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ABSTRACT: By culling through a history of computing technologies and racial capitalism from the last 150 years, this paper identifies a trans-historical figuration at work. Following, as case studies, the metaphorical lives and afterlives of the Mechanical Turk—a chess-playing automaton from the nineteenth century—and Maxwell's Demon—a scientific thought experiment first conceived in 1867—in technical and cultural discourses, it traces the figure of a cyber-homunculus, a tiny science-fictional subject laboring underneath the machinic hood, that animates para-cybernetic discourse and makes computational work palpable. In doing so, it outlines the entangled origins of atomization, automation, and outsourcing, and demonstrates how racialized and classed social relations get miniaturized into the computer, resulting in the simultaneous valuation and erasure of post-human labor.

Walter Benjamin, Charles Babbage, and Edgar Allan Poe shared an interest in a peculiar eighteenth-century phenomenon: a chess-playing automaton. A machine with the figure of an exoticized other—a brown man with Ottoman robes, a turban, and an unusually long pipe—sitting at a cabinet with a chess set, the automaton would star in numerous matches all over Europe and the United States between 1770 and 1854, reportedly playing against Benjamin Franklin, Napoleon Bonaparte, and Poe, among other luminaries. Babbage, like Franklin and Bonaparte, lost both his games, or so it is said, and was certain that this automaton, called "the Turk," was some

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sort of hoax.[1] It has even been suggested that this encounter may have inspired Babbage to work on his Difference Engine.[2] Babbage's collaborator, the Scottish physicist David Brewster, would hint at this connection when he later remarked how "those automatic toys which once amused the vulgar, are now employed in extending the power and promoting the civilization of our species."[3] Whether or not there was a direct developmental link between the automaton and the Difference Engine, it cannot be denied that the transition from an Orientalized chess-playing automaton to the plans for a massive computational apparatus had co-terminal locus in terms of history and demographics. The illusion of the Turk pervaded discussions among the British elite in the eighteenth and nineteenth centuries, and it was later revealed that this automaton had been operated by a human chess player sitting inside the machine.[4] This figure of the chess-playing robot is a perfect entry point into the set of ideas about computation and culture that I discuss in this piece. My story centers around the figuration I call the "cyber-homunculus," the imagined creature crouching within our machines, waiting to do our bidding, and how this figure has played into the history of

1. I sincerely thank Colin Milburn, Joe Dumit, Tim Lenoir, N. Katherine Hayles, Patrick Jagoda, Kris Fallon, Gerardo Con Diaz, Katherine Buse, Kate Marshall, Nan Z. Da, Jacob Hagelberg, Benjamin Blackman, Théo Lepage-Richer, Lucy Suchman, Bernard Geoghegan, Patrice Lord, the peer reviewers and the rest of the editorial team at *Configurations*, and Sahana Srinivasan for all their help and support. I am also grateful to my peers, colleagues, and students at University of California, Davis, University of Siegen, and University of Notre Dame.

Simon Schaffer, "Enlightened Automata," in *The Sciences in Enlightened Europe*, ed. William Clark, Jan Golinski, and Schaffer (Chicago: U. Chicago Press, 1999); Simon Schaffer, "Babbage's Dancer and the Impresarios of Mechanism," in *Cultural Babbage: Technology, Time, and Invention*, ed. Francis Spufford and Jenny Uglow (London: Faber & Faber, 1997): 65–75; Gerald M. Levitt, *The Turk, Chess Automaton* (Jefferson, NC: McFarland & Co., 2000); Gaby Wood, *Edison's Eve: A Magical History of the Quest for Mechanical Life* (New York: Bantam Doubleday Dell, 2003). There are some debates, it must be noted, on the historical veracity of all the Turk's famous adventures.

2. Oscar Schwartz states that "the possibility of machine intelligence embodied by von Kempelen's hoax seems to have inspired Babbage to think about machines in entirely new ways." See Oscar Schwartz, "Untold History of AI: When Charles Babbage Played Chess with the Original Mechanical Turk," *IEEE Spectrum* Tech Talk, 2019. https://spectrum.ieee.org/tech-talk/tech-history/dawn-of-electronics/untold-history-of-ai-charles-babbage-and-the-turk. Schaffer also speculates along those lines on Babbage's encounters with automatons. Schaffer, "Babbage's Dancer" (above, n. 1).

3. David Brewster, *Letters on Natural Magic Addressed to Sir Walter Scott*, Bart. Landmarks of Science. (London: J. Murray, 1832).

4. Tom Standage, *The Turk: The Life and Times of the Famous Eighteenth-century Chess-playing Machine* (New York: Walker & Co., 2002).

computing, serving as a science fiction that buttresses the racial and economic logics of computation itself.

It is clear that this figure of the human-inside-the-machine was not just bound to the specific example of the chess-playing automaton, but also animated the technological discourse at large in the late nineteenth century. Here, I would further suggest that such a figuration (if not specifically *this* one) may indeed have been incorporated by Babbage as an important feature of his very conceptualization of the computational. My opening gambit here is that if we were to closely follow this figuration across the history of technology, it may allow us a peek into the messy racial and labor politics at work in the computer as the locus of social and technological relations.

This subjective figuration of a cyber-homunculus appears throughout the nineteenth and twentieth centuries in computer science fictions—and by that I mean both science fiction texts, and the fictions that occur within the practice of science itself—and remains an alien dimension of the scholarship on cybernetics, posthumanism, subjectivity, critical race studies, and critical theory. By cutting diagonally through the histories of technology, culture, and politics, this article identifies this certain cybernetic subject formed by a simple and conceptually impoverished maneuver: one that involves miniaturizing the human and all their social relations with it. In other words, I argue that the computer as a machine requires an imagined cyber-homunculus inside it, and that the idea of a cybernetic machinic intelligence is merely this dislocation of the intellectual labor done by some *Othered* labor force. Instead of proposing a strict historical genealogy per se, this essay instead focuses on the conceptual ramifications of this pervasive, temporally and geographically extended discursive move.

In the first two sections, I take up two transhistorical, roughly temporally successive sketches, following two such homunculi: an automaton, and a demon, in order to parse the conceptual maneuver that repeats again and again—in thought and in practice, in histories of philosophy and technology, in fantastically idealized thought experiments and in pragmatic implementations—namely, imagining a human-inside-the-machine. In the final section, I engage with scholarship around technology, race, and labor to argue that we need to think about our computational technologies via the lens of this laboring cyber-homunculus. In this story, atomization, automation, and outsourcing all turn out to be linked through this Othered figuration. In short, across scientific, artistic, and popular cultural discourses of the last two centuries, the computer comes

with an imagined cyber-homunculus inside the machine. In fact, I argue that the very idea of a cybernetic machinic intelligence is merely a dislocation of the intellectual labor done by some Othered labor force. Such a history necessitates a conceptual framework that considers computation as labor.

Before we embark on this journey, however, I must offer a clarifying note on the terms "figuration" and "homunculus." The term "figuration" has a number of histories that run through Erich Auerbach, Norbert Elias, Jacques Derrida, and Michel Serres, among others. Following Donna Haraway, here I use the term '"figuration" as both a trope—a repeated turn of phrase and idea—and a material presence. Figurations, thus, "are more than props for the imagination."[5] They become "intrinsic to explanations of" our world, and how we end up building it.[6] In my story, the material-semiotic figuration of a cyber-homunculus goes from being imagined in plans and metaphors before the machines are even built to becoming and being a critical part of the physical machine. As I discuss in the second and third sections, this presence inside the machine has enough *matter* to warrant discussion as a proper subject position.[7]

The homunculus in my cyber-homunculus should be seen then in light of this material-semioticity. Though its sticky, cabalistic prehistory stretches back to the Arab scholars of the first millennium, if not to the Greeks of Aristotle's era, the homunculus only shows up fully formed in the literature of early modern Europe. Thinkers around the sixteenth century, such as Paracelsus and Agrippa, posited the (thought) experimental, possible creation of this artificial humanoid: a frequently supernormal servant alchemically made using semen. In calling the figuration that I am studying a cyber-homunculus, I wish to gesture towards, and heuristically bring together, some of its commonly repeated features and characteristics (even if all of

5. Donna J. Haraway, *Crystals, Fabrics, and Fields: Metaphors of Organicism in Twentieth-Century Developmental Biology* (New Haven: Yale U. Press, 1976), p. 41. For more on the uses of the figural, also see Donna J. Haraway, *Modest_Witness@ Second_Millennium. FemaleMan©Meets_OncoMouse™* (New York: Routledge, 1997), pp. 11, 95, 179). Haraway traces this mode of thought back to Eric Auerbach, but a similar claim can be made via, among others, Derrida. See Jacques Derrida and F. C. T. Moore, "White Mythology: Metaphor in the Text of Philosophy." *New Literary History* 6:1 (1974): 5–74.

6. Haraway, *Crystals, Fabrics, and Fields* (above, n. 5), p. 41.

7. My position here echoes Braidotti's discussion of figuration as a "politically informed account of an alternative subjectivity." See Rosi Braidotti, *Nomadic Subjects: Embodiment and Sexual Difference in Contemporary Feminist Theory* (New York: Columbia U. Press, 1994): 1–8.

them may not appear together all the time): its anthropomorphism, diminutiveness, artificiality and machinicity, alterity (which we will see linked to race, gender, and class), (lowly) subjectivity, supernormality, and fictionality.[8] Even its social relations differ occasionally; moving between different distributions of agency, much like the homunculus of Alfred Gell's "homunculus effect," it may show up as the sole imaginative power inside the machine (as in the case of the chess-playing automaton), as one of the many laboring entities (as in Babbage's plans), or both (as the computational daemons I discuss in the second section).[9] Nevertheless, we shall see that historically, parts of computational infrastructure repeatedly are described using the vocabulary surrounding this dehumanized and superhuman cyber-homunculus. As a result, thinking with this figuration of a servant helps us understand the registers of race and labor in the development of computing. But a servant is a historically and socially situated *agent*, and we shall see that this tiny science-fictional being turns out to be quite the handful.

Babbage Needs an Army

Following this cyber-homunculus into a manufactory of figures, in this section I look at a pre-history of computer architecture to argue that from the chess-playing automaton to Babbage's plans for computing, our cyber-homunculus shows up as an uncomfortable, laboring factory worker.[10]

The extension "of power" and "promotion of civilization" that Brewster mentions were no neutral task for the benefit of the whole world. His friend, Charles Babbage, the father of computing, was also

8. Kevin LaGrandeur, who also recruits the golem as one of the ancestors of the homunculus and links them to automatons, has listed most of these qualities in his own terms. See Kevin LaGrandeur, *Androids and Intelligent Networks in Early Modern Literature and Culture: Artificial Slaves* (New York: Routledge, 2013): 48–77.

9. Gell's use of the term "homunculus" comes not via this history of homunculi but through psychology, where he reads it as being a "predictable consequence of our (possibly innate) propensity to attribute 'intentional psychology' to humans, animals, etc." For more, see Alfred Gell, *Art and Agency: An Anthropological Theory* (Oxford: Clarendon Press; New York: Oxford U. Press, 1998): 96–155. For an example of this line of thinking applied to computers, see R. John. Brockmann, "A Homunculus in the Computer?" *Journal of Technical Writing and Communication* 27:2 (April 1997).

10. Computer architecture, for our purposes, is a term for the rules, methods, and plans detailing the internal organization of a computer. Alan Clements, *Principles of Computer Hardware* 4th ed. (Oxford: Oxford U. Press) p. 1. For a masterful account of plans and their situation in the histories of AI and HCI, see Lucy A. Suchman, *Plans and Situated Actions: The Problem of Human-Machine Communication* (Cambridge: Cambridge U. Press, 1987).

the father of the discipline of industrial engineering, a fierce anti-unionist, and a rabid proponent of the British empire. Optimizing a labor force and its physical, mechanical gestures occupied the same register for Babbage as dividing a complex task into simple arithmetic operations that even a not-so-intelligent human could perform.[11] The intellectual crowd(-labor-)sourcing discussed by Babbage and his contemporaries explicitly borrowed from the French mathematician and engineer Gaspard Clair François Marie Riche de Prony's work on producing logarithmic and trigonometric tables for the land administration of French cadastre. De Prony, it should be noted, was himself borrowing this division of labor from Adam Smith's *Wealth of Nations*, having read just the first chapter and claiming that he "could manufacture logarithms as easily as one manufactures pins."[12] "Nineteenth-century European thought was thus preoccupied with labor: with its political and economic interests, its diverse forms of organization, its intrinsic meaning, and its productive potential."[13] And for Babbage, his Analytical Engine "was a political machine with the power to control both the legislative and the executive, . . . literally a mechanical revolution in which control over the process of government would be seized."[14] Per Agar, this machinic materialization of state activity that Babbage had planned was now to perform an explicitly political executif of analysis.

Babbage's intellectual situation, as numerous historians from Simon Schaffer to Jon Agar and Lorraine Daston to Jessica Riskin have demonstrated, effortlessly connected and co-produced a political position on the division of labor with a techno-scientific position on machinic intelligence.[15] A class-based organization of

11. Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy* (London: Penguin UK, 2005): 690–96.

12. See Lorraine Daston, "Calculation and the Division of Labor, 1750–1950." *Bulletin of the German Historical Institute* 62, Spring (2018): 9–30; Matteo Pasquinelli, "The Origins of Marx's General Intellect," *Radical Philosophy* 2.06, Winter 2019.

13. For more on this human motor metaphor in the nineteenth century, see Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: U. California Press, 1992), p. 4.

14. Jon Agar, *The Government Machine: A Revolutionary History of the Computer* (Cambridge, MA: MIT Press, 2003): 19, 41.

15. Jessica Riskin, "The defecating duck, or, the ambiguous origins of artificial life," *Critical Inquiry* 29:4 (2003): 599–633; Lorraine Daston, "Enlightenment calculations," *Critical Inquiry* 21:1 (1994): 182–202; Agar, *The Government Machine* (above, n. 14); Simon Schaffer, "Babbage's Intelligence: Calculating Engines and the Factory System," *Critical Inquiry* 21:1 (1994): 203–27; Schaffer, "Enlightened Automata" (above, n. 1).

mental work in the intellectual logarithmic factory extended and corroborated not only Babbage's political position on social order but also his ideas about the human mind being differentially mechanizable. In the words of Babbage, "from that part executed by the third class, which may almost be termed mechanical, requiring the least knowledge and by far the greatest labor, the first class were entirely exempt . . . the completion of a calculating-engine shall have produced a substitute for the whole of the third section of computers."[16] Much like the Jacquard loom (yet another historical predecessor of the modern computer) that he really admired, these calculating-engines, Babbage's lifelong obsessions (and the contribution to world history that he is known most widely for) were only a substitute for the third-class laborers that were good for nothing, except, of course, third-class labor.[17] Even when they were solving equations, these classed subjects could not escape their class. And if all went well in Babbage's world, they would not even be needed in the future. (Spoiler alert: most of them still were, merely displaced into the Global South.)

What concerns our story here is the entanglement of the following three ideological positions: first, the body-workplace equivalence, which posited that physical and mental labor can be, and should be, divided for capitalist efficiency and that such a division only seeks to optimize "natural" class-based hierarchies that imply the degree of humanness of these individuals; second, the machine-state equivalence, according to which the machine being planned by Babbage was but a materialization of politics, which was much needed if the laborers were to be managed and kept from revolting; and finally, the machine-workplace equivalence, which argued that the automata of this era were physically and logistically similar to the newly emerging devices of industrial automation such as the automatic loom and the Analytical Engine—here, automat(i)ons as hoaxes and/or illusions were extensions of automation as labor displacements.

In other words, the analogies of machine, body, and workshop were developed at the same time as the machine-state equivalence. When considered together, these positions not only foreshadow

16. Charles Babbage, *On the Economy of Machinery and Manufactures* (Cambridge: Cambridge U. Press, 2010), p. 157.

17. "One of the most singular advantages we derive from machinery is in the check which it affords against the inattention, the idleness, or the knavery, of human agents," he writes, not hiding his disdain of these humans. Babbage (above, n. 16), p. 39. See also Laura Otis, *Networking: Communicating with Bodies and Machines in the Nineteenth Century* (U. Michigan Press, 2001), p. 31.

but also pre-figure the cybernetic paradigm that will come a century later. The human-inside-the-machine of the chess-playing automaton—our cyber-homunculus that made the geared, rational mechanism of the automaton imaginable—shows up here as a part of Babbage's machinic plans. As workers in a factory toiled at a machinic apparatus, so did the parts of the machine that Babbage had planned. However, the automaton did not just help people understand the factory system, as Simon Schaffer has suggested.[18] In fact, the success (what an automaton could mimic) and failure (like the chess-playing Turk's need to employ a human) of automatons also pointed towards the success and failure of the factory system and consequently, the success and failure of the (thinking) machines that could not yet be made. Babbage's Analytical Engine was nothing but "a projection of a more perfect factory."[19] Babbage had used the historically situated ideology of his social position that was at hand for him, and imagined the computer as an efficient schema of lower-class laboring bodies.

Consider, for example, Babbage's conversation with Arthur Wellesley, the Duke of Wellington and a strong supporter of the Difference Engine. Here, when trying to explain *how* his machine worked, Babbage asked the Duke to imagine all the machine's parts in motion as being analogous to commanding an army.[20] The "greatest difficulty in contriving this machine," he would write assertively later, was similar to that of a "general commanding a vast army."[21] For Babbage, these networks of control were instantiated by an imagined militarized force of bodies and a scalar inversion of the subject: just as you imagined controlling your soldiers moving in formation, you imagined controlling machine's parts-in-motion. They communicated between them just as the subjects of your empire, as Harold Innis might have said, communicate between them. And these soldiers were always Other, either colored or always already classed. They were subjects imagined to be busy at work, always on the move, from the empire to the factories. And *imagining*—such are the fictions in science—the machinic parts through a figure of miniaturized sol-

18. Schaffer, "Babbage's Dancer" (above, n. 1).

19. Philip Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science* (New York: Cambridge U. Press, 2002), p. 34.

20. Charles Babbage, *The Ninth Bridgewater Treatise: A Fragment* (London: John Murray, Albemarle Street, 1837).

21. Charles Babbage, *Passages from the Life of a Philosopher* (London: Longman, Green, Longman, Roberts, & Green, 1864).

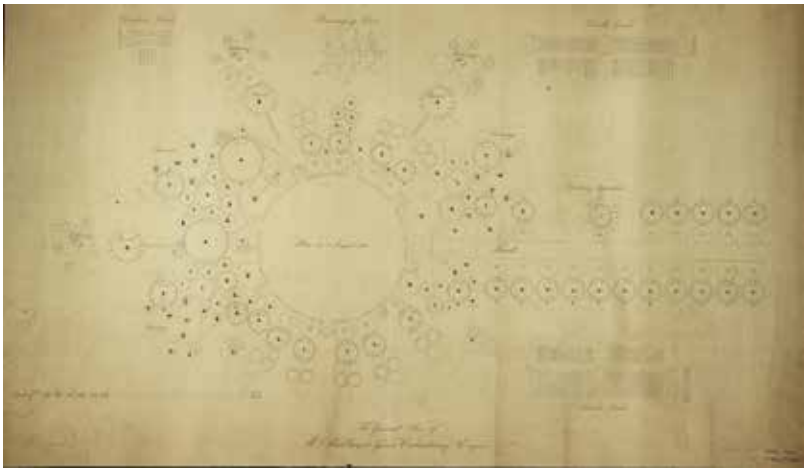

Figure 1. Spatializing the Calculating Engine: Stores, Mills, and Babbage's Plans.

Source: The Babbage Papers at the Science Museum, London (used under creative commons, noncommercial license).

diers worked for his milieu, since the general, of course, was then able to satisfactorily understand Babbage's problems.

This movement that Babbage was starting to trace becomes evident when you see his plans for the Difference Engine, or as Simon Schaffer would call it, a miniature number-processing factory. Titled "A General Plan of Mr. Babbage's Great Calculating Engine, 1840," this image (called Plan 25) lays out a mill in the center-left (the structure around large circular wheels) and a store on the right that extends beyond the sheet. The spatial invocation of a "mill" and a never-ending "store" is not accidental. The word "store," for example, was synonymous with the word "factory" in the East India Company's discourse. And soon, the word "factory" would start to describe workshops at home in Europe.[22] Steeped in the industrial capitalist vocabulary, the economist Babbage conceived of his labor-substituting device in terms of a capitalist factory, so he merely imagined a miniaturized version. This very first cyberspace[23] assumes the genre conventions of an *architectural* plan, with top-view and side-views all rendered in detail as if planning the construction of a miniature spatial order.

22. "And the automata shifted between both these worlds," Schaffer reminds us. Schaffer, "Babbage's Dancer" (above, n. 1).

23. Both as an intellectual precedent of the Gibsonian cyberpunk cyberspace, and as the general control space for cybernetics.

It is clear then, that Babbage, alongside others in his era, saw automata as machines modeled on and operating in the same ways as the increasingly mechanized industrial labor of the nineteenth century. In other words, automata, much like Babbage's Analytical Engine, were tiny microcosms, physically and logistically similar to the newly emerging devices of industrial automation, such as the automatic loom made by Jacques de Vaucanson. Such connections are not unique to Babbage. Even before Babbage, the German polymath G. W. Leibniz had compared labor calculation to the work of slaves.[24] And around the same time as Babbage, the German philosopher-scientist Hermann von Helmholtz commented on the oeuvre of de Vaucanson, the French automaton-and-automation-equipment inventor and inspector of silk manufacture, by describing how slave-like automata that fulfilled "the thousand services required of *one* man" had been succeeded by automation devices performing only *one* service, but in doing so, occupying "the place of a thousand men."[25] The European nobility saw swarms of men everywhere, in armies, factories, bodies, and machines. Automatons, factories, and thinking machines together formed and shaped fundamental questions of labor, humanity, and social order.[26] Babbage's engines, unfortunately for him, were never to be fabricated at the nanoscale. Nevertheless, the subjects had begun to shrink into the machine.

It was this shrinkage that Edgar Allan Poe drew upon when commenting on the Turk automaton in his essay "Maelzel's Chess Player." He suggested that the human inside the machine is in clear physical discomfort, in an "exceedingly painful and awkward position."[27] Now, that was technically not true; the machine seems to have been relatively comfortable to inhabit. Still, even many years later, Walter Benjamin could only start his essay "On the Concept of

24. Gottfried Wilhelm Leibniz, "Machina arithmetica in qua non addition tantum et subtraction sed et multiplication nullo, divisi overo paene nullo animi labore pregantur" (1685), trans. Mark Kormes, in *A Source Book in Mathematics* by David Eugene Smith (New York: McGraw Hill, 1929), p. 181.

25. Hermann von Helmholtz, "On the Interaction of the Natural Forces," in Hermann von Helmholtz, *Science and Culture: Popular and Philosophical Essays*, ed. David Cahan (Chicago: U. Chicago Press, 1995), p. 19 (lecture delivered Feb. 7, 1854, at Königsberg).

26. Schaffer, "Enlightened Automata" (above, n. 1). See also William Sewel, "Visions of Labor: Illustrations of the Mechanical Arts Before, In, and After Diderot's Encyclopédie"; and Cynthia J. Koepp, "The Alphabetical Order: Work In Diderot's Encyclopédie" in *Work in France: Place, Practice, Organization, and Meaning*, ed. Steven Kaplan and Cynthia Koepp (Ithaca: Cornell U. Press, 1986): 258–86.

27. Edgar Allan Poe, "Maelzel's Chess-Player." *Southern Literary Messenger* 2:5 (1836): 318–26.

History" with a statement about the hunchbacked dwarf inside the machine.[28] Let us consider this odd pattern. When they look at the chess-playing automaton, both Poe and Benjamin see a contorted, abnormal body inside, despite little evidence backing their hunch. Where Poe sees a human painfully compressed at work, Benjamin sees a hunchbacked dwarf, and yet others in popular discourse saw other Others: midgets, legless men, children, even monkeys. I read Poe's and Benjamin's subtle ethical rhetorics as an index of the contortions of labor in Babbage's era, where laborers were increasingly forced to adapt to the machine of capital, which exhausted and maimed them. In other words, the relationship between bodies *and* machines was being viewed as, and refracted through, the bodies *in* machines.

The automaton's Turkish attire, and the fact that it was called a Turk (as a German colloquialism for "counterfeit" that emerged in a politically charged atmosphere of the Austrian court of that era) have been studied by Bernard Geoghegan as an occasion for the inauguration of alterity script, a performative pattern that uses the image of a Turk from the Orient to bring into relief the Western, rationalist mechanism of gears within the automaton.[29] Following Geoghegan, who focuses on the theatricality of the Orientalized depiction in this story, I wish to note that the peculiar pattern, exemplified by Poe and Benjamin, of seeing alterity inside the machine suggests the presence of the aforementioned cyber-homuncular figuration, where alterity shows up on the surface but also, in its Derridean other, *within* the machine. In other words, the theatricality of alterity of the Turk, I argue, merely obscured the alterity of the (imagined-to-be-contorted) worker within.[30] The operational

28. Walter Benjamin, "On the Concept of History," in Walter Benjamin, Marcus P. Bullock, and Michael W. Jennings. *Selected Writings, vol. 4*. (Cambridge, MA: Belknap, Harvard U. Press, 1996), p. 389.

29. Bernard Dionysius Geoghegan, "Orientalism and Informatics: Alterity from the Chess-Playing Turk to Amazon's Mechanical Turk." *Ex-position*, 43 (June 2020): 45–90. For a very different take on politics and digital media through the question of unconscious, see Lydia H. Liu, *The Freudian Robot: Digital Media and the Future of the Unconscious* (Chicago: U. Chicago Press, 2010.)

30. For more scholarship along this line of thinking, see Ayhan Ayteş, "The 'Other' in the Machine: Oriental Automata and the Mechanization of the Mind." PhD diss., UC San Diego, 2012; Ayhan Aytes, "Return of the Crowds: Mechanical Turk and Neoliberal States of Exception" in *Digital Labor*, ed. Trebor Scholz (New York: Routledge, 2013); David Golumbia, "The Amazonization of Everything," *Jacobin*, Aug. 5, 2015; Edward Jones-Imhotep, "The Ghost Factories: Histories of Automata and Artificial Life," *History and Technology* 36:1 (2020): 3–29. In a different context, see also, Lucy Suchman, "Configuring the other: Sensing war through immersive simulation," *Catalyst: Feminism, Theory, Technoscience* 2, no. 1 (2016): 1-36.

mechanics of the design of the automaton were epistemologically similar to those of Babbage's machines insofar as they both harbored homuncular figurations. The chess-playing automaton's cyber-homunculus was an anthropomorphic entity (a human) that was sometimes diminutive (as a dwarf) and sometimes merely an-other (as a pained worker or child), machinic in its actions (after all, he sits there instead of the imagined gears and mechanics of rationality) and supernormal in its chess-playing-feats, while the cyber-homunculus of Babbage's world (that entangled Analytical Engine and industrial capitalism) was an anthropomorphic entity (a human worker or an army man), who was an-other through their naturalized class–based subject position, machinic in their actions (the regularity of a worker's motion in a factory or the roboticism of a soldier of the British empire) and fictional (both in Babbage's metaphors and insofar as his most ambitious plans were not implemented materially in his lifetime). Such similarities—metaphorical, historical, and material—in conceptualizing (and implementing) the inner world of machinery shall reappear throughout this essay.

It should be noted that three different phenomena appear to be interlinked in this history: atomization (breaking down a task into smaller units), automation (transferring the task from a human laborer to a machine), and outsourcing (transferring a task from one human laborer to another, usually in a worse social position than the original laborer). It is my contention that all three phenomena here must be read as being entangled in origin. Historically, they emerge in the same phase of industrial-colonial-capitalist expansion. Epistemologically, they trace their origins in the same conceptual maneuver that births a cyber-homunculus. The key operation, in this case, is the devaluation of labor according to one's socioeconomic subject position. The rational positioning of an automaton while its worker is being contorted and hidden, the insistence that third-grade laborers can and should have their work done by a machine, and the fluid chains of labor supply plugged into cheap colonies that contained an Othered, subjugated population are all functional cognates. The cyber-homunculus, in this light, is a figure of thought that makes possible these epistemic moves across scales and sites. In this world, because the working class of London is devalued (De Prony and Babbage's atomization), armies (the laboring ones inside the store of a thinking machine and the ones stationed in East India Company's storehouses to ensure a regular supply of surplus value in the colonies) can be used to replace it. Furthermore, the line distinguishing the idea of a machine with one person inside it (like the automaton) and the idea of a machine as a factory with multiple

laboring subjects inside it (like Babbage's engine) is quite porous, both historically and logically. The laboring subject needed to be miniaturized and stowed away, his body compressed: by nature (in Benjamin's reading) or by the machine (in Poe's deduction).[31] The worker was squeezed, both literally and figuratively, and captured by the machine.

Meanwhile, let us briefly return to the (post-)history of the chess-playing automaton. The most prominent namesakes of the Turk today all feed into the aforementioned pool of discourse that considers the literal and figurative compression of workers, thereby keeping the lingering material-and-cultural memory of this automaton alive.

There is, of course, Amazon's Mechanical Turk—an online platform that distributes complex tasks to cheap, precarious labor from around the world—proving that Babbage's dream of eliminating the third-class of labor proved to be a hard task in itself.[32] This has been the case not just because Babbage's machine ran into issues of materiality and was never accomplished in object, as Matthew Jones points out, but also because while Babbage imagined certain routine tasks to be "mechanical," most of those tasks, unlike calculation, didn't end up being "routine" or "mechanical."[33] Precisely these tasks that are done by lower-class, low-wage workers (driving, classifying, data entry, etc.) remain the toughest to automate, as labor histories of textile and electronics industries show.[34] Even when AI systems get better at some basic pattern recognition task, they do so by standing on the shoulders of a number of laborers who label, classify, train, and perform other small tasks that were initially thought to be easily mechanized by computer systems. In using the name Mechanical Turk, Amazon winkingly acknowledges the impossibility of truly au-

31. Another related version of this oppression is, of course, Michel Foucault's work on the historically situated disciplining of the laboring body. His comments on man-a-machine ("L'Homme-machine," a concept he was borrowing from Offray de La Mettrie) mention already the role of automata as "political puppets, small-scale models of power." Michel Foucault, *Discipline and Punish: The Birth of the Prison*, (London: Allen Lane, 1977), p. 136.

32. For more on labor and colonial politics of Amazon's Mechanical Turk, see Lilly Irani, "Difference and Dependence among Digital Workers: The Case of Amazon Mechanical Turk," *South Atlantic Quarterly* 114:1 (2015): 225–34.

33. Babbage, *On the Economy of Machinery* (above, n. 16); Matthew L. Jones, *Reckoning with Matter: Calculating Machines, Innovation, and Thinking about Thinking from Pascal to Babbage* (Chicago: U. Chicago Press, 2016).

34. See Ellen Israel Rosen, *Making Sweatshops: The Globalization of the US Apparel Industry* (Oakland: U. California Press, 2002); Jefferson Cowie, *Capital Moves: RCA's Seventy-Year Quest for Cheap Labour* (Ithaca: Cornell U. Press, 1999).

tomating low-wage labor, and instead offers a platform that allows a user to hide thousands of humans inside your machine, *as if* they were part of its mechanism. Ironically, the actions involved in Babbage's first-class labor might be most susceptible to automatization; managerial work, for example, has proven to be far more expendable in the recent history of algorithmic governance.[35]

It is clear then, that the social construction of the categories of labor for automation was nothing but a theoretical performance justifying and reproducing the bourgeoisie ideology. There was little evidence that "lower-function" (hence lower-wage) labor could all be successfully mechanized; after all, several attempts at simulating basic bodily functions in automatons turned out to be illusions. What was at stake, for Babbage's company, was the naturalization of certain beliefs about labor, technology, power, and rationality of the human. These social and political positions needed to be constructed along with the newly imagined technologies, and the cyber-homunculus was a convenient mediator. The very "invention" of the thinking machine, a computer, created and was created by this particular social and political order.

I'll end this section by also briefly mentioning a long tradition in science fiction of machinic-characters resembling the man inside the machine. From Edgar Allan Poe to Cory Doctorow (author of *For the Win*), sf has always been reflecting and bouncing back a fiction that already exists in computer science. This account emphasizes that Amazon's Mechanical Turk and the science-fictional figure may be different sides of the same coin, for, as the story of the automaton shows, one's occluded labor allows the Other's very conception to happen. And both find themselves squeezed into tiny boxes.

Many years later, when Alan Turing was conceiving of "a machine to do the work of this computer," he made a tautological move that

35. For more on algorithmic management, see Alex Rosenblat and Luke Stark, "Algorithmic Labor and Information Asymmetries: A Case Study of Uber's Drivers" *International Journal of Communication* 10 (July 2016): p. 27; Min Kyung Lee, Daniel Kusbit, Evan Metsky, and Laura Dabbish, "Working with machines: The impact of algorithmic and data-driven management on human workers." In *Proceedings of the 33rd annual ACM conference on human factors in computing systems* (2015) pp. 1603–12. For more general accounts from the field of economics, see Morgan R. Frank, David Autor, James E. Bessen, Erik Brynjolfsson, Manuel Cebrian, David J. Deming, Maryann Feldman, et al. "Toward understanding the impact of artificial intelligence on labor." *Proceedings of the National Academy of Sciences* 116:14 (2019): 6531–39; David H. Autor, "Why are there still so many jobs? The history and future of workplace automation." *Journal of Economic Perspectives* 29:3 (2015): 3–30.

never disguised its purpose, *work*.[36] In the words of Jon Agar, Turing's paper "can be read, indeed should be read, as being informed [and even framed] by the organization of civil service 'machines.'"[37] In Turing's own account later, clerks—already mechanical beings who work "without understanding"—could clearly be subsumed by the machines that solve similar problems. Here we see a political throughline in British history from Babbage—whose "gaze was designed to produce the rational order it purported to discover" and in whose milieu, '"to make machines look intelligent it was necessary that the sources of their power, the labour force which surrounded and ran them, be rendered invisible"—to Turing, who, per Agar, should be read as the representative figure for a "Generalist-Mechanical Bureaucracy."[38] Thus, this history of artificial intelligence, which is a history of artificializing intelligence, is also a history of labor practices, as well as the history of atomization whereby simple operations are performed monotonously (and repetitively) by the workforce at the bottom of the economic hierarchy.

The figuration of a tiny being inside-the-machine adapted and survived the cybernetic implementation and came to be embedded, very materially, in our digital systems. The following section is another transhistorical example of this miniaturization and requires building another parallel narrative. Perhaps, following in the wake of a demon might lead us down some paths that we will not walk alone.

Fictions Become Science

In 1867, the Scottish physicist James Clerk Maxwell came up with a thoroughly science-fictional thought experiment. What if an imagined tiny demon were able to upset the rules of entropy by selectively manning a tiny door between two chambers full of gas? This fictional character, entangled by a graphical pun between a valve and value, as Colin Milburn has pointed out, then makes a journey from physics to information sciences over the next century or so.[39] By

36. Alan Mathison Turing, "On computable numbers, with an application to the Entscheidungsproblem." *Proceedings of the London Mathematical Society* 2:1 (1937): 230–65; Alan Mathison Turing, "Proposed Electronic Calculator" in B. J. Copeland, *Alan Turing's Automatic Computing Engine* (Oxford: Oxford U. Press, 2005): 369–454.

37. Agar, *The Government Machine* (above, n. 14), pp. 19, 22.

38. Schaffer, "Babbage's Intelligence" (above, n. 15); Agar, *The Government Machine* (above, n. 14): p. 22.

39. Colin N. Milburn, *Mondo Nano: Fun and Games in the World of Digital Matter* (Durham, NC: Duke U. Press, 2015): p. 256.

the time cybernetic visions of a digital computer were starting to get materialized in ENIAC and EDVAC, the science fictional entity that was Maxwell's demon had become, for all practical and theoretical purposes, *the* producer (and the general processor) of information.[40] For the birth of the digital computer as we know it, the epistemic (and epistemological) conditions that were necessary included a microscopic demonic subject that could allow for information to be endowed with entropic, yet materially ambiguous, qualities.[41]

The demon even makes a brief cameo in early neural networks, the technology most prevalent in contemporary AI systems, through Oliver Selfridge's pan*demon*ium architecture, which elucidated a hierarchy of demons, groups of McCulloch-Pitt neurons, named image demon, feature demons, cognitive demons, and decision demon, with each layer working at a separate image-recognition stage.[42] Selfridge's work shows how the demon was starting to become indistinguishable from any imagined subject that could make a lowly decision. His plans for a "demoniac assembly" that could computationally recognize letters from an image relied on a division of labor wherein the task is broken into constituent units and democratic decisions reassembled at each successive hierarchical stage. So, for example, at the bottom are his data demons that "serve merely" to store and transmit data; their aggregated results are used by computational demons to identify patterns. Selfridge's "screaming chorus" of neurons-as-servants is a shockingly cacophonous representation of artificial intelligence animated by anthropomorphic entities trying to compete with each other. The "demonic assembly" is less a legislative assembly of elders and more a scene from the cutthroat corporate world.

It is worth briefly pondering the alterity of these demons. Peter Galison has already identified a cybernetic subject position relevant to our story, emphatically claiming that a certain cybernetic Other was/is nothing like a racialized Other. Galison instead identifies a mechanized Enemy Other that was forged in laboratories of the

40. N. Katherine Hayles, *Chaos Bound: Orderly Disorder in Contemporary Literature and Science* (Ithaca, NY: Cornell U. Press, 2018), p. 7.

41. N. Katherine. Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: U. Chicago Press, 2008).

42. Oliver Selfridge, "Pandemonium: A Paradigm for Learning." In *Mechanisation of Thought Processes: Proceedings of a Symposium Held at the National Physical Laboratory on 24th, 25th, 26th and 27th November 1958* (London: Her Majesty's Stationery Office, 1959), pp. 511– 29. See also Joseph Dumit, "Plastic Diagrams: Circuits in the Brain and How They Got There." In *Plasticity and Pathology: On the Formation of the Neural Subject*, ed. David Bates and Nima Bassiri (NY: Fordham U. Press, 2016): 227–28; Théo Lepage-Richer, "Adversariality in Machine Learning Systems: On Neural Networks and the Limits of Knowledge." In *The Cultural Life of Machine Learning*, ed. Jonathan Roberge and Michael Castelle (Cham, Switzerland: Palgrave MacMillan, 2021): 197-225.

early and mid twentieth century. Thinking with Wiener's comments about airplanes inhabited with gremlins, he suggests that "the cybernetic Other is not negatively contrasted with us" but is instead an implacable, naturalized-yet-technologized entity "grounded in the design and manufacture of wartime servomechanisms and extended, in the ultimate [somewhat metaphysical] generalization, to a universe of black-box monads."[43] I suggest that the figuration of cyber-homunculus, insofar as it is connected with Galison's story, suggests that the Othering is nonetheless racialized via a slightly more *circuitous* route. The imagined gremlin, or the "perfectly intelligent, perfectly ruthless" mechanical operator, hints at the politics of the entangled human-technical systems that our cyber-homunculus inhabits. Through this history of imagined operators of technical apparatuses, we must resituate the question of this perfect operator. Why is this entity operating? What for? In attaching the question to a question of work and labor then, as I suggest, the cybernetic Other in its constituent units emerges as a tiny being[44] that is necessarily working in the service of a *system*. How the theorist Norbert Wiener understands the abstract Other in its macro-emergent-entirety is merely the surface level effect of the micro cyber-homunculus that, as Wiener himself suggests playfully, can be considered a living phenomenon but only if the rhetoric is shifted to the *work* we make our language do.[45] In the same text, the displacement of labor is clearly front and center, and Wiener states that "the automatic machine, whatever we think of any feelings it may have or may not have, is the precise economic equivalent of slave labor. Any labor which competes with slave labor must accept the economic conditions of slave labor."[46] Such a Marxist statement[47] contains within it the racialization of the automatic machine via its comparison with the robotic slave.[48] Thus, the demonic racialization that clearly escapes

43. Peter Galison, "The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision." *Critical Inquiry* 21:1 (1994): 264–65.

44. And Galison's own reading of Wiener's use of Leibniz's conception of monads hints at this very scalar undertone.

45. Wiener quotes Humpty Dumpty here: "I pay them extra, and make them do what I want." See Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society* (Boston: Da Capo Press, 1988), p. 32.

46. Ibid., p. 162.

47. It is worth noting that slaves, for example, were not "employed," and so in Marx's technical definition they were merely "living labor machine[s]," closer to technical implements than they were to wage-laborers. Marx, *Grundrisse* (above, n. 11), p. 465.

48. It must be remembered that Maxwell's demon was never morally neutral. As Matthew Stanley shows in his study of the theological implications of Maxwell's demons, Maxwell considered the human-machine equivalence a merely analytical choice. Mat-

the cybernetic Other nevertheless implicitly makes its way at the level of the cyber-homunculus. As I suggested previously, for a bourgeoisie industrial economist, imagining armies in a colonial era is not, after all, imagining an army of others like oneself. Labor is not evenly distributed in the world. Here, the mechanized Other cannot be imagined without the history of mechanization, Taylorist and Fordist aspirations, and the rise of industrial capitalism. The cyber-homunculus needs to be belittled, and cyclically, those who are belittled can/must be imagined as the cyber-homunculus. Whether or not it was vilified or racialized explicitly, the demon nevertheless always needed to get to work for someone.

Meanwhile, the figuration continued its march in first and second order cybernetics and history of computing in a number of forms. In 1963, for example, in MIT's laboratories working on DARPA funded projects, efforts were on to create the very first computational network. Project Mathematics and Computation (MAC), was perhaps "the world's first online community, complete with online bulletin boards, email, virtual friendships, a cloud, an open-source software exchange—and hackers": a thoroughly technogenic world that needed workers.[49] So, the word daemon was adopted from thermodynamics and information theory to denote a tiny being that did the maintenance work inside the machine. Fernando José Corbató, a founding member of the team, later would look back on this development as a way of finding vocabulary that would "describe background processes which worked *tirelessly* to perform system *chores*" (emphasis added).[50] These daemonic processes were, in the words of Wendy Chun, "slaves that work[ed] tirelessly and, like all slaves, define[d] and challenge[d] the position of the master."[51] MAC's creation of the "user" as a new category of subjectivity was tied with the move away from waged labor towards immaterial labor, as Tung-Hui Hu has suggested.[52] And in this world, the daemon was both a maintenance service and a personal server, for the imagined subject inside the machine that was creating the subject of user outside it. The term daemon was adopted by UNIX soon after, to refer to background

thew Stanley, *Huxley's Church and Maxwell's Demon: From Theistic Science to Naturalistic Science* (Chicago: U. Chicago Press, 2015), p. 239.

49. Defense Advanced Research Projects Agency. Accessed Jan. 30, 2020. https://www.darpa.mil/about-us/timeline/project-mac.

50. *Take Our Word For It* 129, n.d. http://www.takeourword.com/TOW129/page2.html; The Origin of the Word Daemon. Accessed Jan. 30, 2020. http://ei.cs.vt.edu/~history/Daemon.html.

51. Wendy Hui Kyong Chun, *Programmed Visions: Software and Memory* (Cambridge, MA: MIT Press, 2011), p. 89.

52. Tung-Hui Hu, *A Prehistory of the Cloud* (Cambridge, MA: MIT Press, 2015).

processes, the obfuscation of which allows the user to become the "source" of the action.[53] In other words, the plan for computational systems encodes intersubjectivities, co-creating the status of the servant-program on one hand and the master-subject, who does not need to even know about its existence, on the other.

Not long after, these demons made their way into internet infrastructures, as Fenwick McKelvey has well explored.[54] In this history, all the terms used for these demonic entities are, unsurprisingly, as labor-based as they come: service, started task, and ghost job. If a job needs to be done somewhere, then surely a ghost (in the machine) can be recruited to do it. An excellent representation of these labor dynamics shows up through the media depictions of the BSD (a Unix-based operating system called Berkeley Software Distribution) daemon nicknamed Beastie,[55] frequently shown in popular images as doing all the work you may imagine: he carries a trident that shows his ability to fork (or divide) processes, he carries a hammer and a forklift to do the menial tasks when needed, he reads a lot and helps you guide the insane world of Unix documentation (even his tail and trident read!), and if you need, he'll be your personal server, like a waiter at a restaurant, bringing you informational content, CDs, and drinks.

There are so many of these demons, in so many variants. It has appeared with a halo, as a guardian angel, but also has been a part of law enforcement, showing up as a police officer in OpenBSD 2.5.[56] Harkening back to Charles Babbage's factory inside a machine, several of them even appear in the single image as (probably low-wage) maintenance workers.[57] "As a rule, UNIX systems seem to be infested with both daemons and demons."[58] The same can be said of all our networks today, since the concept of demons in digital network communications works along those very same lines: they maintain, you disrupt, they do our dirty jobs and ask nothing of us in return. How convenient!

Even outside computer science proper, cybernetics continued

53. Wendy Hui Kyong Chun, "On 'Sourcery,' or Code as Fetish." *Configurations* 16:3 (2008): 299–324.

54. Fenwick McKelvey, *Internet Daemons: Digital Communications Possessed* (Minneapolis: U. Minnesota Press, 2018).

55. Comic artist Phil Foglio was the first to draw the daemon, while the Lucasfilm animator John Lasseter made its popular version later.

56. https://www.openbsd.org/25.html. For more, see https://www.freebsd.org/art/.

57. See https://www.mckusick.com/beastie/shirts/usenix.html.

58. Evi Nemeth, Garth Snyder, Scott Seebass, and Trent Hein. *UNIX System Administration Handbook* (New York: Pearson Education, 2000), p. 403.

Figure 2. Living with our Daemons: Menial Labor Inside the Machine.

Image by Poul-Henning Kamp (used under Beerware License, Revision 42).[1]

1. The file is licenced under Revision 42 of the Beerware Licence. Poul-Henning Kamp wrote this file. As long as you retain this notice you can do whatever you want with this stuff. If we meet some day, and you think this stuff is worth it, you can buy Poul-Henning Kamp a beer in return.

its obsession with such cyber-homunculi. The demon, in a "post-computational phase of his career" leaped from computational systems to become the very location of thought.[59] Heinz von Foerster, the Austrian American physicist who was one of the members of the Macy conferences (and a close associate of McCulloch, Wiener, and von Neumann), used this figuration to posit internal and external demons that could work at the structural heart of self-organizing systems. Von Foerster saw his demons as "being manifest in some of the intrinsic structural properties of these elements [of self-organizing systems]." Disappointed that his science fictional entities did not labor enough, he bemoaned "that today these fellows don't come as good as they used to come." His *demonology* is explicit about the labor politics of his writing: he doesn't want them to remain "lazy" for too long, and knows that if his "two [employed] demons are *permitted* to work together, they will have a disproportionately easier life."[60] In the end, putting a nice liberal bowtie on his elaboration of the "noise from order" principle, he forgets his own excesses and conveniently thanks his demons. Whether they would like to thank him back or not is left for the reader to decide.

If science is in dire need of these tiny servants, then science fiction can do no better without them.[61] As a final location for proving the

59. Bruce Clarke and Mark Hansen. *Emergence and Embodiment: New Essays in Second-order Systems Theory* (Durham, NC: Duke U. Press, 2009), p. 43.

60. Heinz Von Foerster, "On self-organizing systems and their environments," in *Understanding Understanding* (New York: Springer, 2003): 1–19.

61. Jimena Canales and Markus Krajewski, "Little helpers. About demons, angels and other servants." *Interdisciplinary Science Reviews* 37:4 (2012): 314–31; Jimena Canales,

historical situation of the cyber-homunculus, I gesture to science fictional narratives and suggest a longer trajectory of speculative thought, where the technical homunculus shows up repeatedly.[62] From Robert A. Heinlein's 1942 short story *Waldo* to Steven Lisberger's 1982 film *Tron*, numerous science fictional tales about the posthuman only make sense with the presence of imagined subjects that are tiny and perform significant work, narratively, economically, and conceptually. The DataSoft game for Atari 800, *Maxwell's Demon* (1982), is a literal reading of this very work, and you are expected to play (as) the demon. In Thomas Pynchon's *Crying of Lot 49*, to take a prominent example, the daemon is a central diegetic fiction, one whose sorting capacities make it stand in not just for the protagonist Oedipa Mass's own quest to separate fact from paranoia, but also for the new apophenic, postmodern regimes of (dis)information at large. The same strand (cleaving closely from the program daemons in computer science and networks) also is scattered all throughout cyberpunk novels: for example, Neal Stephenson's 1992 text *Snow Crash* and Greg Egan's 1994 novel *Permutation City* both have daemons maintaining their virtual realities, while Daniel Suarez's 2006 *Daemon* (as well as its 2010 sequel *Freedom*) merges the maintainer and the sinister valences of the word together into a daemon program run amok because it was assigned a task by its creator. The prevalence of these science fictional narratives (and their interrelations) suffices to show here that the cyber-homunculus is as well and alive in popular fiction as in technoscientific speculations; one might even argue that it performs significant work for both, and is in turn well fed by the interplay between the two.

This demon (along with all its friends: the artificial neurons, UNIX demons, the man with the bowler hat, etc.) is a mediating figure in the history of technology[63] but also is a figure that links this history

Bedeviled: A Shadow History of Demons in Science (Princeton, NJ: Princeton U. Press, 2020). See also: Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton, NJ: Princeton U. Press, 1986); Léon Brillouin, "Maxwell's Demon Cannot Operate: Information and Entropy. I." *Journal of Applied Physics* 22 (1951): 334–37.

62. For a related analysis of famous men (and Donna Haraway) and their androids in fiction, see Sarah L. Higley, "The Legend of the Learned Man's Android," in *Essays in Honor of Russell Peck*, ed. Thomas Hahn and Alan Lupack (Woodbridge, Suffolk: Boydell & Brewer, 1997).

63. Much like what Markus Krawjeski has shown for the generic category of "servers," of which this demon is a specific instance. Markus Krajewski, *The Server: A Media History from the Present to the Baroque* (New Haven: Yale U. Press, 2018).

with a history of labor and subjectivity. They are sometimes all the same demons that manifest differently according to the disciplinary framework in which they are mobilized; other times they are constantly transformed and reformulated as epistemic virtues evolve, while transforming and reformulating epistemic virtues themselves with their (purported) material-discursive agency. This figuration can also be used to further think with these demonic entities that, at different moments in time, seed and supplement scientific/technological discourses, as the final section of this essay will show.

We all need to make sure to not reduce this demon to a valve, and as such, to value him. With this history in mind, we can now chart the conceptual implications of this cyber-homuncular presence in computational and para-computational discourse. In the next section, re-animating some of the questions that I had pinned, I offer two interrelated registers of discussion that are enriched by the aforementioned homuncular history: posthuman subjectivity, and racialization and technological labor. This valuation of the homuncular leads us to necessarily contend with questions of valuation in the broadest sense of political-economic thought, and it is clear that at all scales, the logic of computation is the logic of labor.

Living with a Homunculus

In this essay, I have specifically chosen a broad history of computing as my analytical framework because it inhabits the rich intersection of notions of machinic intelligence, technological development, and automation. But any Marxist scholar of mechanization (and Charles Babbage) could easily attest to the fact that *all* problems of automation are essentially problems of displacement of labor, as the development of machines in order to replace human workers is well documented and theorized throughout the history of Marxist thought.[64] Our cyber-homuncular history merely provides a glimpse of *how* that automation comes to be ideologically.

As I have shown, the figuration of the cyber homunculus, the human or humanoid subject laboring in miniature within our machines, is pervasive across scientific, literary, and popular cultural discourses, as exemplified by the computer science fictions that I followed across disciplinary boundaries. Methodologically speaking, it is my contention that cultural and philosophical understandings of media technologies gain both depth and breadth through this critical mode of studying figurations (both figural and figurative). One of the hallmarks of literary studies is to follow tropes across genres and

64. For a compelling overview of the automation discourse, and the problems with it, see Aaron Benanav, "Automation and the Future of Work." *New Left Review* 119 (2019).

histories, and here I have been adapting these literary methods by bringing histories and theories of science and technology to bear on texts that already engage in cultural pathways and understandings of technoscience.

If one were to identify the genre of this cyber-homunculus's story, it would perhaps be tagged as a reification tale. Reification, in Marxist terms, is the "act (or result of the act) of transforming human properties, relations, and actions into properties, relations, and actions of man-produced things that have become independent (and are imagined as originally independent) of man and govern his life."[65] In reification tales, living labor becomes dead labor, and the human social relations become objectified and are then conceived of as static facts, untethered from their originary conditions of production. The *object*-ification that is unique to our tale is the cyber-homuncular mode of miniaturization.

Miniaturization can be defined as a specific form of reification wherein some macro-level social relations are imagined to be diagrammatically operating *as such* at a smaller scale in a man-made object. Effected through metaphors, figurations, diagrams, and other semiotic orders of planning before materialization, miniaturization is a somewhat simplistic, blatant, and ruthless mode of naturalizing certain ideological positions. These rhetorical maneuvers (metaphors, figurations, diagrams, etc.) can all be said to together embody a certain diagrammatic mode of operation, one where visual and graphical semiotic markers indexing a map of power instead show up as neutral linguistic guides. For example, the idea that machines perform repetitive, *low* work might at first seem innocuous to us today; only after we closely analyze the historical and political genealogies of such a claim do we see the ideologies at work in the language and graphs mapping this certain lowly subject position as a political act.[66] Seen in this light, then, the spatialized plans for a computer over the last 150 years show themselves to be miniaturized

65. Gajo Petrović, "Reification," *A Dictionary of Marxist Thought*, ed. T. Bottomore, L. Harris, V. G. Kiernan, R. Miliband (Cambridge, MA: Harvard U. Press, 1983): 411–13. For more on reification, see Georg Lukács, "Reification and the Consciousness of the Proletariat," *History and Class Consciousness* (London: Merlin Press, 1967); Max Horkheimer and Theodor W. Adorno, *Dialectic of Enlightenment*, trans. John Cumming (New York: Continuum, 1972).

66. Even when conventionally understood diagrams are not being explicitly drawn in our story, the said metaphors are diagrammatic insofar as they encode and enlist certain strategies and dynamics of (political) power. For more, see D. N. Rodowick, quoted in Greg Elmer, "A Diagram of Panoptic Surveillance." *New Media & Society* 5:2 (June 1, 2003): p. 238; Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: U. Minnesota Press, 1987), p. 141.

battlefields and workshops (Babbage), administrative offices (Turing), assemblies (Selfridge), laboratories and/as universe (Wiener), and maintenance workplaces (UNIX and internet daemons). These particular sites—which lie along the lines formed when I connect the dots with racialization later in this section—show further evidence of why—and here I build on Matthew Hockenberry's observation—the fact that "the 'floorplan' was a name for organizing the sections of the slave ship as well as the designs of the integrated circuit" is actually no coincidence at all.[67] In this fundamental operation naturalizing diminution, the use of the word "miniaturization" in (micro) electronics and related phenomenon such as Moore's law, then, only shows up as a second-order effect.

To refract miniaturization back into a realm of comprehension, if not to de-reify it, we must historicize moments wherein such a miniaturization came to be. For example, one can very well ask: Could we have imagined different computers at any point in the past? If the social relations of nineteenth-century England were radically different, would these thinking machines have been imagined differently, if they were imagined at all? And who is the "we" imagining these computers? Would a factory worker have forged a machine that denigrated their work, encoded their subject position as being lowly, and stifled the possibility of political collective action? Likely not, and one can depart from that assumption by asking what other forms of machinic intelligence can be imagined. But I will leave some of these alternate histories, thought experiments, speculative fabulations, and critical makings for the reader. What I do wish to highlight here is that these reifications create historical inflection points, some of which I have considered in this piece, that can help us speculatively imagine alternate machines, or even the absences of our machines. The very specific nineteenth-century social relations and ideas of division of labor were not only encoded into plans for computing, but also were/are imagined having independent, even apolitical (as progressivist versions of history narrate) existences.

But it did not have to be this way. Feminist and Marxist science and technology studies (STS) has been, for decades, pondering questions like these by exploring the interconnections between computational cultures and social relations that give rise to (and sustain) them. Histories show automatons and homunculi all having been polluted, and constituted, by the taint of gendered and

67. Matthew Hockenberry, "Techniques of Assembly: Logistical Media and the (Supply) Chaîne Opératoire," *Amodern* 9 (April 2020). For a different take on microelectronics and politics, see Andrew Lison, "Toward a Theory of 100% Utilization," *Configurations* 28, no. 4 (2020): 491-519.

racialized violence.[68] Haraway's "A Manifesto for Cyborgs," the epicenter of cyborg scholarship of the 1990s, is all about the elision of women of color around the world that makes cybernetic technology possible.[69] In the same vein, the recent spate of scholarship that focuses on the unequally laborious underpinnings of contemporary computational cultures offers us one explanation for how computation appears effortless. Digital culture today operates on a model that obscures the technopolitics of our zeitgeist by occluding the labor performed (frequently in the Global South) in content moderation, dataset training for machine learning systems, and outsourced programming practices.[70] But the protagonists of our reification tale offer us a prehistory of these labor displacements. As discussed in the first section, from the point of view of the Othered cyber-homunculus, the history of atomization, automation, and outsourcing appears to be co-terminally originating in nineteenth-century England. There are, of course, clear legal and geopolitical disruptions in a seamless flow between atomization, automation, and outsourcing, but they are nevertheless epistemologically entangled, and the devaluation involved in the very birth of cyber-homunculus is precisely what entangles these three modes of violence. After all, before the computational outsourcing to the Global South, there was outsourcing to the computer. And it is here that cyber-homunculi were made to take over the work from real-life humans. The first objectification of social relations happens in the production of the machine, the second happens atop it once it is operated to produce and use global labor differentially.

In its most ambitious form, an argument about the cyber-homuncular figurations can move beyond just the operations of the machine, as Katherine Hayles's argument does when it identifies

68. M. Norton Wise, "The gender of automata in Victorian Britain," *Genesis Redux: Essays in the History and Philosophy of Artificial Life*, ed. Jennifer Riskin (Chicago: U. Chicago Press, 2007): 163–95; William R. Newman, "The Homunculus and the Mandrake: Art Aiding Nature versus Art Faking Nature," *Genesis Redux*, 123–28.

69. Donna J. Haraway, "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s," *Socialist Review* 15:2 (1985): 65–107.

70. As pointed out by numerous scholars. For more, see Sarah T. Roberts, *Behind the Screen: Content Moderation in the Shadows of Social Media* (New Haven: Yale U. Press, 2019); Lisa Nakamura, "Indigenous Circuits: Navajo Women and the Racialization of Early Electronic Manufacture," *American Quarterly* 66:4 (2014): 919–41; Jennifer Rhee, *The Robotic Imaginary: The Human and the Price of Dehumanized Labor* (Minneapolis: U. Minnesota Press, 2018); Neda Atanasoski and Kalindi Vora, *Surrogate Humanity: Race, Robots, and the Politics of Technological Futures* (Durham, NC: Duke U. Press, 2019); Ruha Benjamin, *Race after Technology: Abolitionist Tools for the New Jim Code* (Cambridge, UK; Medford, MA: Polity, 2019).

such entities as the core components of the unthought world, a world that is enlivened by calculative demons.[71] In this context, a computational medium appearing to work is as much about merely seeming to be operational as it is about occluding labor. This reification tale, thus, makes a case for considering nonorganic processes through the lens of labor. This is important not only because the armies inside Babbage's computers were realized as displacement of human laborers from the colonies, but also because using computational labor as a diagnostic helps us better critique and suture the many computations at hand, especially human and mineral ones.[72] Today, the individual user takes credit for all the work that takes place when they use a computer. But to disassemble their individual agency would be to discover that they leaned on the labor of countless others, both human and nonhuman. In other words, because they are built on these situated labor imaginaries, contemporary computing systems create exploitative hierarchies. This is not just because of extractive violence in coltan mining or the precarity affordances of platform economies, though those make it even more of a smoking gun. Even in a case where the computer exploits no one directly, it still allows some "users" to have access to more computing power, which amounts to the ability to amplify and credit their actions over and above others. The "user" literally takes credit for more than they are personally capable of doing, and those who don't have access to the technology become correspondingly "unproductive" and "powerless." Acknowledging and recognizing nonhuman operations, especially as laboring forces, may be critical to undoing the appropriation of the Other.

If we are to investigate the specific nature of subjectivities enmeshed in this cyber-homuncular story, then it may be useful to elucidate some of the complex, cognitive webs woven by the cyber-homunculus, webs that allow Hayles's unthought world to function. If a machine "is a mechanism that, after being set in motion, performs with its tools the same operations as the worker formerly did with similar tools," as Karl Marx, arguably the most astute reader of Babbage, described,[73] then it does not take long to identify the psychoanalytic underbelly of the conception that is

71. N. Katherine Hayles, *Unthought: The Power of the Cognitive Nonconscious* (Chicago: U. Chicago Press, 2017).

72. Ranjodh Singh Dhaliwal, "On Addressability, or What Even Is Computation?" *Critical Inquiry* (2022) 49:1, 1–27.

73. Karl Marx, *Capital: A Critique of Political Economy, Volume I*, trans. Ben Fowkes (New York: Penguin, 1976).

cyber-homunculus, an underbelly that runs throughout our story, from Babbage's differentially laboring intellects to von Neumann and Wiener's citations of Freud. The question of unconscious here isn't accidental; if the story of cyber-homunculus shows us anything, it is precisely *how* the psychoanalytic subject melds into this politico-economic one that Haraway outlines. The miniaturization of social relations is the precondition for imagining systems of machinery[74] that lead to complex machines, and the cyber-homunculus is merely the subject caught in (and born out of) that human to nonhuman miniaturization. "Cybernetics recomposes globally and organically the functions of the general worker that are pulverised into individual micro-decisions: the bit links up the atomised worker to the figures of the Plan," wrote the Italian operaismo sociologist Romano Alquati.[75] Pulverization, *micro*-decisions, atomization, the bit, figures of the Plan: Alquati's vocabulary indexed precisely what I have defined as miniaturization. They all involve *tiny* subjective units being mobilized for labor by the plans of Capital-Computer. In other words, while the cybernetic (pre-)conditions might have been around for centuries, if not millennia, a new posthuman cybernetic subject emerges in the nineteenth century both as the precondition and the result of this fusion of the psychoanalytic and the economic subject. This new subject, a carbosilicon assemblage, then, complete with its social relations, can be (and is) miniaturized, and its labor form homologously encoded into the material technical apparatii, in order to birth the "informatics of domination."

That these immaterial visions of informatics and domination need micro-imaginaries rooted in material bodies points to how these social relations emerge in the first place. The derivation of value from the machinic apparatus is, and has to be, accompanied by the devaluation of labor that has been subsumed into the machine. This story, then, is about an affirmation of the cyber-homunculus as a subject that is both necessary to the history of computing and the one always put in question, under erasure, belittled, rendered into

74. Haraway's "informatics of domination" is merely a special, historically situated instance of these techno-socio-economic systems.

75. See Matteo Pasquinelli, "Italian operaismo and the information machine." *Theory, Culture & Society* 32: 3 (2015): 49–68. Alquati argued that the cybernetic apparatus is but "an extension of the internal bureaucracy of the factory." Romano Alquati, "Composizione organica del capitale e forza-lavoro alla Olivetti." *Quaderni Rossi* 2 (1962): 63–98; Matteo Pasquinelli, "Machinic capitalism and network surplus value: Notes on the political economy of the Turing machine." Unpublished paper delivered at Joy Forever: Political Economy of Social Creativity Conference in Warsaw (Berlin, Oct 2011).

a fiction.[76] This is the story of the labor that is constantly displaced and given no rights. And this is ultimately about the revalidation of the unthinkable thought that the computational apparatus is inherently predicated upon the imagination of subjectivity in the machine, always already. This begs the question: Can we even *imagine* a machine that does not have the laboring human as its constituent?

I hope this essay has already convincingly presented a slice of a history in which our computers have been, and are, politically (and diagrammatically) constructed.[77] Yet, the implication of this thesis is that the birth and development of machines is not only predicated on, but also *creates* social and subjective relations.

I wish to take my cue here from Sylvia Wynter's magisterial historicization wherein sometime around the nineteenth century, during the rise of industrial capitalism, a certain Man_2, the political subject of the state, was invented and the mode of humanity shifted from a religious presence to a racial presence. Wynter points out that homunculus (or "little man") was the first figuration used to racialize and dehumanize native populations in the Americas.[78] As the explanatory model of supernatural causation made way for the explanatory model of natural causation, a new thoughtspace began legitimizing "large-scale expropriation and mass enslavement of two peoples [Africans and Native Americans] on the grounds of a naturally determined difference of rational substance between them and their expropriators and slave masters," a logic "that [at the same time also made] possible the rise and development of the physical sciences as a new order of human cognition."[79] Wynter also already

76. In the account of Giedion, mechanization mystifies labor "into a technological form so as to render it invisible." Sigfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (New York: Oxford U. Press, 1948). For more on invisible labor, see *Invisible Labor: Hidden Work in the Contemporary World*, ed. Marion G. Crain, Winifred Poster, and Miriam A. Cherry (Oakland, CA: U. California Press, 2016); *Invisible Labour in Modern Science*, ed. Jenny Bangham, Xan Chacko, and Judith Kaplan (Lanham, MD: Rowman & Littlefield, 2022).

77. For other examples of such political constructions, see Paul N. Edwards, *Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996); Alexander R. Galloway, *Protocol: How Control Exists after Decentralization*, (Cambridge, MA: MIT Press, 2004).

78. Sylvia Wynter, "Human being as noun? Or being human as praxis? Towards the autopoetic turn/overturn: A manifesto." Unpublished essay (2007). Sepúlveda cited by Pagden in Anthony Pagden, *The Fall of Natural Man: The American Indian and the Origins of Comparative Ethnology* (Cambridge: Cambridge U. Press, 1986), p. 117.

79. Sylvia Wynter, "Unsettling the coloniality of being/power/truth/freedom: towards the human, after man, its overrepresentation—an argument." CR: *New Centennial Review* 3:3 (2003): 257–337.

notes that AI should point out a useful test-case for the metaphysics of this dehumanization. Borrowing from Margaret Boden: Wynter already situates artificial intelligence (or its cognate, cognitive sciences) as the space of Otherness insofar as it co-constructs (produces and orders the status) and maintains (reproduces) the social order (which was precisely what Babbage and Turing claimed about their respective machines as *dispotif*).

It is no coincidence then that our cyber-homunculus is birthed by Man at the same time and place as Man_2, somewhere around the nineteenth century in Western Europe. "So irrational that it will have to be governed by others," this homunculus is then made by this changing Man to continue the project that earlier Native American homunculi had been recruited for.[80] The new inscriptional weapons were rationality, order by nature, and humanness. Interned Native Americans, enslaved Blacks, and interned madmen (who, again, show up at the same time in history, as Wynter shows via Foucault) find another nonhuman foil: the belittled laborer who must be shrunk and stowed in a machine. The rationality that Geoghegan identifies in his alterity script is here to be generated by imagining an irrational, not-able-to-govern-itself humanoid nonhuman laborer. In making this claim, I absolutely do not wish to flatten the violence of our history but instead want to show how the nonhuman world was entangled in the very human violence via its mutually enforcing loops of representation. If, at the same place within the same episteme, the same vocabulary of less-than-human is being used for two groups, we must attend to the logic that made them equivalent, and be wary of dismissing the contributions of one as Man_2 mistakenly did a few centuries ago for the other (and still is doing).

Other scholars of racial capitalism have also accounted for this very shift in mercantile to industrial capitalism as a driving force defining and sustaining orders of racialization and mechanization.[81] Borrowing from an 1846 letter by Karl Marx wherein he compares "direct slavery" with "machine" and considers the two to be pivots of industrialism (alongside credit), Cedric Robinson states that "the creation of the Negro, the fiction of a dumb beast of burden fit only for slavery, was closely associated with the economic, technical, and financial requirements of Western development from the sixteenth

80. Ibid.

81. Capitalism and racism "did not break from the old order but rather evolved from it to produce a modern world system of 'racial capitalism' dependent on slavery, violence, imperialism, and genocide." Robin D. G. Kelley, "What did Cedric Robinson Mean by Racial Capitalism?" *Boston Review* 12 (2017).

century on."[82] It is in this context that I am highlighting a rhetorical maneuver from the eighteenth and nineteenth centuries in which the machine proves to be an equivalent of, and thereby helps generate, "the fiction of a dumb beast."

Where Wynter considers the overrepresentation of Man to be the primary problem of our era, she also proffers a potential solution: critiquing and attacking the overrepresentation of Man. In picking a little man, an imagined (by Man) cousin of Wynter's "little men," both categories of belittled men, I have, in this essay, attempted to re-present the narrative of labor and technology, providing, if not a new descriptive statement, then a heuristic critiquing the previous one. There is little about the inside of computers (if not all technology) that calls for devaluation of their mechanisms (for the "primitiveness" of actions is very much politically constructed), just like there was/is little about labor of the expropriated populations that called for their devaluation. Yet Man_2 sees its actions as simple and makes everyone fall for it. I would, however, be gravely mistaken if I thought that mere recognition of alternate subjectivities, even as unexpected as the ones in nonhuman labor, would lead us anywhere by themselves.[83] As always, it is all fun and games in discourse until the material (of the material-semiotic fame) comes crashing down.

A critique of the history that got us where we are today—in a world full of broken differential subjectivities and exploitative labor practices enabled by digital infrastructures—requires a refocus on the elided materiality of the formation of this computational world. Fred Moten also notes this very complex lifeworld that connects political-economies and techno-mechanical subjectivities, from the touring machines of slavery to Turing machines, name calling the very same historical aggressors that Wynter, Robinson, and I have pointed at:

> [Keep] in mind that the revolution in theories and techniques of computation (especially the computation of risk and maritime positioning that helped significantly to fuel the transition from mercantilism to [the interplay of the dispersion of sovereignty and the refinement of private accumulation and the conceptualization and regulative exclusion of externalities that we call] capitalism) that began to emerge in the mid-nineteenth century with the work of Charles Babbage and that took more immediately practical and efficient shape in the mid-twentieth century by way of the contributions of Alan

82. Cedric J. Robinson, *Black Marxism: The Making of the Black Radical Tradition* (Chapel Hill, NC: U. North Carolina Press, 2000), p. 115.

83. For a critique of "politics of recognition," see Glen Sean Coulthard, *Red Skin, White Masks: Rejecting the Colonial Politics of Recognition* (Minneapolis: U. Minnesota Press, 2014).

> Turing, Norbert Wiener, and others coincide roughly with the inception and return of Afro-diasporic revolutionary social movement and the new modes of consciousness (and their globalized dispersal) such movement reflected and helped to shape.[84]

For Moten, the subjectivities of technics may be the same integral location for the subjectivities of devalued bodies but the way out, via an infinite social, collective memory is also co-terminus with technological potentials. In rhetorically and historically connecting the theories/techniques with social movements and consciousness, Moten offers a (somewhat Haraway-like) vision where the subject may be able to use, for his own revolutionary moment, the very same subjectivizations that he has been hammered with. But if our technologies encode the violence that we have to escape, what are the limits of using the master's computer?[85]

Who is, after all, the κυβερνήτης (*kybernētēs*, steersman or governor) of cybernetics? It is our cyber-homunculus, the governor-demon![86] The same entity considered "so irrational that it will have to be governed by others" is taken by Man's capitalism and given the governance of a miniaturized inner world.[87] He/she/they/it is the one doing the steering, aboard the ships, in the factories and the mills, behind the screens, under the hoods of the machines.

Let us compare Charles Babbage's and Bill Gates's opinions on the interrelations between economic organization and human mental functions. Here is Babbage:

> The arrangements which ought to regulate the interior economy of a manufactory, are founded on principles of deeper root than may have been supposed, and are capable of being usefully employed in paving the road to some of the sublimest investigations of the human mind.[88]

84. Fred Moten, "The Touring Machine (Flesh Thought Inside Out)," *Plastic Materialities: Politics, Legality, and Metamorphosis in the Work of Catherine Malabou,* ed. B. Bhandar and J. Goldberg-Hiller (Durham, NC: Duke U. Press, 2015).

85. See also Jonathan Beller, *The Message Is Murder: Substrates of Computational Capital* (London: Pluto Press, 2017); Jonathan Beller, *The World Computer: Derivative Conditions of Racial Capitalism* (Durham, NC: Duke U. Press, 2021); Seb Franklin, *The Digitally Disposed: Racial Capitalism and the Informatics of Value* (Minneapolis: U. Minnesota Press, 2021).

86. Norbert Wiener, *I Am a Mathematician: The Later Life of a Prodigy* (New York: Doubleday, 1956); James Clerk Maxwell, "I. On Governors." *Proceedings of the Royal Society of London* 16 (1868): 270–83.

87. Wynter, "Unsettling the coloniality" (above, n. 73).

88. Babbage, *On the Economy of Machinery* (above, n. 16), p. 153.

And here is Gates:

> An organization's nervous system has parallels with our human nervous system. Every business, regardless of industry, has "autonomic" systems, the operational processes that just have to go on if a company is to survive . . . What has been missing are links between information that resemble the interconnected neurons in the brain. . . . You know you have built an excellent digital nervous system when information flows through your organization as quickly and naturally as thought in a human being and when you can use technology to marshal and coordinate teams of people as quickly as you can focus an individual on an issue. It's business at the speed of thought.[89]

Both Babbage and Gates imagine a deeper, almost-natural, *reified* underpinning to the social structures of industrial processes, and in doing so, rely on the devaluation of the very labor that drives them. This reliance works, time and time again, because the miniaturized imaginaries are rendered devalued by the very same intellectual moves that allow their socio-politico-economic emergence. By calling for these psychological, neural models of organization, hoping to move towards "business at the speed of thought," people-whose-subjectivities-are-never-under-erasure eschew questions like (and rely on us eschewing questions like): Whose neurons? Whose brains? Whose business? Whose thought? Not Man_2's *again*, surely?

Studying diagrammatic orders in order to de-reify leads us to see how their very nature relies on this slippage, their deconstructive potential. There is no way for Babbage or Gates to slice away the demonic (the appropriation of surplus value, the devaluation, the capitalist subsumption, the surplus populations) from the cyber-homunculesque demon of their dreams, dreams that have been coded in metaphors of technical dehumanization of the human laboring subject. It remains our task to ask these questions, and, once the surface-depth models have been plumbed, deny this devaluation. Maybe this is what a society would look like if we paid heed to the words of the German media theorist, Fredrich Kittler, who in a conversation with the French philosopher Paul Virilio, once argued for a new sociology. Talking about how we are not alone anymore in the presence of computational entities, who always do something for us, he argued that "the term 'society' should include people and

89. Bill Gates, *Business @ the Speed of Thought* (New York: Warner Books, 1999). Gates also used this analogy in his keynote speech at Microsoft's *Second Annual CEO Summit* in 1998. Another CEO of Microsoft, Steve Ballmer, has also used this analogy to describe the commonalities undergirding human subjects and corporate organizations. Gates may have gotten the idea from Judith E. Dayhoff, *Neural Network Architectures: An Introduction* (New York: Van Nostrand Reinhold Co., 1990).

programs."[90] Kittler's gambit here exposes the conceptual shortcoming in not being able to imagine computational processes without tiny beings at the back. But at the same time, it potentially offers us a way out. If indeed we can do no better than imagine cyber-homunculi, then to accept these agents and enthusiastically value them as such may be our best chance of living carefully and responsibly *with* this already-all-pervasive Other, recognizing its fleshy origins and insides, thinking with its very material presence.

But can we even do so? What, after all, might our demons even want? What sacrifices may we have to offer?

90. Paul Virilio, Friedrich Kittler, and John Armitage. "The information bomb *a conversation*," *Angelaki: Journal of Theoretical Humanities* 4:2 (1999): 81–90.