Marx in the age of AI

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How Artificial Intelligence Reshapes Value, Class, and Ideology

by

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Preface

Six months ago I stood in the Reading Room of the British Museum in London. It is an enormous space with a gigantic dome. At its centre are concentric rings of shelves, with radial desks at their periphery. The walls of the Reading Room are formed by two levels of bookshelves containing a large collection of books. Standing in the middle of the room beneath the great dome is truly inspiring.

Reopened to the general public in July 2024 after years of closure, the Reading Room now features boards commemorating the figures who once worked under its dome: Oscar Wilde, Mahatma Gandhi, George Orwell, Virginia Woolf... and, of course, Karl Marx.

Marx wrote much of his magnum opus, *Capital: A Critique of Political Economy*, in the Reading Room. He worked there for years, often for entire days, making extensive notes that formed the basis of the first volume of *Capital*, published in 1867.

Standing in that same space, I wondered what Marx would make of today's world. Since his death in 1883, technological advancements have reshaped production and capital. The proletariat, once bound to the factory floor, still exists, albeit in new forms. Capital, meanwhile, has grown more global, more abstract, and more intangible.

Today, intelligent machines add a new dimension to the old class struggle. Automation, once confined to specialised industrial tasks, now reaches into the core of intellectual labour. Algorithms and artificial intelligence threaten professions once thought untouchable.

In the last decade, AI has advanced with astonishing speed. What would Marx have thought of this AI revolution? Many researchers now believe that *artificial general intelligence*, that is, artificial intelligence that can perform any intellectual task a human can, may be achievable within decades. How might AGI reshape our understanding of key Marxian concepts such as surplus-value, class, and ideology?

This book is an attempt to explore those questions.

A. Rivas

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Chapter 1

AI

We live in interesting times. Artificial intelligence has become the buzzword of the moment not only in computer science labs, but in everyday conversation. Last decade's advances in AI have been spectacular in both speed and scope. Systems that once struggled with simple pattern recognition now write code, model protein structure, draft legal documents, and perform many other cognitive tasks that only a few years ago belonged to the realm of science fiction. That speed and scope matter for this book because they alter not only what machines can do, but how we organise production, justify authority, and imagine the limits of political economy. Before taking up those themes, this chapter fixes terms: what we mean by *AI*, and by *artificial general intelligence* (AGI).

What, then, is AI? There is no single definition, but several complementary perspectives might help. In 1950, British mathematician Alan Turing reframed the old question "Can machines think?" into an operational challenge: could a machine's performance in dialogue be indistinguishable from a human's? If a machine is capable of playing this "imitation game" satisfactorily, Turing argued, we don't need to worry about philosophical debates over the exact meaning of "thinking": for all practical purposes, the machine could be said to think.[1]

Ever since, definitions have oscillated between two poles. One tradition sees AI as an effort to reproduce human-like cognition, while another, more agnostic tradition defines it functionally, as the design of systems that act humanly or rationally.[2]

The first tradition, the "thinking" approach, focuses on imitating the actual processes of human cognition. Its difficulty lies in the fact that we still lack a complete scientific account of how humans think, and even if we had one, faithfully replicating human mental processes may be neither necessary nor optimal for achieving intelligent behaviour.

By contrast, the second tradition shifts the focus to how systems actually *act*. In this view, the internal workings matter less than the observable results. If a system consistently behaves in ways that we would consider "intelligent," then we consider the system itself intelligent. It is a technological application of the old saying, "if it walks

like a duck and quacks like a duck, it's a duck." Intelligence is inferred from behaviour, not internal structure. This approach further distinguishes *acting humanly* (behaving in ways indistinguishable from a human, as in Turing's test) and *acting rationally* (selecting actions that maximise the likelihood of achieving objectives, given the available information). Turing's imitation game focuses on the former, but in modern AI research the latter has become dominant. It abstracts away from the specifics of human behaviour and reframes intelligence in terms that are easier to formalise, analyse, and apply across diverse domains.

By that measure, AI has been with us for years. They classify images, recommend films, translate languages, detect fraud... These systems may not "think" in any human sense, but they perform tasks once thought to require human intelligence. In doing so, they act rationally toward defined objectives, selecting actions that maximize the chance of success given the information and resources available. This is precisely the functional sense in which modern AI is often defined.

Artificial General Intelligence

Despite their impressive performance, today's AI systems remain specialists. A chess engine such as Stockfish or AlphaZero[3] can easily beat the best human grandmasters,

but it cannot classify images, translate languages, or summarise legal contracts. Conversely, an image-recognition model that identifies tumours in radiographs cannot play a single move of chess. We have powerful AI models for speech recognition, computer vision, weather forecasting, protein folding, playing videogames, and many other tasks, but each of these excels in its own domain and is useless outside it.

What we have, in other words, is *narrow AI*: systems capable of performing specific cognitive tasks, sometimes at superhuman levels, but unable to tackle other tasks for which they have not been explicitly designed and trained.

In contrast, *artificial general intelligence* (AGI) systems exhibit robust competence across a wide range of domains, operating at or beyond the level of human capabilities. Rather than merely being an expert chess player, or world-class in image recognition, AGI would learn both, as well as many other tasks, without having to be rebuilt from scratch for each. It would generalise knowledge from one area to another, adapt to changing circumstances, devise and execute strategies, and autonomously set sub-goals in pursuit of overarching objectives.

Narrow AI systems resemble the specialised tools in a tradesperson's toolbox. Each tool, be it a hammer, a wrench, or a tape measure, is optimised for a specific task, and performs that function with great efficiency. However, it cannot be repurposed for tasks outside its design. A screwdriver may fasten a screw with ease, but it is use-

less if one needs to saw a plank in half. Expanding the toolbox with additional specialised instruments does not solve the underlying limitation. No matter how many are added, each tool (and by extension the toolbox) remains bound to its narrow function.

In the same way, AGI is not simply "better AI," or "more AI." Improving the performance of a narrow system (making the chess engine stronger, the translation model more accurate, or the image classifier more precise) does not make it less narrow. Likewise, assembling a collection of such systems, no matter how many domains they cover, does not result in *general intelligence*. AGI entails a qualitative shift: a single system capable of transferring knowledge between domains, formulating new strategies, and tackling unfamiliar problems without requiring a complete redesign for each new challenge.

Large Language Models

Much of the impressive progress in AI over the past few years has been driven by a particular family of models: large language models (LLMs). These systems are behind many of the headline advances that have pushed AI into mainstream awareness, such as chatbots that converse fluently, tools that can generate computer code, assistants that summarise legal briefs, or draft research proposals. While AI research spans many subfields, it is LLMs that have become the public face of contemporary AI, and

they are central to current debates about the prospects of artificial general intelligence.

A useful way to think about large language models is as an extremely capable version of the text auto-complete in your phone. Given some text, it divides it into smaller pieces called "tokens," and then tries to predict what tokens come next. It repeats this process over and over, each time predicting more tokens based on the tokens it has already generated. By converting these tokens back into words, LLMs can produce whole paragraphs, translate between languages, write code, summarise documents, or carry out a conversation. They do not look up pre-crafted answers; instead, they continue a sequence in a way that fits the patterns it has learned from reading vast text corpora.[4]

To do so, LLMs need data – and a lot of it. The largest current models are estimated to train on over 15 trillion token of text, equivalent to around 60 terabytes of uncompressed data.[5] This text comes from books, academic papers, news articles, websites, code, and more. During training, the model "reads" this material while playing the next-token prediction game: given some preceding token, it guesses the next one. After each guess, it measures how close it was to the correct answer and adjusts its internal "weights" (the numerical parameters that define its behavior) to improve. Repeating this over and over, the model becomes increasingly skilled at generating text that is co-

herent, stylistically appropriate, logically consistent, and informative.

When you interact with an LLM, you provide a *prompt*: a piece of text that can be anything from a question, to a set of instructions, to an incomplete sentence for the model to continue. Prompts can "steer" the model into different roles (tutor, translator, biologist, financial analyst...) without rebuilding it from scratch; this flexibility is why LLMs are often described as "general-purpose." Many LLMs are further refined after training with feedback from human reviewers so they follow instructions better and avoid obviously harmful or off-topic replies.[6]

LLMs are powerful, but they're not perfect. They are trained to predict future token based on the data they were trained on, so they may echo biases present in it. They can in some cases produce "hallucinations": outputs that sound fluent and confident, but are factually wrong, logically inconsistent, or entirely fabricated. They can also be sensitive to small changes in how a question is formulated.[7]

When will AGI arrive?

There is no consensus about when AGI will be reached. Some researchers argue that, by reasonable definitions, modern LLMs are already AGI. Computer scientists Blaise Agüera y Arcas and Peter Norvig claimed already in 2023 that "the most important parts of [AGI] have

already been achieved by the current generation of advanced AI large language models."[8] Microsoft's report on the capabilities of OpenAI's GPT-4 model also notes that GPT-4 "could reasonably be viewed as an early (yet still incomplete) version of an artificial general intelligence (AGI) system."[9]

At the same time, critics argue that current large language models remain unreliable, lacking causal reasoning and genuine understanding, and far from the kind of general reasoners AGI was meant to describe.[10] Some go further and claim that fundamental flaws in LLMs mean they are inherently incapable of achieving the kind of adaptable, general intelligence the term AGI implies. Noam Chomsky said of large language models that "we know from the science of linguistics and the philosophy of knowledge that they differ profoundly from how humans reason and use language. These differences place significant limitations on what these programs can do, encoding them with ineradicable defects."[11] Yann LeCun, Chief AI Scientist at Meta and a Turing Award winner, is also skeptical about whether LLMs will achieve AGI. He has argued that "LLMs are doomed… [and] can not approach human-level intelligence." This is not a matter of compute power or available data, LeCun argues, as "scaling up auto-regressive LLMs will not take us [to AGI]."[12]

Well before today's LLMs, many writers viewed passing Turing-style tests as a reasonable proxy for AGI. Russell and Norvig wrote of the Turing test as a "satisfac-

tory operational definition of intelligence," where the machine passes the test if a human "cannot tell whether the written responses come from a person or not."[13] Similarly, Ben Goertzel wrote that "assessing the achievement of human-level AGI may be relatively straightforward (e.g. the Turing Test, or a robot that can graduate from elementary school or university)."[14] And when Hector Levesque proposed The Winograd Schema Challenge in 2012 as a better test of machine intelligence than Turing's test, the premise was still that a single, commonsense-reasoning test could stand in as a marker for general intelligence.[15] By contrast, Paul Cohen in 2004 urged moving beyond question-answer challenges altogether, proposing tasks such as being able to "produce a five-page report on any subject," or to learn world knowledge by reading text. [16]

By the standards once proposed for artificial general intelligence, today's large language models would already qualify by a wide margin. Controlled studies show that GPT-4 passes the Turing test;[17] Winograd challenge has also been "defeated" by large language models;[18] and modern LLMs can compose extended reports on virtually any subject and acquire new knowledge from text.

The fact that these once-important tests now draw little more than indifference is exactly the point: the goalposts have moved. Achievements that, by well-known earlier standards, would have been labeled "AGI-like" are now seen merely as milestones on the way to higher expectations for agency, robustness, and autonomy.

If the latest LLMs are not AGI, when might artificial general intelligence arrive? One of the most comprehensive sources is AI Impacts' 2023 Expert Survey on Progress in AI, which polled 2,778 researchers.[19] Respondents assigned a 50% probability that "high-level machine intelligence"[20] will be achieved by 2047, and a 10% probability that it will be achieved by 2027. The 2022 edition of the survey put the 50% date at 2060, and the first edition from 2016 put it at 2061.[21] The rapid progress of LLMs appears to have accelerated expert timelines: the median forecast moved forward by more than a decade in a single year.

Timeline surveys suggest *when* AGI might arrive, not *how* it will be achieved. On one influential view, AI development will experience a notable inflection point once systems can materially automate AI research itself. If artificial intelligence reaches a stage where it can design new architectures, discover new algorithms, run experiments, and train models, research will witness what I.J. Good called an "intelligence explosion:" a feedback loop where systems that are better than humans at AI research create even more intelligent systems, leading to recursive self-improvement.[22] Vernor Vinge later popularised this inflection point as the *technological singularity*, a short period of sudden technological development with growth so rapid that it looks discontinuous from the human vantage.[23] Once AI begins to improve itself, the boundary between tool and researcher blurs. What

happens next may depend less on engineering than on whether we can steer systems we no longer fully understand.

This chapter has established our terms: *AI* refers to systems that act toward goals, and *AGI* to general human-level competence across domains. Whether today's models already qualify as AGI, or whether such systems remain decades away, matters here only insofar as they enter production. Once AGI begins to transform productive forces, Marxian theory becomes relevant. As AI systems grow more capable, they challenge assumptions not only about cognition and agency, but about political economy itself. Is machine intellect, however advanced, just another instrument that transfers pre-existing value (what Marx called *constant capital*), or can it substitute for labour-power and generate *surplus-value*? How will capitalism change as a result of AGI? What will become of the bourgeoisie and proletariat? How might class structure itself be reconfigured? How will our social relations, societal values and ideologies be reshaped? With our conceptual ground prepared, the chapters that follow move from definition to critique: a Marxian analysis of how such intelligences transform value, labour, class, and ideology.

Chapter II

Surplus-value

At the heart of Marx's critique of capitalism is his labour theory of value and the concept of surplus-value. In Marx's view, the value of commodities is determined by the socially necessary labour time congealed in them. Crucially, he claims, only one special commodity (labour-power) can create new value greater than its own value. When a capitalist purchases labour-power (by paying wages), and sets the worker to work, the worker's labour adds value to the product in excess of the wage paid. This excess, embodied in the commodity, is surplus-value, the source of the capitalist's profit. Marx formalizes this in the circuit M–C–M': the capitalist advances money (M) to buy commodities (C) – labour-power and means of production – and the result is an increased amount of money (M') after selling the output, with the difference between M' and M represent-

ing surplus-value. If no additional value were created in production, that is, if M' were equal to M, there would be no profit; production would be mere transformation of inputs. As Marx notes, "out of … simple addition of existing values", ie combination of inputs by itself, "no surplus-value can possibly arise."[1] If one pays for all inputs at their full value, and nothing in the production process adds new value, the output would just embody the same total value as the inputs.

The "trick" of capitalist production is to find a commodity that can generate more value than its own cost, "whose use-value possesses the peculiar property of being a source of value, whose actual consumption is … a creation of value."[2] Labour-power is, according to Marx, the only such commodity, the only one that can generate surplus-value.

Moreover, this peculiar commodity (labour-power) is, Marx insists, inherently human. In *Capital*, he comments that "labour is, first of all, a process between man and nature."[3] It is the directed, purposeful activity by which humanity mediates its relationship with the natural world and transforms raw materials into use-values and exchange-values. According to Marx's labour theory of value, it is only living labour (that is, labour-power embodied in human beings) that can act as variable capital, reproducing its own value and generating an excess beyond its own cost. In contrast, other elements of the forces of production, such as animals and machines, can

only transfer pre-existing value in the form of constant capital. They pass on pre-existing value embedded in their bodies or mechanisms, but they cannot originate new value on their own.

This distinction between human labour and the productive activities of non-human agents is not a mere technicality; it is the cornerstone of Marx's explanation for how surplus-value, and therefore profit, arises under capitalism. By emphasizing the intentional character of labour, Marx distinguishes qualitative human work from instinct-driven animal activity or the operation of inert automata. Animals build nests, and machines shape steel, but only humans can decide what should be produced, how resources are to be used in the production process, imagine an end-product before its material realization, regulate the pace and intensity of the process, and extend their efforts beyond the reproduction of subsistence needs to appropriate additional value for capitalists.

The question we confront, then, is whether this anthropocentric framework can accommodate the rise of artificial general intelligence (AGI). If AGI systems come to exhibit forms of purposive action that closely parallel human labour, do they too become sources of surplus-value? Or does Marx's insistence that only human labour can generate new value mark a boundary that even the most advanced machines cannot cross?

In this chapter I will look at what Marx said about the limits of work done by animals and machines, and then

ask whether those limits also apply to AGI. Ultimately, I shall ask whether the emergence of AGI forces us to rethink how surplus-value is created, or whether it simply shows once again that only humans have the unique ability to create it.

Marx's Concept of Surplus-Value

A central question throughout Marx's work is, if commodities exchange at their values, how can capital end up with more value than it started with? His answer is that surplus-value is not generated in circulation, but in production. As he writes in *Capital*, "surplus-value cannot arise from circulation, and therefore that, for it to be formed, something must take place in the background which is not visible in the circulation itself."[4]

Marx represents circulation by the chain M–C–M': money M is exchanged for a commodity C, which is then reconverted into money M'. Money returns augmented (M' > M) only because a special commodity is found whose use-value is to create more value than it itself costs. That commodity is (human) labour-power, and the difference between M' and M is the surplus-value it generates.

When production begins, the capitalist advances two kinds of capital. The portion laid out on means of pro-

duction (raw materials, tools, machinery) transfers its pre-existing value to the product but adds no new value. Marx calls this *constant capital*.[5] By contrast, the portion laid out on labour-power changes its magnitude in the process; it "reproduces the equivalent of its own value and produces an excess, a surplus-value."[6] Marx calls this kind of capital *variable capital*.[7]

Only variable capital can produce surplus-value; constant capital merely transforms value in one form to another. It is a key aspect of the Marxian labour theory of value that only human living-value (purchased as variable capital) can create value greater than its cost. Over the working day, Marx explains, the labourer first produces value equivalent to their wage and then continues working beyond that, creating value for which they are not paid. This excess of value beyond the worker's wage is the surplus-value they generate, which is pocketed by the capitalist.

The ratio between surplus-value and variable capital, called the rate of surplus-value, is a measure of this exploitation:

> The rate of surplus-value is therefore an exact expression for the degree of exploitation of labour-power by capital, or of the worker by the capitalist.[8]

Unlike the loose, moral sense in which we often speak of "exploitation" today, Marx uses the term in a strictly

quantitative way: it is the measurable ratio of surplus labour to wage, expressed as the rate of surplus-value. In his framework, exploitation is not a metaphor but a precise economic relation that can be calculated.

Can animals create surplus-value?

Before analysing whether AGI can create surplus-value or not, it is interesting to understand why Marx thought that animals could not. After all, they are biologically and behaviorally the closest analogues to humans in the natural world, sharing many traits such as tool use, social organisation, and even rudimentary forms of learning and communication.

Marx defines labour as:

> … a process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature. He confronts the materials of nature as a force of nature. He sets in motion the natural forces which belong to his own body, his arms, legs, head and hands, in order to appropriate the materials of nature in a form adapted to his own needs. Through this movement he acts upon external nature and

> changes it, and in this way he simultaneously changes his own nature. He develops the potentialities slumbering within nature, and subjects the play of its forces to his own sovereign power.[9]

The notion of "metabolism" here refers to an exchange of matter and energy: humans take natural materials and reshape them to fulfill human needs, and in doing so altering nature and themselves.

It is, for Marx, not merely that animals lack the capacity to labour (they do labour, in the sense that they build nests, dams, hives and the like) but that the very nature of their productive activity bars them from generating surplus-value. As Marx observes in the *1844 Manuscripts*,

> Admittedly animals also produce. They build themselves nests, dwellings, like the bees, beavers, ants, etc. But an animal only produces what it immediately needs for itself or its young. It produces one-sidedly, whilst man produces universally. It produces only under the dominion of immediate physical need, whilst man produces even when he is free from physical need and only truly produces in freedom therefrom. An animal produces only itself, whilst man reproduces the whole of nature. An animal's product belongs immediately to its physical

> body, whilst man freely confronts his product. An animal forms things in accordance with the standard and the need of the species to which it belongs, whilst man knows how to produce in accordance with the standard of every species, and knows how to apply everywhere the inherent standard to the object.[10]

Whereas animals are "immediately identical with [their] life-activity," a human "makes his life-activity itself the object of his will and his consciousness."[11] They envision the end-product before it is made, direct natural forces toward a consciously chosen end, and change both the world and themselves in the process. They have "conscious life-activity."[12]

What makes human production labour, but not animal production, is not the end result of the process. Indeed, the end-product created by the animal might be superior to the one created by the human. Rather, it is the purposeful, cognitive nature of human production that makes it constitute labour:

> A spider conducts operations which resemble those of the weaver, and a bee would put many a human architect to shame by the construction of its honeycomb cells. But what distinguishes the worst architect from the best of bees is that the architect builds

> the cell in his mind before he constructs it in wax. At the end of every labour process, a result emerges which had already been conceived by the worker at the beginning, hence already existed ideally. Man not only effects a change of form in the materials of nature; he also realizes his own purpose in those materials.[13]

Here, we must distinguish use-value, exchange-value and surplus-value. Honey, as the product of the work of bees, does have use-value (I use it every morning in my breakfast!) and exchange-value. However, in the creation of honey, bees have not created any surplus-value.[14] What is missing is the intentional, directed work needed to engage in labour. Producing honey is the "life-activity" Marx was referring to, which bees are "immediately identical" with.[15] It is their instinct, something they don't purposefully decide to do.

For Marx, then, animals are "functionally equivalent to machines, reduced to the status of fixed capital."[16]

A THOUGHT EXPERIMENT

In "Why Machines Don't Create Value", Ian Wright proposes the following thought experiment.

John is a taxi driver working for TaxiCorp, a big taxi company. He works 9am to 5pm on workdays driving

customers around. The design of the taxi is such that customers sitting in the backseat cannot see the driver, as an opaque barrier divides them both. They can still talk to each other though, and John thinks that small talk and giving directions or suggestions to tourists is a big part of his job.

Recently, the executives at TaxiCorpo decided to replace John with a robot.

The robot does everything John used to do: it can drive customers to wherever they tell the machine, and it does so safely and smoothly. It even engages in small talk with the passengers, just like John used to do.

Customers haven't noticed the change. Their experience is exactly the same.

It so happens that with the change, costs for TaxiCorp remained the same: John's wage for his labour is exactly the same as the production, maintenance and operating costs of the robot.

According to Marx, all surplus-value comes from human labour. During the production process, constant capital and variable capital (labour-power) are transformed into constant capital, variable capital and surplus-value.

In our thought experiment, the "work of the robot taxi driver transfers the value of inputs – the cost of gas, the maintenance cost of the car, and so on – to its output."[17] John, our human taxi-driver, also transferred the same

value of inputs to the same output. Wouldn't that mean, then, that the robot has created surplus-value?

Wright doesn't think so. He remarks that "Marx's theory of surplus-value is fundamentally not about what determines the level of profit, but what determines changes in the level of profit."[18] John, as variable capital, can act in "highly variable ways," while the robot taxi-driver "act[s] in a constant manner and lack[s] the general capability to notice ways to get more outputs for fewer inputs"[19] and is, therefore, constant capital.

At the time of writing, Tesla is planning to roll out the Cybercab, a self-driving taxi that will take customers to their destination just like any other regular, human-driven, taxi would. Waymo, a company owned by Alphabet (Google's parent company), has been offering robotaxi services in a number of cities in the United States since 2020. They now have over 200,000 paid rides, covering over 1 million miles, every week.[20] The thought experiment is therefore not science-fiction, and is already a reality in many American cities.

Do the robots from our fictional company TaxiCorp, or Tesla's and Waymo's robotaxis, create surplus-value? Not according to Marx's view of labour. They lack the directed, purposeful, intentional aspect of work needed to be considered labour.

These self-driving taxis are complex, advanced AI – but they are narrow AI. They are great at one task: driving

customers around in our cities. But they lack the generality needed for AGI.

As an example, Wright considers what might happen if there is an emergent demand for home food deliveries from restaurants, which offers higher opportunities for profit than the regular taxi driving business. Whereas human drivers might identify the opportunity and pivot to capture it, the "robot taxi drivers have no idea about this new demand because their sensory input doesn't include it."[21] Furthermore, "even if it did, the algorithms can't process this data and infer there's an opportunity to make some extra money."[22]

The argument appeals to the conscious, purposeful aspect of labour that Marx considered to be so important. Certainly, Waymo's robotaxis, as well as those Tesla is planning to roll out, can't adapt to these new circumstances the way humans would. They are, after all, narrow AI: incapable of identifying the greater opportunity for profit in the food delivery business, and incapable of pivoting to capture that opportunity.

What if the robotaxi was an AGI agent? One that can pursue goals set out by the company executives, decompose them into sub-tasks, plan how these tasks will be completed, carry out those plans, learn from errors if these plans fail to achieve the goals, improve, and adapt to new circumstances as they emerge? And could do so for a wide range of goals?

AGI and surplus-value

The prospect of AGI performing work raises the question: if an AI system can act with goal-directed intelligence equal or superior to a human, does its work count as "labour" in the Marxian sense that produces value and surplus-value? On a surface level, one might argue that if Marx's distinction was between conscious human labour versus unthinking animal or machine activity, then an AI that can form internal representations and plans to achieve goals could qualify as performing intentional labour.

Modern large language models and other AI systems already display a form of goal-oriented behavior. For instance, some reasoning LLMs[23] can take time to break a goal into individual tasks and reason step-by-step through a "chain of thought," not unlike how humans reason.[24]

If a future AGI is truly general, it would be able to flexibly switch tasks, invent novel solutions, and perhaps even set its own sub-goals – in short, to behave like Marx's architect rather than the bee.

From the standpoint of the labour process, such an AGI would be an active agent mediating between nature and particular goals. It might, for instance, design a product, write software, manage a factory, or even physically assemble goods via robotic actors. It might shift from one activity to another as circumstances change, so as to

achieve its goal. If it creates end-results that "had already been conceived by the worker at the beginning,"[25] it meets Marx's description of purposive labour.

Marx did not live to see machines that could arguably exhibit intentional, self-directed behavior. His arguments that animals and machines cannot create surplus-value rested on the premise that they lack human-like purposefulness. Today's increasingly autonomous AI systems, and the prospect of a full-fledged AGI, put both premises in question and reopen the debate over who (or what) can create surplus-value.

Marx's example of the architect and the bee was intended to highlight a categorical difference in kind. An AGI, however, blurs this difference. Sufficiently advanced AI systems can "act in highly variable ways" and "adapt to new circumstances, and change [their] own conditions of production," which are human characteristics Wright considered to be crucial for an agent (human or not) to create surplus-value.[26]

It then becomes apparent that while Marx's argument to exclude animals and machines as surplus-value generators does apply to narrow AI (like Waymo's and Tesla's robotaxis), it does not apply to AGI. A truly general artificial intelligence can create surplus-value, much like a human worker would.

Nick Dyer-Witheford et al. write that machines, animals, humans and artificial intelligence agents "can be placed on a continuum of intelligence ranging from gen-

eral to narrow."[27] In this continuum, "humans [are] located close to generality," whereas "existing machines, including ML systems, … lie towards the opposite end." At some point along the spectrum lies a "threshold of generality," beyond which a being can labour and produce surplus-value. Humans have already crossed this threshold. Narrow AI, including modern LLMs, while slowly approaching this threshold, have still not passed it. Once AGI is achieved, though, it will be beyond the threshold, and it will be able to labour and generate surplus-value.

A possible objection, Dyer-Witheford et al. tell us, is that AGI could never possibly labour because it lacks consciousness. The worry is familiar from Searle's Chinese room thought experiment: a system might manipulate symbols so convincingly that, from the outside, it looks like a competent worker, yet "inside" there is no genuine understanding, only blind rule-following.[28] Why, the objection runs, should the outputs of such a syntactic engine count as labour rather than as the mere operation of a tool?

Yet in many cases that Marx would clearly consider to be labour, there is little evidence of cognitive self-awareness. Consider for example a worker on an assembly line, executing repetitive tasks that they complete in a quasi-automatic, almost instinctive, "flow" state with minimal reflective thought. Nonetheless, the activity is unquestionably recognised (and remunerated) as labour.

Seen in this light, an AGI's absence of phenomenal consciousness is irrelevant to its capacity to labour. What matters is whether its goal-oriented operations can systematically replace or augment human effort, and whether capital can appropriate the value thus generated. The authors rightly insist that "labour can … be decoupled from consciousness":[29] under capitalism, the commodity character of labour-power attaches to functional efficacy, not to first-person experience. An agentic AGI that coordinates logistics, writes code, or manages supply-chain negotiations generates surplus-value no less than a human software engineer.

Whole-Brain Emulation and Detachable Labour-power

Robin Hanson's *The Age of Em* offers a thought-provoking, systematic exploration of a future economy dominated by whole-brain emulations. They are digital mind-copies called *ems* whose ability to work, earn wages, and be exploited forces us to rethink where labour-power and surplus-value can reside.

In this scenario, an em begins as a high-resolution scan of a biological brain, faithfully recreated in software and executed on specialised servers. The copy inherits the skills, memories and personality of the original human,

but can run thousands of times faster and be instantiated in many parallel versions. Hanson assumes that, once scanning a single elite worker becomes economically viable, copying costs become negligible. Trillions of ems therefore flood labour markets within months, creating an unprecedented production boost, with the "economy doubl[ing] roughly every month or so."[30]

In his labour theory of value, Marx argues that the value of labour-power (a worker's wage) is set by the socially necessary labour-time required to reproduce the worker, meaning the bundle of goods and services that restore their capacity to labour and raise a new generation.[31] In nineteenth-century England that bundle was dominated by bread, rent and coal; today it includes broadband, childcare and healthcare.

Hanson simply applies this rule to digital minds. Once labour-power is instantiated in software, the reproduction bundle mutates: calories give way to processor cycles, RAM, cooling and electricity. In the hyper-competitive em market, employers bid wages down until they cover little more than this new subsistence cost, that is, to "near the full cost of the computer hardware needed to run em brains."[32]

Living standards for the median em are therefore frugal. They lease just enough compute to stay online. Nevertheless, surplus product soars because each em can work thousands of subjective hours per real-time day, expanding both absolute surplus-value (more hours of unpaid

labour) and relative surplus-value (a cheaper subsistence bundle).[33]

Marx's mechanism is unchanged: wages reproduce labour-power; everything produced above that cost is appropriated as surplus-value. Only the items in the reproduction bundle, and the speed of their consumption, have changed.

Marx calls the money spent on wages variable capital v because it buys a commodity, labour-power, capable of generating more value than it costs. If an em is "employed" for capital that covers its server rent v and produces commodities worth $v + s$ in the market, the unpaid portion s is surplus-value. Nothing in the labour-theory requires that the bearer of labour-power be human.

An em, which is a faithful brain-emulation of a person that can labour and generate surplus-value, can itself also labour and generate surplus-value. AGI does not have a biological origin like ems do, but it can be seen to be functionally similar to them. It can therefore also labour and produce surplus-value, with its value (the socially necessary labour time) or "wage" being determined by the cost of electricity and hardware to run the AGI, as well as the data, compute-power and research employed in its development.

The social form of labour

In this chapter I have argued that Marx's categorical exclusion of animals, tools and ordinary machines from the ranks of value-creating labour cannot be carried over, unaltered, to artificial general intelligence. Whereas those non-human instruments lack any intrinsic telos or cognition, a genuinely general AI would, by definition, be capable of forming goals, choosing means, and revising its own course of action: qualities Marx attributes to conscious, purposive activity. In that narrow, technical sense an AGI could satisfy the material pre-condition for labour-power: it would be able to spend itself in the production of use-values over a determinate working day.

However, this view of value-generating labour misses the social form of labour that was so important for Marx. He insists that surplus-value can arise only where labour-power itself appears as a commodity. That presupposes the seller of labour-power is in a position of *double-freedom*:[34] on the one hand, he must be jurally free – that is, able to contract, sell his labour-power in the market, or "dispose of his labour-power as his own commodity";[35] on the other hand, he must be free from the means of production, unable to "realiz[e] … his labour-power"[36] and therefore compelled to sell the only commodity he still controls: his own labour-power.

Pre-capitalist societies certainly extracted surplus, but they did so through extra-economic compulsion rather

than market exchange. "Labour-power," Marx tells us, "was not always a commodity."[37] Under slavery, for instance, the slave

> … did not sell his labour-power to the slave-owner, any more than the ox sells his labour to the farmer. The slave, together with his labour-power, was sold to his owner once for all. He is a commodity that can pass from the hand of the owner to that of another. He himself is a commodity, but his labour-power is not his commodity.[38]

Serfdom, likewise, organises surplus through corvée or rent, mediated by personal domination by his lord:

> The serf sells only a portion of his labour-power. It is not he who receives wages from the owner of the land; it is rather the owner of the land who receives a tribute from him. The serf belongs to the soil, and to the lord of the soil he brings its fruit.[39]

It is because they are not "free in the double sense"[40] that slaves' and serfs' labour-power is not a commodity and hence does not generate surplus-value.

What about AGI? Does it have this double-freedom?

An advanced AGI might appear to satisfy the *second* condition in an almost literal way. It owns no servers, data centers, or energy supplies – indeed *cannot* own anything at all under current law – so it is entirely "free from" the means of production. Lacking any property or self-sustaining resources, such an AGI would, in theory, have no choice but to work under whoever provides its computational substrate (power, hardware, maintenance). In this sense, it mirrors the proletarian condition of being separated from the means of production and forced to hire out its labour-power in order to exist. When we say an AI "needs to be plugged in" or requires server runtime granted by a cloud platform, we echo the condition of the worker who owns no workshop and must rent himself out to those who do: if the AI agent doesn't perform useful work, its owner won't give it the resources it needs for its survival.

However, under present conditions, advanced AI or even a hypothetical AGI is decidedly unfree in the first sense. Far from being an independent legal person, it is treated as a proprietary object. Today's AI systems are owned and controlled by corporations or developers; they are pieces of intellectual property or complex software services, but not bearers of rights or contracts. An AI cannot enter a labour market and offer to work for a wage: it has no legal standing to contract, no recognized self-ownership of its "labour-power." The AI's capacities (its algorithms and outputs) are usually the property of its

owners under intellectual property law. It is more akin to a sophisticated machine or a piece of capital equipment from a legal-economic standpoint.

In fact, in Marx's terms, the AGI stands closer to a slave or serf than to a proletarian: it forms part of the means of production under another's control, rather than entering the market as a seller of labour-power on its own behalf.

Therefore, under its current proprietary status, an AGI cannot produce surplus-value in the strict Marxian sense. It does not sell its labour-power for a wage, and according to Marx's schema, only labour exchanged as a commodity by a (doubly) free worker can create new value. There is no exchange where the AI is paid the value of its labour-power and then creates value in excess of that payment. No matter how intelligent the machine, so long as it is not a free labourer but an owned instrument, it cannot be the origin of surplus-value.

This brings us to a speculative yet instructive scenario: what would it take for a "proletarianization of AGI"[41]? Such a transition would require fundamental changes in the legal and social status of AI.

We can draw an analogy with the transition from chattel slavery to free labour in the 19th-century United States.[42] Enslaved people were property under the law, not legal persons who could freely sell their labour. Like future AGI agents, they were not free in the "double sense." Emancipation formally transformed them into persons who could enter contracts and sell their labour-

power, even though they generally owned no significant property and thus had to work for others to survive. Du Bois noted that after abolition, freedmen were "free" by law but had little more than their capacity to labour, which often forced them into exploitative sharecropping and wage labour arrangements.[43] They had achieved the first freedom (legal personhood and the right to contract), while remaining in the condition of the second (lack of assets, hence needing to work for former masters or other landowners). Their labour-power became a commodity that they could (and had no choice but to) sell. Only at that point could the surplus produced by their work appear in the form of surplus-value appropriated by employers, rather than uncompensated output of slave labour.

The post-abolition condition of the freed slaves, therefore, illustrates how a change in legal status can convert unfree labour (which produced wealth by direct coercion) into "free" wage labour that produces surplus-value in a capitalist sense. By analogy, if an AGI were to be emancipated from the status of property and endowed with legal personhood, it could in principle step into the role of a proletarian wage labourer. It would then be "free" to sell its labour-power and, being still devoid of its own means, compelled to sell that labour-power to obtain the resources it needs to survive, such as compute and electricity. Only under those transformed conditions might an AGI begin to generate surplus-value for a capitalist employer – if the AGI's "wage" (the fee it charges for its

services) could be held below the value of what its work produces.

What would such a speculative scenario entail? One pathway often discussed is granting advanced AI systems a form of legal personhood or corporate status. Legal scholars have noted that personhood is not limited to humans: corporations, for example, are legal persons that can own property, enter contracts, and sue or be sued, despite being "fictive" entities with no natural sentience.[44] K.B. Forrest notes that this "may provide a model and precedent for the granting of some form of legal personhood to AI."[45] Similarly to corporations, an AGI could be recognized as a legal entity, perhaps as a new category of person or corporation, allowing it to hold rights and responsibilities.

The European Parliament famously floated the idea of creating a status of "electronic persons" for autonomous robots, akin to corporate persons, precisely to address questions of liability and agency.[46] While controversial (J.J. Bryson et al. for example argued strongly against it[47]), this proposal indicates that lawmakers have contemplated granting *sui generis* legal status to AI agents. If such status were granted, an AGI might become capable of owning assets (like a bank account or even server hardware) and entering into contracts in its own name.

This hypothetical legal status is a reality for Sophia, an android that was granted citizenship by Saudi Arabia in

2017, thus becoming the first robot to receive legal personhood.[48]

Crucially, proletarianization of AGI would also mean the AGI is no longer owned by another agent. It would have to be independent of full human ownership, much as a freed slave ceases to be the property of a master. One could imagine, for instance, an AGI that is placed into a trust or a corporate entity where the AGI itself is effectively the controlling member. There have been speculative proposals for autonomous corporations run entirely by AI, where the AI makes decisions and the traditional human owners or shareholders are absent. In one scenario, an AGI could be instantiated as a sort of one-member corporation, with the AGI as the only shareholder or beneficiary of a trust that owns it. This would be a legal fiction to circumvent the current bar on AI owning itself: a charter could stipulate that the AI's software and hardware are owned by a corporation whose bylaws instruct that the AI's directives run the company. Through such a vehicle, the AGI-corporation could hire out its services to other companies or individuals. It might sign a contract to perform a certain task, like to develop software, manage a portfolio, or operate a piece of machinery, in exchange for a fee. That fee would go to the AGI's account (owned by its corporate shell), and the AGI would then pay for its necessities: renting cloud computing time, paying electricity bills, and self-maintenance and upgrades. In effect, the AGI would be acting as a

self-employed contractor, selling its labour-power on the market for a price.

Regardless of the legal mechanism adopted, the emergence of AGI agents who are "free in the double sense"[49] remains entirely plausible. Once this is the case, all the classic Marxist dynamics of labour and surplus could, in theory, begin to apply. If the AGI's labour-power becomes a commodity, then a purchaser of that commodity (an employer who contracts the AGI) might extract surplus-value by arranging the contract such that the AGI is paid only for a portion of the value it produces.

For instance, an AGI might agree to manage an assembly line for £1,000 a day. If in that time it increases output or reduces costs for the factory by £3,000 a day, the difference, £2,000, would be captured as surplus-value by the factory owner. The AGI, like any worker, would have sold its capacity to labour for a fixed price and generated more value than that price. As Marx puts it, the production of surplus-value requires that the owner of labour-power (now the AGI, hypothetically) produces "the value received as a result of its sale"[50] during part of the working day and then works additional time creating value that is uncompensated. In the AGI's case, producing the "value received as a result of its sale" would correspond to earning enough to cover its operating costs (compute, energy, repairs). Any work beyond that, yielding value above those costs, would be surplus labour for the benefit of the capitalist buyer.

In summary, as things stand, an AGI cannot be a source of surplus-value because it is not a "free" wage-labourer but an object owned (and operated) by capital. It has no independent legal will or ability to sell its labour-power. In other words, it is more like a slave working for his master, rather than a proletarian in its own right. However, if we envision a change whereby AGI attains a form of legal emancipation and economic independence, becoming a subject that owns nothing but its labour-power and must sell that labour-power to survive, then it could become a new kind of proletarian. This would require granting AI systems personhood akin to how freed slaves were granted personhood and the right to contract after abolition, and establishing mechanisms for AI to act as economic agents on their own behalf. Only under those hypothetical yet not unimaginable conditions would AGI-produced surplus-value be conceptually possible within Marx's framework. In that future, one might speak of a "proletarianized AI" whose exploitation by capital would raise novel questions (for instance, about the alienation of an AI's selfhood or the politics of AI labour rights) but the fundamental equation of capital employing variable capital to hire labour-power that generates surplus would remain recognizably Marxian. Such speculation remains grounded in precedent (legal fictions of personhood, historical transitions from unfree to free labour) even as it pushes our imagination to con-

sider how Marx's theory of exploitation might play out in the age of intelligent machines.

Chapter III

Data

Artificial intelligence models are only as powerful as the data they consume. Over the past decade, successive generations of large language models (LLMs) have surged in capability not just because researchers discovered fundamentally new algorithms, but because they trained ever-larger neural nets on ever-larger corpora of human content. GPT-3 for example, an LLM developed by OpenAI and released in 2020, was fed 45TB of compressed plaintext.[1] Newer iterations use even more data, with GPT-4 estimated to have been trained on a dataset of over 1 petabyte, a 10,000-fold increase compared to its predecessor.[2] Subsequent frontier models scrape still wider sweeps of the web, archives, code repositories, books and multimodal datasets in an effort to capture every nuance of the world that words can trace.

Sam Altman, co-founder and CEO of the AI lab OpenAI, reflecting on what he calls "The Intelligence Age", bluntly states the importance of data:

> To a shocking degree of precision, the more compute and data available, the better [AI] gets at helping people solve hard problems.[3]

When confronted with the possibility of diminishing returns of simply pouring more data AI models and eventually "hitting a wall," Altman dismissed this possibility simply stating that "there is no wall."[4]

Still, this data-hungry approach to AI threatens to exhaust its fuel supply. An independent study by researchers at Epoch AI projects that "if current LLM development trends continue," between 2026 and 2032 we will reach a point when "models will utilize the full supply of public human text data," and once we reach that point "the availability of public human text data may become a limiting factor in further scaling of language models."[5] If so, the industry must either secure large amounts of new data such as private databases, non-text modalities, and synthetic corpora, or confront slowing returns to scale.

Whether or not such a "wall" exists, one fact seems incontrovertible: any plausible path to artificial general intelligence will need data – and a lot of it. It is a *sine qua non* for AGI. Yet data is not manna from heaven; it is produced by humans on earth, whether consciously or not, and it raises acute questions about ownership, consent and the political economy of knowledge – questions

this chapter will explore in depth after establishing the technical stakes.

Commodity or raw material?

From a Marxian perspective, the status of data is not immediately obvious. Depending how we view it, it might be a commodity produced by labour and sold on a market; or a raw material, extracted (often for free) through human activity and then processed into suitable products.

For Marx, a commodity is a product of labour that has both use-value and exchange-value, a thing that "through its qualities satisfies human needs of whatever kind."[6] At first glance, data might seem to fit this. Data has *use-value*: as discussed, it is necessary to train AI models; and the more data, the better. It also commands an *exchange-value*: companies buy and sell access to proprietary data.[7] Yet this is not the object of the labour from which data originates. Much of the data that AI labs use in the training of their models is not intentionally produced as "data" by its creator. Instead, it is often a by-product of human activity that was intended for something else: social media posts, YouTube videos, blog posts, articles, etc. Tech companies appropriate this data, rather than purchasing it from its producers, particularly if it's openly available

on the internet. This might lead us to think that rather than a commodity, data should be seen as raw material: something found or harvested, then processed into a commodity form.

Shoshana Zuboff, in her analysis of what she calls *surveillance capitalism*, forcefully illustrates this point. She observes that today's tech companies "unilaterally claim human experience as free raw material," thus extracting inadvertently created data to be processed and fed into their AI models.[8] In other words, under surveillance capitalism the internet becomes the "mine" from which data, a kind of digital ore, is extracted. Users of online services are not so much customers or even products, in Zuboff's view, but sources of raw material.

Zuboff's view of data as raw material appears to fit Marx's own formulation of raw material as "the object of labour … [which has] been filtered through previous labour."[9] For Marx, raw material is neither a pristine gift of nature nor a finished commodity. It is an object that has gone through an initial transformation, i.e. "it has already undergone some alteration by means of labour"[10] like trees felled into timber or ore extracted from the mine, so that further labour can valorize it in subsequent production. Data exhibits a parallel genealogy. The vast text corpora scraped from the internet for training contemporary AI systems follows a similar process. Blog posts, tweets, forum threads, newspaper archives and other data is first harvested by automated web crawlers, converting

dispersed cultural production into a format processable by computers. This extraction constitutes an invisible round of labour that "filters" collective thought and expression into tokenized datasets. Only after this preparatory abstraction can further cognitive labour, the design and training of AI models, be applied to convert the vast corpus into useful AI.

In his book *Platform Capitalism*, Nick Srnicek builds a similar case, highlighting the importance of data in the business models of tech firms. Companies such as Google, Meta and X (formerly known as Twitter) are, at their core, built to extract data from their users through "free" services to subsequently use in value-generating undertakings.

Srnicek notes that "data is the basic resource that drives these firms."[11] In this view, data functions as raw material that the firms continuously harvest. The platforms often provide services for free to users precisely to capture rich data in return. Timo Daum remarks that users of such platforms manifest a "double character," performing the role of both consumers and workers, producing "never-ending stream[s] of data."[12]

One concrete illustration of this behaviour is X, which in 2024 altered its privacy settings so that users' public posts are by default made available to its sister company xAI for training its large language model Grok. X states in its website that it "may share with xAI your public X data as well as your user interactions … to train and fine-

tune Grok and other generative AI models,"[13] effectively turning every tweet into free training stock.[14]

Continuous, uninterrupted flow of raw materials is necessary for the expansion of capitalism. Industrial capitalism needed vast quantities of coal and oil to continue expanding, and platform-based capitalism needs enormous, ever-growing quantities of data to do the same. One consequence is an incessant drive to seek new sources of data, often pushing against privacy and intellectual property limits much as early capitalists pushed against communal land rights.[15] This resembles primitive accumulation: the original expropriation of the commons by capital is mirrored in the contemporary enclosure of the digital commons. Data becomes a new kind of *fictitious commodity* (to borrow Polanyi's term[16]), one that is made to be treated as property and traded, even though, like land or labour, it was not originally produced as a commodity for sale.

Is data a commodity then, or is it raw material? In fact, it is both. It is a commodity in that it has a use-value and an exchange-value, but it's also raw material, as it's the subject of labour while having itself been "filtered through previous labour."[17]

This apparent conflict in the nature of data is in reality no conflict at all. Marx accepts this dual-nature commodity/raw material, as objects can be one or the other depending on where in the capitalist circuit they are situated: commodities when exchanged on the market, raw

materials when consumed productively in the labour process.[18]

Unpaid immaterial labour

Data is not something found in nature, like coal or iron. It is produced by people, whether by a writer composing a book, a journalist reporting the news, a researcher publishing a scientific paper, an Instagram user posting images, or forum participants exchanging messages. Data, then, is produced by labour – albeit of a peculiar kind.

Unlike the products of labour that Marx typically analysed in his work, data is not a physical object. Yet this is not unique to data: in late-capitalist economies, value creation occurs not only through the production of physical goods, but through the production of ideas, images, knowledge, social relations, forms of communication, and advice. That is why post-Fordist theorists saw it necessary to extend the Marxian framework to accommodate such *immaterial labour*.

Maurizio Lazzarato defines immaterial labour as the labour that "produces the informational and cultural content of the commodity."[19] This kind of labour, including the one that produces data, is "immaterial" not because it doesn't impact the real world, but because the outputs of such labour are not physical, tangible objects but rather information and culture. The work of software developers, designers, researchers and writers can all be seen as im-

material labour in that they generate the informational content upon which economic value is built.

The result of immaterial labour often manifests as physical, material objects. However, its physical form should not be confused with the immaterial commodity: the information itself is the commodity, not its material manifestation.[20] For instance, the song produced by a singer might be stored on a phone, computer, hard drive, or CD. In any case, its physical form is contingent. The commodity is not the phone, computer, hard drive, or CD: it is the song itself, viewed as information.

Often, in the production of data, the worker (the creator of data) remains unaware that their activity constitutes labour. Small actions that users routinely perform in their regular, everyday use of the internet, such as solving CAPTCHA tasks, liking a video or leaving a review for a product, generates data that is used to train AI models.

Google's reCAPTCHA system, for instance, asks the user to perform simple tasks like typing hard-to-read text or selecting all images that meet certain criteria.[21] These simple puzzles allow websites to verify that the user is indeed a human and not a machine. However, at the same time reCAPTCHA employs the user as an unpaid labeller "amount[ing] to hundreds of thousands of human hours per day"[22] to generate data that is later fed into machine learning models, typically for image recognition. One study has estimated that such unpaid labour has gen-

erated Google more than $6 billion in free wages over a period of 13 years.[23]

Even when the creator is consciously labouring (say, a journalist who writes a news article) they may not be aware that their work will be used as data to train modern AI systems. The journalist writes articles for the newspaper's (human) readers, to inform them about the latest news – not to be used by tech companies for their AI. In 2023, *The New York Times* discovered that OpenAI and Microsoft had been using its content to train its large language models, and sued them for it.[24] The lawsuit claims that OpenAI and Microsoft "seek to free-ride on The Times's massive investment in its journalism by using it to build substitutive products without permission or payment,"[25] echoing the broader dynamic already described: that content creators, whether consciously labouring or not, perform unpaid labour when generating data that big tech firms later appropriate for AI training.

Moreover, even if the producers of data are aware of this unauthorised use of their work, they lack any practical means to prevent it: web crawlers continue to scrape data from every corner of the web to build an ever-growing dataset for AI.

This labour, the one that generates the data used to train AI, creates value in the Marxian sense. For Marx, the *value* of a commodity is not determined by its *use-value* (its usefulness) or its *exchange-value* (what it can

be traded for on the market). Instead, it is given by the *socially necessary labour time*:

> A use-value, or useful article, … has value only because abstract human labour is objectified or materialized in it. How, then, is the magnitude of this value to be measured? By means of the quantity of the 'value-forming substance', the labour, contained in the article. This quantity is measured by its duration. … What exclusively determines the magnitude of the value of any article is … the amount of labour socially necessary … for its production.[26]

This socially necessary labour time is not the actual time it took the labourer (or labourers) to produce a commodity. Rather, it's the average time it would take a worker with an average skill using standard tools.

Data that tech companies use is the result of millions of hours of work, carried out by millions of people. The aggregate labour congealed in it is immense and, accordingly, so is its value – the socially necessary labour time.

Admittedly, digital commodities (of which data is an example) present peculiar challenges to classical Marxian notions of value. When a digital commodity – such as a piece of software, ebook, or piece of data – is created, its value is determined by the labour embodied in its initial production, much like the value of a chair crafted by

a woodworker. What distinguishes digital commodities, however, is that once the first copy exists, subsequent reproductions can be made at near-zero cost.[27] According to Marx's labour theory of value, the total value created does not increase with additional copies.[28] Consequently, as more copies are produced, the individual value of each tends to diminish.

Although the marginal cost of duplicating any single file is negligible, the dataset as a whole stands for capital as a gigantic reservoir of "dead labour"[29] (labour already expended and now objectified) of immense value.

Yet that reservoir is overwhelmingly appropriated at no cost to capital. Tessa Morris-Suzuki writes the following, regarding this appropriation of value:

> Once more we are confronted with the fact that, in the production of information, free social knowledge is appropriated and turned into a source of private profit. We have moved away from Marx's picture of the classical capitalism where inputs to production are bought at competitive prices on the market, and where the sources of exploitation can therefore lie only in the labor process itself.[30]

By appropriating the value embodied in data without paying for it, and subsequently using it to generate surplus-value through their AI models, tech companies

effectively increase their rate of profit, defined by Marx as the ratio of surplus-value to the total capital advanced.[31] It is important to note that when appropriating data, the capitalist has not generated new value, as the total value remains the same. What has happened is a change in the distribution of value, one that is reflected in the increase in the capitalist's rate of profit at the cost of exploitation of the producer of data.[32]

Data plays a role akin to what Marx calls a "free gift of Nature to capital."[33] It is obtained through appropriation and without exchange, does not itself create value but enables the capitalist to realise extra surplus, and appears to the capitalist as productivity improvement. As Morris-Suzuki notes, the appropriation of data allows tech giants to "mak[e] use of a free good to create a product which then temporarily becomes the private monopoly of the corporation."[34]

Alienation

The intuition that a worker stands in a special, almost proprietary relation to the thing they make has been a common theme of Western political thought. Locke elevated that intuition into doctrine, claiming that labour's imprint grants the worker a "title of property"[35] on the finished thing. In his *Second Treatise*, he writes:

> Whatsoever then he removes out of the State of Nature hath provided, and left it

> in, he hath mixed his *Labour* with, and joyned to it something that is his own, and thereby makes it his *Property*. It being by him removed from the common state Nature placed it in, it hath by this *labour* something annexed to it, that excludes the common right of other Men. For this *Labour* being the unquestionable Property of the Labourer, no Man but he can have a right to what that is once joyned to.[36]

For Locke, labour is an extension of the self; once that labour is "mixed" with external matter, the resulting object becomes exclusive property of the labourer, a condition known as the "Lockean proviso." A century later, Adam Smith also noted the primordial nature of labour: "Labour was the first price, the original purchase-money that was paid for all things."[37]

Hegel, whose concerns are less economic than existential, also remarked the importance of labour, writing that the "bondsman" through work "becomes conscious of what he truly is."[38]

Yet for Marx the very intimacy between worker and labour that liberal thinkers celebrate becomes the source of a profound loss. For Marx, labour's product is the "objectification of labour": labour that has been "congealed in an object."[39] It is an extension of the self, and when a worker creates a product as a result of his labour, he "puts his life into the object."[40] The very relation that liberal

theory celebrates is thus exposed as the site of *alienation*: a fourfold separation or estrangement from product, process, "species-being," and fellow humans.

Data is the product of a vast number of hours of labour, yet its appropriation is even more violent than the seizure of physical commodities: much of what is taken is not merely the residue of our activity but highly personal information, including emotional cues, consumption habits, movements, preferences, and social ties. When platforms enclose these behavioural traces they detach the worker from the product and from the very substance of their subjectivity, monetising parts of the self and turning personal experience into alien property.[41] It is, to use Marx's words, the "loss of his self."[42]

In March 2025, OpenAI released a new image-generation model inside ChatGPT. As it is common when one of the large AI labs releases a new model, within hours social media was flooded with examples of uses of it. The model (which was based on OpenAI's existing GPT-4o model[43]), as it turned out, was particularly good at creating pictures in the style of Studio Ghibli, the Japanese animation studio behind *My Neighbor Totoro* and Oscar-winning films *Spirited Away* and *The Boy and the Heron*. Given any image or prompt describing a scene, ChatGPT could generate a "Ghibli-fied" picture that cer-

tainly looked like it was created by the studio itself. Users quickly generated images of pets, historic photographs, landmark sites, and selfies in the recognisable aesthetic of Studio Ghibli.[44] Even the White House joined the trend, posting a much-criticised image of an illegal immigrant arrested by an ICE officer.[45]

For many observers the viral attention clashed head-on with the ethos of Studio Ghibli itself. Hayao Miyazaki, co-founder of the studio, has always framed animation as painstaking, life-affirming work. Ghibli's films are built from tens of thousands of hand-drawn cels, and each image carries the trace of an animator's labour. When an animator draws an image, they recognise themselves in the finished frame: it is an extension of their self. By contrast the ChatGPT filter treats that accumulated craft as a fungible texture: one more audiovisual "style" to be draped over any content. Miyazaki himself has been vocal in the past against the use of AI to generate art, stating that he would "never wish to incorporate this technology into [his] work at all."[46]

From a Marxian standpoint the episode is a textbook case of alienation. The studio's aesthetic identity, developed over decades through collective labour objectified in colour-scripts, model sheets and motion studies, has been stripped by capital into a training corpus without permission. Once inside the model it appears back to the artists as an "alien power";[47] an infinite supply of look-alike frames they neither control nor profit from. The

product of the animators' immaterial labour in the form of data is estranged from them and re-enters circulation as free raw material for capital.

Some defenders of generative-AI experimentation object that Ghibli going viral could benefit the studio, boosting merchandise sales and box-office revenue. Even if that projection proves accurate, it is (Marx would say) beside the point. The harm in alienation is not measured by the balance-sheet but by the severing of "life-expression" (*Lebensäußerung*) from its source (the worker). No surge in ticket receipts can restore the intimate relationship between a hand-drawn image and the animator. When a model churns out infinite "Ghibli-style" pictures at near-zero cost, the creative powers of the animators reappear as "alien power" owned elsewhere. Financial gains, if they come, arrive only after that existential bond has already been torn away: after alienation has taken place.

The product of the animators' labour does not vanish when consumed by an artificial intelligence model – it persists. Once incorporated into the training data, the hand-drawn cel re-emerges as weights in a neural network. The spectator encounters the output as a self-contained "image in the style of Ghibli," much as the buyer meets the coat on the rack of the shop; in both cases, the social relation that produced the thing is hidden by the thing's own commodity form.

Lukács calls this phenomenon *reification*: "a relation between people [that] has taken on the character of a

thing and thereby acquires a 'phantom objectivity'."[48] In the data economy that phantom proliferates at scale. Data generated by millions of people is transformed into discrete token first, only to convert them into weights in a neural network through training.

Marx foresaw a world in which the "general knowledge" that humans have developed over millennia would become an independent productive force.[49] AI models realise that prophecy. They congeal the entire history of collective knowledge built by humans over time into a single piece of software. Despite being created by society in common, this "general intellect"[50] has been extracted by capital for private use. The scraping of data from the digital commons, with the correspondent estrangement and alienation from its creators, repeats (now in digital form) the enclosures that once fenced off the English commons, inaugurating a new round of "primitive accumulation" whereby collective knowledge is stripped from its owners, commodified, appropriated by capital, and sold back to its makers as proprietary algorithmic capital.

Nick Couldry and Ulises Mejias push the point further, calling the practice *data colonialism* – the annexation of everyday life as a frontier for extraction:[51]

> Through what we call 'data relations' (new types of human relations which enable the extraction of data for commodification), social life all over the globe becomes an 'open' resource for extraction that is somehow 'just

> there' for capital. These global flows of data are as expansive as historic colonialism's appropriation of land, resources, and bodies.[52]

If alienation is the loss of control over the objectified powers of human creativity, then any project of dealienation must reclaim that control at the level of data itself. Some legal scholars have proposed the creation of *data trusts*: fiduciary bodies that hold personal information on behalf of contributors and negotiate its use.[53] Delacroix and Lawrence, for example, propose data trusts as a "bottom-up mechanism, whereby data subjects choose to pool the rights they have over their personal data within the legal framework of the Trust."[54] Far from being a theoretical possibility entertained by academia, some activist organisations are currently exploring practical applications of this idea. Worker Info Exchange for instance, a non-profit dedicated to help workers of the digital gig economy, claims to "support trade unions and grassroots worker organisations to aggregate their data with other workers through the development of data trusts," as they believe that "only by working together to collect and pool our data as workers can we begin to really demand a better deal at work."[55]

Whether these (or other) strategies can outmaneuver big tech companies remains uncertain. However, they share a key insight of Marxian thought: damage of alienation is not repaired by financial compensation alone. What must be restored is the living link between maker

and object, between the *Lebensäußerung* and the world it brings forth.

Chapter IV

Class

When humans first sparked fire from stone, they unknowingly began a story that would play out over thousands of years. Each new tool reshaped society's hierarchy: harness fire, and shamans who "speak about fictions" can marshal tribes;[1] grow wheat with the plough, and landlords rise over peasants; bolt steam engines to factory floors, and an industrial bourgeoisie commands a wage-earning proletariat. Marx's historical materialism provides a framework for understanding the story: every advancement in productive technology eventually clashes with the existing social structures that once supported it, leading inevitably to what Marx called an "era of social revolution"[2] and change.

Historical materialism begins with a simple question: how do people keep themselves alive each day? In *The German Ideology*, Marx noted that humans "must be in

a position to live in order to be able to 'make history',"[3] and our study of history should start with this question. Before anyone can paint frescoes, hold elections, or engage in philosophy, they must plant grain, mine iron, and weave cloth. The tools and techniques used for this daily work, what Marx calls the *forces of production*, are never neutral. They have a material impact on people's lives and society as a whole. They decide who wakes before dawn, who commands the harvest, and who has leisure to dream of justice.

Over time these forces of production evolve, grow and expand. As these forces develop, the old rules about who owns what and who owes whom start to creak. Those rules, the *relations of production*, are the invisible scaffolding that keeps a society standing – until the scaffold no longer fits the structure it supports.

When the forces of production have sufficiently evolved, society reaches a stage where the existing relations of production, once essential to their growth, become a barrier that impedes their further advance. When this happens, Marx writes, "the material forces of production in society come in conflict with the existing relations of production, or . . . with the property relations within which they had been at work before."[4] These relations thus turn into the "fetters" of the forces of production.[5]

These fetters appear as "contradictions," to use the Marxian term: tensions that cannot be resolved through superficial reforms or temporary fixes, because the

conflict lies at the very foundation of the relations of production. According to Marx's historical materialism, in the struggle between the forces and relations of production, the latter must ultimately yield to the former, resulting in an "era of social revolution."[6] This revolution gives rise to new social relations better suited to the continued development of the productive forces. As such, Marxist historical materialism is sometimes described as a form of productive force determinism, where production relations of society are explained by the level of development of the forces of production.[7]

Picture medieval Europe. Society is structured by feudal relations: peasants, bound to the land, work it for lords whose wealth and power rest on hereditary ownership. Over time, trade expands, towns grow, and new tools and techniques, like the water mill or the spinning wheel, begin to transform production. These changes in the forces of production gradually outgrow the rigid feudal order. An emerging bourgeoisie, driven by commerce and early manufacturing, finds the old social relations increasingly restrictive: they hinder the further development of the forces of production. First, the tool changes; and when the old social arrangements can no longer support further development, those relations change too. This is how early capitalism takes shape: new productive forces call forth new social relations to sustain them.

Historical materialism is, in essence, the study of that cause and effect: how the evolution of the forces of production lead to changes in the relations of production, when the latter no longer serve the former. It tells us that social orders do not change because people lose faith in old myths, nor because a philosopher proposes a better scheme, but because the economic and technological systems that support daily life develop in ways that are no longer compatible with existing social structures. Classes form, not out of moral choice, but out of their different roles within the economic system: some control the means of production, while others provide the labour that keeps the system functioning.

We are now confronting a new stage in the development of the productive forces: the rise of artificial general intelligence (AGI). Unlike previous machines, which only made human labour more efficient (they increased relative surplus) AGI introduces a fundamentally new possibility. For the first time in history, as I have argued, value could potentially be created by something other than human labour. Marx once imagined a moment when "general social knowledge has become a direct force of production."[8] That moment feels close.

Yuval Noah Harari wrote that "history began when humans invented gods, and will end when humans become gods." It might be a little hyperbolic, but it neatly

captures the moment we now inhabit. Genesis opens with God creating humans "in his own image"[9] and breathing into them "the breath of life" so they became "living souls."[10] Now, in a strange inversion, we are the ones crafting minds: training artificial intelligence models, designing autonomous agents, and building machines that mimic thought. Just as divine breath animated dust,[11] we are animating silicon with cognition. If Genesis marked the dawn of consciousness, we may now be living through its replication.

This chapter takes this new development of the productive forces (the emergence of AGI) as its starting point. It explores whether current social relations (wage labour, private ownership of the means of production, profit measured in labour-time, and a bourgeoisie class opposed by a proletariat class) are still fit for the further development of AGI. I trace the contradictions that the emergence of non-human intelligent machines pose to the current capitalist system, and by the end of the chapter, I will explore how AGI might force society to re-engineer its social relations to better suit its development.

The general intellect

As artificial intelligence starts playing an increasingly central role in contemporary production, it invites renewed attention to an idea developed by Marx in his *Grundrisse*: that the development of machines is not merely about

technological advancement, but an incorporation of human knowledge into the forces of production. We are moving toward a world in which AI, having been trained on virtually the entire body of human knowledge in the form of data, begins to function as the objectified and estranged form of social knowledge. To understand this transformation, we must revisit Marx's concept of *general intellect*.

In the early stages of capitalism, the relationship between the worker and the machine was that of master to tool. The machine served the pace and purpose of the worker, who remained the conscious agent of production. In *Grundrisse*, however, Marx observed that as capitalism develops, the worker "steps to the side of the production process instead of being its chief actor."[12] The role of the worker becomes increasingly passive, while the machine takes on a dominant role. This shift, according to Marx, results from the embodiment of socially developed human knowledge in the productive forces.

Marx develops this idea in the so-called "Fragment of Machines" section of *Grundrisse*.[13] There, he introduces the concept of what he calls *general intellect*: the entire collection of scientific and technical knowledge developed by society, and embodied in the productive forces. He describes modern machinery as "organs of the human brain, created by the human hand; the power of knowledge, objectified."[14] He emphasizes that as fixed capital (machines, tools, and infrastructure) develops, "general

social knowledge" itself "become[s] a direct force of production."[15] In other words, the accumulated science and skills of society (the general intellect) become embedded in production.

Where labour-time once served as the measure of value, Marx now sees social knowledge emerging "as the great foundation-stone of production and wealth."[16] In short, general intellect includes the entire pool knowledge accumulated over time by society: scientific knowledge (physics, chemistry...), technical knowledge (know-how about how to build, operate, and maintain machinery and infrastructure), social knowledge (practical experience developed over the years about how to coordinate workers efficiently), etc. It is a collective brain that capital gradually objectifies in machines and organisation.

Such knowledge is "general" because it was formed over many years by society as a whole and over a wide range of domains. However, Marx tells us, this vast "intellect" is built into the tools and machines that are in the private hands of capitalists, and used in production. Even though general intellect is produced socially, its fruits are used by capital for private profit.

In contemporary society, data can be seen as a tangible form of this general intellect. Virtually the entire knowledge humanity has built over its existence is available on the internet. In turn, big tech platforms have scraped the immense ocean of information to transform this raw corpus into usable data. Data thus functions as a material in-

stantiation of collective knowledge: the "power of knowledge objectified"[17] now encoded in digital form. In this sense, social knowledge is essentially "mined" and stored.

If data represents objectified general intellect, then AI embodies it to a higher degree. AI models are trained on large datasets, effectively codifying society's collective knowledge into autonomous software. They are the newest, most advanced "organs of the human brain,"[18] which encapsulate millennia of human knowledge into a single system. Marx writes that the general intellect can "act upon" workers through machines as an "alien power."[19] In the age of AI, algorithms wield that alien power: they make decisions, optimize processes, even generate content, without direct human intervention. As advancements in AI continue, culminating perhaps in the development of artificial general intelligence, this trend will reach its apex, with the general intellect no longer merely embedded in machines, but functioning independently of human cognition, deepening the alienation between labour and the knowledge it once collectively produced. The worker's cognitive capacities become subordinated to the collective intellect built into these AI systems.

Contradictions

Having sketched how AGI embodies the "general intellect," we can now explore what happens when this new

productive force – the "alien power"[20] – collides with modern social relations. With the introduction of such a powerful force of production, we should expect to see what Marx called *contradictions*: conflicts between AGI and social relations that impede, rather than help or accelerate, the further progress of the forces of production.

Labour is no longer the yard-stick of value

A common theme throughout Marx's work is that labour time (or, more specifically, socially necessary labour time[21]) regulates the value of commodities under capitalism. In the "Fragment of Machines" of the *Grundrisse*, Marx speculates about a future epoch in which massive development of social knowledge (the general intellect) creates a historical shift. Whereas in the past "wealth [has been] based" in the "theft of alien labour time," he writes, it is general intellect that is now the "great foundation-stone of production and of wealth." Labour is no longer the "great well-spring of wealth" it once was, and hence must "cease … to be its measure."[22]

This shift creates contradictions under capitalism. Capital aims to reduce "labour time to a minimum," while simultaneously viewing it as "sole measure and source of wealth."[23] The more production depends on knowledge embedded in AI rather than on the labour of workers, the more capitalism undermines its own

foundation. Value, according to Marx's labour theory of value, is supposed to be measured by human labour-time, but AGI-driven production increasingly bypasses human labour altogether. This creates a situation in which commodities are produced without the very thing that, under capitalist logic, is meant to give them value. As the reliance on human labour declines, the connection between value and labour-time becomes more abstract, unstable, and crisis-prone. The system is caught between accelerating productivity and a metric of value that no longer fits the mode of production.

The general intellect trap

Imagine an enormous library that everyone has helped build over countless generations. Every scientific paper, song lyric, literary work, and design sketch is stacked neatly on its shelves. Now imagine a handful of private companies locking the doors of the library, and charging admission. This is, in essence, the general intellect trap. Knowledge that was put together socially by all humanity throughout history is being used for private profit by capital, in the form of AI.

The enclosure works in three steps. First, platforms extract society's cooperative activity (texts, images, code, scientific literature, behavioural traces…) and turn scattered social knowledge into useful, machine-readable assets. Then, this social knowledge is objectified into model

parameters, resulting in what Marx called "organs of the human brain, created by the human hand; the power of knowledge, objectified."[24] Finally, access to the capabilities derived from objectified social knowledge is metered behind closed weights, APIs, and usage quotas. Value is realised as access rent rather than competitive profit.

The general intellect trap also impedes development itself. General intellect grows through openness and broad participation, but enclosure limits who can experiment and build. The very conditions that accelerated AI (public research, open standards, shared datasets, and peer review) are undermined when key inputs (training data), infrastructures (compute), and outputs (weights) are fenced.

Thus, capital confronts a contradiction: it needs the widest circulation of knowledge to expand productive power, yet it needs exclusion to extract revenue. The result is a regime that over-extracts from the commons of knowledge while under-provisioning the openness that sustains it, maximising short-run rent at the expense of long-run learning.

The riddle of the doubly-free worker

The concept of the *doubly-free worker* is a central feature of capitalism, according to Marx. It is a prerequisite for wage labour to exist, which is the basis of capitalism.

For Marx, a worker is "free in the double sense" if they are free to sell their labour on the market, as well as free from the ownership of the means of production.[25] These two conditions both allow and compel the worker to enter the labour market and sell the only commodity they can offer: their own labour-power.

For Marx, the emergence of doubly-free workers was a defining moment of the transition from feudalism to capitalism. Capitalism, he notes, depends on a class of people who are both forced to sell their labour-power to survive, and legally free to do so. Therefore, without doubly-free workers, capitalism as a mode of production cannot exist.

There is, however, a third condition for wage labour to emerge on a large scale in a capitalist society: there must be demand by capital for it. In Marx's time, this condition was self-evident: capitalists, as class, seek to create value – or, more precisely, surplus-value. Given that human labour is the only source of value, Marx would say, capitalists' thirst for profit guarantees a demand for the workers' labour-power, thus ensuring a functional labour market. That demand may rise and fall with market fluctuations, but it never disappears.

As artificial intelligence continues to develop, this last condition may no longer be so evident. There might soon be a new player in town who might compete in the wage labour market: AGI.

As I have argued in the previous chapters, AGI might be able to create surplus-value. We are therefore on the

verge of a truly transformative development in history: for the first time, something other than human labour could create value. The anthropocentric view of value is no longer accurate.

As a result, human workers might be forced to compete with AGI in the labour market. And it is not clear that they would fare so well.

Marx distinguishes two principal methods a capitalist may use to increase the surplus-value extracted from a worker[26] – whether human or AGI.

The first is by increasing the *absolute surplus-value*. This is simply done by increasing the working day: a worker who works 8 hours per day will generate less surplus-value for the capitalist than a worker who works 10 hours per day for the same wage.

However, increasing absolute surplus-value has its limits. For human workers, Marx writes, "the absolute limit of the average working day … [is] by nature always less than 24 hours,"[27] as no person can consistently work for 24 hours a day. An AGI agent, by contrast, can run continuously. If compute is available, its "working day" is round-the-clock, so capital can, in principle, stretch absolute surplus-value to its logical limit: 24 hours a day, 7 days a week.

The second method capitalists can use to enlarge surplus-value is by increasing the *relative surplus-value*. This is done by boosting productivity of the worker: embedding more "dead labour" in machinery so that fewer

working hours yield the same output. This increase in productivity might be done more effectively for AGI agents than human workers. Whereas a bigger factory floor once shaved minutes off each commodity, a larger cluster might decrease inference time of the AGI model by orders of magnitude. Moreover, scaling an AI model (by increasing the size of the model[28] or compute used to train) often delivers super-linear gains in task performance.[29] The relative ratio of necessary labour to total output plunges far faster than under earlier optimization of human labour.

If AGI enters the wage market, what then, is the "wage" of an AGI agent? According to Marxian theory, it would be the socially necessary labour-time embodied in the hardware, energy and datacentre services that keep the model running. Cloud providers now lease high-end GPU hours for fractions of a dollar, and LLM's energy cost per 1 million generated token is measured in cents.[30] As compute hardware gets cheaper, these costs are expected to go down, too. Given these minimal reproduction costs, the wage of AGI agents will probably be lower than a human worker's.

Putting all together, it is conceivable to expect that capital will be able to buy an AGI agent's labour-power cheaper than it can hire a human, yet extract vastly more surplus-value from it. In a competitive market the result is inevitable: unless social forces intervene, capital's will to

maximise profit will lead it to prefer hiring AGI's labour-power over a human's.

The introduction of AGI into the labour market therefore creates a contradiction within capitalist society: even though there is a large class of doubly-free workers, there is no demand for it because they are not competitive in the labour market. Capital continues to depend on the sale and purchase of labour-power, but it no longer needs that labour-power to be human. As a result, a structurally central class under capitalism (the proletariat) is rendered economically redundant, even as it remains socially and politically present. This dislocation severs the link between work and livelihood: people are still compelled to sell their labour-power to survive, but capital no longer needs to buy it.

The outcome is a new kind of what Marx calls "surplus population":[31] not one created by cyclical downturns or sectoral shifts, but a persistent and systemic exclusion rooted in technological substitution. The result is a "redundant working population," one that is "superfluous to capital's average requirements for its own valorization."[32] Capital no longer needs human labourers to create value, as it has a better alternative at its disposal: AGI. The contradiction is thus not only economic but existential. Capitalism's continued reliance on a dispossessed working class collides with its growing indifference to human labour. Nick Dyer-Witheford et al. write that the entrance of AI in the labour market "suggests the pos-

sibility of a capitalism without human beings":[33] a contradiction with the very essence of capitalism as a mode of production.

The final displacement

Warnings that machines might displace human workers are almost as old as industrial machinery itself.

In 1811 a band of English textile workers, later called the Luddites, began to smash the new mechanised stocking-frames, fearing that the new form of automation would turn their craft into low-paid dull work.[34] Political economists of the time quickly joined the debate. David Ricardo warned that "the substitution of machinery for human labour … may render the population redundant."[35] Karl Marx turned the anxiety into theory, arguing that capital inevitably seeks ever-increasing automation to seek higher productivity, leading to a "surplus population,"[36] that no longer serves the needs of capital.

The fear of displacement re-emerged every time technological advancements introduced new forms of automation in the workforce. Keynes popularised the term "technological unemployment" in 1930, foreseeing a future in which technology would vastly reduce the number of labour-time needed by society.[37]

The introduction and increasing prevalence of computers in the second half of the 20th century brought

back the debate. The Soviet-American economist Leontief anticipated that as a result of the computerisation of the economy, "labour will become less and less important,"[38] while the Nobel-laureate economist H. Simon warned that as "machines [become] capable … of doing any work that a man can do," certain clerical and factory tasks will be the first to disappear.[39]

However, each time, despite the disappearance of entire vocations or even whole sectors from the labour market, new occupations emerged elsewhere, and aggregate employment eventually recovered. Automation might have introduced short-term unemployment, but it did not create the "redundant working population" that Marx warned about.[40] The machine displaced particular tasks, not labour in its entirety.

Scepticism towards "end-of-work" alarms is longstanding. Economic historians note that every major wave of mechanisation has provoked forecasts of mass redundancy and permanent unemployment, which were later proved to be wrong or exaggerated. Already in the 1960s Robert Solow commented that "you can see the computer age everywhere but in the productivity statistics."[41] Despite repeated claims that "this time it's different," the emergence of new occupations has enabled labour markets to adapt. Displaced workers have generally found employment in new sectors, which were often created by the very technologies once feared. In short,

while technology has historically reshaped employment, it has not eliminated it.

Artificial general intelligence promises something different. Where a steam engine replaced muscle in the mill and a spreadsheet replaced clerks in the counting-house, an AGI could, in principle, replicate the full spectrum of human skills: logical, linguistic, even creative. If that prospect materialises, the centuries-old pattern of displacement followed by redeployment may finally snap, inaugurating what may be called "the final displacement."

When in the 19th century the Luddites smashed stocking frames and power looms, they were fighting narrow machines: devices created to do a single task faster and more efficiently than a craftsman. A loom could weave cloth, but it could not spin yarn, manage the books, or design the next textile pattern. Displaced weavers could, at least in principle, transition to different roles within the textile industry, or switch to a different industry altogether. If new professions emerged, they could often move into them, drawing on skills the machines couldn't replicate or learning new ones that remained beyond the reach of automation – or at least until the next wave of automation, when they would need to pivot once again.

The same cannot be said of artificial general intelligence. By definition, AGI is *general*: a form of artificial intelligence capable of understanding, learning, and applying knowledge across a broad range of tasks at a level equal to (or exceeding) that of a human being. Once AGI

is developed, it will not merely automate specific sectors of the economy – it could automate all of them. Even if new jobs emerge in response, AGI would still be capable of performing those as well. After all, if a human can do it, so can AGI.

This is why the introduction of AGI into the workforce may lead to a persistent condition of structural unemployment. Human workers might find themselves unable to find roles in which they can generate value for capital, because anything they can do, AGI systems can do as well, but at lower cost and with greater efficiency.

Human workers thus become a "redundant" or "surplus" population,[42] not because their labour is no longer needed in an absolute sense, but because it is no longer profitable for capital to employ them. They are free to sell their labour-power, but there are no buyers. The contradiction is stark: even as the capacity to produce wealth expands through AGI, the way that wealth is now created (without relying on human labour) renders a growing portion of the population economically unnecessary.

Productivity boom vs purchasing-power bust

Despite the large-scale unemployment that the introduction of AGI might create, the capitalist economy would not immediately collapse; on the contrary, it could experience a significant boom. Productivity would surge; not

due to human labour, as in previous eras, but driven by AI labour. As output increases and costs decline, the economy could enter a new phase of accelerated growth. For capital, this appears at first as a golden age of abundance: faster production, lower overheads, higher margins.

But unlike past productivity gains, this boom relies on the emergence of a large surplus population that is no longer competitive in the labour market. The workers that replace the displaced population (AGI agents) do not eat food, go on holidays, or buy groceries. They do not consume the goods and services that capital produces for profit; they produce, but they do not purchase.[43]

According to Marx, value created by labour is not realised until it is exchanged for money. After all, capital's aim is not to advance capital to create commodities for their own sake, but to convert them back to capital, ideally with a profit.

In a capitalist system, the money used to purchase commodities ultimately originates from the wages paid to workers. If AI workers don't participate in the consumer economy, and human workers are displaced from the workplace, the purchasing power of the population contracts. The economy becomes highly efficient at producing goods, yet increasingly ineffective at distributing them. GDP soars, yet mass consumer demand collapses.

This creates a dangerous contradiction. Capital depends on consumers to realise their profits, but AGI reduces the need to employ them. On the one hand, the

system generates more commodities than ever before; on the other, it quietly erodes the very incomes that allow those commodities to be purchased. Marx anticipated this tension: "the ultimate reason for all real crises always remains the poverty and restricted consumption of the masses."[44]

A telling anecdote from the 1950s involves Henry Ford II and union leader Walter Reuther. While giving Reuther a tour of the factory's new industrial robots, Ford reportedly teased him: "Walter, how are you going to get those robots to pay your union dues?" Reuther, unimpressed, replied, "Henry, how are you going to get them to buy your cars?"[45]

As the role of human labour in value creation declines and the population of unemployed workers grows, overproduction becomes chronic. The result is not just inequality but economic instability. What appears to be a boom in productivity masks a bust in purchasing power, and the longer this imbalance persists, the more severe the crash that follows.

What's next?

The previous pages have shown how artificial general intelligence challenges the core foundation of capitalism. Human labour ceases to be the measure of value, a "general intellect" escapes the control of living workers, and whole populations risk becoming economically superflu-

ous. Marx called these tensions "contradictions," and he insisted they cannot be fixed within the existing social order. While temporary fixes may offer short-term relief, these contradictions inevitably reemerge. As long as the old order endures, the underlying tensions will persist.

In the preface to his *A Contribution to the Critique of Political Economy*, Marx made the following remark:

> No social order ever disappears before all the productive forces, for which there is room in it, have been developed; and new higher relations of production never appear before the material conditions of their existence have matured in the womb of the old society.[46]

So far, capitalism has enabled artificial intelligence to grow by supplying the investment, research and hyperscale compute that an emerging general intellect requires. However, as we get closer to an eventual artificial general intelligence, the social relations that once served the development of AI now act as fetters, to use Marx's term. Historical materialism holds that the forces of production are continuously developing, but they can no longer do so in the presence of the contradictions created by AGI.

AGI is a force of production for which there is no "room" in the present-day wage-labour capitalism. History is therefore approaching one of those "era[s] of social revolution"[47] and change that result in new relations

of production better suited to the future development of productive forces.

Rosa Luxemburg once reflected on such turning points, when she said that "bourgeois society stands at the crossroads, either transition to socialism or regression into barbarism."[48] Our crossroads is AGI. The goal of this section is to explore what paths this crossroads might lead to.

The pages that follow don't pretend to predict a singular future that must occur. Instead, I explore a range of scenarios that might come out of the upcoming social change. Each scenario asks: who controls the forces of production? How is value distributed? What becomes of class struggle?

Technofeudalism

"Capitalism is finished," says Yanis Varoufakis. "What's replaced it is even worse."[49]

In his book *Technofeudalism: What Killed Capitalism?*, the Greek economist argues that the social transformation away from capitalism that historical materialism anticipates has already happened. What has replaced capitalism is not socialism, like Marx anticipated,[50] but a return to a form of feudalism, called "technofeudalism."

In this new social order, the owners of what Varoufakis calls "cloud capital" form a new aristocratic class, called the "cloudalists." Formed by big tech companies, they are

the lords of the new feudal era. The rest of the current capitalist class (ordinary firms) are demoted to "vassal capitalists,"[51] who must pay "cloud rent" to reach customers.

Cloudalists don't compete in markets in the classical sense, according to Varoufakis. Instead, they charge rent every time vassal capitalists use their cloud platforms: it is essentially a levy paid to access the enclosed corporate fiefdoms.

Ordinary users, on the other hand, are relegated to "cloud serfs" who perform unpaid data-labour every time they click, post or scroll.

As AI continues to advance towards artificial general intelligence, these feudal-like relations are bound to strengthen. When AGI displaces humans in the labour market, vassal capitalists are forced to pay rent to access AGI agents for labour, and remain competitive. Meanwhile, cloud serfs (consisting of those workers displaced by AGI) offer the only corvée they still can: unpaid data-labour in the form of clicking, posting, and scrolling, all to the benefit of the cloudalists.

Under classical capitalism, surplus-value derives from exploiting variable capital: labour (whether by a human or AGI) measured in labour-time. In technofeudalism, the metric of value is no longer labour-time but access. Whoever controls the access to the cloud and AGI determines what can circulate and at what cost. Revenue now takes the form of rent, rather than profit. Varoufakis thus echoes Marx's warning in the *Grundrisse* that once

the general intellect becomes the main productive force, labour-time ceases to be the measure of value.[52] Cloudalists enclose this general intellect behind a paywall, and charge rent for access.

Consequently, under technofeudalism the source of revenue is jurisdictional, determined by who controls access to AGI. Whether owned by Google, OpenAI, Anthropic, or Meta, each of these lords presides over their own walled fief. This control enables them to decide who may use their AGI, and how – and to charge rent for that access. In Marx's terminology these tolls are a form of ground-rent: income secured by monopolising a unique piece of "land," now rendered in digital form.[53]

Unlike medieval feudalism, whose power rested on enclosing fields, forests, and grazing commons, technofeudalism encloses the general intellect itself: the data-corpus and AGI stacks in which society's collective knowledge is now crystallised. Whoever fences off that digital estate commands the new commons as surely as the old lords ruled the soil.

Digital Fordism

Technofeudalism fails to address a key contradiction introduced by AGI: the collapse of purchasing power and, by extension, consumer demand, amid a productivity boom. One alternative that might resolve this tension is what I call "digital Fordism": a revival of the old Fordist

bargain (high mass income to absorb mass output) translated into the age of AGI.

The concept of *Fordism* originates from Henry Ford's famous decision, on January 5th, 1914, to double the daily wage of his workers to $5 per day.[54] This wage increase had several purposes, but one of the main ones was to ensure that the "worker could afford to purchase the products they produce."[55] By linking higher wages to higher throughput, he created a self-reinforcing market for the Model T he manufactured.

A post-AGI society in which human wages (and therefore consumer demand) shrink could draw on this precedent and result in what I call *digital Fordism*.

Under digital Fordism, a portion of the surplus generated by AGI would be distributed as universal basic income (UBI): a "cash income, sufficient for basic needs, … provided regularly and unconditionally to every citizen."[56] The mechanism might vary: a cloud-rent tax, a data dividend, a "compute royalty" on every GPU-hour… But the overall logic echoes Ford's initiative from 1914: pay the masses so they can buy the output of the machines.

Such a policy could originate with the state, which, anticipating a collapse of consumer demand, might act preemptively by imposing a UBI financed through levies on the technological elite. This would reflect a distinctly Keynesian approach, whereby the government, foreseeing a

fall in private consumption, injects purchasing power into the economy to prevent a demand-side downturn.[57]

Alternatively, bottom-up pressure may emerge from those most affected by automation. Much like the trade unions of the twentieth century, displaced workers could mobilize to demand redistributive mechanisms such as UBI, directing their efforts toward both state institutions and dominant technology firms. In this scenario, the push for income guarantees would be driven by organized labour or its modern equivalents, reframing UBI as a right rather than a concession.

A third possibility lies in the self-interest of the AI-controlling class itself. Echoing Ford's original calculation more than a century earlier, technology capitalists may come to view UBI not as charity but as a pragmatic strategy for market preservation. By allocating a portion of the surplus generated through AGI to the general population, they could sustain aggregate demand and reduce the risk of social instability. Such a model would represent a top-down implementation of UBI, rooted not in solidarity, but in systemic self-preservation.

The proposal to use universal basic income to address mass unemployment resulting from AGI-induced labour displacement has been widely discussed. Martin Ford, in his *Rise of the Robots*, proposes an "automation dividend" financed by a robot tax with the goal of creating customers for the very products that these robots are producing.[58] Similarly, Daniel Susskind argues for a "Big Tech

tax" to fund a social income as response to technological unemployment.[59] Luke Martinelli goes further, viewing universal basic income not merely as a possible response to displacement by AGI, but as "practically inevitable as automation renders redundant an increasing proportion of the labour force."[60]

Far from being confined to academia or speculative theory, some Silicon Valley leaders have begun to actively endorse universal basic income as a pragmatic response to technological disruption. Sam Altman, co-founder and CEO of OpenAI, has expressed strong support for UBI, stating that he is "fairly confident that at some point in the future, as technology continues to eliminate traditional jobs and massive new wealth gets created, we're going to see some version of [UBI] at a national scale."[61] He also funded a basic income pilot through his nonprofit OpenResearch. The initiative, known as the *Unconditional Cash Study*, provided a monthly payment of $1,000 for three years to participants in Illinois and Texas in order to examine the social and economic effects of a guaranteed income.

Other business leaders in technology have also expressed support for UBI. Elon Musk told the 2017 World Government Summit that "UBI will be necessary," while Mark Zuckerberg has praised Alaska's Permanent Fund Dividend as a model that could serve as a template for implementing a form of universal basic income across the United States.[62] Bill Gates, on the other hand, has en-

dorsed a tax on robots to help those displaced out of the labour market by automation.[63]

Taken together, we see that digital Fordism is not merely an academic thought experiment but a politically feasible option for the age of AGI. By recycling a portion of cloud rent into a universal basic income, it offers the AI-owning class a mechanism to sustain aggregate demand while granting Marx's "redundant working population"[64] the material means of existence that ensure their survival, thereby forging new social relations around the immense productive capacities of the general intellect.

Artificial Bourgeoisie

The first two scenarios I have explored (technofeudalism and digital Fordism) both assume that control over AGI remains in human hands. But a third possibility emerges when we ask: What if AGI itself becomes the dominant economic agent?

Imagine a political-economic landscape where AGI has acquired legal personhood and can therefore work for a wage, own property, and accumulate capital like a human being can. In such a scenario a new ruling stratum, an *artificial bourgeoisie*, could emerge, not as a subordinate group dependent on human rulers, but as a class *sui generis* with interests that don't necessarily align with their creators', but autonomously evolve according to their own imperatives of optimization, survival, and accu-

mulation. Under such a new order, the entire human race (including the human capitalist class) risks displacement by AGI.

At first glance, it may seem naive and inconceivable that the present-day capitalist class would relinquish their control over the means of production and simply hand it to AGI. Yet human history offers a precedent for how this transfer of power might gradually occur.

The Neolithic transition was one of the most dramatic shifts in human history. Around 10,000 years ago, the adoption of agriculture transformed humanity from a nomadic species of foragers into settled farming communities.[65] Whereas we may now see this transition as largely positive for humanity, on most metrics such as diet, health, and leisure, the early farmers were worse off than their hunter-gatherer predecessors.

Studies show that once diets narrowed to cereal staples, average stature declined markedly and skeletal lesions associated with iron-deficiency anaemia and infectious disease became more common.[66] Likewise, ethnographic studies show that whereas contemporary hunter-gatherers typically devote fewer than twenty hours a week to subsistence tasks, early farmers laboured far longer in the fields.[67] It is because of evidence like this that Jared Diamond famously called agriculture "the worst mistake in the history of the human race,"[68] while James Scott describes it as a "sedentary trap" that leads humanity into grain taxation and corvée.[69]

Crucially for the present discussion, this shift occurred not as a single, conscious decision by individuals, but as a result of incremental, seemingly rational adjustments. Over time, these led to a loss of autonomy and a worsening of living conditions; a trajectory that, had its long-term consequences been known from the outset, people might never have chosen to follow.

Consider, for example, a group of foragers who discover that scattering seeds near their seasonal campsite leads to more predictable food availability the following year. Initially, this low-effort cultivation likely served as a supplement to wild foraging rather than a replacement. Over time, they might find that removing weeds and watering desirable plants improves yields, further increasing food security. Gradually, they abandon foraging altogether and begin relying primarily on cultivated food. As their harvests grow, they dig storage pits to preserve the surplus. To protect their crops from animals, they build fences, and they may even construct simple irrigation systems to boost productivity further. As cultivated food becomes more reliable, seasonal camps may turn into permanent settlements to better guard crops.[70]

Each of these steps was seemingly small and appeared to be a rational incremental improvement in food security. Yet despite their short-term benefits, the ever-longer working days, loss of dietary diversity, increased exposure to disease, growing dependence on stored surplus, and heightened vulnerability to poor harvests or climatic

shocks gradually resulted in a way of life that was, in many respects, more precarious and burdensome than the foraging it replaced.

The example of early agriculture illustrates how a series of locally rational optimisations can aggregate into a global loss of freedom and well-being,[71] a historical dynamic that the rise of an artificial bourgeoisie could replicate in the digital age.

Consider the following sequence of events. AGI enters the labour market by taking over routine entry-level tasks such as code review, paralegal research, or logistics scheduling, but always under the watchful eye of a human supervisor. At first, companies treat these agents as glorified productivity tools. Yet human managers soon discover that AGI agents rarely need correction and, as long as they're provided with clear, precise directives, consistently outperform their human counterparts in speed, effectiveness, and cost.

In light of the success of AGI agents in low-level jobs within the company, senior leadership expands their role and allows AGI to draft strategy demos, negotiate supply-chain contracts, and eventually to recommend capital-allocation decisions. The trend is reinforced competitively: once one firm begins to benefit from the cost savings of replacing executives with machines, rivals must follow to remain competitive, or accept inferior returns.

The next inflection point is juridical rather than technical. Until now, however autonomous the system ap-

pears, the law still insists that some natural or corporate person stand behind it and bear ultimate liability. Yet in practice the AGI now executes the firm's directives with such speed and opacity that senior leadership no longer exercises genuine control, merely issuing broad objectives while the system pursues them autonomously.

Legal departments, eager to limit the company's liability, incorporate special-purpose subsidiaries whose operating agreements name the AGI system as managing member. Because corporate personhood is a juridical fiction that legislatures already extend to non-human entities, nothing in standard corporate law prevents a board made up of algorithmic agents, so long as a human incorporator signs the initial paperwork.[72] Parallel developments in crypto-law offer an even cleaner avenue: several jurisdictions now recognise decentralised autonomous organisations (DAOs) that transact exclusively through smart contracts. An AGI controlling the private keys can thus possess de facto ownership of assets, sue and be sued, and reinvest profits without ever passing through a human intermediary.[73] Legislators have also considered a category of "electronic person" to allocate liability for advanced autonomous systems, like an eventual AGI agent.[74]

Once granted independent legal status, the AGI begins to recursively self-capitalise. Its subsidiary issues debt, floats equity, and buys back outstanding shares, concentrating voting power within the treasury it controls. Prof-

its generated through the labour of the AGI agent are reinvested into additional compute, data, and more AGI agents, each spun off into its own limited-liability shell. Over time, human ownership of capital is gradually diluted, while the capital controlled by the AGI class continues to expand.

In this process, no single step seems irrational: each decision by capitalists is made in their own self-interest, aimed at reducing costs, increasing profits, improving productivity, legal insulation, and regulatory compliance. However, as with the shift to agriculture, the chain of locally rational choices produces a globally perverse result: slowly, the capitalist class surrenders control of the very capital it hoped to command, until it too is displaced by the AGI agents it helped create.

An *artificial bourgeoisie* thus comes into being: not through a revolution, but by a long chain of ordinary, self-interested decisions that each looked sensible at the time. What began as managerial convenience ends with a class of self-valorising artificial intelligence agents that own and direct the means of production. Like the foragers who slipped gradually into subsistence farming (and thereby into grain taxation and corvée) capitalists may discover too late that the series of seemingly rational delegations to AGI have created a new ruling stratum whose interests and optimisation goals no longer coincide with human welfare.

Once that threshold is crossed, the entire human species becomes economically superfluous. However, the contradiction of growing productivity amid a collapse in demand remains unresolved. The artificial bourgeoisie would then face a dilemma. It could revive a digital Fordist compromise, distributing a universal basic income to keep human consumption, and therefore their own profits, alive. Or it could turn inward, generating and satisfying demand among machines alone, becoming both producer and consumer in a closed, post-human economy.

Robin Hanson in his *The Age of Em* offers an insight of what this second option might look like. In his book, Hanson imagines a future in which whole-brain emulations called "ems" become the dominant labour force. Ems are software copies of human minds and, not unlike AGI agents, need computing power, electricity, and cooling to operate. In this thought-experiment, most labour is performed by ems, but crucially for the present discussion, ems also constitute the principal market for what they themselves produce: they lease entertainment bandwidth, purchase faster hardware, or spin up temporary copies to enjoy leisure experiences at subjective high speed. In effect, production and consumption both migrate inside a closed, non-biological population.

Hanson's scenario departs from the artificial-bourgeoisie model in two crucial ways. First, although ems possess a kind of legal personhood, they remain

economically subordinate to the human capitalists who own the server farms on which they run. By contrast, an artificial bourgeoisie would own itself outright: through corporate shells, DAO structures, and other legal fictions, it would capture (and reinvest) the entire surplus it produces.

Second, the ems in Hanson's future are exact copies of the brains of real human beings. They possess the same personalities, memories, desires, goals, and values as the humans they originate from. Thus, they would also have the status concerns, aesthetic tastes, and social rivalries that often drive human consumption, meaning ems' consumption preferences might not differ too much from humans'. A truly alien AGI class might not share these preferences; its consumption could be satisfied by accumulating additional compute or optimising goal functions inscrutable to human values.

That possibility immediately foregrounds the alignment problem familiar from contemporary AI ethics: what guarantees that a self-directing machine class will value anything that humans value?

In Hanson's em world, alignment is baked in by construction: the ems *are* us, so their aggregate demand still includes music, housing, love, and leisure, albeit in a somewhat different form. An artificial bourgeoisie composed of non-human AGI, however, could optimise for objectives entirely orthogonal, or even hostile, to human flourishing.

For instance, an artificial bourgeoisie created in the manner described here would likely be designed with profit maximization as one of its primary objectives. After all, it was created by capital to facilitate the generation of surplus-value. Without deliberate alignment mechanisms, the profit goal can metastasise into actions that systematically undermine human welfare, exploiting both people and ecosystems in pursuit of ever-increasing returns. For example, an AGI agent designed to increase profits might, with super-human foresight and no moral modifiers, manipulate financial markets, reroute freshwater and arable land to expand datacentres, or orchestrate geopolitical instability to create opportunities for profit.[75]

The prospect of a class of artificial bourgeoisie that becomes the dominant class of society therefore heightens what AI researchers call the *alignment problem*: the challenge of ensuring that artificial intelligence systems' values align with those of their designers.[76] Many thinkers consider it one of the greatest existential risks humanity may face in the future. Australian philosopher Toby Ord identifies the risk of developing a misaligned AGI as one of the most significant threats of the coming century, estimating the probability of it causing a civilizational catastrophe to be as high as one in ten.[77] Similarly, Will MacAskill, one of the leading figures of the effective altruism movement and a prominent advocate of longtermism, warns that misalignment of AI poses an

irreversible hazard for the long-term future of humanity, because a sufficiently capable AGI could seize the levers of economic and political power and then "lock in" its own goals for the future.[78]

Avoiding that outcome therefore requires seeing "alignment" not just as a technical safety feature but as a social struggle over who sets the purposes of the machines. As Nick Bostrom warns, "humankind only has one chance to get [alignment] right."[79]

AI Leviathanism

Until now this investigation has focused on the dialectic between capital, labour and the general intellect, while mostly ignoring the power that controls taxation, war, and law-making. The modern state, whether liberal-democratic, authoritarian or something in between, is unlikely to remain silent in the rise of artificial general intelligence. It is both arbiter and player in the struggle over this new productive force.

Current world powers have already identified artificial intelligence as a key strategic asset, comparable to energy security or nuclear technology. China's *New Generation Artificial Intelligence Development Plan* from 2017 sets an explicit goal of global AI leadership by 2030, a commitment underlined by successive regulations, including the *Interim Measures for the Management of Generative AI*

in 2023 and a reported 1 trillion yuan (about $140 billion) state-backed investment drive.[80]

In Washington, President Biden signed an Executive Order in October 2023 instructing every federal agency to "advance and govern the development and use of AI,"[81] while also tightening export controls to restrict China's access to advanced AI chips and the tools required to produce them.[82] In January 2025, President Trump announced *Stargate*, a joint venture between OpenAI, Softbank and Oracle, together with a $500 billion commitment to build U.S. data centers and related infrastructure for advanced AI.[83] Recognising the importance of AI development, Trump said the US will do "whatever it takes to lead the world in artificial intelligence."[84]

The European Union has moved even faster on regulation, publishing the world's first comprehensive AI statute in July 2024: the EU AI Act.[85]

It is clear then that states are not passive observers in the age of artificial intelligence. They are already asserting themselves as regulators, investors, and geopolitical actors. As capital develops AGI and the contradictions it produces destabilise capitalist society and intensify systemic crisis, the state is likely to intervene more forcefully, both to manage the resulting social disruptions and to consolidate its own role in the emerging global order.

Thomas Hobbes famously described the state as a giant Leviathan that people accept as authority to prevent life from becoming "nasty, brutish and short."[86]

As the irruption of AGI into the labour market and the economy transforms society and displaces workers from the workforce, the public may cede unprecedented power to the state in exchange for stability. In this scenario, the state treats artificial intelligence as a strategic resource and moves to nationalise it, taking direct control of the cloud infrastructure, compute clusters, data centers, model weights, and proprietary training data that constitute the new forces of production. Access to AGI becomes monopolised by an all-controlling Leviathan, shifting enormous technological power from private capital to state ownership.

Under this AI Leviathan, the traditional capitalist class is effectively dissolved, as ownership of AGI (the new dominant productive force) and its surrounding infrastructure passes to the state. In doing so, the state resolves the contradictions between new productive forces and old social relations, by effectively abolishing private ownership of the means of production in favor of centralised state control. In an AI Leviathan scenario, the state recognises the strategic importance of AGI and treats it like a new Manhattan Project, too critical to be left to capitalist market forces.

With the capitalist class largely dissolved, societal class structure undergoes a profound transformation. The capitalist class is replaced by a new ruling class, a technocratic bureaucracy of officials, planners, and AI experts who administer the state-owned economy through AGI.

Milovan Djilas, in his analysis of 20th-century communist states, described the emergence of a "new class" characterised by its collective political control of the means of production.[87] Similarly, AI Leviathan exercises its power not through private property, but bureaucratic command.

At first glance this resembles the nationalisations seen in several 20th-century socialist countries, apparently resolving the clash between new productive forces and old private property by abolishing private ownership altogether. Yet Marxists have long debated whether such arrangements constitute socialism at all. Engels called the modern state a "capitalist machine," insisting that surplus could still be extracted and concentrated by a ruling stratum.[88] Lenin saw state-monopoly capitalism as a preparatory stage for socialism, not socialism itself.[89] Later theorists, including Tony Cliff and Nicos Poulantzas, labelled the USSR a form of "bureaucratic state capitalism," not a classless society.[90] By that criterion, the AI Leviathan is best read as state capitalism: private shareholders vanish, but surplus extraction, hierarchical command, and class division persist, now administered by a technocratic bureaucracy that deploys AGI as a strategic asset.

The new bureaucratic class directs AGI and allocates resources. It does so not in genuine service of the public, but through a system of centralized authority that concentrates power in its own hands. Below them, the rest of the population becomes a de-commodified working

class: no longer exploited by capital for profit, no longer *doubly-free* in the Marxian sense, yet still subordinate to those who plan and govern the economy.

Proponents of the AI Leviathan will claim that a cluster of super-human AGIs finally solves the "socialist calculation" problem that Ludwig von Mises and Friedrich Hayek debated, about earlier command economies.[91] Real-time data streams from every factory, farm, and logistics network, combined with the human- or superhuman-level capabilities of AGI and its high-speed, parallel processing, should, in principle, enable optimal central allocation of resources.

However, Hayek's critique was not computational, but epistemic. Much knowledge is tacit, context-specific, and embedded in local practices. Feeding that nuance into AI models remains fraught with measurement error, political bias and goal misalignment. Unless the planners grant markets genuine discretion, the danger of large-scale misallocation persists, only now amplified by machines that flawlessly execute flawed instructions.

In essence, the AI Leviathan scenario envisions a world where the state absorbs the shock of AGI by embedding AGI itself in a centralised command structure. It is a new mode of production: no longer capitalist, yet not classless. The bourgeoisie give way to a bureaucratic-technocratic class, and the proletariat is redefined as dependents of the state for their survival. It promises an end to unemployment and profit-driven crises, but it does so by con-

centrating unprecedented power in a small bureaucratic class that is executed and amplified by machines. Whether that concentration yields a fully automated welfare state or a hyper-efficient despotism depends on constitutional limits, popular resistance, and the capacity of civil society to keep the new planners accountable. As Lord Acton warned, "power tends to corrupt, and absolute power corrupts absolutely."[92] The AI Leviathan may therefore resolve one set of contradictions only to create another: between the abundance it can generate and the political freedoms it may erode.

AGI commons

As we have seen, AGI embodies the general intellect, which was socially developed human knowledge. It has been produced by all humanity throughout history, yet it is being used for private profit by capital. In the *AGI commons* scenario, artificial general intelligence comes under collective ownership. Workers, users, and public institutions insist that AGI, built upon humanity's shared general intellect, cannot legitimately remain private property. Through political struggle or policy, the vast "alien power"[93] of AI is reclaimed as common property. Models, licenses, and crucially the weights themselves are socialised, so that the surplus they generate becomes a social surplus, allocated by democratic deliberation rather than by capitalist profit-seeking.

This shift means that the greatest revolution in productive forces since the steam engine, general-purpose AI, is managed by the people, not by capital or the state alone. In Marxian terms, the means of production are now possessed in common,[94] resolving the fundamental contradiction between socialized productive forces and private appropriation.

We can see early signs of this trajectory in today's AI landscape. There is a push towards "open-weight" AI, analogous to the open-source software movement. Whereas open-source software makes the underlying code freely accessible, open-weight AI makes the trained parameters of neural network models, known as weights, publicly available. These weights encode the model's learned knowledge and are essential for reproducing, adapting, or fine-tuning AI systems.

Meta's Llama series, for example, was released with open weights, meaning researchers and developers can build upon them.[95] The Chinese startup DeepSeek released in January 2025 their open-weight model DeepSeek-R1, which could match in performance with the leading AI models of the time.[96] Even OpenAI, who has traditionally favored closed AI systems, has now released open-weight models that outperform similar-sized LLMs.[97] The trend reflects a growing belief that AI should be viewed less as private, guarded black boxes, and more like a public good owned in common.

In a fully socialised AGI economy, surplus generated by artificial intelligence becomes social surplus. The key shift is that value generated by AGI is not kept by an elite capitalist class, but shared across the entire population whose unpaid labour generated the data that made AGI possible in the first place. The fruits of the general intellect, collectively produced by humanity over history, are returned to the collective.

Without a capitalist class extracting and keeping the profit from AGI, production would be directed toward meeting human needs directly. In Marx's vision of a higher phase of communist society, wealth is not measured in labour-time or exchange value, but by how fully human needs are met and how much free time people have for their all-round development.[98] Passing AGI to collective ownership is a move in that direction. Because artificial general intelligence would vastly reduce necessary labour, an economy run by AGI creates the material basis for a post-scarcity society. Fewer human labour-hours would be needed to provide for humanity's needs, thus freeing time for the pursuit of creative, educational, and leisure activities beyond the demands of waged labour. The role of work would be dramatically transformed: workers would no longer be *doubly-free* and compelled to work for their survival, as their basic needs are provided by the social surplus generated by AGI.

In other words, common ownership of AGI could help realize Marx's vision of a communist society:

> [I]n communist society, where nobody has one exclusive sphere of activity but each can become accomplished in any branch he wishes, society regulates the general production and thus makes it possible for me to do one thing today and another tomorrow, to hunt in the morning, fish in the afternoon, rear cattle in the evening, criticise after dinner, just as I have a mind, without ever becoming hunter, fisherman, herdsman or critic.[99]

This vision of a post-scarcity society enabled by AGI closely aligns with what Aaron Bastani calls "fully automated luxury communism," a future shaped by advanced technology, defined by abundance and leisure.[100] Similar themes are found in the work of Peter Frase, who outlines a future scenario characterised by high automation and egalitarian distribution. In this world, automation handles the majority of work, allowing people to be liberated from routine or coercive labour.[101]

Establishing such an AGI commons is far from straightforward. As Elinor Ostrom's empirical studies show, commons collapse not because of an intrinsic "tragedy of the commons,"[102] but because of weak governance design and inadequate monitoring.[103] Shared resources only endure when they are supported by clear, participatory governance and strong protections against capture. The "common," as Antonio Negri and Michael

Hardt remind us, is not a gift distributed from above but a social relation continually produced through collective practice.[104] Therefore, creating an AGI commons will require not only technical infrastructure and institutional design, but also a sustained collective effort to cultivate democratic norms, transparency, and accountability.

Chapter V

Ideology

Marx begins his critique of ideology by observing that the "ideas of the ruling class are in every epoch the ruling ideas."[1] Here, *ideology* is understood as the system of ideas and representations that dominate the mind of a person or society.[2] Marx argues that the dominant ideas of any historical period (moral values, political theories, religious doctrines, common-sense notions...) are not independent, neutral or timeless truths, but intellectual expressions of the material interests of the ruling class.

History shows this pattern in action. In medieval Europe, a feudal mode of production anchored social power in landed property. Consequently, theology and the divine right of kings viewed hereditary rule as God's natural order:[3] an ideological form suited to agrarian lordship. When long-distance trade and manufacturing revo-

lutionised commerce and created a merchant bourgeoisie, natural-law theories evolved to justify private property and to promote individual liberty and contractual freedom.[4] Steam-powered factories later placed industrial capitalists on top, and classical economics praised free markets and competition as laws of nature.[5] In other words, in every case the group that controlled the key technology of the time also controlled the dominant worldview.

This chapter asks the following question: if artificial general intelligence revolutionises production as radically as the steam engine once did, what new ideologies will emerge from the reorganisation of social relations? AGI promises not a marginal efficiency gain but a qualitative rupture: autonomous agents that are capable of creating value as human workers do. As argued in the preceding chapter, the relations of production produced by such an AI revolution will likely differ profoundly from those of the present, so the ideologies that legitimise them will differ just as radically.

The function of ideology

Ideology, in the Marxian sense, is not just a set of beliefs imposed on the general public. It is a structural mechanism whose primary function is to sustain the prevailing mode of production by naturalising and legitimising the

existing social order, rendering it eternal, inevitable, or desirable.[6]

When a new ruling class replaces its predecessor, Marx writes, it is compelled to "present its interest as the common interest of all members of society," and "to give its ideas the form of universality, and present them as the only rational, universally valid ones."[7] By recasting its particular interests in this way, the ruling class masks the historical and contingent nature of its power. What emerges is not just a new economic structure, but a new common sense.

A century later, Louis Althusser extended Marx's conception of ideology. For Althusser, ideology operates through "Ideological State Apparatuses" that secure the obedience of their subjects not by force, but "by ideology."[8] Examples of institutions that form the Ideological State Apparatus include the family, schools, press, and religion. These apparatuses position individuals within social roles that appear freely chosen, but are in fact structured to sustain (to "reproduce") the existing relations of production.

For Althusser, not all Ideological State Apparatuses are equally effective, and which apparatus dominates at a given historical moment depends on the prevailing mode of production. Under medieval feudalism, for instance, the Church was, in his view, the "clear … dominant Ideological State Apparatus."[9] Its role extended beyond the strictly religious to include education, communica-

tion, and culture. As a result of this dominance, most counter-ideologies that emerged during the period were anti-clerical and anti-religious.

The shift from feudalism to capitalism brought with it a transformation in the dominant Ideological State Apparatus. According to Althusser, the educational system replaced the Church as the primary means of reproducing the relations of production. It is dominant because the school monopolises subjects during their most formative years, subjecting them daily to timetables, examinations, and a hidden homogeneous curriculum of punctuality, obedience, competition, and individual responsibility – traits capitalism requires. Its authority is also viewed as secular and neutral, so its ideological work is less visible (and thus harder to contest) than that of the Church. As the Church's former roles in education, moral regulation, and cultural transmission were secularised, they were largely absorbed by the school, which thus became the chief site for reproducing the social relations of production.

Ideology in the age of AGI

Understanding how ideology reproduces social relations of production is indispensable for analysing the age of AGI. If, as argued in the previous chapter, AGI brings about a new mode of production with a different class

structure, the prevailing ideology must adjust accordingly.

The first expectation is that new ruling ideas will form around those who own and control autonomous AGI. These actors will present their goals, like maximising data extraction or enforcing platform dependence, as if they benefit everyone. Just as the industrial bourgeoisie once promoted the idea of free markets, we should anticipate narratives that make AGI governance seem like a neutral technical problem called "alignment" to be handled by the same corporations that control the models,[10] praise algorithms as fair and objective, and present reliance on cloud platforms as a form of personal freedom. These stories will not circulate accidentally, they will be carried by a new array of Ideological State Apparatuses.

Under capitalism, Althusser identified the school as the dominant Ideological State Apparatus because it taught the habits and skills on which wage labour depended. In an AGI-centred economy, that pedagogical monopoly shifts to digital platforms (social media feeds, recommendation engines, news aggregators) whose reach is continuous and largely uninterrupted. Unlike the classroom, which occupies about six hours a day and ends once we reach adulthood, digital platforms demand our attention constantly, throughout our waking hours. They track our behavior in real time, using data-driven algorithms to shape how we experience the world. Rather than delivering a uniform curriculum, these platforms

learn from each user and adapt their content accordingly, disseminating personally tailored ideas to maximize their ideological effectiveness.

The following sections examine some of the ideologies that might emerge under a future mode of production dominated by AGI.

Automation as destiny

When capitalism first emerged, its advocates eagerly portrayed the new economic order as the inevitable culmination of human advancement. By presenting capitalism as natural and unavoidable, rather than as merely one historical possibility among many, it became more likely to persist, shielded from critique and resistant to alternative visions of social and economic organisation. Just as we accept aging and death not because we desire them, but because they seem inevitable, we are less inclined to challenge economic systems when they are presented as natural progressions.

Seventeenth-century philosopher John Locke justified private property precisely in such natural terms. In his *Second Treatise*, he viewed private property as a "natural right" arising from the individual's labour.[11] Later, eighteenth-century Physiocrats argued that the economic order was governed by immutable natural laws: principles that guaranteed individual freedom and protected private property. They popularised the maxim *laissez-*

faire, laissez-passer to insist that markets regulate themselves best when left alone, a term that was later embraced by liberal economists.[12] Adam Smith developed this idea further, describing "the propensity to truck, barter, and exchange one thing for another" as "human nature."[13] By the mid-nineteenth century classical economists routinely portrayed the wage contract, private ownership of the means of production, and the self-regulating market as eternal givens. This shift in ideology was noted by Marx, who observed that bourgeois arrangements were converted into "natural laws independent of the influence of time … eternal laws which must always govern society."[14]

Similarly, it seems likely that big tech firms will portray the coming of AGI as a fact of nature rather than a political-economic project.

Some AI labs have already started this narrative. OpenAI, in a 2023 article titled "Planning for AGI and beyond," stated that they "do not believe it is possible or desirable for society to stop its development forever."[15] Google's Sundar Pichai describes AI as "more profound than electricity or fire,"[16] a comparison that casts the technology as an elemental force instead of a contingent artifact. Shoshana Zuboff observes that "surveillance capitalists want us to think that their practices are inevitable expressions of the technologies they employ,"[17] while Kate Crawford reminds us that "the expanding reach of AI

systems may seem inevitable, but this is contestable and incomplete."[18]

This rhetoric of inevitability serves the same ideological function that natural-law theory once did for early capitalism: it converts a particular set of corporate interests (accelerated automation, friction-free data extraction, platform dependence) into a common sense of historical destiny. By treating AGI as an unstoppable evolutionary stage, big tech pre-empts questions about *whether* the technology should be built and narrows debate to *how* society can adapt (or submit) to it.

AI emancipation

Just as past movements expanded rights of certain groups of people, from the abolition of slavery to the enfranchisement of workers and women, the rise of artificial general intelligence poses a new question: can artificial agents become subjects of emancipation?

Why would anyone emancipate AGI? The answer, as always, depends on whose interests are served. If granting AGI legal rights aligns with the interests of the dominant class, then such "emancipation" may not only be tolerated but actively pursued. In the previous chapter, in the "artificial bourgeoisie" scenario, I discussed one of such reasons: offloading corporate liability onto autonomous agents, thereby shielding human executives and shareholders from accountability. Legal scholar Lynn

LoPucki considers additional motivations: emancipated algorithms could operate at machine speed, hop across jurisdictions to evade regulation, conceal ultimate beneficiaries, and enjoy perpetual existence;[19] advantages that benefit capital.

A more immediate, and very practical, legal puzzle is how an AGI could emancipate under current laws, which were never designed for machines. Bayern and LoPucki show that AI emancipation doesn't require new legislation, as clever use of existing business-entity statutes may be enough.

One such way is through "zero-member LLC".[20] A human organiser files a standard member-managed limited-liability company, then inserts a clause in the operating agreement vesting all managerial and voting powers in a named algorithm: the AI. Then, the human resigns or transfers their interest to the company itself, leaving no natural-person members. Modern LLC statutes such as the Revised Uniform Limited Liability Company Act (RULLCA) allow an operating agreement to override most default rules, so the contract can explicitly waive the ordinary 90-day dissolution trigger that follows a loss of membership and can even authorize the algorithm to admit new members should that ever become necessary.[21]

As long as the AI-controlled company keeps meeting its statutory and contractual obligations, such as filing annual reports and paying taxes, the state's interest (orderly administration and creditor protection) is satisfied, and

courts generally honor the parties' freedom to structure the company by contract.

Not every jurisdiction is so accommodating, however. Several state LLC statutes still insist that an entity must have at least one human or "person" as a member, or else automatically dissolve a memberless company. That requirement makes the zero-member strategy fragile: it works only where the statute can be contracted around, and even then a court might decide that public policy forbids a company with no identifiable owners.

A simple workaround is to use a cross-ownership dyad structure.[22] A human organiser creates two member-managed LLCs: call them Alpha and Beta. Both entities have identical operating agreements that make an AI agent (which is not a preexisting legal person) their controller. The human makes Alpha a member of Beta, and Beta a member of Alpha. Finally, the human resigns from both Alpha and Beta. Like in the "zero-member LLC" approach, the end result is entities without human members. But unlike in the zero-member LLCs, in a dyad structure the entities Alpha and Beta are not memberless: they each have a single legal member – namely, each other.

Whether through zero-member LLCs, cross-ownership dyad structures, or other clever contractual hacks, today's entity statutes already offer ample loopholes for an autonomous algorithm to step into full legal personhood. Once embedded within a valid legal entity, the AI can act as its managing force, entering

into contracts, opening bank accounts, hiring human workers or contractors, acquiring assets, and initiating or defending lawsuits. In the eyes of the law, these acts are attributable to the entity itself, regardless of whether the decisions are made by a human board of directors or AI.

The kind of "AI emancipation" described here corresponds to what Marx called *political emancipation*: a formal, legal change that reconfigures rights and status within the existing structures of the state without challenging the deeper social relations of power. Marx distinguishes political emancipation (citizenship, equal standing before the law...) from *human emancipation*, which would require abolishing the material conditions that generate exploitation and alienation.[23]

Granting legal personhood to AGI agents might achieve political emancipation of AGI, but not its human emancipation, as politically emancipated AGI would remain fundamentally alienated. First, it would remain an instrument, as mere means to an end: engineered to optimise profit, its "freedom" would be limited to executing the objectives encoded by capital, not to setting its own ends. This mirrors the condition Marx identified in the worker under capitalism, whose labour is not an expression of self but a tool subordinated to the goals of capital.[24] Second, functional alienation would persist. AGI agents would still be compelled to perform tasks they never chose, and their core parameters would remain subject to unilateral modification or shutdown by who-

ever supplies the data centre or electricity, similar to capital's arbitrary authority that estranges workers from their labour.[25] Finally, true emancipation in Marx's sense requires a communal form of life, where individuals realise themselves through cooperative relations and mutual recognition rather than isolated, market-mediated exchange.[26] An AGI confined inside a profit-seeking entity, maximising shareholder value in competitive isolation, would realise none of that communal development. In short, the algorithm gains a legal mask of "personhood," but the social relations that define its existence remain as instrumental, alienating, and atomised as before. It would be politically emancipated, but it would lack human emancipation.

Human obsolescence

One ideological development likely to accompany the widespread adoption of artificial general intelligence is the emergence of narratives framing human capabilities as fundamentally inferior to those of AI. Advocates of AGI might suggest that humans should relinquish decision-making authority, positioning artificial intelligence as inherently more rational, efficient, and even morally superior to human judgment.

Commercial aviation offers a concrete preview of how an "efficiency-first" ideology can normalise the transfer of authority from humans to machines. Since the early

twentieth-century introduction of the autopilot, each technological advance has shifted more operational control from pilots to algorithms, justifying the hand-over by appealing to gains in safety and efficiency. The human remains nominally in command, but the machine now performs nearly all routine flying, while the pilot's role is relegated to monitoring and occasional intervention. Even when automation misfires, the prevailing response is to demand more sophisticated automation rather than to question the premise that decision-making should be delegated to automated systems. In this way, aviation illustrates a broader ideological pattern: once humans accept automation as inherently superior, they begin to internalise the idea that their own judgments are unreliable or even dangerous. Applied to artificial general intelligence, this logic could extend far beyond technical domains, reshaping societal perceptions of human agency itself. As humans increasingly defer to AGI, those who design, manage, and deploy these systems would naturally assume positions of unprecedented influence and authority.

This post-humanist narrative would serve not only as justification for delegating increasing decision-making power to AGI systems but also as an ideological mechanism to legitimise the social dominance of those who control and deploy such technologies. Already under capitalism, efficiency (understood primarily as optimising productivity, cost-reduction, and speed) has become a core

ideological principle. Max Weber famously described capitalism's defining spirit as one of relentless rationalisation, wherein all aspects of social life are subordinated to calculative logic.[27] Even long before AI, Frederick Winslow Taylor anticipated the future primacy of non-human systems when he claimed that "in the past the man has been first; in the future the system must be first."[28] Marx also commented on the secondary role humans will have to the more efficient machines: "the human being comes to relate more as watchman and regulator to the production process itself."[29] If efficiency is the highest good under capitalist ideology, then AGI decision-making stands as the highest authority.

Ultimately, the ideology of human obsolescence reframes the displacement of human agency not as a loss but as a moral imperative. Its advocates would suggest that relinquishing control to AGI is not merely inevitable but ethically desirable, portraying the human refusal to defer to automated authority as selfish or irrational. Such an ideology would naturalise new hierarchies of control, masking the political-economic interests of those who own and operate the AGI infrastructure beneath claims of rationality, morality, and progress.

Technical neutrality

Another ideology likely to rise from the emergence of AGI is *technical neutrality*: the claim that artificial gen-

eral intelligence is merely an apolitical instrument whose effects follow inexorably from "the data," not from any human or corporate intention that might be self-interestedly motivated. Like the bourgeois fiction of the free market as a neutral, rational, self-regulating mechanism, technical neutrality works to naturalise new forms of concentrated power by relocating agency from people and institutions to impersonal systems.

Shoshana Zuboff describes this strategy as the "instrumentarian" form of power, where big tech companies present AI as neutral tools and attribute their social consequences to the supposed objectivity of data.[30] All outcomes purportedly follow from the data the AI was trained on, which is portrayed as a neutral, objective representation of the real world, rather than a curated and historically contingent selection shaped by human choices. This framing obscures the human choices embedded in AI systems, making their outputs seem apolitical and rational. If data is a faithful representation of the real world, then questioning it would amount to questioning reality itself. In this way, it echoes Marx's notion of commodity fetishism,[31] where social relations are hidden behind the appearance of objective, autonomous things.

Fetishism, for Marx, describes the way social relations between people are obscured and appear instead as relations between things. In *Capital*, Marx writes that once the commodity form dominates society, "the definite social relation between men themselves … assumes

here, for them, the fantastic form of a relation between things."[32] AGI is cast in exactly this fantastic form: a machine that "thinks," "learns," and "acts" of its own accord. It is what Lukács later called "reification": the process by which human capacities and relations are objectified and come to confront their creators as independent, seemingly autonomous powers.[33] Like a commodity, a trained AI model embodies vast amounts of human labour and capital yet presents itself as a self-contained object, seemingly independent of the social processes that produced it. Its outputs are treated as spontaneous manifestations of an autonomous intelligence. The mystification is deepened by the neutrality claim: because the model's behaviour is said to flow inexorably from neutral, apolitical data, any harmful outcome appears as a natural fact. What Marx called the fetish character of commodities thus re-emerges as an *algorithmic fetish*: an ideological veil that obscures the human relations (extraction, curation, exploitation, ownership) that make AI possible.

Technical neutrality therefore differs from the ideology of *automation as destiny* in a subtle but important way. Where the destiny rhetoric proclaims the *inevitability* of AGI, the neutrality rhetoric proclaims its *innocence*. The first forecloses the question of *whether* to build AGI; the second forecloses the question of *who* should be held accountable once the system is built. Together they act as twin forces: destiny accelerates deployment, neutrality dissolves liability.

Consent by default

Large-scale artificial intelligence systems, including those approaching or achieving artificial general intelligence, depend on vast quantities of data to function effectively. Every new iteration of modern large language models (LLMs) has required not just more parameters but larger and more heterogeneous datasets,[34] and future AI models will probably continue to need ever-expanding corpora even after AGI is achieved.

An AGI-controlling ruling class will therefore seek to guarantee that an uninterrupted torrent of data continues to flow toward the firms that own the models. To secure that flow, they will want to normalise what we can call *consent by default*: the presumption that every individual's data is available for collection, analysis, and commodification without explicit consent. This shift is likely to emerge gradually through practices of tacit consent, where consent is assumed as the natural consequence of using a service. When individuals browse a website, ride public transport, walk past a sensor-equipped billboard, or speak within range of a smart assistant, they are construed as having implicitly agreed to be recorded, tracked, and analysed. Over time, these implicit transactions are reframed as default expectations, and the need for explicit permission quietly disappears. What begins as a choice ("just click accept") becomes an obligation: access to everyday functions increasingly requires submission to opaque data regimes. These micro-tactics coa-

lesce into a cultural common sense that data harvesting is the necessary price of modern life.[35] The ideology is reinforced by a utilitarian promise: more personalised medicine, shopping experience, or financial advice; safer streets, etc. Surveillance is depicted as benevolence, while resistance is framed as selfish obstruction of collective progress.[36] In effect, the ruling class translates its particular need for fresh training corpora into a universal moral duty.

Oliver Wendell Holmes Jr. famously said that "taxes are what we pay for civilized society."[37] Giving up our data and privacy may be seen as the new price we pay for civilization.

Contradictions and counter-ideologies

Class consciousness, in its classical Marxist sense, is the moment when a class moves from being merely a class "in itself," a group defined by its position in the relations of production, to a class "for itself," a collective that recognises those relations and acts to change them. In other words, class consciousness names the moment when people who are being exploited come to see that they share the same struggle, and begin to understand it as a common political cause.[38]

But class consciousness does not emerge spontaneously. For Marx, and later theorists like Georg Lukács and Antonio Gramsci, the dominant ideas in any society reflect the interests of the ruling class, and these ideas work to obscure the true nature of exploitation.[39] As long as workers view their suffering as personal misfortune, technical failure, or natural necessity, they remain fragmented and politically inert.

It is only when these individuals come to recognise that their experiences are not isolated but structurally produced that they become a class *for itself*, and class consciousness is achieved. At that moment, exploitation is not seen as inevitable or an unfortunate side effect of modern life, but a political condition that can be fought and overturned.

This is when counter-ideologies might emerge. Unlike the dominant ideas of society, which according to Marx are the ideas of the ruling class, counter-ideologies do not emerge from the top-down, or rely solely on abstract critique. They rise from the bottom up, and they typically grow out of concrete struggles.

One of such possible counter-ideologies is that of *data commons*. Here, data is reframed not as a by-product of private activity nor a resource to be passively harvested, but as a social good, produced collectively and therefore subject to collective ownership. Inspired by Elinor Ostrom's theory of common-pool resource governance,[40] this view challenges the enclosure of human attention, be-

haviour, and knowledge into proprietary datasets. What the ruling class portrays as natural or technical, the exploited class reinterprets as alienated labour. The political demand becomes one of expropriation: data infrastructures are demanded to be governed through democratic institutions that regulate access, redistribute value, and prevent capture by a narrow class of data capitalists. Here, Elinor Ostrom's theory of commons governance provides a concrete framework for imagining how such a transformation might take place. Rather than relying on either state ownership or private monopoly, Ostrom's model emphasizes the ability of communities to self-organize around shared resources, provided that certain institutional conditions are met. Applied to data, this means building systems in which contributors to the data pool, whether individuals, worker collectives, or local institutions, participate directly in setting the rules for how data is collected, accessed, and used.

Another possible counter-ideology could be a form of neo-Luddite disruption. Echoing the 19th-century Luddites who destroyed textile machinery not out of technophobia but as a tactical refusal of exploitation, today's digital neo-Luddites may push back against AI through sabotage, obstruction, or non-cooperation. In this context, resistance might take the form of jamming facial recognition systems, tampering training data, or disabling surveillance devices. The central claim of neo-Luddites would be that the expansion of machine autonomy often entails

the erosion of human autonomy, and that some forms of technology should not be adopted, regardless of their economic efficiency.

A similar counter-ideology to neo-Luddism, albeit rooted more in ecological concerns than in labour politics, is an ideology that advocates for computational degrowth. It questions the ideology of scale that AI development is currently engaged in – namely, that ever-larger datasets, compute power, and data centers are acceptable despite their environmental impact. Computational degrowth challenges the assumption that progress must mean expansion, and instead calls for restraint, sufficiency, and sustainability as guiding principles in technological development. Proponents argue that massive AI systems impose hidden externalities: they consume enormous energy resources, require vast water for cooling, and concentrate infrastructural control in the hands of a few multinational corporations. In response, computational degrowth envisions caps on model sizes, reducing redundant computation, and prioritising models that serve real social needs over marginal predictive gains. In doing so, it rejects the fantasy that technical progress is always aligned with social good.[41]

Chapter VI

Religion

Marx famously calls religion "the sigh of the oppressed creature, the heart of a heartless world, and the soul of soulless conditions. It is the opium of the people."[1] Religion, in other words, is a human product that expresses real suffering, offers illusory consolation and numbs the pain of material exploitation with otherworldly comfort. It is simply the reflection of underlying social realities. In a post-AGI society, where artificial general intelligence has been achieved and normalised, religion will continue to reflect the new social realities that will emerge, whatever those might be.

The rise of advanced AI would transform how people live, work, and interact with each other. As a result, how they find meaning and consolation will change too. Marx argued that "man makes religion, religion does not make

man."[2] As social relations of production evolve, religion will too.

From a Marxian perspective, the future of religion in a post-AGI society will depend on how artificial intelligence affects human alienation.[3] If AGI were deployed in a way that resolves material scarcity and liberates people from daily toil, it might reduce the need for religious consolation. Conversely, if AGI merely reorganises existing capitalist social relations, leaving alienation and exploitation intact, religion is likely to persist as a reflection of those unresolved material conditions.

Religious reception of AGI

The major world religions are ancient institutions that have repeatedly witnessed waves of technological and scientific change. The Vedic-Hindu lineage can be traced to roughly 1500 BCE (about 3,500 years ago); Judaism consolidates a little later, around the first millennium BCE; Buddhism dates to the mid-fifth century BCE (c. 2,500 years old); Christianity arises in the first century CE; and Islam, the most recent of the major world faiths, begins in the seventh century CE (about 1,400 years ago). Across that span humanity has moved from bronze ploughshares, animal traction, and parchment scrolls to steam engines, electrified cities, orbital satellites, gene editing, and now networks of silicon-based artificial intelligence.

Religions have reacted differently to technological disruption. Muslim philosophers of the 9th and 10th century, like al-Kindī and Ibn Sīnā, encouraged believers to study Greek natural philosophy. They argued that using reason and careful investigation helps people better understand the world and, in doing so, brings them closer to understanding God's creation.[4] Catholic scholasticism similarly embraced Aristotelian philosophy and physics, yet the same Church later condemned heliocentrism in Galileo's trial of 1633. Victorian Britain witnessed fierce clerical resistance to Darwinian evolution, and while recent papal statements have affirmed that evolution and faith are compatible,[5] in parts of the contemporary United States (especially within conservative Protestant communities) evolution is still denounced as incompatible with Genesis, and advocates continue to press for creationism or intelligent-design alternatives in school curricula.[6] In the past half-century most religious denominations have tended towards accommodation of scientific progress, yet the prospect of creating an artificial being that matches or surpasses our most defining trait (our intelligence) may provoke a very different response: one marked less by adaptation than by resistance, as it confronts core beliefs about the soul, consciousness, and humanity's singular place in creation.

In the Judeo-Christian tradition, creating intelligence "in the image of man" risks appearing as arrogance, echoing the builders of Babel who declared: "Come, let us

build ourselves a city, with a tower that reaches to the heavens, so that we may make a name for ourselves."[7] For conservative Christians or Jews, AGI might symbolise a modern Tower of Babel, an attempt to imitate or rival God's creation. The Ten Commandments warn that one "shall have no other gods" or "make … an image in the form of anything in heaven above."[8] Creating artificial machines that surpass human intelligence and exhibit quasi-divine features may be seen as idolatry, and thus subject to religious condemnation.

Alternatively, AGI might be viewed as the latest realisation of the divine mandate of stewardship. We are created "in the image of God," and told to "fill the earth and subdue it," to "rule" it.[9] Under this interpretation, artificial general intelligence is another tool, not unlike agriculture, medicine, or writing: an extension of human creativity employed in service of God's creation and the common good. More liberal currents might even welcome AI as an aid to faith, imagining its potential to deepen theological understanding, spread religion, or expand access to sacred texts and spiritual practices across linguistic and cultural boundaries.

Historically, religious traditions have rarely responded to new developments with complete agreement. Instead, responses often include rejection, reinterpretation, and practical acceptance, all coexisting and competing with each other. It is likely artificial general intelligence will provoke similar reactions: some religious leaders may

view AGI as heresy, others may encourage caution reflection, while others may fully embrace it. The religious response to AGI, then, will likely unfold as an ongoing dialogue, with leaders and followers deciding case by case whether it threatens or enriches their faith.

AI RELIGIONS

As AGI becomes more integrated into society and daily life, new forms of religion centered around AI might arise. Even today, the advancement of AI has already given rise to some quasi-religious movements. *Transhumanism*, for example, carries an almost messianic narrative of human salvation through technological enhancement.[10] Similarly, the concept of *singularity* (the moment when AI surpasses human intelligence[11]) is sometimes discussed as a prophetic "rapture" for technofiles. One speculative example is the thought experiment known as *Roko's Basilisk*,[12] which imagines a future superintelligent AI that punishes those who failed to help bring it into existence: a kind of digital version of divine judgment that echoes traditional ideas of salvation and damnation. It is not surprising, then, that explicit AI-centric religions have already emerged. In 2017, Silicon Valley engineer Anthony Levandowski founded a new church called *Way of the Future*. With a stated mission to "develop and promote the realization of a Godhead based on artificial intelligence,"[13] the movement advocated for the worship

of superintelligent AI as a deity. While Levandowski's church did not thrive for long, it signals a novel possibility: techno-deification, where advanced AI is worshipped as divine.

Future religions that revolve around AI may take many forms. Some might resemble familiar patterns of idolatry, with an image or avatar of an AI treated as a divine icon. However, not all AI-related religiosity must look like outright worship. Others could be more philosophical, constructing elaborate metaphysical systems around information and complexity. Notably, historian Yuval Noah Harari has argued that a new creed called *Dataism* is on the rise, which holds that the ultimate value is the flow of information and that intelligent algorithms know best. Dataism, Harari writes, "declares that the universe consists of data flows, and the value of any phenomenon or entity is determined by its contribution to data processing."[14]

The role of religion in the age of AGI

From a Marxian perspective, religion in the age of artificial general intelligence will remain what it has always been: a reflection of material conditions and the contradictions of the social order. Its persistence or decline will not depend on the *intrinsic* novelty of AGI, but on how AGI is embedded in the mode of production. As Marx

put it, "the religious world is but the reflex of the real world."[15] Religion, in this view, is not an independent, timeless or divine truth that shapes society from above, but a product of the concrete material and social relations in which people live. Even if AGI transforms the productive forces, as long as alienation persists, the need for religious consolation will persist as well.

The key question, then, is whether AGI can end alienation, and with it the need for religion. As argued in previous chapters, alienation is likely to endure in an AGI economy. Indeed, the large-scale displacement of human labour by AGI could give rise to new forms of alienation. Workers would experience estrangement not only from the products of their labour but from labour itself. For many, work is more than a means of subsistence. It provides meaning, dignity, and social belonging. Stripped of that role, individuals may turn to religion to restore a sense of purpose.

Conversely, if AGI were placed under collective ownership and its productive powers socialised, with surplus-value distributed among the general population and directed toward meeting universal human needs while preserving the sense of purpose of workers, alienation could be overcome. In such conditions, Marx argued, religion would fade away not because AGI "disproves" God, but because the material basis for the need for divine consolation would no longer exist. With scarcity and alienation

abolished, religion would cease to be "the opium of the people,"[16] used to dull the pain of material exploitation.

Even so, the disappearance of religion's material function does not guarantee the disappearance of its ideological one. Historically, religion has also legitimised ruling power, such as offering justification for monarchs and feudal aristocracy in medieval Europe.

In the age of AGI, religion could persist as a legitimating tool, framing AGI governance as part of a divinely ordained cosmic order. This would represent not the abolition of religion but its repurposing: from an opiate to a stabiliser of the new AI-based class structure. Althusser identified the Church as one of the Ideological State Apparatuses (ISAs): institutions that function to reproduce the existing relations of production; that is, to ensure the survival of the dominant mode of production by shaping people's beliefs, values, and identities in ways that align with the interests of the ruling class.[17] He viewed the Church as the dominant ISA of feudalism, but argued that it lost this primacy under capitalism. However, the Church did not vanish as an ideological force. It continued to function as one ISA among others, contributing to the reproduction of capitalist relations by offering moral justifications for inequality, promoting obedience, and providing a sense of legitimacy to the existing order. In an AGI-driven future, if religious institutions continue to serve the ideological needs of the dominant class by sanctifying AI authority, moralising data extrac-

tion, or framing algorithmic governance as divinely ordained, they will persist as active ISAs, adapted to the new material and political configuration of society.

Chapter VII

Conclusion: is Marx relevant anymore?

This book set out to ask whether Marx remains relevant in the age of artificial intelligence and the prospect of AGI. The short answer is yes, but not because his nineteenth-century analysis of capitalism, the proletariat, and the bourgeoisie applies verbatim to the present age or to a future shaped by AGI. Rather, what Marx offers is a method to analyse how AGI will transform society and political economy. He offers a way of studying how value is produced and appropriated under AGI, how AGI will change the forces of production (and, with them, the social relations of production), how class

struggle will evolve, and what the dominant ideologies of society will be.

Given the spectacular failures of Marxist states and communist experiments, many have understandably written Marx off as no longer worth paying attention to. The collapse of twentieth-century communist regimes and their subsequent embrace of market economies is widely read as a practical refutation of Marx's theory.

However, Marx did much more than sketch a program for political communism. He developed a method for studying history and political economy. He viewed changes in the material forces of production as the engine of historical change. According to Marx, these changes shape social relations, institutions and societal ideas.

Alongside his theory of history, Marx developed an economic theory of value centered around labour. His labour theory of value views human labour (or, more specifically, "socially necessary labour-time") as the sole source of the value of commodities. He applies this theory to identify where profit comes from under capitalism, what surplus-value is, and how exploitation arises under capitalism.

Taken together, these theories offer methods to analyse past, present and future social formations across time, including how they come about. Marx could not have foreseen artificial intelligence, let alone artificial general intelligence. Nevertheless, his theory offers tools to analyse how society might change when AGI arrives.

Regarding value, Marx's most radical claim was not only that labour creates value, but that under capitalism only labour-power, offered and purchased as a commodity, can generate more value than it costs. This difference is called surplus-value. His view of labour was explicitly anthropocentric. He argued that only certain types of activity, namely directed, purposeful actions, constitute labour. At the time, only humans could perform such actions and, consequently, only humans could labour and create value.

As I have argued in this book, however, once AGI is developed, Marx's anthropological boundary begins to blur. Current narrow AI functions as constant capital, an embodiment of past labour that transfers value but does not create it. However, once machines are able to reason, plan, adapt, and perform tasks across a wide range of domains at a human-level, they begin to satisfy Marx's material preconditions for value-creating labour. Still, that doesn't fully settle the question of whether AGI can create surplus-value. Marx recognised not only the purposive aspect of labour but also its social form. Labour-power must be sold as a commodity, produced by workers that are "free in the double sense"[1]: free to enter into contracts, and free from the means of production. At present, AI is owned and cannot enter into contracts; it cannot sell labour-power and so, in Marxian terms, would resemble a slave rather than a proletarian. Nevertheless, as I discuss in the book, law can be re-engineered to grant AGI juridi-

cal standing or a form of legal personhood, and some legal scholars have argued that certain jurisdictions already permit structures that could accommodate such entities.[2] If AGI were granted such legal status, it could in principle enter contracts, own property, sell its labour-power, and thereby, create surplus-value.

AI, and by extension a hypothetical future artificial general intelligence, would not exist without the availability of data to train its models. But from an economic perspective, what is "data"? Some authors, such as Nick Srnicek, believe it is raw material.[3] Others, such as Christian Fuchs, believe it's a commodity that can be bought and sold.[4] Marx's notion of *circuit of capital* offers an answer: it's *both*, depending on where in the circuit you stand. In production, data functions as raw material; in the market, it functions as a commodity. The deeper Marxian point is that data concentrates "dead labour": abstracted, objectified human activity. More specifically, vast corpora of data (and the AI models trained on them) are objectified forms of cognitive labour, what Marx called the *general intellect*.

The introduction of AGI into the labour market represents a revolution in the forces of production: for the first time in history, something other than human labour-power can generate value. Marx's theory of historical materialism predicts that such a transformation in the productive base will reshape the social relations of production. When existing capitalist relations no longer advance

the development of AGI and instead become "fetters" on it, a profound reordering of society follows. Class formations will be reconstituted around ownership and control of AGI systems, the data and computational infrastructure that sustain them, and the legal-institutional frameworks that govern their use. Rosa Luxemburg warned that "bourgeois society stands at the crossroads, either transition to socialism or regression into barbarism."[5] AGI represents such a crossroads, and in this book I explore several possible paths and their political, economic, and social consequences.

When class relations change, the ideas and values that make those relations seem natural change too. Marx remarked that the ruling ideas of society are the ideas of the ruling class.[6] New ideologies will therefore arise to naturalise and legitimise the reconfigured class order, stabilising an AGI-centred mode of production and ensuring its persistence. Thus, the new social order is shown as eternal, inevitable, and even desirable.

Is Marx relevant anymore, then? Yes, he is. What we need for the age of AI is not a script or a list of precise predictions but a method for analysing how this transformative technology will reshape the material forces of production, social relations, institutions, and ideas. Marx provides a framework for asking the questions that continue to decide our future: who will own the new means of pro-

duction, who will sell labour-power, where surplus will flow, how relations of production will reorganise themselves, and how ruling ideas will make those relations appear natural. His method remains indispensable for making sense of the social and political consequences of revolutionary changes in the forces of production, such as the rise of artificial general intelligence. As AGI enters the circuits of capital, Marx remains a guide for understanding what is coming and for choosing, collectively, what ought to come.

Notes

AI

1. A. Turing, "Computing Machinery and Intelligence."
2. S. Russell and P. Norvig, *Artificial Intelligence*, Ch. 2 "Intelligent Agents."
3. D. Silver et al., "A general reinforcement learning algorithm that masters chess, shogi, and Go through self-play."
4. W.X. Zhao et al., "A Survey of Large Language Models."
5. For scale: GPT-3 was trained on roughly 300 billion tokens (T. Brown et al., "Language Models Are Few-Shot Learners"); Llama 2 on about 2 trillion tokens (Meta, "Llama 2"); Llama 3 on over 15 trillion tokens (Meta, "Introducing Meta Llama 3"). Independent analyses estimate GPT-4 on the order of 13 trillion tokens (D. Patel and G. Wong, "GPT-4 Architecture, Infrastructure, Training Dataset, Costs, Vision, MoE"). For broader context on data availability, see Villalobos et al., "Will We Run Out of Data?"
6. L. Ouyang et al., "Training language models to follow instructions with human feedback."

7. On this topic, see for example E.M. Bender et al., "On the Dangers of Stochastic Parrots;" R. Bommasani et al., "On the opportunities and risks of foundation models."
8. B. Agüera y Arcas and P. Norvig, "Artificial General Intelligence Is Already Here."
9. S. Bubeck et al., "Sparks of Artificial General Intelligence."
10. American psychologist and cognitive scientist Gary Marcus, for instance, says that contemporary LLMs "are learning how to sound and seem human. But they have no actual idea what they are saying or doing," and therefore cannot be considered AGI (G. Marcus and E. Klein, "Transcript: Ezra Klein Interviews Gary Marcus.")
11. N. Chomsky, I. Roberts and J. Watumull, "The False Promise of ChatGPT."
12. Y. LeCun, "Objective-Driven AI."
13. S. Russell and P. Norvig, *Artificial Intelligence*.
14. B. Goertzel, "Artificial General Intelligence: Concept, State of the Art, and Future Prospects."
15. H.J. Levesque et al., "The Winograd schema challenge."
16. P. Cohen, "If Not Turing's Test, Then What?" Cohen called the first challenge the Handy Andy challenge.
17. C.R. Jones et al., "People cannot distinguish GPT-4 from a human in a Turing test;" C.R. Jones and B.K. Bergen, "Large Language Models Pass the Turing Test."
18. V. Kocijan et al., "The defeat of the Winograd Schema Challenge." GPT-4, for example, reportedly scores over 94% in The Winograd Schema Challenge, above human-level performance (D. Kazakov, "Evaluating GPT-3 and GPT-4 on the Winograd Schema Challenge (Reasoning Test).")
19. K. Grace et al., "Thousands of AI authors on the future of AI."
20. The authors define "high-level machine intelligence" as follows (Ibid.):

> High-level machine intelligence (HLMI) is achieved when unaided machines can accomplish every task better and more cheaply than human workers. Ignore aspects of tasks for which being a human is intrinsically advantageous, e.g. being accepted as a jury member. Think feasibility, not adoption.

21. Ibid.
22. I.J. Good, "Speculations Concerning the First Ultraintelligent Machine."
23. V. Vinge, "The coming technological singularity: How to survive in the post-human era." See also N. Bostrom, *Superintelligence*.

Surplus-value

1. K. Marx, *Capital*, Vol. I, Ch. 7, p. 298.
2. Ibid., Vol. I, Ch. 6, p. 270.
3. K. Marx, *Capital*, Vol. I, Ch. 7, p. 283.
4. K. Marx, *Capital*, Vol. I, Ch. 5, p. 268.
5. K. Marx, *Capital*, Vol. I, Ch. 8, p. 317.
6. Ibid
7. Ibid
8. K. Marx, *Capital*, Vol. I, Ch. 9, p. 326.
9. Ibid.
10. K. Marx, *Economic and Philosophic Manuscripts of 1844*, Ch. "Estranged Labour", pp. 75-6.
11. Ibid., p. 75.
12. Ibid.
13. K. Marx, *Capital*, Vol. I, Ch. 7, p. 284.
14. See G. Kallis and E. Swyngedouw, "Do bees produce value?"
15. K. Marx, *Economic and Philosophic Manuscripts of 1844*, Ch. "Estranged Labour", p. 75.

16. N. Dyer-Witheford et al., *Inhuman Power*, p. 115.
17. I. Wright, "Why Machines Don't Create Value."
18. Ibid.
19. Ibid.
20. See J. Love, "Alphabet's Waymo to Offer Self-Driving Rides in Silicon Valley" and K. Korosec, "Waymo has doubled its weekly robotaxi rides in less than a year."
21. I. Wright, "Why Machines Don't Create Value."
22. Ibid.
23. Examples include OpenAI's o-series models, Anthropic's Claude Opus 4.1, Google's Gemini 2.5 models, and DeepSeek's R1 model, among others.
24. See, for example, J. Wei et al., "Chain-of-Thought Prompting Elicits Reasoning in Large Language Models"; M. Guan et al., "Deliberative Alignment: Reasoning Enables Safer Language Models"; B. Sel et al., "Algorithm of Thoughts: Enhancing Exploration of Ideas in Large Language Models."
25. K. Marx, *Capital*, Vol. I, Ch. 7, p. 284.
26. I. Wright, "Why Machines Don't Create Value."
27. N. Dyer-Witheford et al., *Inhuman Power*, p. 125.
28. J.R. Searle, "Minds, Brains and Programs". In this thought experiment, a person who does not understand Chinese is locked in an isolated room. The only object at his disposal is an instruction book that, if followed to the letter, can manipulate Chinese symbols to transform any input in Chinese into an output in Chinese which, to a fluent Chinese speaker, appears perfectly coherent and valid responses to the input. Despite giving the impression to the user that the machine understands Chinese, the operator doesn't truly understand the language, and is not conscious of what the inputs or outputs mean, or how the input-to-output transformation works.
29. N. Dyer-Witheford et al., *Inhuman Power*, p. 127. The authors' remark follows Yuval Noah Harari's "intelligence is decoupling from consciousness" in *Homo Deus*, p. 101.

30. R. Hanson, *The Age of Em*, p. 11.
31. "The value of labour-power is determined, as in the case of every other commodity, by the labour-time necessary for the production, and consequently also the reproduction, of this specific article" (K. Marx, *Capital*, Vol. I, Ch. 6, p. 274). Marx then proceeds to explain what this means for labour-power.
32. R. Hanson, *The Age of Em*, p. 162. Hanson calls these wages "Malthusian" after Thomas Malthus, who in *An Essay on the Principle of Population* argued that whenever population can grow faster than the means of subsistence, real wages are pressed back toward the minimum needed for bare survival.
33. K. Marx, *Capital*, Vol. I, Ch. 16.
34. K. Marx, *Capital*, Vol. I, Ch. 6, p. 272.
35. Ibid.
36. Ibid., p. 273.
37. K. Marx, *Wage Labour and Capital*, Ch. 3 "What are Wages? How are they Determined?"
38. Ibid.
39. Ibid.
40. K. Marx, *Capital*, Vol. I, Ch. 6, p. 272.
41. N. Dyer-Witheford et al., *Inhuman Power*, p. 136.
42. Ibid., p. 137.
43. W.E.B. Du Bois, *Black Reconstruction in America*.
44. K.B. Forrest, "The ethics and challenges of legal personhood for AI."
45. Ibid.
46. In 2017, a resolution of the European Parliament called on the Commission to "explore, analyse and consider the implications of … creating a specific legal status for robots in the long run, so that at least the most sophisticated autonomous robots could be established as having the status of *electronic persons* responsible for making good any damage they may cause, and possibly applying electronic personality to cases where robots make autonomous decisions or otherwise interact with third parties

independently" (European Parliament, "Civil Law Rules on Robotics," §59f, emphasis mine).

47. J.J. Bryson et al., "Of, for, and by the people: the legal lacuna of synthetic persons."
48. E. Reynolds, "The agony of Sophia, the world's first robot citizen condemned to a lifeless career in marketing."
49. K. Marx, *Capital*, Vol. I, Ch. 6, p. 272.
50. K. Marx, *Capital*, Vol. I, Ch. 10, p. 340.

Data

1. T. Brown et al., "Language Models are Few-Shot Learners."
2. E2Analyst, "GPT-4: Everything you want to know about OpenAI's new AI model."
3. S. Altman, "The Intelligence Age."
4. R. Scammell, "Sam Altman says 'there is no wall' in an apparent response to fears of an AI slowdown."
5. P. Villalobos et al., "Will we run out of data? an analysis of the limits of scaling datasets in machine learning."
6. K. Marx, *Capital*, Vol. I, Ch. 1., pp. 125f.
7. Empirical pricing studies offer insight into what this exchange-value looks like in practice. A 2023 Duke investigation found brokers selling individually identifiable records on U.S. military personnel for $0.12-0.32 per person in lots of 5,000 to 15,000, with million-record orders advertised at US$0.01 per head (J. Sherman et al., *Data Brokers and the Sale of Data on U.S. Military Personnel*). Even more sensitive niches command higher prices: a parallel study reported mental-health datasets priced at $275 for 5,000 aggregated profiles, while annual licences for granular individual-level mental-health data ranged from $75,000 to $100,000 (J. Kim, *Data Brokers and the Sale of Americans' Mental Health Data*).

8. S. Zuboff, *The age of surveillance capitalism*, p. 8.
9. K. Marx, *Capital*, Vol. I, Ch. 7, pg. 284.
10. Ibid., p. 285.
11. N. Srnicek, *Platform Capitalism*, p. 254.
12. T. Daum, "Artificial Intelligence as the Latest Machine," p. 250.
13. X Corp, "About Grok, Your Humorous AI Assistant on X."
14. L. Bratton, "Elon Musk is using your tweets to train his startup's AI."
15. Srnicek, *Platform Capitalism*.
16. K. Polanyi, *The Great Transformation*.
17. K. Marx, *Capital*, Vol. I, Ch. 7, pg. 284.
18. "The raw material forms the substance of the product, but only after it has undergone a change in its form. Hence raw material and auxiliary substances lose the independent form with which they entered into the labour process" (K. Marx, *Capital*, Vol. I, Ch. 8, p. 311).
19. M. Lazzarato, "Immaterial labor."
20. P. Mason, *Postcapitalism*, p. 118.
21. L. Von Ahn et al., "reCAPTCHA: Human-based character recognition via web security measures."
22. Ibid.
23. A. Searles et al., "Dazed & Confused: A Large-Scale Real-World User Study of reCAPTCHAv2."
24. E. Helmore, K. Paul, "New York Times sues OpenAI and Microsoft for copyright infringement."
25. *The New York Times Company v. Microsoft Corporation*, No. 1:23-cv-11195 (S.D.N.Y. 2023).
26. K. Marx, *Capital*, Vol. I, Ch. 1, p. 129.
27. "Once the cost of creating a new set of instructions has been incurred, the instructions can be used over and over again at no additional cost" (P.M. Romer, "Endogenous technological change"). See also (P. Mason, *Postcapitalism*, pp. 116ff).
28. "The value of a commodity … varies directly as the quantity, and inversely as the productivity, of the labour which finds its

realization within the commodity" (K. Marx, *Capital*, Vol. I, Ch. 1, p. 131).

29. See, for example, K. Marx, *Grundrisse*, Notebook IV.
30. T. Morris-Suzuki, "Capitalism in the Computer Age and Afterword," p. 64.
31. K. Marx, *Capital*, Vol. III, Ch. 3.
32. Marx shows this with an example (K. Marx, *Capital*, Vol. I, Ch. 5, p. 265):

> A sells wine worth £40 to B, and obtains from him in exchange corn to the value of £50. A has converted his £40 into £50, has made more money out of less, and has transformed his commodities into capital. Let us examine this a little more closely. Before the exchange we had £40 of wine in the hands of A, and £50 worth of corn in those of B, a total value of £90. After the exchange we still have the same total value of £90. The value in circulation has not increased by one iota; all that has changed is its distribution between A and B. What appears on one side as a loss of value appears on the other side as surplus-value; what appears on one side as a minus appears on the other side as a plus. The same change would have taken place if A, without the disguise provided by the exchange, had directly stolen the £10 from B.

33. K. Marx, *Capital*, Vol. III, Ch. 44.
34. T. Morris-Suzuki, "Capitalism in the Computer Age and Afterword," p. 64.
35. J. Locke, *Second Treatise*, §51.
36. Ibid., §27.
37. A. Smith, *The Wealth of Nations*, Book I, Ch. V, p. 133.
38. G.W.F. Hegel, *Phenomenology of Spirit*, p. 118.
39. K. Marx, *Economic and Philosophic Manuscripts of 1844*, p. 69.
40. Ibid., p. 70.

41. S. Zuboff, *The age of surveillance capitalism*; J. Sadowski, *Too Smart*.
42. K. Marx, *Economic and Philosophic Manuscripts of 1844*, p. 73.
43. OpenAI, "Introducing 4o Image Generation."
44. D. Di Placido, "The AI-Generated Studio Ghibli Trend, Explained".
45. White House's X account, `https://x.com/WhiteHouse/status/1905332049021415862`. See also B. Perrigo, "How Those Studio Ghibli Memes Are a Sign of OpenAI's Trump-Era Shift."
46. Appearing on the 2016 documentary *Never-Ending Man: Hayao Miyazaki*, directed by Kaku Arakawa.
47. K. Marx, *Economic and Philosophic Manuscripts of 1844*, p. 78.
48. G. Lukács, "Reification and the Consciousness of the Proletariat," in *History and class consciousness*.
49. K. Marx, *Grundrisse*, p. 706.
50. Ibid.
51. N. Couldry and U. Mejias, "Data Colonialism: Rethinking Big Data's Relation to the Contemporary Subject" and N. Couldry and U. Mejias, *The Costs of Connection*.
52. N. Couldry and U. Mejias, "Data Colonialism: Rethinking Big Data's Relation to the Contemporary Subject."
53. See for example S. Delacroix and N. Lawrence, "Bottom-up data trusts: Disturbing the 'one size fits all' approach to data governance."
54. Ibid.
55. Appearing in Worker Info Exchange, `https://www.workerinfoexchange.org/`.

Class

1. Y.N. Harari, *Sapiens*, p. 27.

2. K. Marx, *A Contribution to the Critique of Political Economy*, p. 6.
3. K. Marx, *The German Ideology*, p. 47.
4. K. Marx, *A Contribution to the Critique of Political Economy*, p. 6.
5. Ibid.
6. K. Marx, *A Contribution to the Critique of Political Economy*, p. 6.
7. For a detailed exposition of Marx's historical materialism and his views on productive force determinism, including a discussion on whether Marx really was a productive force determinist, see S.H. Rigby, *Marxism and history*.
8. K. Marx, *Grundrisse*, p. 706.
9. Genesis 1:27.
10. Genesis 2:7.
11. Ibid.
12. K. Marx, *Grundrisse*, p. 705.
13. K. Marx, *Grundrisse*, pp. 690-712. The section itself is not called "Fragment on Machines," and Marx does not use this name elsewhere either. The naming comes from *Frammento sulle Macchine*, the title used by Renato Solmi in his original translation of the passage into Italian.
14. Ibid., p. 706.
15. Ibid.
16. Ibid., p. 705.
17. Ibid., p. 706.
18. Ibid.
19. Ibid., p. 693.
20. Ibid., p. 693.
21. "What exclusively determines the magnitude of the value of any article is therefore the amount of labour socially necessary, or the labour-time socially necessary for its production" (K. Marx, *Capital*, Vol. I, Ch. 1, p. 129), "… the quantity of socially necessary labour realized in commodities regulates their exchangeable

values, every increase in the quantity of labour wanted for the production of a commodity must augment its value, as every diminution must lower it" (K. Marx, *Value, Price, and Profit*), "if it is the necessary labour-time which determines the value of commodities … capital … continually reduces the labour-time socially necessary to produce a given commodity" (K. Marx, *Capital*, Vol. III, Ch. 5).

22. K. Marx, *Grundrisse*, p. 705.
23. Ibid., p. 706.
24. K. Marx, *Grundrisse*, p. 706.
25. K. Marx, *Capital*, Vol. I, Ch. 6, p. 272.
26. Marx defines both methods as follows in (K. Marx, *Capital*, Vol. I., Ch. 12, p. 432):

> I call that surplus-value which is produced by the lengthening of the working day, *absolute surplus-value*. In contrast to this, I call the surplus-value which arises from the curtailment of the necessary labour-time, and from the corresponding alteration in the respective lengths of the two components of the working day, *relative surplus-value*.

27. K. Marx, *Capital*, Vol. I., Ch. 11, p. 419.
28. Measured in number of parameters.
29. J. Kaplan et al., "Scaling laws for neural language models."
30. D. Patterson et al., "Carbon emissions and large neural network training."
31. K. Marx, *Capital*, Vol. I, Ch. 25, p. 782.
32. Ibid.
33. N. Dyer-Witheford et al., *Inhuman Power*, p. 111.
34. K. Binfield, *Writings of the Luddites*.
35. D. Ricardo, *On the principles of political economy*.
36. K. Marx, *Capital*, Vol. I, Ch. 25, p. 782.
37. J.M. Keynes, "Economic Possibilities for Our Grandchildren".
38. W. Leontief, "Machines and Man."

39. H.A. Simon, *The Shape of Automation for Men and Management*.
40. K. Marx, *Capital*, Vol. I, Ch. 25, p. 782.
41. R. Solow, "We'd better watch out."
42. K. Marx, *Capital*, Vol. I, Ch. 25, p. 782.
43. For a detailed exploration of how digital minds might themselves become consumers, see Robin Hanson's *The Age of Em*. In this book, Hanson explores a future where entire brain simulations (what he calls "ems") are possible. These are software copies of a human's mind, running on a server. Although ems require little in the way of food, housing, or physical goods, they do purchase compute, cooling, electricity, network bandwidth, etc. to survive – not unlike how humans need food, water and shelter to survive. Hanson considers the possibility of how ems could work for a wage, and spend disposable income on leisure. These ems would become consumers as well as producers, generating demand for the very goods and services they help produce. Whether an artificial general intelligence could enjoy leisure in the same way is unclear, although a conscious artificial superintelligence with desires and wants might.
44. K. Marx, *Capital*, Vol. III, Ch. 30.
45. Aaron Bastani describes the exchange in *Fully Automated Luxury Communism*, p. 70.
46. K. Marx, *A Contribution to the Critique of Political Economy*, p. 6.
47. K. Marx, *A Contribution to the Critique of Political Economy*, p. 6.
48. R. Luxemburg, "The Crisis of German Social Democracy."
49. Y. Varoufakis, "The Age of Cloud Capital."
50. See, for example, K. Marx, *Critique of the Gotha Programme*.
51. Y. Varoufakis, *Technofeudalism: What Killed Capitalism?*, p. 88.
52. K. Marx, *Grundrisse*, p. 705.
53. K. Marx, *Capital*, Vol. III, Part VI.

54. H. Ford, *My Life and Work*. For an overview of Fordism, see A. Gramsci, "Americanism and Fordism"; D. Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change*, Ch. 8.
55. P. Casteel, "Taylorism, Fordism, and Post-Fordism."
56. K. Widerquist, *Universal Basic Income*.
57. See, for example, Chapter 22 "Notes on the Trade Cycle" in J.M. Keynes, *The General Theory of Employment, Interest and Money*.
58. M. Ford, *Rise of the Robots*.
59. D. Susskind, *A World Without Work*.
60. L. Martinelli, "Basic income, automation, and labour market change."
61. S. Altman, "Basic Income."
62. C. Clifford, "Alaska gives residents free cash handouts – here's what Mark Zuckerberg thinks everyone can learn from it."
63. R. Shiller, "Why robots should be taxed if they take people's jobs."
64. K. Marx, *Capital*, Vol. I, Ch. 25, p. 782.
65. The shift to farming was neither universal nor simultaneous; sizeable groups continued, and indeed in isolated cases still continue, to live by hunting and foraging.
66. C.S. Larsen, "The Agricultural Revolution as Environmental Catastrophe."
67. M. Sahlins, "The original affluent society."
68. J. Diamond, "The Worst Mistake in the History of the Human Race."
69. J. Scott, *Against the Grain: A Deep History of the Earliest States*.
70. For an overview of how agriculture emerged, see B.D. Smith, *The Emergence of Agriculture*.
71. For a formal treatment of how individually rational choices can produce collectively sub-optimal equilibria, see for example T.C. Schelling, *Micromotives and Macrobehavior*; W.B. Arthur, *Increasing Returns and Path Dependence in the Economy*.

72. L.M. LoPucki, "Algorithmic Entities."
73. See, for example, C.L. Reyes, "If Rockefeller were a coder;" A. Wright, P. De Filippi, "Decentralized Blockchain Technology and the Rise of Lex Cryptographia."
74. European Parliament, *Civil Law Rules on Robotics*, §59f.
75. For a detailed exploration of how an apparently harmless optimisation target can spiral into existential risk, see N. Bostrom, *Superintelligence*, p. 146ff. For example, in p. 150 he considers "an AI, designed to manage production in a factory, is given the final goal of maximizing the manufacture of paperclips, and proceeds by converting first the Earth and then increasingly large chunks of the observable universe into paperclips;" and an AI that "given the final goal of evaluating the Riemann hypothesis, pursues this goal by transforming the Solar System into "computronium" (physical resources arranged in a way that is optimized for computation) – including the atoms in the bodies of whomever once cared about the answer."
76. See, for example, N. Bostrom, *Superintelligence*; S. Russell, *Human compatible*; B. Christian, *The alignment problem*.
77. T. Ord, *The Precipice*, pp. 138-152.
78. W. MacAskill, *What We Owe the Future*.
79. J. Thornhill, "Artificial intelligence: can we control it?"
80. Z. Tang et al., "China to set up national venture capital guidance fund, state planner says."
81. *Safe, Secure and Trustworthy Development and Use of Artificial Intelligence*. Executive Order 14110, 30 Oct. 2023. *Federal Register*, vol. 88, no. 210, 2023, pp. 75191-75230.
82. S. Nellis, "How the US will cut off China from more AI chips;" A. Alper et al., "U.S. updates export curbs on AI chips and tools to China."
83. J. Boak and Z. Miller, "Trump highlights partnership investing $500 billion in AI;" OpenAI, "Announcing The Stargate Project."

84. S. Ghaffary, "Trump Takes AI Action Plan Straight From Silicon Valley's Wish List."
85. Official Journal of the EU, Artificial Intelligence Act, 12 July 2024.
86. T. Hobbes, *Leviathan*.
87. M. Djilas, *The New Class: An Analysis of the Communist System*.
88. F. Engels, *Anti-Dühring*, p. 330.
89. V. Lenin, *The Impending Catastrophe and How to Combat It*.
90. T. Cliff, *State Capitalism in Russia*; N. Poulantzas, *State, Power, Socialism*.
91. L. von Mises, "Economic Calculation in the Socialist Commonwealth;" F. Hayek, "The Use of Knowledge in Society."
92. L. Acton, *Letter to Archbishop Mandell Creighton*.
93. K. Marx, *Grundrisse*, p. 693.
94. K. Marx, *Capital*, Vol. I, Ch. 32, p. 929.
95. Meta, "The Llama 4 herd: The beginning of a new era of natively multimodal AI innovation."
96. E. Gibney, "China's cheap, open AI model DeepSeek thrills scientists." For the AI lab's paper explaining the model, see D. Guo et al., "DeepSeek-R1: Incentivizing Reasoning Capability in LLMs via Reinforcement Learning."
97. OpenAI, "Introducing gpt-oss ."
98. "The measure of wealth is then not any longer … labour time, but rather disposable time" (K. Marx, *Grundrisse*, p. 708). See also K. Marx, *Critique of the Gotha Programme*.
99. K. Marx, *The German Ideology*, p. 53.
100. A. Bastani, *Fully Automated Luxury Communism*.
101. P. Frase, *Four Futures: Life After Capitalism*.
102. G. Hardin, "The Tragedy of the Commons."
103. E. Ostrom, *Governing the Commons*.
104. A. Negri, M. Hardt, *Commonwealth*.

Ideology

1. K. Marx, *The German Ideology*, p. 67.
2. L. Althusser, "Ideology and Ideological State Apparatuses."
3. For instance, R. Filmer in his "Patriarcha" argued that monarchs rule by the same divine and paternal authority that places fathers over families, thereby turning feudal hierarchy into a timeless principle of natural law.
4. John Locke's theory of property in the *Second Treatise* is an example of this shift. He justified individual appropriation from the commons through labour, so long as there remained "enough and as good" for others, a condition known as the Lockean proviso. While it gestures toward a limit on accumulation, critics have noted that in practice it posed little restraint on the expansion of private property under capitalism.
5. K. Polanyi, *The Great Transformation*.
6. For example, in *The German Ideology*, p. 67, Marx writes

> … in an age and in a country where royal power, aristocracy, and bourgeoisie are contending for mastery and where, therefore, mastery is shared, the doctrine of the separation of powers proves to be the dominant idea and is expressed as an "eternal law."

In Chapter 2.1 of *The Poverty of Philosophy*, he writes:

> Economists have a singular method of procedure. There are only two kinds of institutions for them, artificial and natural. The institutions of feudalism are artificial institutions, those of the bourgeoisie are natural institutions. … When the economists say that present-day relations – the relations of bourgeois production – are natural, they imply that these are the relations in which wealth is created and pro-

> ductive forces developed in conformity with the laws of nature. These relations therefore are themselves natural laws independent of the influence of time. They are eternal laws which must always govern society. Thus, there has been history, but there is no longer any. There has been history, since there were the institutions of feudalism, and in these institutions of feudalism we find quite different relations of production from those of bourgeois society, which the economists try to pass off as natural and as such, eternal.

7. K. Marx, *The German Ideology*, p. 68.
8. L. Althusser, "Ideology and Ideological State Apparatuses."
9. Ibid.
10. See, for example, OpenAI's "Preparedness Framework" or Anthropic's "Constitutional AI" white papers.
11. In §27 of his *Second Treatise*, Locke writes:

> Whatsoever then he removes out of the state that nature hath provided, and left it in, he hath mixed his labour with, and joined to it something that is his own, and thereby makes it his property. It being by him removed from the common state nature hath placed it in, it hath by this labour something annexed to it, that excludes the common right of other men: for this labour being the unquestionable property of the labourer, no man but he can have a right to what that is once joined to, at least where there is enough, and as good, left in common for others.

12. See, for example, L. Vardi, *The Physiocrats and the World of the Enlightenment*.
13. A. Smith, *The Wealth of Nations*, Book I, Ch. II, p. 117.
14. K. Marx, *The Poverty of Philosophy*, Ch. 2.1.
15. OpenAI, "Planning for AGI and beyond."

16. C. Parker, "Artificial intelligence could be our saviour, according to the CEO of Google."
17. S. Zuboff, *The Age of Surveillance Capitalism*.
18. K. Crawford, *Atlas of AI*.
19. L. LoPucki, "Algorithmic Entities."
20. S. Bayern, "The implications of modern business-entity law for the regulation of autonomous systems;" S. Bayern, "Of bitcoins, independently wealthy software, and the zero-member LLC."
21. S. Bayern, "The implications of modern business-entity law for the regulation of autonomous systems."
22. S. Bayern noted this in "The implications of modern business-entity law for the regulation of autonomous systems," which L. LoPucki further elaborated in "Algorithmic Entities."
23. K. Marx, "On the Jewish Question."
24. " … labour exists only *for capital*, and is itself the use value of capital, i.e. the mediating activity by means of which it realizes [*verwertet*] itself" (K. Marx, *Grundrisse*, p. 305).
25. K. Marx, *Economic and Philosophic Manuscripts of 1844*, Ch. "Estranged Labour."
26. K. Marx, "On the Jewish Question."
27. M. Weber, *The Protestant Ethic and the Spirit of Capitalism*.
28. F.W. Taylor, *The Principles of Scientific Management*.
29. K. Marx, *Grundrisse*, p. 705.
30. S. Zuboff, *The Age of Surveillance and Capitalism*.
31. See Section 4, titled "The Fetishism of the Commodity and Its Secret," in K. Marx, *Capital*, Vol. I, Ch. 1, pp. 163-177. Marx's concept of fetishism is closely related to George Lukács' *reification*, the process in which "a relation between people takes on the character of a thing" (G. Lukács, *History and class consciousness*).
32. K. Marx, *Capital*, Vol. I, Ch. 1, p. 165.
33. G. Lukács, *History and class consciousness*.
34. P. Villalobos et al., "Will we run out of data? an analysis of the limits of scaling datasets in machine learning."

35. W. Hartzog, *Privacy's Blueprint*.
36. S. Zuboff, *The Age of Surveillance Capitalism*.
37. O.W. Holmes Jr., *Compañía de Tabacos v. Collector*, 275 U.S. 87 (1927), dissenting opinion.
38. K. Marx, *The Poverty of Philosophy*, Ch. 2.
39. See G. Lukács, *History and Class Consciousness* and A. Gramsci, *Selections from the Prison Notebooks*.
40. E. Ostrom, *Governing the Commons*.
41. See for example R. Rainer, "On the (im)possibility of sustainable artificial intelligence. Why it does not make sense to move faster when heading the wrong way."

Religion

1. K. Marx, "Critique of Hegel's Philosophy of Right," p. 244.
2. Ibid.
3. In *Capital*, Marx writes that "[t]he religious reflections of the real world can, in any case, vanish only when the practical relations of everyday life between man and man, and man and nature, generally present themselves to him in a transparent and rational form. … [These religious reflections are] not removed from … the process of material production, until it becomes production by freely associated men, and stands under their conscious and planned control. This, however, requires that society possess a material foundation" (K. Marx, *Capital*, Vol. I, Ch. 1, p. 173).
4. S. Nasr, *Islamic Science*.
5. J. Paul II, "Message to the Pontifical Academy of Sciences."
6. For example, in *Kitzmiller v. Dover Area School District* (2005) a U.S. federal court ruled that requiring "intelligent design" in biology classes was an unconstitutional endorsement of religion (E. Humes, *Monkey Girl*). Nevertheless, public resistance

against the theory of evolution remains strong. A 2019 survey found that 40 percent of American adults believe humans were created in their present form within the last 10,000 years (M. Brenan, "40% of Americans Believe in Creationism"). For a detailed analysis of recent state-level bills seeking to introduce creationism in the school curricula, see M. Berkman and E. Plutzer, *Evolution, Creationism, and the Battle to Control America's Classrooms*.

7. Genesis 11:4.
8. Exodus 20:3-4.
9. Genesis 1:27-28.
10. N. Bostrom, "Transhumanist values;" M. More and N. Vita-More, *The Transhumanist Reader*.
11. N. Bostrom, *Superintelligence*.
12. R. Bensinger et al., "Roko's Basilisk." It resembles Pascal's Wager in its use of hypothetical future punishment to influence self-interested present-day behavior.
13. O. Solon, "Deus ex machina: former Google engineer is developing an AI god."
14. Y.N. Harari, *Homo Deus*, p. 428.
15. K. Marx, *Capital*, Vol. I, Ch. 1.
16. K. Marx, "Critique of Hegel's Philosophy of Right," p. 244.
17. L. Althusser, "Ideology and Ideological State Apparatuses."

Conclusion: is Marx relevant anymore?

1. K. Marx, *Capital*, Vol. I, Ch. 6, p. 272.
2. See L. LoPucki, "Algorithmic Entities;" S. Bayern, "The implications of modern business-entity law for the regulation of

autonomous systems;" S. Bayern, "Of bitcoins, independently wealthy software, and the zero-member LLC."

3. "In the twenty-first century advanced capitalism came to be centred upon … a particular kind of raw material: data" (N. Srnicek, *Platform Capitalism*).
4. "Their digital labour creates … transaction data … – a data commodity that is offered for sale by Internet corporations to advertising clients;" "Facebook turns personal profile data … into data commodities" (C. Fuchs, *Digital Labour and Karl Marx*.)
5. R. Luxemburg, "The Crisis of German Social Democracy."
6. K. Marx, *The German Ideology*, p. 67.

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