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2015

<https://doi.org/10.25969/mediarep/1215>

Veröffentlichungsversion / published version

Sammelbandbeitrag / collection article

Empfohlene Zitierung / Suggested Citation:

Woodard, Ben: Loops of Augmentation. Bootstrapping, Time Travel, and Consequent Futures. In: Matteo Pasquinelli (Hg.): *Alleys of Your Mind. Augmented Intelligence and Its Traumas*. Lüneburg: meson press 2015, S. 157–168. DOI: <https://doi.org/10.25969/mediarep/1215>.

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Loops of Augmentation: Bootstrapping, Time Travel, and Consequent Futures

Ben Woodard

The essay examines the concept of bootstrapping as a model of augmentative reason in contemporary neorationalist philosophies. In particular, it examines the concept of bootstrapping, here meaning mental capacities or processes capable of self-augmentation. Well illustrated in numerous time-travel fictions, the genealogy of bootstrapping lies in the legacy of German Idealism and can be met in the figure of Münchhausen. Looking how the problem of origin, or of determining an ultimately stable ground, is replaced by horizon, or location, both determined through action, the essay proposes that the notions of embodiment and location prove troublesome for neorationalism.

One of the core concepts of the contemporary neorationalist (and more broadly pragmatist) camp is that of *bootstrapping*—that certain mental capacities or processes are capable of self-augmentation. While less often discussed in philosophical circles in terms of *recursion* (invoking a functionalist or mathematical context), bootstrapping indexes the material consequence of self-augmentation. Whereas recursion is an instance of an object being defined using its own terms (such as, to define recursion, one could say: look up the definition of recursion), bootstrapping assumes that there is an augmentative capacity in the material performing the original act. One instance would be discussing thought as a process of thinking that produces thoughts: this process engenders a massively complex chain of consequences for everything including thought itself. Thinking about thinking can change our thinking.

Bootstrapping bears asking what makes the difference between augmentative and non-augmentative, or *virtuous* versus *vicious* causation—a question which entails further questions about locality and augmentation as neither merely a qualitative nor quantitative treatment of the loop. Such a model of causation engenders in fact a navigational model: *augmentation is neither a more nor a better, but an elsewhere*. Rational augmentation is about going further with thought in a way that has constructive consequences for thought's future capacities and thought's future navigations. This essay attempts to outline and assess the importance of bootstrapping as a synthesis of recursion and augmentation, as well as its preferred illustration via time-travel narratives both in film and in neorationalist philosophy. In closing, I will relate the bootstrapping model of cognition to intelligence as time-manipulation found in Hegel and in more general conceptual aspects of German idealism taken up by Reza Negarestani.

Recursion and Augmentation

Where bootstrapping indicates a mental act informing a self-affecting physical act, a recursive definition seems to operate in one abstract realm. Yet, if this were the case, then recursion would be the same as circularity. But even in this abstract sense, circularity can be avoided in terms of adding values and rules. Vicious circularity, or ill-defined self-recursion, can contain these elements but only produce nested recursion as in the case of a famous line by Douglas Hofstadter (1985, 26):

This sentence contains ten words, eighteen syllables, and sixty-four letters.

Recursion begins with a ground or base case, material, or world that then goes through a recursive step. A famous example: "Zero is a natural number,

and each natural number has a successor, which is also a natural number. Following this base case and recursive rule, one can generate the set of all natural numbers.” Bootstrapping then is of course not just self-reference but the utilization of the base case or ground as a process—as a process entailing consequences that it can be added to itself. Thus recursion, and augmentative recursion, appeals to qualifications or rules in order to not merely be repetitions of the same. A related but not altogether different concern is that of medium or location. Recursion, whether vicious or virtuous, has a different set of consequences given the particularity of its medium or context.

Because of the nature of physical systems, and the particularity of instantiation, the repetition of a phrase has different kinds of consequences, at least immediately, than the repetition of a physical gesture, for instance. This is not to trump recursion with the simple reply of “context matters therefore structure does not” but to plant a skeptical seed regarding how determinate augmentation is separable from contextual or environmental augmentation.

At the level of thought however, it is not difficult to imagine how consciousness augments itself through the production of thoughts which do not simply add thoughts to those that have already been produced, but add thoughts that alienate the mind from itself. This alienation is productive in that it expands the capacities of the mind while devaluing the mind as an essence other than as a target of determination, as a thing or selection of content to be looped. Such an articulation appears as unhelpful as it is unavoidable. To ask the question “how do you start thinking?” would set you on a course partially of your choosing but which would have volition caused by an apparently exterior force. Recursion takes place before it is recognized and thus one could argue that augmentation is the turning of this process upon itself, i.e., *augmentation is recursive recursion, or self-aware recursion.*

The desire to appeal to fictions, speculations and simulations (that will be introduced soon) should begin to become clear. Speculations or certain exercises in reflection are a low-cost means of practicing augmentations without concern for context, medium, and minimizing consequences. But since this is how recursion occurs, at what point does that very structure of augmentation shift as it moves across scales? Does the augmentative recursive structure of thought remain as context-independent in its simulations as it does once those simulations are deployed in a particular medium?

Furthermore, while augmentative recursion positively obliterates the shackles of origin, does this unnecessarily risk the veneration or obscuring of limits at broader scales to thinking? Although it is a simplification, one can take the well-known story of Fichte’s lectures in which he attempted to assert the irreducibility of the “I” as the necessary starting point of all philosophy. Fichte (1796/99) instructed his audience to look at the wall, then the floor, then

to look at the thing that was doing the looking. In illustrating the subject's inability to get behind itself, Fichte hoped to cement his claim that the "I" was the primary point of access for all philosophy. While this is certainly the case for the speculative simulation engine, we can reduce our place in the creation of things in the world to constructively alienate that very capacity. This does not change the experience of that viewing, but it questions the universalization of the medium and location from which the augmentative recursion of self-reflection occurs.

Fichte's example demonstrates the stubbornness of philosophy to admit that its modeling capacities may undo the very grounds that shelter that model from the impacts of its simulations. Time travel becomes a meta-abstraction of this problem with the timeline replacing consciousness in which, because of narrative constraints, self-reflective consciousness itself remains immune to the manipulations made upon the stream of time.

Time Travel as Bootstrapping Simulator

The strangeness of recursion can be illustrated (albeit hyperbolically) in stories of time travel to the past. Robert Heinlein's story "By His Bootstraps" (1941) is one of the more famous examples of the bootstrap paradox. The paradox being if an object is sent to the past and received and brought to the future to where it was sent, then the origin of the object is lost. Similar issues, though not as drastic arise from sending information back (though, one could argue, that both cases materially change the past in such a way that the second law of thermodynamics is violated). A growing amount of mainstream films have examined both stable and unstable time loops. These stable time loops (or augmentative recursions) are probably best known in the movie series *Terminator* (1984–2015). In these movies each attempt to stop the consequences of the future (the traveler's present) actually contribute to that future in that the film's protagonists may change the date of the catastrophic future event, but this event nevertheless always occurs. Otherwise put, the *Terminator* series is ambiguous as to whether the reason why judgment day or the rise of a malevolent artificial intelligence has *always already* happened because of the structure of time (i.e., fate can only be postponed not canceled) or because such an event is a historical inevitability.

The past, taken as a process to be manipulated, is added to the future that always was but, from the perspective of the manipulator, events seem to occur in a generally novel way. In this sense, origin becomes a moot point at least when considered in a material sense. It is the exploration of the consequences that ultimately matters in bootstrapping rather than determining the limits of the capability to manipulate. Exploration would require determining the coherent limits of the loop's boundary or the field of manipulation or, the

degree to which one explores before turning onto that process of exploration to augment it. That is, at some point the time traveler has to decide what variables to take into account in order to change the future, changes the traveler can only then register by going back to the future. By remaining too local, the manipulation of the processes of thought is safer but more myopic (such as in the case of the film *Primer*, 2004) and altering the past too much may very well lead to the opposite problem. In *Primer*, a group of friends discovers how to travel twenty minutes back in time. One of the film's characters decides to use this to socially engineer the present by recording conversations and by giving his past self-advantageous information.

The problem of origin, or determining an ultimately stable ground, is replaced by horizon, or location, which are determined through action. Hence, this is why Schelling, who studied under Fichte but broke away from him over the latter's dismissal of material nature, denies that there is any singular material origin as such: There is no seed corn from which all things spring. What's interesting here is that in stories of time loops, whether stable or unstable, thought is an exception or a process which is minimally material in such a way that the recording of past loops is not seen as a thermodynamic violation. In the film *Edge of Tomorrow* (2014), the iterations of the loops is retained even after it is closed (because of an absorption of alien biology). In the film, a military officer is exposed to the blood of a temporally-altering alien species and relives the same day of a doomed battle over, and over again. His death resets the day, and he alone retains the memories of what happened, in order to attempt various strategies to end the war. But an interesting tension of the film, despite and because of its repetition, is in the question of how many iterations the protagonist has gone through before the iteration we see treated as if it is novel. The film constantly shifts the parameters of self-augmentation while it openly displays the repetition of certain events as leading to the main character's honing of his combat abilities. At other times it is obfuscated whether, and how many times, painful or banal scenes have already occurred to him.

The film *Source Code* (2011) isolates consciousness in a similar fashion, which is why it was discussed by Grant (2011) at the opening of his talk entitled "The Natural History of the Mind." In the film, the creators of a time travel device believe they are sending a consciousness back in time (into another person's body) when they are in fact creating an alternate universe as the addition or supplanting of the consciousness alters the actuality into another future. In this sense, it is somewhat ambiguous whether they are stating that time travel is impossible or if even the addition of consciousness to a past leads to a branching theory of time travel, and the universe is redirected. Grant takes this as an illustration of idealism's advantage over realism, namely, that idealism is not opposed to realism but emphasizes the reality of the idea.

But how do these speculative exercises relate to neorationalism? If there is a binding theme between the pragmatism of Charles S. Peirce, Robert Brandom, Mark Wilson etc. and the futural or accelerationist tendencies of Reza Negarestani, Nick Srnicek, Alex Williams, Peter Wolfendale and others, it is the willingness to treat the past as material to be transformed and augmented to create a future. While pragmatism is often decried for being insufficiently radical, accelerationism, is decried for forgetting the present for the sake of the future. A certain amount of philosophical discomfort arises following both projects' admitting the open manipulation of the past in constructing a future. All philosophy is grave-robbery but while some projects display these spoils as already relevant consequences in and of themselves, for neorationalism and accelerationism, it is far better to play Dr. Frankenstein, to treat the past as materials for something else altogether.

The playing out of consequences takes on a different function, since we have no knowledge of the future but only meta-cognitive rules and operations to check our explorations and navigations according to our capacities and wagers (as opposed to origins and ends). The interesting tension is how conceptually determined capacities and wagers are from the point at which we find ourselves, a point which is of course arbitrary but only before we admit that our self-augmentation took serious hold of its place. This strange place, this alienated home, is how Reza Negarestani recently opened his talk "What Philosophy Does to the Mind":

The ideal aim of philosophizing is to become reflectively at home in the full complexity of the multi-dimensional conceptual system in terms of which we suffer, think, and act. I say "reflectively" because there is a sense in which, by the sheer fact of leading an unexamined, but conventionally satisfying life, we are at home in this complexity. It is not until we have eaten the apple with which the serpent philosopher tempts us, that we begin to stumble on the familiar and to feel that haunting sense of alienation which is treasured by each new generation as its unique possession. This alienation, this gap between oneself and one's world, can only be resolved by eating the apple to the core; for after the first bite there is no return to innocence. There are many anodynes, but only one cure. We may philosophize well or ill, but we must philosophize. (Sellars 1975, 295)

Time travel, as a genre, attempts to reconcile the arrow of time and our non-linear experiences of time or, what appear as asymmetrical forces of causation, our ignorance of those causes, and our powers of manipulation over the future and the past. Nick Land's short piece *Templexity* argues that this reconciliation demonstrates that the very notion of travel is a misnomer, and states that one should focus on templexity. Templexity is indistinguishable from real recursion and is the auto-productive nature of time as general entropic dissipation (Land 2014, 4). However, as Land notes, negentropic exceptions appear

as local productivities; life for instance is a highly complex and productive instance of chaos which would seem to run against the general wave of cosmological decay or statistic flattening. But, as Land emphasizes, negentropy is just a case of uneven distribution and not physical exception. Though, as is evident in both his past and present works, Land is less concerned with tracing the physical consequences of loops and more interested in how loops as fictions come to have a life of their own. Land is less interested in the kind of augmentation that takes place and more in how loops or recursion pass from an ideal to a real state (if such division can be held to begin with, i.e., if the ideal can be taken to be the future, which has not yet returned to the present).

One must be careful in establishing a correlation between positive and negative feedback and virtuous and vicious circles too quickly. Since both virtuousness and viciousness are augmentative, they can both be viewed as having positive feedback qualities: in that both are additive it is only that viciousness and virtuousness are qualitative judgments made from a position exterior to the cycles themselves. It is this making real that manifests as a problem for neorationalism, albeit in a different register, one that the simulations of time travel hyperbolically illustrate (particularly given the destruction of origin and the importance of self-manipulation as augmentation).

Consequent Futures

The philosophical and political relevance of a future to be constructed is central to the work of neorationalism as well as its more recent political and theoretical alliances (whether accelerationist, transmodernist, Promethean, or xenofeminist). Instead of an equivocation of futurity and inevitability, Negarestani and Wolfendale assert that the future is a positive project in the sense that one should neither admit to a present merely of better failures, nor to a past of genealogical guilt, but to an operable progressiveness. Given this it is not unsurprising that for Negarestani (2014) and Wolfendale (2010), Hegel's model of history and of the development of self-consciousness as a historical project, is central to pursuing a universalist notion of reason that attempts to be directed towards the future.

As Rory Jeffs (2012) notes, the importance of temporality in Hegel has been repeatedly emphasized, particularly in its early French reception (by Kojève and Koyre) through the present with figures such as Catherine Malabou and Slavoj Žižek. Across these readings a tension exists between the restlessness or productivity of time, and the thinkability of time, requiring its stoppage or flattening out via "the end of history." As Jeffs demonstrates, Hegel's temporality is taken to be ontological primordial for Koyre, whereas it is collective and anthropological for Kojève. Malabou attempts to navigate between constructed time and flatly navigated history in highlighting plasticity, as a means

of attempting to discern the present import of the *to come*, or *what we will see*. However, I would argue that in *The Future of Hegel*, Malabou (2004) repeats the strange dualism that Kojève constructed with Hegel's system in order to separate the human from nature or philosophy from science.

In many senses Negarestani's reading of Hegel maintains a duality but in a methodological or non-absolute sense following his Sellarsian commitments. Thus while Negarestani takes up the socially constructed aspect of Kojève's reading as determining the path of time, Negarestani would not locate this determination primarily in terms of mutual recognition but in the augmentation or inhumanization of time via reason. Negarestani de-phenomenologizes the Kojèvean reading and reforms it to resemble a more Koyrean or Wahlian perspective. In essence Negarestani re-subjectifies the Hegelian construction of reason but via an inhuman notion of the subject.¹ Negarestani approaches this version of Hegelianism in his text "Labor of the Inhuman" by arguing for a particular reading of destiny. He writes:

Destiny expresses the reality of time as always in excess of and asymmetrical to origin; in fact, as catastrophic to it. But destination is not exactly a single point or a terminal goal, it takes shape as trajectories: As soon as a manifest destination is reached or takes place, it ceases to govern the historical trajectory that leads to it, and is replaced by a number of newer destinations which begin to govern different parts of the trajectory, leading to its ramification into multiple trajectories. (Negarestani 2014a, 451)

In further articulating the functional aspect of this revisable destiny, Negarestani examines his own relation to Hegel (as well as Kant and Sellars). Following Hegel, Negarestani (2014a, 454) argues that reason requires its own constitutive self-determination. Contrary to Hegel, he states that normativity is not composed of explicit norms from the bottom up (Negarestani 2014a, 455). To follow Hegel too closely in regards to explicit norms (as opposed to the utilization of interventional norms) would be to ignore the regress in the setting up of norms as self-standing, of being the norm "just because." Thus Negarestani points out another layer of recursive loops, that of question begging versus non-question begging. Hegel's reliance on explicit norms begs the question since the proper augmentation which would distance the premise from the conclusion is absent. Generally, the difficulty for Negarestani and the neorationalist project is how to grant reason its "proper autonomy" without appearing to be making reason immune from non-reasonable egress in such a way that is, at its root, unreasonable or question begging. Negarestani's answer is to combine pragmatism and functionalism, arguing that the linguistic decomposition of thought, and the rational decomposition of nature, lead

1 One can also observe similarities between Negarestani's emphasis on the future operating on the past in Hegel and Jean Hyppolite's discussion of the future healing the past (see Hyppolite 1974, 525).

to a relation of thinking and doing that is gradual yet universally revisionary (Negarestani 2014a, 456).

While Negarestani argues that philosophy invents its own history in a particularly Hegelian vein, the essential difference between Hegel and Schelling's model of time, is that the act of invention, the act of self-augmentation, uproots in a way that the view, the new horizon viewed, cannot be separated from history materialized. This is not to suggest, *pace* Žižek's (1997) reading of Schelling, that thought or will interrupts the ontological structure of the world or of nature. Instead, the act made possible through that particular material world never fundamentally interrupts it, but re-orientates it from that particular view. That is, the unknowability of the ultimate source of the re-orientation does not destroy reason. It indicates that experience is not the base of reason but that experience always escorts reason. As Schelling puts it in *The Grounding of Positive Philosophy*:

Reason wants nothing other than its original content. This original content, however, possesses in its immediacy something contingent, which is and is not the immediate capacity to be; like-wise, being—the essence—as it immediately presents itself in reason, is and is not being. It is not being as soon as it moves, since it then transforms itself into a contingent being. (Schelling 2007, 134)

Nature is not a solid ground or that which trumps self-augmentation for Schelling, but a slower and more stubborn effect on the horizon viewed from the perspective of the thinker. The difference between Hegel and Schelling becomes that of setting the formers' confidence in the amount of conceptual determination possible from one perspective, whereas for the latter, change in a position requires more attention to the ground one is standing (admitting that ground's synthesis) as well as recognizing the high cost of shifting positions.

Otherwise put, Schelling errs on the side of analyzing the non-predicative weight of predication by which it functions, whereas Hegel further solidifies the future perspective and risks over-conceptually determining the past and the present. As Negarestani put it in the talk quoted above, philosophy refuses to close the loop of its revenge against belief, against over-grounding. Again, Schelling worries about the labor of keeping the loop open where Hegel attempts to hold the circle (the loop) open till the last instance.

In this regard, and to return to self-augmentation, the essential difference between Schelling and Hegel is the height from which both descend to redraw the perspective from which reason is working. Hegel reaches perhaps greater heights with the assistance of conceptual certainty (powered by negativity) before descending in order to redraw the reasoner; whereas in keeping experience alongside reason, Schelling makes structural wagers leaving

experience to judge conceptual ones in that particular view. In other words, Schelling emphasizes the local extrapolation, whereas Hegel emphasizes the global decomposition. If philosophy is a time-travel device (as Negarestani puts it), then the different approaches to the relation of past to future, or the pragmatic and the speculative, is the locality chosen when one steps into the time machine.

Conclusion

At a dinner party in early nineteenth century Berlin, Madame du Stael was speaking to Fichte. Fichte was hurriedly attempting to explain his philosophy of the "I" to her in a language that was not his own. After outlining his philosophy, Stael responded that she completely understood, and that his philosophy of the absolute "I" could be explained through the figure of Baron von Münchhausen. In one story, in order to cross a river, Münchhausen grabbed his own sleeve and jumped over himself to cross the water (see Bienerhasett 2013, 82).

The image of bootstrapping, on the other hand, is often tied to the episode in which Münchhausen famously pulled himself out of the swamp by his own hair. Furthermore, the Münchhausen or Agrippian trilemma has been put forward by Paul Franks (2007) as the central philosophical problem to which German Idealism responds.

The trilemma consists of three problems of justifying reason's capacities (or more generally any kind of knowledge) with three equally unsatisfactory options: circularity (or that every consequent leads back to its antecedent), regression (that for every step, every consequent requires infinitely more proofs) and axiom (we make a common sense justification to what we are claiming to know as an axiom). This trilemma centers on the justification theory of knowledge, and it articulates thought as a disembodied and dematerialized activity. But just as an explicit notion of norms functioning from the bottom up begs the question, a notion of materiality or embodiment threatens to be even more vague, and this is why embodiment should be thought of in terms of location, of the local interpretation of deeper nested levels of materiality.

In the same way, the figure of Münchhausen is not merely a critique of all appeal to bootstrapping as ideal or non-embodied; it points out that even virtuous circularity often elides the question of embodiment by relegating it to the space of nature as determined by the sciences alone. However, this dismissal of the space of reason leads often to a reliance upon the given over against any notion of augmentation (scientific or rational or otherwise). As Brassier writes in "Prometheanism and its Critics":

Since cognitive objectivation is conditioned by human existence, human beings cannot know themselves in the same way in which they know other objects. Doing so would require objectivating the condition of objectivation, which would be, as Arendt says, like trying to jump over our own shadow. (Brassier 2014, 476)

Following Arendt's Heideggerian trajectory, Brassier goes on to argue that anti-Prometheanism attempts to defend an unalterable human essence: Those who would claim that the human is alterable are, like Fichte, erasing the difference between the made and the given (or more widely between the ideal and the real) to beg skeptical reproach. In questioning but not destroying or deconstructing the bootstrap logic here, I am—against Arendt—stressing the importance of the embodiment that accompanies the leap, and not the impossibility of the leap itself away from the given.

Here, it is not the augmentative capacities of looping that are in question, but how one explains and understands the ramifications of the point of entry (what in the fictional stories and films mentioned above would be the seemingly impossible advent of the machine as well as the egregious amounts of energy needed to generate the beginning of the temporal journey). Thus, while I agree to the limitations of instrumentality, which Heidegger himself endorsed, these are not due to a particular limit of human access to the human, but due to a skeptical and naturalistic monism; whereas constraints of location and energetic expenditure are not human specific, i.e., not a form of particular human finitude. At the same time, the bootstrap logic applies a particular form of skepticism to the skeptical response, specifically to human capacities: Our location, or perspectival "closeness" to our own capacities, blinds us destructively and constructively, as we attempt to explain our rare (if not unique) cognitive capabilities, this explanation itself actively unfolds those capacities.

Schelling's focus on the measuring of consequents or on futures by their consequents is an attempt to de-relativize context which, viewed from the other side, could be taken as naturalizing the *trans-*, of attempting to identify the cost of navigation, and of having perspectives. This cost is not to be taken as either ontological finitude or as a reason to halt all constructive movement, but as an endorsement of the necessity and instability of ground, and the necessity and insufficiency of navigation. By Schelling's account, and against much contemporary dogma, idealism is the simultaneous simulation and deployment of the consequences of bootstrap logic that is fully embodied in a material nature.

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