Digital Humanism Salon

Lachlan Kermode

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Introduction

In the next half hour, I seek to impress three points upon you:

1. The computer is another version of Marx's machine
2. Capital mystifies the distinction between human and machine
3. The contemporary hysteria of A.(G.)I. should be treated by attending closely to these first two points.

More generally, this talk will present the basis of a relation between the two structures that thread these points together, capital and the computer. Each of these structures has an intimate and important relationship with a practical, historical, and political analogue: 'actually existing' capitalism in the case of capital, and the material manifestations of electronic computing in the 20th and 21st century in the case of the computer. By thinking in structural terms, that is, according to logical entities which map to historical forms and cultures, but which are not strictly reducible to them, I propose we can understand the entanglement of capitalism and computing more thoroughly.

Turing's Computer

I start with the computer, a term [I suppose] that will be familiar to many of you. What characterizes the structure that we call a computer? The British mathematician Alan Turing best formalized it in what he called a **automatic machine**, a structure now more commonly known as a **Turing machine**. Turing's automatic machine consists of three parts:

1. A `store`, which can be conceptualised as an infinite stretch of 'tape', a one-dimensional surface that is separated into discrete 'squares' in which a symbol can be inscribed or erased.

2. A `control`, which can be thought of as a reference table designating which action should be taken at any given square in the tape, such as "erase and move one square forward," or "rewrite a '1' and move two squares backwards."

3. An `executive unit`, which is the operating force that takes steps through the tape based on the control.

This conception of the machine is automatic, because the operating force is not an operating *agent*, i.e. it does not exercise any principle of choice in moving through the tape. We can conceptualise the executive unit as a person, as Turing did, as a worker referencing the control and adjusting the store appropriately; and it is crucial to emphasize that such a person in this arrangement is simply playing the role of enacting an essentially mechanical force. Of relevance here to this conception is that the term 'computer', in Turing's time, referred to a category of feminized labourer who computed sets of calculations for various business aims. For example, the orbital mechanics calculations that were essential to the success of America's mid-century space program were done by Katherine Johnson, a 'computer'. In the structural arrangement of the computer, the human worker is reduced to a 'force' that is operating in a wholly deterministic manner, reading the next step from the control and adjusting the store

appropriately. As such, the executive unit is designed so that it can replaced by a non-human force, such as steam-power or electricity.

In Turing's famous 1936 paper introducing this machine's structure, he emphasized the infinite capacity of time that is conceptually available to the executive unit. Whether it takes 1 minute to perform each step, 1 second, or one nanosecond, the structure is still fundamentally a structure called a computer. A contemporary electronic computer, then, is a **finite realization** of a computer as such, as it is limited in its spatial and temporal dimensions according to the number of bits it is capable of storing and the "head speed" of its CPU.

Indeed, Turing's automatic machine serves as the logical definition of a computer precisely because this structure provides a definition that encompasses the entirety of what can conceivably be computed, regardless of the limit or extent of hardware and software capacity. If something can be computed, there exists a Turing machine to calculate it. Whether this calculation can be completed in a reasonable time and within the constraints of an actually existing stretch of conceptual tape is a question further constrained to the historical state of computing technology.

Babbage's Computer

So far, so good: and [I am sure] nothing new to those of us who suffered some sort of education in computer science. Indeed, even in Turing's time, the idea was not so much a new one, but rather an old one repurposed in a mathematical domain. In his now-famous 1950 paper, *Computing machinery and intelligence*, Turing gave credit where it was due: namely, to the British industrialist and polymath, Charles Babbage. Turing writes:

> The idea of a digital computer is an old one…. Babbage had all the essential ideas…. Importance is often attached to the fact that modern digital

> computers are electrical, and that the nervous system also is electrical. Since Babbage's machine was not electrical, and since all digital computers are in a sense equivalent, we see that this use of electricity cannot be of theoretical importance. (Turing 1950, 438)

The computer, as we have seen, is a conceptual structure of automation that posits a kind of production in which the position of executive unit is concievably simply as an interchangeable motive force, rather than as a necessarily knowledgeable, responsive, or reactive labourer. So it should come as no surprise that the man responsible for formalizing this idea was an ethnographer of the 19th century factory, or a "factory tourist" as historian Simon Schaffer refers to him, and also an optimist regarding it, in the sense both of being supportive of and of seeking to optimize the factory space.

In Babbage's most extensive and renowned work, the 1832 volume *On the Economy of Machinery and Manufacture*, he laid out a set of principles for the budding capitalist who sought to optimize their production in the factory. The Marxist historian and theorist Harry Braverman dubbed Babbage's most durable insight from this work the "Babbage principle," which can be summarized as follows: in poorly organized production, workers waste much of their time performing tasks that are below their skill-level, and/or waste time by 'context-switching.' Factory production can be optimized, therefore, through a principle of the division of labour whereby high-skill tasks are accorded to high-skill, high-paid workers, and low-skill tasks are accordid to low-skill, low-paid workers. What the Babbage principle optimizes, it should be noted, is not worker welfare, or even the longevity of a particular factory as such, but rather the total profit accrued to the factory owner at the end of the day, i.e. the surplus value skimmed off the top of what Babbage himself recognized as the "variable cost" of a worker's time.

As historian Simon Schaffer has noted, Babbage's 1832 volume is intimately and obviously linked to his interest in his Calculating and Difference Engines, the names he gave to his life-long project of creating one of Turing's 'automatic machines' avant la lettre, powered by an executive unit of steam. In the opening sentence of *On the*

Economy of Machinery and Manufacture, Babbage notes how the projects of the book and the machine are part and parcel of each other in his own estimation. Babbage was deeply admiring of the idea that one could create a machine that so reduces the necessary skill of its operator that its motive force could be substituted for a lower-paid worker in the first instance, and something as 'stupid' as steam in the final one. The optimized economy that such a calculating machine would effect in factories was his motivation for attempting his whole life– and draining much of his father's and the State's funds in the endeavour– to build it.

From his understanding of factories and his hope to optimize them with such a machine, Babbage formulated a principle of what he called "intelligence." As the calculating machine came to substitute more and more of the tasks in the factories, workers could in turn become dumber and dumber (read: cheaper and cheaper), eventually being reduced to nothing but pure force, and thus replaceable by steam. The name Babbage gives to this teleology of the (calculating) machine's eventual domination is "progress," and its proof is a greater quantity of profit in the factory owner's pocket.

Marx's Computer

Babbage's status as an eminent philosopher of manufacture in the early 19th century is crucial to consider in tandem with his stature as the inventor of the computer's concept. Babbage's work seeks to distill principles and inventions if factory organization that can realize the socio-economic visions of the great Liberal philosophers of his time, such as John Stuart Mill and David Ricardo. These philosophers, of course, had not only acolytes like Babbage, but also critics: the greatest of which being Karl Marx.

Marx's work *Capital*, whose first volume's first version was published in 1867, is an immanent critique of these 'great' philosophers, in the sense that it seeks to show the practical and theoretical consequences of constructing society according to their

vision and principles. Marx's theory is immanent in the sense that it is a theory of capitalism, not as we *should* understand it – as if there were some objective position from which we could critique it from outside of itself – but rather of capital as it understands itself. In tracing the consequences of capital's self-understanding in its concepts, starting with the commodity, and tracing value's dialectical decomposition as simultaneously value and use-value, and so on, Marx shows it to be a theory of society that is productive and progressive only in a very particular and flattened sense of those terms. Capitalist society is productive of **value**, a term that for Marx implies an implicit and unconscious measure of itself in human labor-power; and it progresses maniacally towards this kind of value's accumulation and self-aggrandizement. The flourishing of human life a society structured by this value is, at best, an afterthought to the pumping up of numbers that obscure the maliciousness of this measure; and at worst, directly antithetical to capitalism's primary project, value's perpetual increase.

Capital, logically speaking, is not an historical designation of a particular society (such as late 19th-century England), nor is it a designation that rests in a particular kind of motive power (such as steam) or material structure in which most workers labour (such as a factory). It is, rather, the appearance and persistence of the logic of value. This logic naturalizes an historically specific kind of human labor such that the entire spectrum of possible kinds of labor are reduced to it. The only valuable labor in capitalism is a labor that produces surplus value.

This stipulation, as Marx shows in chapters 14 and 15 of *Capital* volume one in particular, produces a social dynamic that posits the human more and more as nothing but a motive force for what he calls the **machine**. In the latter of these chapters, Marx defines his notion of a machine by comparing it with the different notion of a **tool**:

> All fully developed machinery consists of essentially three parts: the `motor mechanism`, the `transmitting mechanism`, and finally the tool or `working machine`. The motor mechanism acts as the driving force of the mechanism as a whole. It either generates its own motive power, like the steam-engine,

> the caloric-engine, the electro-magnetic machine, etc., or it recieves its impulse from some already existing natural force, like the water-wheel from the descent of water down an incline, the windmill from the wind, and so on. (Marx 1992, 494)

The **transmitting mechanism** regulates and operationalizes the motor mechanism's original force, and the **working machine** is the name for the external effect that this force's transmission effects down the line.

Marx goes on in this chapter to explain that, in the automatic factory, the labourer is reduced to "the merely mechanical role of acting as the motive power" (Marx 1992, 496) for a machine. As such, the machine replaces the worker as the *subject* of power in the factory in the name of optimizing for surplus value. As I noted earlier, the pursuit of surplus value, in a strictly logical sense, has no qualms reducing the livelihood of humans in the loop of a machinery system to a shadow of themselves as simply one way to produce, and to produce cheaply, repetitive, mind-numbing, motive force. Marx refers to this structure of human impoverishment as an **automaton**, and emphasizes that within it, the human is no longer subject of the social system, but rather only counts as another input:

> A system of machinery, whether it is based simply on the co-operation of similar machines, as in weaving, or on a combination of different machines, as in spinning, constitutes in itself a vast automaton as soon as it is driven by a self-acting prime mover. (Marx 1992, 502)

Marx's machine, then, like Turing's which came almost a century later, is a concept before it is a specific physical materialization. The machine for both theorists, courtesy of their coupling via Babbage as a mediating notion, perhaps, is a structure of automation that renders the human substitutable for environmental and inhuman motive forces. This is what Marx calls the "automatic principle" (Marx 1992, 503), and it is what gives rise to the mechanical monster that demonizes and threatens the place of labour's subjectivity as the prime mover in the social system as a whole.

`Here` is the core of the proposition I want to put to you today: are not Marx's and Turing's machines, in their essence as notions that describe a structure of automation, equivalent? Marx's 'motor mechanism' is Turing's 'executive unit', Marx's 'transmitting mechanism' is Turing's head and reference table, and both structures are fundamentally **automatic** in the sense that they do not need an intelligent or aware human to operate, only a motive force. Some contemporary theorists have suggested that, while Marx's attention to political economy and its critique remains relevant in the 21st century, we nevertheless need to 'update' Marx's theory to render it relevant to a society structured by information, a substance of which Marx could not have been aware and thus could not have accounted for in his theory. Such suggestions, in my view, fail to recognize that the computer, at least in the abstract register of immanent critique that Marx demonstrates in *Capital*, should not primarily be understood in terms of its substantial effects in information, but rather should be accounted for at the level of **structure**. At the structural level of analysis, there is no clear evidence that today's electronic computer is anything other than a sophisticated form of what Marx called the machine: that is, a structure of automation that poses the human as replaceable by natural or mechanical force through an apparatus that mediates this 'dumb' motive force into a more consequential and thus apparently 'smart' result.

In a famous passage in chapter four of *Capital* volume one, Marx refers to the movement of value in capitalism as an **automatic subject**:

> The independent form, i.e. the monetary form, which the value of commodities assumes in simple circulation, does nothing but mediate the exchange of commodities, and it vanishes in the final result of the movement. On the other hand, in circulation M-C-M both the money and the commodity function only as different modes of existence of value itself, the money as its general mode of existence, the commodity as its particular or, so to speak, disguised mode. It is constantly changing from one form into the other, without becoming lost in this movement; it thus becomes transformed into an **automatic subject**…. It brings forth living offspring, or at least lays golden eggs. (Marx 1992, 255)

I want to propose that one dimension of how we should understand this enigmatic qualification of capital as an automatic subject is through the structure of automation that Marx calls a machine. As labor is reduced, as much as it can be, to mere motive force in service of greater margins of surplus value, the subjective determination of society is distorted and mystified, such that it is not (as we might imagine it to be) a result of the aggregate, conscious decisions of those humans who make it up, a democracy of determination, but is rather compelled to stick to the unconscious contours of a disfigured conception of the human that has trouble separating its labor from mere motive force. In capitalism, in a word, it is structurally difficult to separate human from machine, sinew from steam, skin from silicon.

Today's Computer

Though I will not have time to discuss this aspect of it at length in this talk, I see this analytic error, which we may call **machinic misunderstanding**, as one that dogs the history of Computer Science as a discipline since its emergence in American and European institutions in close contact with cybernetic proposals, which insist that the human body as well as biology tout court is at core nothing but a complex, computational (i.e. machinic) system. The constitutive cybernetic confusion between the computer as a logical machine and the human as a corporeal body is an **informational** oversight in the specific sense that this term– information– is too often understood as a new historical substance that implies or brings with it a natural philosophy or ontology of the human reductively considered as nothing but a machine in the ways I have already outlined.

To conclude, and to deliver on the promise of this talk's title, i.e. that I will bridge the gap between the mid-19th century phenomenon that goes by the name Marx, and the late 20th and early 21st century phenomenon that goes by the name "A.I.", I want to suggest the constitutive confusion of laboring body and machine in capitalism that

I have outlined is one way to bring down to Earth the glittery promises of the current discourse invoking Artificial Intelligence (A.I), which sees near-total automation as inevitable and the threat of sentient Artificial General Intelligence (A.G.I) as nigh. The dimension of the A.I. discourse with which I want to take issue here is that which valorizes it as an invention that will 'automate out' the human in one way or another, either by taking some significant range of jobs at some kind of historically unprecedented scale– which we may call `the societal threat of A.I.`– or by fulfilling full throttle the fantasy of total automation of the human, resulting in a technological entity that is intellectually superior to the human figure in general– which we may call `the existential threat of A.G.I`. Though these two threats operate at different scales, I see the contemporary resurgence of a paranoia about both threats in popular discourse as a function of the constitutive confusion in capitalism that I have already outlined, namely the increasing indistinction between body (or human) and machine (or computer) in service of fantasmatic reality of surplus value. As such, it is no coincidence that the most prominent spokespeople for the seriousness of these two threats stand either directly to gain, or are in close collusion with those who stand to gain, from the skewed structure of debates about technology that results if they are foregrounded.

Let me briefly outline each of these threats with examples, starting with the gravest and most gravely misinformed of them, the existential threat of A.G.I. The wikipedia page on the subject notes that "Concerns about superintelligence have been voiced by leading computer scientists and tech CEOs such as Geoffrey Hinton, Yoshua Bengio, Alan Turing, Elon Musk, and OpenAI CEO Sam Altman" ("Existential Risk from Artificial General Intelligence" 2024). Nick Bostrom, a popular philosopher at Oxford whose 2014 book *Superintelligence* serves for many as the definitive contemporary treatise on this subject, is also a figure who deserves to be named in amongst this other excellent company. We can take his defition of superintelligence as a working definition for A.G.I. For Bostrom, a superintelligent being is "any intellect that greatly exceeds

the cognitive performance of humans in virtually all domains of interest" ("Existential Risk from Artificial General Intelligence" 2024).

The qualifier "in all domains of interest" here hides the implicit capitalist contours of this conception. The relevant domains of interest, of course, are those which produce value for society; and value for a capitalist society, as Marx demonstrates, is a category that inherently devalues labor that cannot be substituted for motive force, as such intelligent labor does not have the same relationship to surplus labor as its dumber counterpart. Bostrom's definition of superintelligence, with this qualification, becomes strikingly similar to the 'Cyclopean machines' of Marx's chapter 15, which substitute as the executive unit in ever-increasingly automated factories, appearing through capital's naturalized ideology as gargantuanly more capable of this role than the force any individual worker might hope to exert. The threat of Bostrom's superintelligence is known as Artificial General Intelligence, or A.G.I., because it generalizes the "intelligence" required to run a productive factory to the entire scope of human existence. If all life is valuable only in terms of capitalist value, then machines really will soon eclipse the productive capacities of human life (indeed, they arguably already have).

The second threat, the societal threat of A.I., is a tempered version of the same proposal. While not so presumptious to assume that the growing capacity of technology will supersede the capabilities of the human in every domain, those afflicted by this phobia see the mode of technological automation effected by machine and deep learning's applications, in object detection and in generative text, image and video models, for example, as one that warrants particular societal attention and regulation. A.I., in this threat's estimation, is a uniquely powerful technology that needs new and particular kinds of regulation, ranging from treating it as its own industry or category within regulative measures to a total moratorium on its development. The 2024 EU A.I. Act, touting itself as "the world's first comprehensive AI law" ("EU AI Act: First Regulation on Artificial Intelligence" 2023), can be seen as an instantiation of this

threat insofar as it considers AI an appopriate name for a distinct domain of technology, which consequently deserves a legal and regulatory treatment that is distinct from computing as such.

I have suggested that both of these threats should be contextualized with reference to Marx's own theory of capital (not an updated version of it) as anxieties that amount to fetishistic emanations of the machine-human indistinction effected by the movement of value. In making this claim, I do not mean to put forward an idea that we should not be worried about the structure of automation that is being effected in these so-called "A.I. systems." On the contrary, I mean to assert the gravity of the situation by showing how the discourse around A.I. facilitates an obfuscation of the dehumanizing logic in capitalist business-as-usual. In framing the threat of A.I. as societal and/or existential in the sense in which I have just described, those with commercial stake in A.I.'s are able to disorient the terms of the debate. Instead of being about the impoverishing logic of automation as such, a critique that still has not adequately been reckoned with since it was put forward by Marx in the 19th century, the debate on A.I. in popular discourse is mostly about safeguards, responsibility, and "alignment." My suggestion here is that we consider A.I. not as a new and near-sentient technology that needs new theories and new kinds of regulation, but first and foremost as the emperor of an old, 19th century logic of capitalist automation in new, 21st century clothes.