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Planning and Anarchy

Central planning?! Computers can do it!!! Among the intuitions animating the contemporary left, we must rank rather high the felt sense that powerful new computing technologies now offer a solution to problems of calculation previously insuperable for the red-eyed central planners of "actually existing" socialist states. This is more or less the central thrust of Leigh Phillips and Michal Rozworski's recent book, *The People's Republic of Walmart,* recapitulating a line of argument expressed in prominent books like Nick Srnicek and Alex Williams's *Inventing the Future* and Paul Mason's *Postcapitalism*. Walmart and other corporations demonstrate that "economic planning on a massive scale is being realized in practice with the assistance of technological advance, even as the wrangling of its infinities of data . . . are supposed to be possible to overcome" (Phillips and Rozworski 2019: 39).

To link planning and computing is, of course, almost tautology. A stored program is nothing if not a series of plans. The first computers were dedicated to solving questions about optimal use of resources within centrally planned institutions like the military. Throughout the twentieth century, computing technology and planning technique

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developed hand in hand, nurtured by generous investment from the Department of Defense. In the decades immediately following World War II, much of this activity happened within the interdisciplinary space of cybernetics, linking the military and its technological programs to an array of private sector and civil-society initiatives. Cybernetics was popular with technocrats and corporate executives because it seemed to offer more efficient ways to plan, automating decision-making. But it appealed to left-wing planners because these newly efficient methods were also more democratic and less reliant on top-down decision making. A touchstone here is Stafford Beer's CyberSyn, built for Salvador Allende's socialist government, and offering planners of the nationalized economy real-time information about output (Medina 2014). More a rhetorical than a practical success, CyberSyn offers for many today a vision of a counterfactual history, in which egalitarian, computer-planned economies displaced the market. Since the heyday of cybernetics, however, computing and information technology has largely acted as helpmeet to a capitalism in which more and more aspects of social life have been turned over to the coordination of the market. This makes the shared fate of computing and planning harder to grasp. If you treat planning and the market as opposites, you may find it difficult to see the algorithms of Uber or Amazon as planning algorithms, though they definitely are.

Part of the problem has to do with what you mean by the term. Planning was central to Marx's own thought in particular and nineteenth-century socialism more broadly but always linked to a specifically emancipatory state of affairs. In Marx's writing, planning offers an alternative to the chaotic and wasteful coordination of human activity by markets, the anarchy of markets, but also an alternative to the direct, personal subordination of pre-capitalist social relations. Planning in and as communism renders social activity not only transparent, overcoming the mystifications of commodity fetishism, but tractable as well: "The veil is not removed from the countenance of the social life process," writes Marx, in his famous remarks on "commodity fetishism" in *Capital* "until it becomes production by freely associated men, and stands under their conscious and planned control" (Marx 1992: 173). Already some sort of distinction is necessary, since the planning of a military quartermaster resembles the planning in Marx's vision not at all, offering to the broad mass of people involved—soldiers in this case—neither transparency nor tractability. Judged by such standards, today's planning by algorithm offers up a coordination of human activity arguably as opaque and intractable as that of the market. In Marx's presentation, planning answers both epistemological and practical questions at once: it allows you both to

know and to do, to see and control. But this does not mean that transparency (removal of the commodity veil) automatically implies tractability nor vice-versa. As we will see, many of the false promises and confusions of cybernetic planning at present descend from a conflation of questions of knowledge with questions of practical control.

Planning as conducted in so-called actually existing socialist countries was often both opaque and inefficient, plagued by an anarchy as great as the market's. Planners lacked knowledge about the location of resources as well as their relative values but, perhaps more importantly, they had no clear mechanism for reallocating these resources (Ticktin 1992; Filtzer 1986). Much debate and discussion about planning has focused on the "socialist calculation problem" but by so doing misses the point: problems with calculation are only the beginning.[1] Beneath problems of calculation lay much deeper organizational issues. At stake in planning is not simply the question of whether or not all resources and all needs can be recorded and measured in terms of labor time or some other numeric marker, not simply the transparency of that data or its legibility in terms of a single measure. The more important question is about control—whether and how that measure can *effect changes* in the distribution of those resources in order to satisfy those evolving needs. Inasmuch as humans are involved, this is not only a technical problem to be solved by mathematical formula and computation algorithm but a political one to be solved by class struggle.

From Calculation to Control

Mid-century microeconomics was vexed by the question of "socialist calculation." No less a central figure than Friedrich Hayek set as his primary polemical task the demonstration that such calculation was impossible (Hayek 1935: 207–13; 1945). Léon Walras's late-nineteenth-century formulation of general equilibrium theory, so central to the work of later economies, had described the functioning of the market by way of the metaphorical figure of the crier or auctioneer, who matched supply and demand through a process of trial and error (*tâtonnement*) (Walras 2010). The implicit idea that a single entity might possess all the information necessary for trial-and-error matching was, perhaps unsurprisingly, latched onto by socialists like Oskar Lange who, in responding to anti- and pro-capitalist critics of central planning, literalized the figure of the Walrasian "auctioneer" (Lange 1938: 72–90). Hayek's ingenious challenge to this approach focused not on the possibility of calculation as such but the difficulty of accurately collecting

and centralizing the data upon which those calculations could be performed. Money was, for Hayek, an exceedingly sensitive, nearly mystical instrument, inasmuch as it allowed price signals to serve as minimal and universally intelligible indices of underlying changes in productivity or supply and demand which could only be gathered by a central repository with great difficulty, and which might, to be intelligible, require very local and embedded forms of understanding. In one case, the increase in the price of a particular commodity—Hayek gives the example of tin—reflects a new industrial application that has generated new demand; in another, it results from the exhaustion of supply in nearby mines. But such knowledge is not necessary for everyone everywhere. All that prospective purchasers of tin need to know is that underlying conditions of supply and demand for resources and labor have changed. Price allows everyone to know what they need to know without presupposing that anyone know everything.

In Hayek's time, it seemed difficult and perhaps impossible to gather and transmit accurate information about actual quantities of raw, intermediate, unfinished, and finished goods at every economic location. Harder still would be using that information to calculate relative prices or determine the optimal future distribution of those resources, by examining *potential* quantities of such goods. The information technology of 1940 was certainly not up to such a task, and instead Lange and Lerner's system involved approximate, or "trial" prices, which planners could use to test the real relative values of the goods in question, much the same way a weather balloon might be used to test the direction of the wind. Today, eighty years later, advocates of central planning use Hayek's argument contra Hayek and suggest that we are finally approaching the point where such calculations *can* be performed by high-powered computers using the most advanced algorithmic techniques. More importantly, advocates of central planning suggest that the logistics revolution, with its technologies for inventory control and management, has demonstrated the capacity for real-time monitoring of quantities of goods in production and circulation. The strongest part of Hayek's argument was that the "man on the spot" knew things about output that couldn't be abstracted from an embodied engagement with local, technical systems (Hayek 1945: 521–22). Perhaps, the would-be algorithmic descendants of Lange and Lerner suggest, we have now entered the age in which circuits and sensors could know as much as or more than the workers on site.

Hayek's best-known essay on the subject, "The Use of Knowledge in Society," has always been striking for the way it shares elements with the discourse of cybernetics as it was then developing (Hayek 1945). He describes

the price mechanism as "a system of telecommunications which enables individual producers to watch merely the movement of a few pointers, as an engineer might watch the hands of a few dials," anticipating some of the elements of the mathematical theory of communication Claude Shannon and Warren Weaver were developing (Shannon 1948; Hayek 1945: 527). To summarize in the most brutal way, cybernetics postulated a theory of self-directed or purposive entities so general that it was meant to encompass animals, humans, machines, organizations, and even entire economies. In order to qualify as purposive and self-regulating in the very simple sense of cybernetics, an entity must possess three capacities: it must have a sensor or receptor, by which it receives information, an effector, by which it can act on the world (or itself), and some calculative or mediating mechanism, a processor, which translates signals received into actions undertaken; limbs, eyes and ears, brain.[2] Inasmuch as actions undertaken produce new signals that, in turn, produce new actions, we can see such an entity as acting on itself, as self-organizing and self-regulating, giving "the appearance of purposefulness in a system which is not purposefully constructed" (Wiener 1954: 38). This is the origin of the term feedback, or what Norbert Wiener describes, helpfully, as "circular causality": the effects of action *feed back* information to the actor and, as such, produce more action, so that the actor can be said to be acting on itself. For cybernetics, control and communication, transparency and tractability, are one and the same, since signals received immediately get translated into action, producing more signals, and so on and so forth. To draw out the cybernetic lines of Hayek's description of the "price system" in terms of telecommunication, we might say that, in capitalism, money is both sensor and effector, at least inasmuch as we assume competitive markets and profit-seeking actors. As sensor, money measures the value of various goods, registering what interpreters of Hayek's remarks on price as telecommunications have come to call "price signals." These received signals, then, motivate the behavior of various capitalists. In cybernetic terms, the signal is processed and actions effected. If the price of a good is very high relative to component goods, capitalists will move into that line of production, ramping up supply. Or, if they are producers that depend upon the good as an input, they will work harder to economize on it, or use a new production technique that foregoes it altogether. In both cases, capitalists will adjust their prices in order to capture more market share or avoid being undersold, leading to a new price signal and new actions and so on and so forth. The result is economic coordination that, while it is often indifferent to the true needs of humans, adjusts supply to meet effective demand and moves resources (including labor) into

the lines of production where it is needed—for the purposes of profit if not human flourishing—selecting the most productive and therefore profitable technique. This occurs without any single person making macroeconomic decisions; it takes place "behind the backs of producers" and, indeed, no single producer is capable of altering the course of such development, dependent as they are upon distributed decision-making.

Central planning in actually existing socialism, by comparison, was broken at every level. It was a machine that didn't work. The assumption on both sides of the calculation debate is that this was primarily a problem with measurement and calculation rather than, as intimated above, a problem with control. In cybernetic terms, the machine had bad sensors and a bad processor, incapable of measuring the relative value of goods or even knowing how much was being produced and where. While this is certainly true, the severest defects of actually existing central planning were on the side of its figurative effectors. Planners had no reliable way to act on the information they possessed, no way to distribute and reallocate resources based on the needs of productive units and consumers. As Donald Filtzer makes clear in his excellent book *Soviet Workers and Stalinist Industrialization*, in the USSR the managers responsible for carrying out the plan set by high-level administration had nothing that could replace the labor discipline of the wage and ensure compliance at the worksite. Though people were required to work in order to earn money to survive, they could not, as in capitalism, simply be cut loose and left to their own devices if they turned out to be bad workers:

> Deprived of any means to defend their interests collectively, the labour shortage and the subsequent breakdown of the traditional labour market, in particular the disappearance of the threat of unemployment, placed the workers in a position to appropriate considerable control over the individual labour process, most notably their work speed, how they organized their work, and the quality of the products they produced or the operations they performed. (Filtzer 1986: 256)

Labor was both right and duty and, as a result, Soviet factories were labor-wasting rather than labor-saving. Productivity slumped, the factories churned out defective goods, and managers found it impossible to meet the targets established by the plan. For downstream producers, this meant they didn't have the resources they needed to meet targets, even if they were able to solve other problems, leading them to hoard and stockpile resources in anticipation of shortages. The overall result was that planners had little hope

of getting managers to allocate resources along the lines of the plan. In capitalism, the distribution of resources is effected by the survival-oriented behavior of workers and the profit-seeking behavior of capitalists. Actually existing socialism had no such mechanisms. In an article based on Filtzer and Ticktin, Chris Arthur describes the Soviet economy as a "clock without a spring" (Arthur 2002). In the years following the revolution, Arthur argues, the Bolsheviks borrowed from capitalism its physical infrastructure, the factory, while stripping out capitalist mechanisms for distribution of resources—price, wage, profit, competition—effectively removing capitalism's motor, leaving the planners to attempt to turn its gears through the application of violence and crude structures of incentive. For Arthur, form and content are inseparable. The factory is the *materialization* of the "law of value," its physical shape congruent with the form of value, and so one can no more expect to install a new motor at its heart than one can expect to plug a watch into an electric outlet once one has removed the spring. Some commentators have wrongly concluded that persistence of the husk of value meant that the law of value still operated in the USSR (Dauvé and Martin 2015: 111–28). But what the USSR offered through planning was not "state capitalism," as some have supposed, but a poor mimesis of capitalism, attempting to reproduce some of its features, such as growth, while stripping away essential elements of profit-driven production for the market.

The main takeaway from Filtzer and Arthur is that one cannot separate planning from the question of command, control, and decision. Advocates of central planning in the Marxian tradition will often quote Auguste Comte's claim, famously repeated by Friedrich Engels, that in a rational society, there will be no need for the "government of men," only the "administration of things."[3] But inasmuch as people are involved in producing things, and inasmuch as those things have as their final end the satisfactions of the needs and desires of people, one cannot so easily separate the administration of things and the administration of people. The USSR had a broken system for administering people, and did so irrationally, relying on violence, and often gratuitous violence, to move the levers of a machinery inherited from capitalism. But perhaps many rational versions of such administration would seem antithetical to emancipatory goals? Would we even want the USSR to be fixed on the terms it set for itself? Would we want a situation where, as fulfillers of the plan, people were simply told where to go, what to do, how to do it? Would such command and control not produce resistance? How would that be handled without betrayal of the aspirations and ideals of a revolutionary project?

The Government of Men by Machines

Our historical moment has brought such questions to the fore. While the USSR had no functional way to replace money, value, markets, and profits as a system for allocating resources, it's possible that today we do have such mechanisms. But would that be desirable, or would it simply reproduce much of what we find intolerable about capitalism and class society more broadly? Media theorists and writers for publications such as the *Guardian* and the *Financial Times* have begun to talk about what they call Google Gosplan or Gosplan 2.0, where the big "platforms" such as Google, Amazon, Facebook, and Apple will have grown so large that their internal algorithmic calculations could come to function as proxies for price system. (Gosplan was the USSR's central planning body). For Izabella Kaminska of the *Financial Times*'s Alphaville Blog, the term is meant to indicate the ways in which these platforms reproduce the inefficiencies and distortions of the Soviet economy (Kaminska 2016). In her Hayekian account, platforms have vitiated the price signal, as these providers now routinely give away services for free in exchange for valuable, but unpriced, user information. In subsidizing services to gain proprietary information, they compromise the public information contained in the price signal. As such, supply and demand under changing conditions of productivity no longer regulate the allocation of investment, as evidenced by the mountains of wealth plowed into Silicon Valley companies without demonstrable revenue sources. "We are reverting to a world," writes Kaminska, "where a technocratic elite makes economic planning and allocation decisions based on their subjective interpretations of personal behaviours, status, and privilege, who it's fair to overprice and who it's fair to subsidise, rather than clearcut at cost price signals from the market."

Citing Kaminska's work in the pages of the *Guardian,* Evgeny Morozv describes the situation as a Silicon Valley feudalism, speculating that platforms like Google will "eventually run the basic infrastructure on which the world functions," charging rents the way that lords and kings once did (Morozov 2016). But there's no reason, in his view, why this infrastructure couldn't be used for "another Gosplan 2.0 . . . one that uses all those sensors, algorithms, databases and real-time co-ordination in order to offer public services that function outside the price system itself." The problem with Google's Gosplan is not calculation itself, for Morozov, "but that all its optimisation efforts aim to satisfy one goal: profit maximization" (Morozov 2016).

This is perhaps a reasonable conclusion for readers of Kaminska, since her analysis follows from the fact that platforms such as Google privatize

information. The assumption here is that the information necessary for adequate calculation is available, but privatized. The big platforms turn that information into proprietary products and therefore weaken the price signal, now a commodity rather than a freely distributed index of commodities. If it were shared freely, the results might be very different. Benjamin Bratton, whose book *The Stack* devotes dozens of pages to the notion of platform as planning, draws similar conclusions, linking the current organization of these information companies to the long history of socialist calculation, describing "our beloved and feared Google Gosplan" as a "descendant flower from the rubble of communism" (Bratton 2016: 332). Bratton thinks that these platforms might solve not only the socialist calculation problem but also the capitalist calculation problem, producing a form of "synthetic catallaxy"—this is Hayek's term for the miraculous, decentralized coordination of the price system—and adequately pricing those long-term costs typically treated by capitalism as "externalities" (Hayek 2012: 269). In Google Gosplan, Bratton sees "a mechanism of projection, response, optimization, automation, not to mention valuation and accounting, beholden neither to market idiocracy nor dim bureaucratic inertia, but to the appetite and expression of a curated algorithmic phyla and its motivated *Users*" (Bratton 2016: 333). As with so many of the projections we've encountered, Bratton focuses almost exclusively on the question of measure and representation and very little on the question of control. Google Gosplan, as platform-of-platforms, is discussed as part of the "address layer" of the contemporary informatic stack, part of a horizon of "deep address" in which "objects and events" are registered and recorded "with a granularity that far surpasses the scales at which humans perceive physical space and duration," allowing for the unbundling of assets and debts lumped together by capital, the tracing of the tiniest velleities and desiderata (Bratton 2016: 334). But once again, this conflates problems of planning with problems of measurement and registration, conflates the government of men with the administration of things.

To optimize, as Bratton suggests Google Gosplan might do, requires not only the calculation of potential uses for given resources and not only the power to shift those resources (labor and intermediate goods) from one line of production to another. It also requires a decision about *what* one wants to optimize. Is it profit? Or value-added? Or productivity? Or some synthetic measure of human welfare? What is the relationship between these variables and the actual well-being of participants, who will of course have distinct needs and desires? The answers in the socialist calculation literature are very thin indeed, and most avoid such questions altogether. The problem is that

the calculation at stake in the socialist calculation debate refers to a number of distinct operations. Sometimes, the debate revolves around whether or not one might calculate the value of every commodity in an economy, according to a given standard, such as hours of labor or barrels of oil. If there are twenty million different types of commodities, then for such a calculation one will need a matrix that is twenty million rows by twenty million columns, detailing the units of any commodity (gasoline, for example) needed to produce a unit of any other commodity (a particular model of truck). This is called an input-output matrix. At present, the platforms that Kaminska, Morozov, and Bratton describe do not collect this information. Amazon has no information about how much time or electricity it takes to produce the items it stocks; as Hayek makes clear, such information is superfluous—all Amazon needs to know, as a capitalist firm, is the cost price. As to whether these platforms could be adapted, it is more than uncertain whether technology exists for automatic recording and aggregation of information necessary, avoiding the problems of self-reporting. In recent years, corporations have vastly increased their ability to surveil workers and measure individual contributions to output, but there is much that is hard to measure, especially in the service sector environment where output is poorly defined in physical terms. Perhaps needless to say, we anticapitalists hasten the growth of these technologies at our own peril. In any case, even if such capacities for measurement and surveillance did exist, we are still talking only about a pure question of calculation and not control, a way of valuing all resources in terms of a single ratio, labor per commodity, and not a way to coordinate and determine labor activity.

From this ratio, other calculations may proceed, but not straightforwardly. For example, though it is a simple enough matter to calculate, given a certain level of demand for gasoline, how much of every other commodity one would need to produce, how does one register demand when it isn't simply "given"? When it comes to "optimization," an altogether different calculation is required. To optimize means to compare different input-output matrices, corresponding to different production technologies, with an eye toward maximizing or minimizing a particular value—profits, wages, steel, CO_2 emissions, etc. Leaving aside the question of what value one chooses, comparing these technologies is no simple matter, unless one assumes, entirely unreasonably, that the coefficients of each matrix will stay the same as production outputs are ramped up or decreased. In the real world, unfortunately, electricity use decreases as one scales up production, for example. While it may be easy enough to plug in numbers for those coefficients today, asking *what if* is harder, though perhaps approximable with very powerful computer

simulations. There is still debate over the tractability of some of the above problems, as well as debate over whether the relevant information can be collected. With what granularity, for example, would one need to distinguish between commodities? If one need only catalog the vast range of commodity brands and types now produced, then it is arguably within range of today's supercomputers. But if a commodity in a different location is essentially a different commodity—as Cosma Shalizi suggests—then the problem may be, in fact, quite beyond available processing power (Shalizi 2012).

But even if the processing power exists, that is hardly the real limit. Optimizing or responding to consumer demand is not a matter of measurement pure and simple but rather a matter of evaluating and then acting on potential courses of action. To optimize or adjust production involves decisions to reallocate people and resources, decisions that cannot be simply accomplished by algorithm, or derived from given data. How is demand determined? Who decides what counts as an optimum, given that producing more stuff in the abstract is not necessarily a good if that "more" is all Styrofoam packing peanuts? There is as yet no serious proposal that eliminates both sovereign decision and market mechanism from central planning through a direct registration of preferences, since there is no avoiding a decision about which preferences to privilege. In other words, at some point, the preferences of the planners themselves must become operative.

In their detailed proposal for a cybernetic socialism, Paul Cockshott and Alan Cottrell punt with regard to the question of demand, and argue that prices will need to rise and fall in order to accurately gauge and adjust demand relative to supply, just as happens in capitalism (Cockshott and Cottrell 1993: 103–10). Theirs is a more or less classically socialist program with a fully socialized, public-ownership economy in which goods are distributed directly between producers. Exchange only happens with consumer goods, for which workers are given a mass of labor tokens equivalent to their contribution of labor in hours. Typically, goods would be priced according to the average hours of labor they took to produce. In cases of weak or excessive demand, however, Cockshott and Cottrell argue that prices should be adjusted upward or downward by the planners in order to stem or spur demand and, in turn, measure how much supply should be increased or decreased. This assumes, problematically, that the demand for these goods will be "elastic"—in other words, that people will respond to increases in prices by consuming less and to decreases by consuming more (which is not true, for example, with many goods). It also unfairly burdens people who happen to have specific needs—for insulin, perhaps, or eyeglasses.

Market-clearing prices would provide planners with information about how much to increase or decrease production levels, but would be of only limited use in making long-term planning decisions. This is the area where capitalism's failures are clearest—vast tracts of empty housing in areas no one can live, an abundance of gadgets but scarcity of life-saving medicine, entire areas of cities served only by convenience stores and gas stations. Simply chasing supply and demand and aping the profit-motive with market-clearing prices is unlikely to do better. What would replace that? Cottrell and Cockshott's answer to this is "democracy," but of a distinctly Athenian variant. Socialist citizens vote on referenda determining production in the aggregate—how much of the economy to devote to education, how much to health care, where to build schools and hospitals. Detailed supervision would be undertaken by experts advised by juries selected randomly—that is, through lottery– from the citizenry.

For all the excitement about Big Data's aggregation of consumer data, this is probably the most that can be done. To calculate present and future demand for every commodity and for every person at every potential price point, and furthermore to integrate that with the optimizing calculations described above, would certainly be beyond the ability of contemporary computers. But there is a deeper epistemological problem here: preferences are not stable, nor are the types of things available to people. Once one leaves behind the assumption of a fixed and unchanging set of commodities organized by stable preferences then mathematical calculation confronts strong limits: one can't really know what people may want in the future when one doesn't know what will be available. For short-run calculation, one might mobilize the technologies of contemporary logistics, developing algorithmic systems that monitor inventories and stocks and make predictions about needed supply and future demand from such observations. But this would do little to guide decisions about long-term investments in plant and infrastructure, nor the allocation of labor, which can't simply be whipped about from site to site, like a pallet of toilet paper. At some point, the planners themselves would have to choose between incompatible developmental paths based on only speculation about the future. Though they would be advised by referenda and juries, one might question whether a group of people should have such power in the first place.

Labor Is Not Like Other Commodities

In most discussions of planning, the continuity of capitalism and socialism is more or less assumed. There will be wages and prices, if not profit and divi-

dends. There will be work and a workday, separated from the rest of the hours of the day. For those deemed able and of age, work will be a requirement. No work, no consumption. None of this should be taken for granted, however, nor should we avoid asking whether this vision of socialism needlessly reproduces too much of what we cannot tolerate about capitalism. The biggest weakness of the planning literature is that it assumes labor is, more or less, a resource like any other, as receptive to the determinations of the plan as a pile of pig-iron is to the embrace of a backhoe. Periodic democratic consultation is no guarantee that being told where to go, how to work and, in some cases, what to consume, won't feel oppressive and, more importantly, won't be resisted, producing political effects that, in turn, destabilize the plan. Central planning as articulated by Cockshott and Cottrell offers freedom and equality to people as consumers but maintains unfreedom at the site of production. It does not, in this regard, count as a system of "production by freely associated men . . . under their conscious and planned control" (Marx 1992: 173). The control that workers display over the conditions of their lives—and we are still quite clearly dealing here with a society of workers, with socialism rather than communism—is too indirect, and too mediated, to count as "conscious control."[4] One aspect of capitalism's intolerability is that the social process through which the value of labor and commodities is established takes place, to use a phrase Marx borrowed from Hegel, "behind the backs" of individual producers, following a course that is neither foreseeable nor adaptable (Marx 1992: 135; Hegel 1977: 56). The intentional actions of individuals chain together to produce unintended, and intransigent, large-scale effects. This is a problem of legibility but also one of tractability—one can neither see the processes that give rise to these effects nor change them.

In capitalism, this process occurs through the automatic mediations of money and capital, steered somewhat by the interventions of the state and very powerful capitalist actors. In the dreams of cybernetic socialists, it seems, one would encounter a similar state of affairs, but with much greater equality, an automatic system acting, via algorithm, behind the back of its subjects but guided by planners, themselves dimly directed by the larger population. Though such a system may aggregate preferences and votes, the result can nonetheless be something many neither prefer nor desire, and leave people without meaningful recourse to change it.

Marx is in the habit of personifying capital, a rhetorical predilection that Marxists continue. But it is more than mere rhetoric at stake, since capital as collective subject comes to represent the aggregate effect of the profit-seeking actions of individual capitalists, standing over and against both them and the class of labor. Capital is an alienated collectivity, a golem brought to life by the

behavior of many but which acts in a manner contrary to their desires. As such, in capitalism, each individual experiences society as an obstruction, the will of the many hindering the freedom of the one. In effect, cybernetic central planning reproduces this division between society and individual, generating a situation where "the plan," chosen by no one, stands over and against everyone, a fateful force determining their life-chances. This is something altogether different than true collectivity—that is, the state of affairs in which individuals, banding together, collectively transform the world and themselves in order to meet common objectives. Such a collectivity would need to be both legible and responsive to individual need and desire.

Marx's favored personifications are gothic—capital is monster, demon, or vampire. In a rather heightened passage in *Capital*, Marx describes large-scale industrial machinery, the embodiment of capital, as "a mechanical monster whose body fills whole factories, and whose demonic power, at first hidden by the slow and measured motions of its gigantic members, finally bursts forth in the fast and feverish whirl of its countless working organs" (Marx 1992: 503). In this state of affairs, "it is not the worker who employs the condition of his work, but rather the reverse, the conditions of work employ the workers" (Marx 1992: 548). We see here the connection to Marx's view of communism, that obverse condition in which "the social life process . . . stands under [the] conscious and planned control" of the producers themselves (Marx 1992: 143).

In capitalism, workers are the "conscious linkages" within this demonic system of machinery, mediating between one automated system and another (Marx 1993: 692). Planners both capitalist and otherwise would like to render these linkages entirely knowable and controllable, but this is impossible. Humans display a creative and unpredictable nature that makes planning and predicting their actions difficult, especially when interactions between individuals produce chaotic effects at the level of the collective. Attempts to codify and precisely determine the actions of workers are often counterproductive, since every workplace depends on spontaneous problem-solving and worker intuition. This is abundantly clear in the passive-aggressive work-to-rule strike, or what the management literature calls "malicious compliance," in which workers do only what they are told, following workplace rules to the letter and acting in all respects like the automata that capital wishes them to be (Vash 1980: 18). The result is a complete collapse in productivity, with one author suggesting it can shave 30–50 percent off the baseline.[5] Business management theory often resorts to hand-waving theories of corporate culture or morale in order to dress up its utter incompre-

hension of those founts of workplace productivity derived from the spontaneous, creative actions of the workers themselves rather than managerial systems or processes.

The problem here is the fundamental fact that, no matter how oppressive, codified, and regulated, work always has its basis in human freedom. How to get people to do what they say they are going to do? How to get people to do what they are supposed to do? How, even more importantly, to get workers to do the things no one knew they needed to do, to respond carefully and intelligently to unpredictable situations? For managers, there is no certain path—the tools available all operate through coercion rather than direct control. Managers must constrain, motivate, and shape free human action; they cannot, at least not yet, immediately determine action with a few keystrokes, as is possible with programmable robots. It is the very fact that people are not machines, and can intuitively and creatively solve problems, that makes them so difficult to truly replace with even the most powerful of rule-bound algorithmic machines. (Situations where machines assist labor are far more common than those where machines truly replace it). The resistance of labor begins from this fact, from the inalienable freedom of the worker, evinced most clearly by the strike. It seems curious, then, that the labor movement should give rise to a vision of a perfected, harmonious future society which so ignores this freedom.

Capitalism has a very weak but nonetheless effective apparatus for forcing people to accept the dictates of management—if they do not do what they are told, they will be fired. This is a requirement of production for profit—if such workers are not fired, if managers are complacent, then the firm will go bankrupt. In other words, unless workers perform to standards established by the market as a whole, they will lose their jobs. But knowing whether people are doing what they are supposed to be doing is difficult, and distinguishing between slacking off and working can be hard in many fields where output is difficult to quantify, such as offices and many in-person services. As noted previously, Silicon Valley is hard at work developing technologies of surveillance—wearable wristbands and lanyards that track workers as they move about the jobsite, gauging their bathroom breaks and pauses. But even here, the difference between measurement and control rears its head. Surveillance is not automatically control. In some cases, it may induce workers to modulate their behavior, to perform according to the plan, but in others it will simply foster new forms of subversion or resistance. Until managers can directly control human action at the neuromuscular level—rendering all emancipatory politics null and void—this will always be possible.

All plans, therefore, subsist within a matrix of free human action, even when that freedom is so entirely constrained as to seem unfree. The jingoist catch-phrase "freedom isn't free" speaks the truth of capitalist society, which offers to its underclass an unfree freedom, the choice between one terrible option and another. The consequence, for would-be planners, is that unless it is freely assented to continuously the plan always implies the possibility of subversion. In many cases, the very presence of a plan, the very presence of a social totality determining what one must do and how one must do it, introduces behavior that destabilizes the plan, by creating that opposition between the individual and the alienated social totality.

Decentral Planning

In the informatic socialism of Cockshott and Cottrell, compliance is harder to secure than in capitalism, since a socialism worth its name cannot deprive workers of access to such goods for doing a bad job, nor can it really fire them, as opposed to reassigning them to some other spot in the economy. If alternately forms of incentive and sanction are used, perhaps tied to surveillance, then egalitarianism and emancipation is jettisoned. To sum up, central planning can't succeed on the terms it has set for itself without, by hook or crook, abandoning the egalitarian and emancipatory commitments that are its reason for being. What might succeed is something no one would desire—a system requiring both surveillance and automatic coercion, a system which, in order to be efficacious, reproduces much of what we find intolerable about capitalism.

Fortunately, *central* planning does not exhaust the meanings of planning as such. Planting a field is planning, as is, looking a bit further out, the rotation of crops. Scattering seeds in an area to which one's tribe will return in six months is planning. The forests that European explorers encountered in North America had, in fact, been made into big-game hunting parks by the controlled, planned use of fire to clear undergrowth. Irrigation canals and viaducts, the Great Wall and Machu Picchu: all planning. In the twenty-first century, with the carbon-saturated atmosphere sealing us into at least a couple degrees Celsius of warming, an emancipated post-capitalist society will need to focus much of its energy on planning: reconfiguring the food supply in order to respond to changing climactic conditions and changing ecosystems, a project which will involve, at a minimum, totally reengineering the built environment, transforming food and energy systems, and reshaping towns and cities and their relationship to the countryside—plan-

ning devoted not to the enrichment of elites but to human survival and flourishing within a newly inhospitable world.[6]

Central planning has, in fact, almost nothing to do with this kind of intentional future-oriented thinking. As we've seen, calculation of labor prices has little to tell us about long-term planning and investment, at most providing a clear measure of resources necessary in order to answer more fundamental political questions. Central planning instead is the name for a system of mediations meant to redistribute and control human labor in the absence of competitive markets, money, wages, and profit. In its cybernetic variant, the proposal is for an impossibly *automatic* control of labor, an automation of politics, and the reduction of questions of how and where people work to entirely technical matters. This is something completely other than the "conscious and planned control" of resources by "freely associated men" that Marx imagined.

The monstrous, demonic aspect of capitalism arises in large part because it consists of a social totality impervious to the intervention of all but the most massive of collectivities, hurtling forward independent of the intentions or the wishes of its subjects, laborers and capitalists included. The CEO of a corporation is, in the last instance, as helpless before the smokestacks of its factories as are the laborers. Lest the firm be bankrupted, that CEO must ensure the firm produces at a given standard of productivity using the technology available. As we've seen, however, the algorithmic balancing of supply and demand through market-clearing prices produces just this sort of monstrosity, even if executed by the clumsy trial-and-error of planners. The sort of planning discussed above would reproduce that monstrosity typical of capital, swapping out circuits and sensors for price-signals, but nonetheless embodying in its mechanisms a social totality before which individuals were helpless. Given this opposition and the effective alienation of the populace, planners would themselves confront an intractable problem, as their attempt to distribute resources according to objectives good or bad would encounter resistance. Inasmuch as they hold sovereign decision-making power, the planners would make themselves a target for capture by groups or factions wanting to gain privileged access to social wealth.

The only alternative, the prerequisite for a truly emancipatory revolution, is the distribution of power throughout society, such that people are directly in control of the conditions that matter for them. Marx and Engels counterposed planning to the "anarchy of production" and the social division of labor, which, because it was based on competition, made any rational organization of society impossible (Marx 1992: 377; Engels 1935: 305–6). But

human action is also anarchic in a fundamental way. It cannot be made completely lawful, because humans have that capacity for unpredictable and novel action that Hannah Arendt termed "natality," because it inheres in the birth of each person (Arendt 2019: 8–9, 247).[7] The only alternative to the anarchy of capitalist production is a planning that embraces this kind of anarchy, a *planarchy* if you will, an organization of human activity that accepts the fundamentally self-directed, spontaneous, and creative character of human action. Under this truly communist planning, the link between calculation and control would be definitively broken. Instead of metering each person's access to the social store based on their contribution of labor, one would instead break the link between production and consumption, distributing goods freely and on demand where they are in abundance, and rationing them based on need where they are not. As we've seen, the reason that planners insist on this crypto-wage structure—with workers paid in tokens that they then use to buy consumption goods—is not because of the necessity of measurement and calculation but the necessity of a lever by which planners can direct labor. The result is, paradoxically, a loss of control, not to mention a betrayal of all emancipatory goals. In such a state of affairs, one might nonetheless measure and evaluate every manner of unit, both physical and synthetic, without using such calculation as an instrument of control over people. People would still account for resources, they would require extensive, up-to-date inventories, itineraries, databases, and schedules. They would, in addition, need to make decisions about the future and undertake step-by-step, path-dependent projects spanning months, years, and decades, all of which would require careful coordination and planning. They would no doubt need to know how long it takes to accomplish a given task, but there would be little reason to calculate indirect labor costs or to price things in terms of total labor content once one dispenses with the need for a unitary price measure in consumption. Though the calculation debate later focused on the calculation of shadow prices denominated in terms of opportunity costs or average labor time, the essays by Austrian communist Otto Neurath which spawned the debate in fact argued that calculation could and should take place "in kind," in terms of physical units rather than money units and with an eye to the satisfaction of a range of fundamentally incommensurable values (Uebel 2005; Neurath 2004a, 2004b). While measurement of labor-time reduces every activity to a single value and single form of optimization, that of minimal labor-time, there are in fact many other "values" that people will seek to increase or decrease—ecological, salutary, aesthetic. Decisions cannot be made in terms of a single synthetic measure, but

instead must reckon with a plurality of units and a host of objectives—trees and gardens, sick days and life expectancy. The "good" in this view is "a vector, not a scalar," not one thing but a long list of things, as Björn Westergard has so deftly summarized (pers. comm. February 17, 2019).

To this end, sensors, circuits, algorithms, and processors, may be a great boon, allowing for efficient coordination and communication and, importantly, allowing people to measure and track the location of resources. But instead of centralizing control, such technologies would distribute and decentralize it, reconciling mutual objectives with the fundamental veto power and autonomy of groups and individuals at all scales. Instead of using the calculations of super-computers as instruments of compliance, they might be instead used to distribute planning across multiple sites, allowing resources to be localized and allowing people to have as much direct control over the things they need to survive and flourish as possible. One would have to accept a certain lack of systematicity and also a certain inefficiency and redundancy, but that seems like a small price to pay for the end of all prices, the end of class society and the beginning of history.

Notes

1 For a summary and an original account of the debate, see Lavoie 1985: 1–27.
2 The seminal text for this model is Wiener 1948.
3 For a genealogy of the phrase, see Kafka 2012.
4 The terms socialism and communism have been freighted with so many meanings that any attempt to define them in mutually exclusive terms can be countervailed by historical usage. In this essay, however, socialism is that organization of society that conserves elements central to capitalism—in particular, the wage. Communism, by contrast, is an organization of social life conducted by "freely associated" people.
5 Given in Ha-Joon Chang, who intriguingly describes the work-to-rule strike as promoting a shift from the rule-based management protocols of Taylorism to the new Toyotism, which emphasized the self-direction and initiative of flexible teams of workers (Chang 2011: 46).
6 For an indication of the work to be done, see Bernes 2018.
7 Arendt is a counter-revolutionary thinker through and through, but her account of free human action and the dangers of treating people as if they were things is indispensable for understanding the limits of planning.

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