, hence the claim in the veritable manifesto of the internet, co-authored by cybernetician and internet pioneer J.C.R. Licklider: “The whole will constitute a labile network of networks – ever-changing in both content and configuration” (Licklider and Taylor 1968, p. 38). But they are also political, since to share a message specifically with one is to deny it *from* and constitute it *as* an ‘other’. Therein lie the fundamental roots of computer cracking and surveillance, as well as disinformation: if another becomes increasingly learned and adept at accomplishing their goals at the expense of your own, then their advantage can be voided by intercepting their communication; it can be weakened by deceptively injecting entropy (the opposite of information) into their *milieu intérieur*, thereby forcing members to divide and choose between competing communication regimes. In short, where Cannon conceived of the body politic in Augustinian terms, with its homeostasis hampered only by the “negative evil” of “incompleteness”, Wiener conceives of it in expressively Manichaean terms – as a “positive malicious evil” that is “determined on victory and will use any trick of craftiness or dissimulation to obtain this victory” (Wiener 1954, pp. 14, 165). Unlike the “passive” evil confronted by science, this “opponent” will “resort readily to bluffing” and “confounding us further”, such that a variant of game theory is at stake, one which assumes players to be rendered infinitely stupefied (33–36). Homeostasis always implied conflict, but only between an individual organism and the surrounding world. According to Wiener’s cybernetics, the neatly bounded individual is dead, and not because, as for the posthumanists, the human is now fluidly interjected with machines and other species, but because discrete organisations and conflicts pervade every border.

Notice that, *contra* Cannon, for Wiener there are multiple regimes of homeostasis at play within the social body. There is the anti-homeostasis of an increasingly confused society bombarded by gossip, marketing, mis- and disinformation, and clichés rather than in-depth news and long-form analyses as well as a homeostasis of profit margins that keep the publisher solvent and profitable (Wiener 1961, p. 161). Cannon stretches the organic *milieu intérieur* onto an entire nation; Mayr, the steam engine. Wiener, rather, subdivides the body politic into endless contradictory and conflicting organisations. The homeostatic freedom of

## T&F PROOFS NOT FOR DISTRIBUTION

170 *Daniel Nemenyi*

one is the anti-homeostatic domination of another. As the nation has no single ideal to aim its regulation, as it is divided and irreducibly multiple, so is the individual which constitutes it. Wiener's theory does not posit individuals and masses but shifting intersections, endlessly divisible subjects: "dividuals", why not (Deleuze 1997, p. 180)? He may have privileged disembodied communication over bodies, but doing so allowed him to abandon the individual. Autonomous liberal individuals? No. After Hiroshima and Nagasaki Wiener's attitude towards his cybernetic machines turned critical. He published a letter in the *Atlantic* in which he expressed his refusal to share his wartime research on guided missiles with, as the editors put it, "a research scientist of a great aircraft corporation" (Wiener 1947). Such a principled stance conforms with what Hayles considers to be Wiener's embodiment of the position of an "outsider", his "standing apart from a privileged group whose boundaries did not include him" (Hayles 1999, p. 93). This is, in Hayles's terms, "homeostatic", since it posits an insider/outside relationship, one that the posthuman is deemed to deny. But an immanent reading would be less harsh: it is an example of his refusal to advance an arms company's learning, to join their network and identify with their end. Instead, he directed his practical energies to peaceable "medical cybernetics" and the construction of what he called an "artificial chain of homeostasis combining elements in the body and elements outside" (Wiener 1951, p. 66): machines that extended the capacities specifically for self-regulation of the organism that bore them. Among these were automatic anaesthetic and insulin dispensers that took continuous inputs from brain waves and glycaemia levels; a glove for the deaf that aimed to translate words into meaningful electrical signals; prosthetic limbs "with strain or pressure gauges" to replace the static "peg leg" (Wiener 1961, p. 26; Kline 2009, pp. 338–339). His work in "medical cybernetics" was widely known, such that when Lockheed space-suit researchers Manfred Clynes and Nathan Kline were working on "the incorporation of integral exogenous devices to bring about the biological changes which might be necessary in man's homeostatic mechanisms to allow him to live in space *qua natura*" (Clynes and Kline 1960, p. 27), the word they coined for their "self-regulating man-machine system" – "cyborg" – was merely a reformulation of what Wiener had termed "artificial homeostasis" (Kline 2009). The cyborg, according to Kline and Clynes' original definition, implied Wiener's homeostasis in an entirely orthodox sense. It concerned precisely the capability to artificially extend the capacity for a free life in otherwise hostile environments. Astronauts should not be "slave to the machine" by constantly having to fiddle with switches and dials, for this should "happen automatically and unconsciously, leaving man *free* to explore, to create, to think, and to feel" (Clynes and Kline 1960, p. 27; emphasis added). The cyborg was originally not simply anything that is "composed of organism and machine" (Haraway 1991, p. 1), but an organism whose *milieu intérieur* has been mechanically ameliorated: *beings of artificially enhanced homeostasis*. Hence also its irreducible, and in a sense Bergsonian, human basis (Bergson 1944, p. 154): only humans can arbitrarily enhance the *milieu intérieur* of themselves or other beings.

## T&F PROOFS NOT FOR DISTRIBUTION

*How we never became posthuman* 171

What Kline and Clynes's "cyborg" emphasises, beyond Wiener's physiological "artificial homeostasis", is that there is no reason why such an enhancement should be restricted to 'correcting' an organism's level of health, to evening out imbalances of control within a species. It shows how "artificial homeostasis" could just as well be developed to enhance an organism *beyond others* in its species: to give it an advantage, a greater degree of control over another. Cyborgs, moreover, do not have to involve physical extensions to the body. They can be, as for Licklider (1960), "man-computer symbioses", which extend the capacities of human cognition to contend with vast oceans of data. A Google search is truly a cyborg operation. But who gains the greater control – the human searcher or Google – as they learn from millions of queries per second? This has distinct consequences for the human since, as Wiener (1961, pp. 163–164) stressed, though one could speak of humans as just another social animal, like "*Drosophila* in a bottle", alas "this is not a sociology in which we, who are human animalcules ourselves, are particularly interested". What is at stake, what matters, is our actual historical (rather than universal or ideal) anthropological, economic, political – Manichaean or agonistic – relations. Wiener restricted his post-war cybernetic research to the democratisation of human capacities, but recognised that in precisely the same system of thought subsisted the enhanced capacity for the monopolisation of control. Indeed, he thought this inevitable. This is why his sequel to *Cybernetics* rails against a "new Fascism" and "World State" which accumulates power by means of cybernetics (Wiener 1950, pp. 102, 214). Wiener 'turned back' from the cyborg because he foresaw that the "hucksters" who were already adept at accumulating power under capitalism would vastly benefit from the capacity to artificially enhance their homeostasis, learning, and advantage by means of it – a social formation whereby boundaries and allegiances constantly separate, overlap, and shift, the endlessly divisible and integratable constitutive elements at war with one another. Hayles (1999, p. 112) writes that "[t]he voices that speak the cyborg do not speak as one, and the stories they tell are very different from the narratives that Wiener struggled to authorize". Far from prudishly shying away from the posthuman, Wiener was precisely concerned with the cyborg's multiplicity, albeit not in Hayles's sense, but rather as the ever-overlapping, labile, artificially homeostatic Manichaean conflict that today constitutes the world.

### References

- Agamben G 1998, *Homo Sacer: Sovereign Power and Bare Life*. Stanford: Stanford University Press.
- Barlow JP 1996, "A Declaration of the Independence of Cyberspace". Electronic Frontier Foundation. Available at: [www.eff.org/cyberspace-independence](http://www.eff.org/cyberspace-independence) (accessed 20 May 2021).
- Bergson H 1944, *Creative Evolution*. New York: Random House.
- Bernard C 1949, *An Introduction to the Study of Experimental Medicine*. Trans. Greene HC. New York: Henry Schuman.

## T&F PROOFS NOT FOR DISTRIBUTION

172 *Daniel Nemenyi*

- Bernard C 1973, "Lessons on the Phenomena of Life Common to Animals and Vegetables. Second Lecture: The Three Forms of Life" in Langley LL (ed.) *Homeostasis: Origins of the Concept*. Stroudsburg, PA: Dowden, Hutchinson & Ross, pp. 129–151.
- Black HS 1934, "Stabilized Feedback Amplifiers", *Bell System Technical Journal*, vol. 13, no. 1, pp. 1–18.
- Caldicott H 1984, *Missile Envy: The Arms Race and Nuclear War*. New York: William Morrow.
- Canguilhem G 2012, *Writings on Medicine*. Trans. Geroulanos S and Meyers T. New York: Fordham University Press.
- Cannon WB 1929, "Organization for Physiological Homeostasis", *Physiological Reviews*, vol. 9, no. 3, pp. 399–431.
- Cannon WB 1939, *The Wisdom of the Body*. London and New York: W.W. Norton.
- Cannon WB 1973, "Physiological Regulation of Normal States: Some Tentative Postulates Concerning Biological Homeostasis" [1926] in Langley LL (ed.) *Homeostasis: Origins of the Concept*. Stroudsburg, PA: Dowden, Hutchinson & Ross, pp. 246–249.
- Clynes ME and Kline NS 1960, "Cyborgs and Space", *Astronautics*, vol. 5, no. 9, pp. 26–76.
- Deleuze G 1997, *Negotiations, 1972–1990*. Trans. Joughin MJ. New York: Columbia University Press.
- Foucault M 1970, *The Order of Things: An Archaeology of the Human Sciences*. Routledge, London.
- Galison P 1994, "The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision", *Critical Inquiry*, vol. 21, no. 1, pp. 228–266.
- Haraway DJ 1988, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective", *Feminist Studies*, vol. 14, no. 3, pp. 575–599.
- Haraway DJ 1991, *Simians, Cyborgs, and Women: The Reinvention of Nature*. London: Free Association Books.
- Hayles NK 1999, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago and London: University of Chicago Press.
- Kline R 2009, "Where Are the Cyborgs in Cybernetics?", *Social Studies of Science*, vol. 39, no. 3, pp. 331–362.
- Kline RR 2015, *The Cybernetics Moment: Or Why We Call Our Age the Information Age*. Baltimore, MD: Johns Hopkins University Press.
- Lamport L 1994, *LaTeX: A Document Preparation System*, 2nd edn. Reading, MA: Addison-Wesley.
- Langley LL 1965, *Homeostasis*. London: Chapman & Hall.
- Licklider JCR 1960, "Man–Computer Symbiosis", *IRE Transactions on Human Factors in Electronics*, vol. HFE-1, pp. 4–11.
- Licklider JCR and Taylor RW 1968, "The Computer as a Communication Device", *Science and Technology*, April, pp. 21–41.
- Maxwell JC 1868, "On Governors", *Proceedings of the Royal Society*, no. 100, np.
- Mayr O 1971, "Adam Smith and the Concept of the Feedback System: Economic Thought and Technology in 18th Century Britain", *Technology and Culture*, vol. 12, no. 1, pp. 1–22.
- Mayr O 1986, *Authority, Liberty & Automatic Machinery in Early Modern Europe*. London: Johns Hopkins University Press.
- Mead M, Bateson G, and Brand S 1976, "For God's Sake, Margaret", *CoEvolutionary Quarterly*, no. 10, pp. 32–44.
- Pias C and Vogl J (eds) 2016, *Cybernetics: The Macy Conferences*. Zurich and Berlin: diaphanes.

## T&F PROOFS NOT FOR DISTRIBUTION

*How we never became posthuman* 173

- Shannon C 1948, “A Mathematical Theory of Communication”, *Bell System Technical Journal*, vol. 27, no. 4, pp. 623–656.
- Shannon C 1956, “The Bandwagon”, *IRE Transactions: Information Theory*, vol. 2, no. 1, p. 3.
- Vernant J-P 2000, “The Polis: Shared Power”, in Bottéro J, Herrenschildt C, and Vernant J-P, *Ancestor of the West: Writing, Reasoning, and Religion in Mesopotamia, Elam, and Greece*. Chicago and London: University of Chicago Press, pp. 164–175.
- Wiener N 1947, “A Scientist Rebels”, *Atlantic Monthly*, vol. 179, p. 46.
- Wiener N 1950, *The Human Use of Human Beings: Cybernetics and Society*, 1st edn. London: Eyre and Spottiswoode.
- Wiener N 1951, “Homeostasis in the Individual and Society”, *Journal of the Franklin Institute*, vol. 251, no. 1, pp. 65–68. doi:10.1016/0016-0032(51)90897-6.
- Wiener N 1954, *The Human Use of Human Beings: Cybernetics and Society*, 2nd edn. London: Sphere Books.
- Wiener N 1961, *Cybernetics: Or Control and Communication in the Animal and the Machine*, 2nd edn. Cambridge, MA: MIT Press.
- Wiener N, Rosenblueth A, and Bigelow J 1943, “Behavior, Purpose, Teleology”, *Philosophy of Science*, no. 10, pp. 18–24.
- Wolfe C 2010, *What is Posthumanism?* Minneapolis and London: University of Minnesota Press.