

ERROR

Let's take all the crud of the world; all the material forms of all the stuff that bears the imprint of this society. Not, for a moment, the social forms themselves — the historically peculiar configurations of relations between people — but rather, all the muck of the world, the turf turned over and mangled by the relentless tread of those definite people, in their definite relations; stuff whose material form is the negative image of those people and their relations. We're not speaking specifically about use value, since what we're looking at is not reducible to the commodity; nor is it an abstract, contemplative natural form, like scenery or the environment. What we're concerned with, rather, is material form as the correlate of definite social relations, and their attendant behavioural patterns, projects, accidents. Neither simply nature nor second nature, here our "objective spirit" leaves its mark in the placement of hedgerows, the specific hue of an agricultural horizon, the percentage of carbon dioxide in the atmosphere, just as much as in the interlacing lines of tarmac and light that straddle urban condensations and their dissipations into the countryside. Flows of water on the approach to cities channel off into decrepit canals, reservoirs, labyrinthine sewerage systems, treatment stations, and onwards to estuaries and seas, their chemical composition and temperature bearing traces of their prior path.

What do we have to say about the infinite concreteness of all this shit? Not as the conceptually recalcitrant, metaphysical matter of a vulgar materialism, but as definite form and pattern, nature-given but socially formed, and thus negatively evidencing a social content. The forms in question are part product of behavioural patterns, and part prerequisite. As experienced, for the most part, they lay down basic parameters — capacities and directionality — of activity. As such, they supply form to it, both enabling it such as it is, and lending limits. But a disused path is quickly overgrown, the particular form lost without the social processes that sustain it, and new paths must at some point be first trodden. And as such, these forms must be thought of in part as reifications of deliberate activity. Infrastructure occupies this ontological field, but there are also plenty of forms here which would not normally be thought of as infrastructural, since what we're looking at is the

entire negative image of the totality of human relations and activity as it occurs in the stuff of the world — not just a specific set of networks and structures that play a clear functional role for “the economy”.

In a world given its predominant social forms by the imperatives of capital, it is of course to capital that we might look for explanation of the material imprints and patterns left by those forms — not just in the material-technological dimension of the production process itself, but also in all the material implications of this process as it unfolds across the surface of the globe. If capital moulds social relations to its ends and means, those relations in turn mould the stuff of the world. And if the affordances of that stuff both enable and limit the patterns of our activity, our own practical-technical capacities and limits must thus be seen as in large part defined by capital.

From this there follows a conundrum in the communist imaginary: In the absence of the specific social forms that are constitutive of capitalist society, what will people do about all the stuff of the capitalist world and the parameters it gives to their action and behaviour? How will they be able to work with these things to reproduce themselves from one year to the next, without being compelled to “reverse engineer” the specific social relations that have inscribed themselves in them? Assuming people will still need electrical power, for example, to do the things that must be done, won’t they need to keep the grid up, the power stations running, the fuel supply coming, and thus to reproduce vast swathes of the global capitalist economy?

This intractable question seems to lead to a choice between two troublesome answers. Either:

1. given the depth of penetration of the effects of capital into the very material structure of the world, it will be necessary to break directly with the entire structure of things as given, since anything less than this will amount to a perpetuation or return of capitalist social relations. Or,

2. given the general human dependence on capitalist infrastructure, it will be necessary to take a pragmatic approach, keeping this infrastructure running while we grapple with the herculean political problem of managing and coordinating some global transitional phase.

From the standpoint of the first answer it will be said in response to the second: keeping such infrastructure running would be tantamount to keeping capitalism in general running, since such things cannot be extricated from the global capitalist system. Keeping such things would thus be in contradiction with the stated aim of making a transition, and this answer is thus no real answer at all. And from the standpoint of the second answer it will be said in response: to advocate some immediate break with the material structure of the capitalist world in general is to advocate a gigantic global humanitarian disaster, since there is no other ready means for dealing with the needs of 7.5 billion people. Such a break could thus never really be pursued as a serious course of action since, given the choice, for everyone other than the nuttiest of wingnuts, the perpetuation of capitalism will always be an option preferable to mass death.

These contrary standpoints, for all the difference between a homely common sense and a rigourist zealotry, share a common framing — perhaps a necessary one — and in at least one sense have similar implications: insofar as the future is foreseeable on the basis of things as currently given, it is capitalism, or else. The affordances of the world open up a vast horizon of possibilities for action, but shaped as these affordances are by the imprint of social forms which are themselves formed by capital, it would seem that ultimately it remains the latter that gives and forecloses that horizon. Thus, at the limit of Hercules’ labours there’s still an inscription that says *nec plus ultra*: nothing else beyond but an ineffable negativity. And whether they like it or not, our intransigent, for their part, will quickly come face to face with all the pragmatic problems of carving some transition through all this crud. If the capital-constrained vectors written into the stuff of the world lead indefinitely towards the horizon, communism can only be projected as an indeterminate, far-off break in these vectors. And as to the exact placement or character of that break: infinitesimals of sectarian fun await those who try to take up a strict position — or to consign some opponent to one — on such matters.

ANTINOMIES

Origin

If we squint our eyes a little, this problematic resembles another, with which Marx grapples in the part of *Capital* on “so-called primitive accumulation”. Given that capital is a self-reproducing totality, a systematic inter-relation of moments for which the preconditions themselves are posited as the primary result, this confronts us with a question: how could such a thing originate in the first place? This is an instance of the general problem of bridging the aporetic gulf between any synchronic theory and any diachronic account of the same theoretical object, between a form and its etiology — or, more broadly, of the ancient and intractable philosophical problem of how to think *becoming*. Considered in synchronic terms, given that all moments of the totality are simultaneously and mutually necessary, in all of their systematic relations with one another, the problem of origin appears absolute. Since the whole totality is needed at once, capital can logically only have sprung fully-formed into the world, and a mere instant prior to this origin, it can’t have existed at all. But considered in historical terms such a claim to absolute origin appears absurd: though little moments of genesis are a regular part of the overall continuity of things, historical development doesn’t produce miracles.

Faced with such metaphysical absurdities we might choose to constrain ourselves to this merely diachronic, historicising mode. History, not philosophy, will be our “queen of sciences”. We now avoid metaphysical conundrums by focusing on the changing patterns of relations between ultimately unsystematised — only externally-related — aggregates of entities. If we wanted to characterise what we’ve just done in philosophical terms, we could proudly affirm our anti-essentialism and wait for the canned applause. If the explanation for the thing lies entirely outside it, deferred onto an open field of historical contingencies, it was surely a mistake to direct our attention to the thing itself when attempting to think about its origin. But what is this thing that we are historicising? Not only are we already thinking about something discrete, with its own particular identity which had somehow to be produced; it also does very well at taking care of its own reproduction, consistently producing and operating upon its

own preconditions over long expanses of historical time. This self-relatedness suggests that explanation cannot after all be an entirely external, contingent affair. And the set of moments through which capital does reproduce itself occur simultaneous to each other. Viewed in purely diachronic perspective then, these moments will collapse into the undifferentiated facticity of capital’s mere existence. And when this occurs it becomes difficult to even say with any clarity what capital *is*, and thus what we are historicising. Or, to put it another way: the simultaneous cannot be narrated.

Marx essentially avoids the problem of capital’s origin by reducing the question to that of the historical separation of producers from means of production — something for which a clear history can be told, and which his synchronic analysis has demonstrated to be a fundamental prerequisite for generalised capitalist production. In strict theoretical terms however, this move is not quite adequate, since it actually only sidesteps the fundamental question of origin of the *system* of all the forms of value that mediate this separated relation. This separation is a necessary, but not a sufficient, condition for the capitalist mode of production. Thus we might reasonably ask whether a different — non-capitalist — mode of production might not have been possible on the basis of this same simple separation if, for example, capital’s self-valorisation had been absent as motive force. In a mode of production lacking generalised monetary exchange or a functional separation of the economic and the political, it is conceivable that a capitalist-like separation of direct producers from the production process could be maintained, for example, through physical coercion and the rationing of products (perhaps this mode of production is less fictional than it at first seems).

The problem is that the sufficient conditions for the capitalist mode of production, as we know them, do not exist in separation from it. These conditions in their totality are the primary systemic outcome of this mode of production in its daily operation. But, if we delete the mode of production from our picture, it is hard to imagine these conditions emerging in their fullness through some external cause, purely contingent to that which would be their outcome — an epic accident of history. Chicken and egg arguments ensue, and quite reasonably so. What came first: generalised exchange relations; a wage-earning class; technical improvements to the labour process; the separation

of producers from the land...? One of the major debates of Marxist historiography—that over transition—springs up on this spot. Controversies unfold, arguments are honed, real progress is made in the understanding of history. But the impertinence of the theoretician cannot be definitively dispelled: Yes, but *exactly* when and how did it *really* begin? Such questioning may, on the face of it, involve a certain stupidity. Perhaps so, but such “stupidity” underlies the empirical enquiry itself, for it is precisely the uncertainty here that drives the struggle for empirical answers. Yet in its bald abstraction, this question threatens to persist dunderheadedly through every answer given it, for it is stuck in a circle: an historical explanation is demanded for something that can only be thought theoretically as a pure event, and which as such resists historical explanation, but yet also *as such* demands it.

Given our reasonably firm grasp of the capitalist mode of production and its history, to push further on this problem of origin might well be a case of philosophical onanism—and, of course, it's better to attend to the “actual world”. But let's venture that this stupid question has a transcendental character, in the Kantian sense: it occurs necessarily, an aspect of the structuring of our thought, and there is no ready way of avoiding it entirely. Indeed, without constitutive uncertainty over key questions like this there might be little impetus to science. But if it is identified like this as an aspect of transcendental structure—an unavoidable *theoretical artefact* of the nonetheless necessary distinction between synchronic and diachronic modes for understanding capital—the effects of such stupidity may at least be managed, bracketed. If there is no clear way out of the bind of thinking with regard to origins then we can at least sketch the lines of this bind, in order to gain a more objective purchase and save ourselves from sophistical games. Historicisation and systematic theory are mutually necessary here, each running into absurdities when pursued entirely to the exclusion of the other, yet the two don't so far appear capable of unification into a single, ultimately coherent mode of analysis.

Recognising this bind as we now do, we might opt for a pragmatic basis for the decision as to which mode of analysis is appropriate: systematic theory where consideration of capital as a self-same, self-reproducing totality looks most useful; historicisation where it seems more illuminating for the contingent to pour into and disrupt the identity of this thing. Some basic scientific criteria like Ockham's razor

and a general weighing of explanatory power will do. This pragmatic distinction cannot revert to an absolute one, or we will be back where we started: historicisation will devolve into a meaningless “one damn thing after another”, unable even to properly identify its objects; theorisation will free itself from temporal difference and thus from historical process in general. Whichever mode is emphasised, this must be grasped as only a provisional bracketing, where what is left out of the analysis is not thereby negated; and the other mode must ultimately be allowed to complicate and structure it.

End

But if, on the pure basis of a synchronic grasp of capital as totality, origin necessarily presents itself as a problem, or as a sort of “miracle”, something similar is true of capital's demise. Thus what is at play here is not merely a scholarly (or scholastic) matter, but the central strategic stake of revolutionary theory. If our theory of the capitalist mode of production hinges upon its self-same theoretical object, neither origin nor demise will be graspable internally to this theory in more complex terms than the mere being/non-being of that object, and such non-being would amount to the “falsification” of the theory itself.¹ On the strict theoretical basis of capital's systemic integrity, its demise is by definition *unthinkable*, and thus, when postulated, can take the abstract, mystical form of a pure, indeterminate rupture. From this absurdity there results a strong, quite reasonable, temptation to recoil from this thought into assuming instead the concrete impossibility of anything so absolute, anything so mystical: of course, some intermediate, transitional phase must be postulated and the purity of such rupture diminished; more pragmatic steps must be taken... Yet it has been known since at least ancient Greece that

1. The outlines of this absurdity stand out if we ascend to a more emphatically philosophical level. Let's take ‘theory’ to by definition involve the drawing-out of the ‘essence’ of some thing. Change to the thing could be superficial, not affecting this essence; it would thus fall outside the ken of the theory. Or it could be fundamental, altering the essence, in which case the thing is no longer the same self-identical object we started with, and the theory must—if it had really grasped the essence—have now become false. There is either an essence that the theory successfully grasps, or there isn't; there appears to be no basis here for thinking about fundamental change. Such problems may be hazards of pure theory when its objects are posited as entities that demand some degree of *internal* explanation, yet this seems unavoidable in some cases. While here we confront a problematic of such generality that it could be traced back to ancient Greece, we got to this point by following the logic of frustrations with the thought-forms of so-called ‘revolutionary’ milieux. At a high enough level of abstraction we always return to the same problems.

paradoxes and absurdities given by the logic of concepts cannot always be so easily dispelled: no amount of common-sense transitioning can bridge from what is to what is not without still implicitly posing the problem of *when specifically* the fundamental break takes place — the problem, if framed in this way, does not go away. The theoretical effects of the synchronic / diachronic distinction appear again, and what we're looking at now resembles one of Zeno's paradoxes.

One might attempt to ward off the impossible negativity latent in thinking these twin transitions by folding them into the persistence of the totality itself: capital does its own becoming and its own dissolving, and somewhere in between it is properly itself. We might invoke some notion of the actualisation and loss of an essence; the drawing out of something already there *in nuce*, and its final withering. Origin and supersession of the totality are something internal to it, something it itself *does*, organically yanking itself into existence, leading a good innings, then shuffling off: the three necessary phases in the arc of any abstract periodisation, and any good story.²

It's more intellectually compelling than a miracle followed, after a very long wait, by a rapture, and a more plausible abstract representation of a pattern of historical development. But, of course, our new theory is all the more question-begging: isn't it paradoxical to allot to something responsibility for its own origin? And — while less immediately counter-intuitive, given the reality of suicides and the self-dissolutions of organisations — perhaps it's equally paradoxical to hold something responsible for its own demise?³ What's more, that "when specifically?" question hasn't really gone away, as quickly becomes apparent when we start trying to map the points of our arc directly onto the course of the "actual world". We then discover that what we've produced is not really a historical periodisation of our totality, but an abstracted theoretical schema of its generic *temporality*, or a philosophy of history.⁴

So, again, it may be best if we provisionally bracket such matters as *theoretical artefacts*, and as not necessarily referring to any literal historical truth,

2. Aristotle, *Poetics*, 1450b:20–30.

3. Ray Brassier seems to think so. See 'Wandering Abstraction' *Mute*, 13 February 2014.

4. It might be said that traditional historical materialism, with its dialectic of the forces and relations of production, escapes such problems. Since a trans-historical 'engine of history' is posited as the force driving the succession of modes of production, these do not appear as the kind of totality that begs such questions. The origin problem has here been displaced to the beginning of class society in general. Thus with this operation comes a loss of specificity:

much as the axiomatic projection of a single infinite flat plane — spatial extension in its most abstract sense — can occur as an artefact of euclidean geometry without rendering useless that geometry in the face of the actual non-flatness of the world. These theoretical artefacts have a tendency to get literalistically pictorialised in the fantasies of the revolutionary imaginary: single, universal process of all humanity deciding its way out of capitalism, or universal, instantaneous, determinationless destruction of the entirety of capitalist being. Both are facile, merely mirroring the necessary abstractness of the concept they depict. Against the more apocalyptic pole of the latter sort of imaginings, the common sense recoil to faith in "transition" is understandable. Yet this will tend ultimately to issue in the equally empty counter-fantasy. And in the final analysis, it will always be susceptible to the impermanent prodding of a theoretical absolutism which correctly perceives that, in itself, no amount of transition can add up to a rupture.⁵ If "rupture" as theoretical artefact should not be mapped literalistically onto historical development, nor can a registering of the generic necessity of historical transitivity solve the theoretical-political problem of revolutionary break. Process and event here are, we might say, complementary abstractions; but they are also in seemingly insoluble contradiction.

IMAGINARY

These antinomies are not matters of explicitly formalised theory alone: such problematics occur within the latent "theory" of everyday social reality, its struggles and identities. The elaboration of such things as a kind of transcendental structure may thus help us to explain the recurrence of such abstraction in the "pre-theoretical" revolutionary imaginary as something more than a matter of mere superstition. Abstract appeals both to pure, total rupture and to

the distinctive internal coherence of the capitalist mode of production — the circle established by the value-form once it takes hold of the production process as industrial capital — risks dissipation into a general economic history. Such history should not be dismissed: perhaps man *can* be the key to the anatomy of the ape. But just as the origin problem was only displaced, its counterpart remains: if the end of capitalism is posited as that of class society, or of history as the history of class struggle, the event of this end will not be thinkable in the terms of such history..

5. Engels and Gladwell notwithstanding: quantity-into-quality shifts and tipping points may be useful figures for thinking about real processes of transformation, but they are just that. They do not ultimately dispel the kinds of impertinent metaphysical pedantry we have been pursuing here: when precisely comes the actual event? If it initiates something genuinely new, how do we think the relation of that novelty to what came before it?

generic process or transitivity have a necessary ground in the structure of revolutionary thinking and are thus not simply incorrect. Indeed, this simple dyad provides the basic coordinates by which historical cases of thinking around the question of revolution will inevitably be characterised: Bakunin, Marx, Engels, Bernstein, Kautsky, Kropotkin, Luxemburg, Lenin, Sorel, Lukács, Pannekoek, Bordiga, whoever. The classical “reform or revolution” debate is of course relevant here, though it is important to underline that it should not be mapped simplistically onto these abstract terms, since revolution can be thought in terms of both process and event, and so can reform.

Individual thinkers have typically developed their strategic visions through mixed distributions of these generic temporal categories. Marx’s pronouncements oscillated between the two poles, depending on context. Late in life, against the gradualism of the Lassalleans, in *Critique of the Gotha Programme* he asserted a revolutionary attitude to the state, but sketched a developmental vision in which the actual event of establishing communism was submerged in an indefinite process in which “bourgeois right” and the “exchange of equal values” were to persist, while “the individual producer receives back from society... exactly what he gives to it.”⁶

For Engels, the proletarian state was to take “possession of the means of production in the name of society”, and then “wither away of itself”, to be replaced by the “administration of things”; it was not to be “abolished out of hand”, as per the fantasies of the “so-called anarchists”. Yet the proletariat’s appropriation of the state was nonetheless to be an act of abolition both of itself as class and of “the state as state.”⁷ Lenin tied himself in knots arguing for a coherent, orthodox conception of revolution on the basis of these pronouncements, opposed to anarchists and opportunists alike: the concept of withering had been taken up as an excuse for opportunist delusions when it was meant only as a corrective to anarchist fantasies of a pure abolition; in reality, the state was to be subjected to both event — abolition of the *bourgeois* state through its proletarian appropriation — and process: withering away of the state *in general*. Thus the initial event of revolution at the level of the state was to be a moment in a larger process, which would itself somehow ultimately issue in the main event of revolution at the level of the mode of production.⁸

6. Marx, *Critique of the Gotha Programme* (MECW 24), 85–6.

7. Engels, *Anti-Dühring* (MECW 25), 267–8.

Event and process do a wild dance through even the most orthodox of revolutionary visions.

Anarchisms and non-Bolshevik communisms would of course perform alternative distributions of these terms, typically locating both event and process at the level of society, means of production, party or organisational form, rather than that of the state. The problem of revolution can start to look like a matter of good cookery: event and process are both necessary ingredients, but must be combined in just the right ratio and with a fine grasp of timing, and the problem with opponents is that *they get the recipe all wrong*. The Leninist loses sight of the actual event of social revolution by neglecting it in favour of the strategic problem of the state. The infantile “left-wing communist” is so constrained by their tight-fitting dogmas they can’t participate in the actual process of revolution. The social democrat foregoes the event of fundamental social transformation in the pursuit of an endless process of piecemeal reform and unprincipled accommodation to the capitalist state...

The material conditions which gave these debates their concrete meaning have, for the most part, long passed. And whatever remains of historical interest is precisely what cannot be reduced to the abstractions we have been considering here. Event or process: neither has, in itself, any strategic meaning of the kind that must be at stake in the actual taking up of a position, or the actual playing out of a revolutionary moment. Yet both persist ineluctably as structuring poles of the revolutionary imaginary, as is evidenced by the fact that we still find revolution imagined as abstract pure event and as simple transitivity in the ritualised disputes of the left and its heirs presumptive. If we are to attempt to subject the abstractions of this imaginary to critique, we can’t assume that we can reduce them to a mere matter of “error” in the epistemic sense: these artefacts of theory are not mere mistakes. And this “imaginary” is not merely something unreal, as in the everyday sense of the word, but rather, a determinate structure with a social reality, intelligible in the patterning of revolutionary discourses, behaviours, identities.

The simple concept of the capitalist mode of production as a synchronically self-related totality in itself implies, as abstract generalities, the structures we’ve examined so far. This concept is no mere mental phenomenon, but an abstraction given socially by the

8. Lenin, *The State and Revolution* (Collected Works 25), 400–6.

movement of the value-form; that is to say, it is not simply an inductive *generalisation* about the world, since its abstraction is actually performed within certain social processes. It is thus reasonable to say that the basic forms of the revolutionary imaginary stem objectively from the mode of production itself. They are the elementary concepts through which the revolutionary horizon presents itself, an immanently-produced effect of the mode of production. As such generalities they are temporally coextensive with the mode of production and thus cannot be periodised or historicised in finer grain than the epoch that this mode of production itself established through its coming into dominance.

But this, of course, is not to say that the revolutionary imaginary undergoes no historical change at all. In its concrete content it is in constant flux, and subject to all the chaotic contingencies of historical process in general. It is only the structural “conditions of possibility” of thinking this content that are limited to such a level of generality and transhistoricity. Beyond this basic level there are degrees of specificity more amenable to historicisation: revolution as Chartist call for a “Grand National Holiday” or as Luxemburgist mass strike; as syndicalist projection of industrial unionism’s universalisation or as Social Democratic appropriation of the modern state’s bureaucratic apparatuses; as Third World detonation of colonial weak links; as generalised refusal of labour; as establishment of cybernetic or algorithmic self-regulation; as willed acceleration of capital’s own hi-tech tendencies; as extension of a new commons; as generalised interruption of commodity circulation; as insurrectionary proliferation amidst a crumbling world system; or simply as pious, empty messianic hope — all are instances of a revolutionary imaginary that can, of course, be historicised in relation to specific conditions. Each may be grasped in itself as more or less abstract, depending on its intrication with, and capacity for generating, consistent concrete strategies in the context of actual struggles, on the basis of those conditions. It is at the extreme of the most threadbare abstraction, where they appear in the form of the merest hope, that we are confronted most immediately with the revolutionary imaginary’s transcendental structures. Here the imaginary tends to mere fantasy; we might view it as a sort of social “wish fulfillment”. At the opposite pole — that of full concretion and immersion in the world of practice — these forms tend to recede

from view, dissolved into the particularities and contingencies of the moment, though the imaginary which they structure will only ultimately be cast aside with the supersession of the mode of production that is at its root.

In historical moments such as the present one, in which communist revolution can hardly be thought as a plausible direct outcome of currently existing conditions, and in which it is thus extremely difficult to orient oneself strategically to such a prospect, we are perforce reduced to a theoretical mode that is more abstractly speculative. Debates about the notion of revolution tend unavoidably towards a poverty of abstraction no matter how hard their participants strain against present conditions, no matter how eagerly they bandy about the standard signifiers of an absent political concretion — organisation, strategy, party, position etc — or busy themselves with the minutiae of speculative formalisms. In such conditions it is all too easy to mistake the playing out of the generic logic of one or another abstract, inherited rhetoric or identity construct for the taking of an actual political position. This is the equivalent at the level of thought of the pious formation of soi-disant revolutionary organisations in non-revolutionary times. Meanwhile, the actual struggles and the real strategic and organisational thinking that inevitably continue to occur, as social actors face the everyday exigencies of life in capitalist societies, tend to be divorced from questions of revolution.

We are not, however, thereby forced simply to abandon the question of the capitalist mode of production’s revolutionary terminus. An indefinite future of successful capitalist growth can hardly be thought with more confidence as a possible outcome of present conditions than can its breakdown or supersession. No: the essential contradiction of the capitalist mode of production — that it always needs both more and less labour; the inherent dynamism and future-orientedness of the accumulation process; and the necessarily conflictual playing out of that process — these posit, of themselves, another structural aspect to the revolutionary imaginary that we have not yet examined. This is a sense of the mode of production’s — and thus also the revolutionary imaginary’s own — ultimate impossibility, and of the necessity of an orientation to that impossibility. For this reason, this “end” is not simply a static generality, nor a simple subsumption of one or another arbitrary, historically-particular content under such a

generality. It is, rather, something produced and reproduced through the immanent dynamics of this totality as it propels itself towards a future in which it must ultimately, on its own terms, be impossible. This propulsion towards an end is intrinsic to this mode of production's inner temporality just as much as are the subsumption of the labour process under capital and the endless accumulation of surplus value. This is specifically an *immanent* material basis for the thought of an end to this mode of production; and as such it gives us something more determinate than, for example, the platitudinous recognition that all things pass, or the simple idea that what has a beginning must also have an end.⁹ Without such ground, the revolutionary imaginary would be reduced to literal unreality, or to the emptiest mysticism. This is also the basis of our capacity to conceptualise capital as constituting a discrete mode of production, dominant only within a specific historically-bounded epoch, rather than as, for example, the revealed truth of human society.

While an effect of its transhistorical structure, the generic temporality of the "being-towards-death" of the mode of production — and thus also that of its revolutionary imaginary — itself also imposes a certain structuring on historical experience, such that it presents itself as progression, development, maturation. The endlessly rehearsed exorcisms of mechanical Second International teleologism still cannot do away with this basic structuring a century after Gramsci's declaration of the "revolution against *Capital*", and decades after Lyotard's announcement of the end of grand narratives, since it is neither a matter of the merely objective operation of some mechanism, nor of mere ideas. Just as capital itself, in spite of all the postmoderns, never lost the directionality of its course, the structural compulsion to project a terminus to that course has never quite been extinguished. And we

9. This linking of origins to ends is a recurrent thought in Greek and Roman philosophy which one still sometimes comes across. The idea that what comes to be must also have an end is the counterpart to a notion of the eternal as that which does not come to be and therefore does not end. But the logic binding these terms, while intuitive, is not self-evident. For there are two possible further terms here: what we might call the 'one-sided' eternities, which either have an origin but no end, or an end but no origin. If there is no logical reason binding origins to ends, couldn't newly eternal beings emerge? And, indeed, why should those things that have no origins necessarily have no ends? (Such things have actually been considered in some historic cosmologies.) If we cannot logically exclude the possibility that the already-eternal might perish, or that new eternities might come to be, what are we to make of the opposition of eternity and transience? Is this perhaps an effect of the Pythagorean ontologisation of the mathematical abstract? In Hesiod the origin of the gods was a fundamental question, and their relation to time itself thematised. By the time we get to the corny

are constantly reminded of that directionality: in the accumulating masses of infrastructure and technological knowledge; in a seemingly secular global polarisation of wealth; in the tottering accretions of arcane financial claims; and in the growing mass of humanity surplus to the requirements of the specifically capitalist production process. Moments of rising social tension are inevitably promoted by these tendencies, and as movements build and subjects start to cohere in struggle, the fog of abstraction begins to dissipate while the revolutionary imaginary bends towards a real-world proletarian practice and the terrain of strategy and organisation.

DETERMINACY

If we have been concerned here with identifying an immanent basis in the mode of production for the structures of revolutionary thought, that is not because the mode of production encapsulates everything. The ineluctability of this structuring of historical experience does not justify a monomaniacal focus on the mode of production alone, as if the latter could provide the final, exhaustive explanatory ground for all phenomena occurring within its epoch. The full extent of concrete history cannot be reduced to the mere playing out of the accumulation process and its effects, for these are nothing more, nothing less than peculiarly dominant *structuring logics*, and are not the only such logics.¹⁰ The mode of production is of utmost importance in the shaping of the world, and in the question of revolution. But it does not encapsulate that world, and it may help us to loosen the antinomies that we have set at play here if we can address a certain question of *scope*.

Marx, and Hegel before him, were prone to a certain holistic or organicist tendency, but neither made much of the concept of "totality" in any technical

banalities of Roman stoicism, the divine is eternal and the human transient, and that is that. But what if capitalism is one-sidedly eternal — something new under the sun, yet stretching off into indefinite time? There are other aspects of human society one might suspect of having this nature (within, no doubt, some ultimate frame, such as the final heat-death of the universe), and thus persisting into a post-capitalist future: textual language, numeracy, science, agriculture. That capitalism has an origin does not in itself exclude it from this set; for this, communist theory needs to find other reasons.

10. These considerations have a bearing on the old socialist feminist question of how many systems there are — one for patriarchy and one for capital? One each for class, sex, race and so on? Or one mega-totality which we can show all these others to somehow be intrinsic to? In an ultimate sense there must surely be only one — for there is only one world. But the world is an indeterminate totality. Within that world, dominant social logics such as gender and class form themselves into more determinate structures, and can become tightly, systematically →

sense.¹¹ The elevation of this concept was a Lukácsian innovation. Lukács opened his reification essay as follows:

It is no accident that Marx should have begun with an analysis of commodities when, in the two great works of his mature period, he set out to portray capitalist society in its totality and to lay bare its fundamental nature. For at this stage in the history of mankind there is no problem that does not ultimately lead back to that question and there is no solution that could not be found in the solution to the riddle of commodity-structure.¹²

Could the solution to the riddle of the *Warenstruktur* really contain that of every other problem? It is tempting to put this extraordinary claim down to rhetoric, but thoughts like this occur with such frequency in the history of Marxist and revolutionary theory that even if what we are looking at is a matter of rhetoric, it would seem to be in the sense of a deep-rooted structure of discourse rather than a superficial moment of verbal excess. The key question here is what “capitalist society in its totality” might be. What does it include? All the particular people, institutions, techniques, cultures, artefacts, geography, practices and so on that make up what people might have in mind when referring to “a society”? How might Marx have portrayed such a thing? Was his theory just an abstracted map for that particularly amorphous kind of territory, or something more specific?

Lukács should probably have said “the capitalist mode of production in its totality”, for that was surely Marx’s real object. And its nature as a totality is quite precise: it is not simply the sum of the indeterminate mass of particulars that make up capitalist societies, but rather the articulated unity of a specific set of mediations that can be elaborated through theoretical

entwined. Thus it may be possible with synchronic analysis to show how one becomes intrinsic to the other (see for example ‘The Logic of Gender’, *Endnotes* 3), while at the same time it is hazardous to identify them. If gender is only a capitalist construct, for example, how are we to account for such things as the gendered spheres of the ancient world, or even the ternary gendering of the Byzantine Empire? Nominalist solutions, such as defining our terms to exclude such considerations, just defer the problem.

11. For more on this point see Rob Lucas, ‘Feeding the Infant’, in Anthony Iles and Mattin, eds., *What Is to be Done Under Real Subsumption?*, forthcoming. See also Chris O’Kane, “Society maintains itself despite all the catastrophes that may eventuate”: Critical theory, negative totality, and crisis’ *Constellations* vol. 25 no. 2 (2018).

12. Lukács, *History and Class Consciousness* (Merlin 1971), 83.

analysis: commodity, value, wage labour, capital and so on.¹³ Insofar as it constitutes a unity of the determinate moments that make up its own accumulation process, capital is itself a totality in this sense. But it is not the only relevant totality, for individual capitals are of course combined, through exchange, into a larger whole which has such unity that it systematically reproduces the primary condition of its own existence: the separation of labour-power and means of production, ready to be recombined again through the labour market. These totalities are both self-related and self-constituted through determinate internal mediations; they involve a specific kind of reflexivity, and those internal mediations depend upon one another such that they can be said to involve a certain kind of necessity.

The mode of production is a totality in this technical sense, which we term *determinate totality*. In contrast, when one simply invokes the abstract unity of an indefinite mass of particulars without articulating in any systematic way how those particulars make up a whole that is anything more than an aggregate, this is an *indeterminate totality*.¹⁴ Theologians of Old Kingdom Egypt were perhaps on to something when they came up with the creator god Atum, whose name means both totality and nonexistence: rather like the Being of Hegel’s *Logic*, totality as an unarticulated “all” is contentless. “Society” is an indeterminate totality; “civilisation” another; “capitalism” another — at least when this is used as anything other than a synonym for the mode of production.

At least since Lukács, Marxist theory has had a tendency to slide between determinate and indeterminate totalities. That Marx elaborated in detail the articulations of the mode of production as a totality might be taken as meaning that he also sketched the fundamental truth of everything that occurs in a hazily-defined “society”, which itself may be implicitly

13. Even Marx and Engels’s seemingly vaguest, most expansive definitions of the concept of the mode of production remain, in the last analysis, closely tied to production in a fairly narrow sense. See, for example, the opening chapter of the *German Ideology*: ‘This mode of production must not be considered simply as being the production of the physical existence of the individuals. Rather it is a definite form of activity of these individuals, a definite form of expressing their life, a definite *mode of life* on their part. As individuals express their life, so they are. What they are, therefore, coincides with their production, both with *what* they produce and with *how* they produce. (MECW 5), 31–2.

14. Theorising systems, which are a close relative of totalities, Stafford Beer recognises both determinate and indeterminate, but adds a third: probabilistic. Investigation of this interesting parallel will, however, have to be left as a task for another day. See Beer, ‘The Irrelevance of Automation’ in *How Many Grapes Went into the Wine* (Wiley 1994), 104.

imagined as something coextensive with the modern nation-state, and which may include its populations, its territories, its infrastructures... Layers of mediation may be surreptitiously telescoped, such that a very well-articulated theory for one thing—capital, or the capitalist mode of production—may be taken for a theory of something quite different, or perhaps even of *everything*.¹⁵

And once this elision has been performed, it becomes singularly difficult to conceptualise the overcoming of the mode of production at all. Rather, we are precipitated into rather “theological” problematics of immanence and transcendence; into questions of whether the mode of production has any “outside”; into visions of the future as a completely contentless blank slate—for if everything really is to be at stake, then what lies beyond can only be *nothing*. Revolution can then only be thought of as something utterly transcendent; a sort of ineffable sublime that is the abstract, indeterminate negation of an equally ineffable, indeterminate totality.¹⁶ We return once again to our antinomies, which seem as pathological as ever.

There are objective bases for the tendency to project the capitalist mode of production as an indeterminate totality that subsumes all the world’s particulars. First, the value form that lies at its heart finds its ground in exchange-value, and particularly in money as general equivalent. It is the nature of the general equivalent to present itself as the “truth” of all particulars, since it is only through the mediation of money that they can ultimately express their value. This may appear directly, in all actual empirical acts of exchange, or as a mere potentiality, in those things which have not yet been, but could be, sold as commodities. Second, the fact that, due to certain aspects of capital’s inner temporality, we can always think of its subsumption of the labour process as in some sense more “real”, less “formal” than before seems to logically present the prospect of some completion of this tendency at which “subsumption” will be

15. The concept of ‘subsumption’ sometimes lubricates such slippages, seeming as it does to provide a theoretical justification for identifying capital with the world outside it. For more on this point, see Rob Lucas, ‘Feeding the Infant’.

16. Robin Blackburn has identified what he calls ‘simplifying’ and ‘developmental’ assumptions in Marxism, the first of which simply imagines away all complexity in the overcoming of capitalism, while the second is committed to the idea that ‘human social powers are cumulative, dialectical and various, and that in a socialist society some forms of complexity may be removed but others will be added’ (‘Fin de Siècle: Socialism after the Crash’, *New Left Review* 1/185, 1991, 12). But do these two coexist simply as two *choices*, one more sensible than the other? What we are attempting here might be taken in part as an explanation for the stubborn persistence of this dichotomy. What complexity can we

“total”. Third, the dynamism of the specifically capitalist mode of production is such that it tends to annihilate, or at minimum, dominate and sideline, all other modes of production. It is tempting to visualise this process of extension as a kind of complete *incorporation* of the entire non-capitalist world into capital. Fourth, it is in the epoch of the dominance of the capitalist mode of production that the nation-state crystallises into its own kind of articulated totality, mediating much of what remains of the lives and affairs of those within its territory beyond what is already mediated by commodity exchange, and concerning itself with the reproduction of “society” at large. Given this historical concurrence it is tempting to view the nation-state reductively as a sort of mere *emanation* of the capitalist mode of production, and thus to conceptually arrogate to the latter all that the nation-state does. Finally, in an era in which capital seems to have vanquished or absorbed all systemic opponents, what point of resistance to its march can consistently be identified?

While these grounds are real, none provides a sufficient basis for a projection of the capitalist mode of production beyond the loop traced by the reproduction of the separation of labour power and means of production. Though it has, of course, wide-reaching implications beyond this narrow circle—even to the extent of defining a geological epoch—it is here alone that the determinacy of the capitalist mode of production as a totality must ultimately be grasped, and thus also the determinacy of any revolution that would overcome it. What is determinate here is not *simple*: the process of this reproduction implies many mediations—the gendering of spheres, the separation of the political and the economic, of intellectual and manual labour and so on. But the determinate negation of the capitalist mode of production will be determinate specifically in the sense that it overcomes *this* reproduction. And while attempts to conceptualise *any* transformation in time may, at the limit, be subject to the sort of paradoxes we have identified here, the less we fixate on thinking in general terms the mutations of an integral, complex “essence” the more these will fade into the background.

And this is not simply an arbitrary intellectual choice: when it comes to ends in particular, it may make sense, for origins and ends perhaps prove less symmetrical than the preceding analysis suggested.

meaningfully anticipate yonder side of the break, if all complexities we know may be up for grabs?

At the scale of complex entities, time has an arrow: if it was easy to see how their origins could confront us with baffling conceptual artefacts, this is less intuitively the case with their demises. The origin of a single complex animal is a wonder of developmental biology, so intricate it is still barely understood—for how can it be that a single cell, with a single chain of protein-coding molecules can generate not just a single final “design”, but a whole manifold of forms of escalating complexity, each working upon but not simply extending the other, in which the supposed “code” means something different in each anatomical context and at each turn of the developmental spiral? And at what point can this be considered to have accounted for the adult? If origins are ever truly a mystery it is surely here. Yet death can come from a single knife-wound to the heart. All that complexity that we had to account for in the first case is quickly reduced to nought when a vital organ is rendered non-functional. If the origins of bafflingly complex entities must be sufficiently complex to account for that baffling complexity, their ends may prove brutally simple in reality, no matter how hard it can be adequately to think them through in a purely conceptual sense.¹⁷ It is here that the antinomies loosen, for when we acknowledge that we can start to differentiate a strategic field even abstractly, we can start to ease our own tugging at those binds: we are no longer stuck in the problem in the same way, since we don’t need to focus on everything all at once. Indeed, if our tendency is to get lost in the loop-the-loop of totalities, performing a certain deliberate strategic *reduction* may actually be illuminating—as we do when we emphasise the priority of means of subsistence.¹⁸

The crucial question is not one of rupture vs. transitivity, event vs. process, though these concepts will unavoidably play a role in how we think it through. All we need say is that the overcoming of the reproduction of that separation must occur by definition if we are to have a revolution that negates the mode of production: it must no longer be the case that the bulk of humanity has to drag itself to market to meet with its partner, capital, to continue the dance of accumulation. The occurrence of this

17. It makes sense here to differentiate the end of one mode of production and the emergence of its successor, which will have its own similarly baffling origin problem once established. The two processes will be entwined in reality, but not identical, since the disorderly breakdown of the first is liable not to correspond precisely to the formation of a new structure.

18. See John Clegg and Rob Lucas, ‘Three Agricultural Revolutions’ *South Atlantic Quarterly* vol. 119 no. 1 (2020).

transformation would, no doubt, *have duration in time*, and it would also by definition involve the production of a genuine *novum*. If the old transitional model of a workers’ state is no longer tenable, we are not merely left with an instantaneous universal miracle as the only alternative: the rejection of a specific kind of process does not in itself commit one to the abstract event. So let’s set aside all fantasies of the Great Riot at the End of Time; of the primitivist hope for an apocalypse that sweeps the Earth clean not just of capital, but of every concrete thing it has bequeathed us. But let’s also set aside any fantasies of a Great Deliberation through which humanity gradually makes its escape from this world at large in planned, orderly, *sensible* fashion. Any real debate on strategy will do well to stay cognisant of the tendency towards such pathological abstractions in revolutionary thinking. When it comes to overcoming the mode of production at least, there is one task to work out; achieving it will probably be *very* messy, confusing and, indeed, destructive, but it will not be mere chaos. Its determinate strategic contours will, of course, be given by the shape of the world as it is.

DETERMINATION

It is time, perhaps, to return to the problem with which we began: that of the practical recalcitrance of a material world that has been shaped indelibly by centuries of capitalist dominance. That world gives shape to possibilities for action, insofar as it makes some things easy, some hard, and others impossible; it presents us with a mass of specific *affordances*, which are for the most part fitted to the daily reproduction of capitalist social relations. Capital’s own “rationality” has been crystallised into infrastructures we have to navigate and architectures we have to inhabit. It has left its mark more-or-less directly on much of the world’s land area, and on the atmosphere and oceans as a whole. But what kind of causation is at play here?

If it is a kind of material determination, it is not the sort that people mean when they speak of economic or technological “determinism”. We are locating the primary cause fully on the level of the relations of production, for it is most importantly capital—or more precisely, the capital-relation—that shapes the world which in turn structures our capacities for action. Anyone who has paid serious attention to Marx

knows very well that the handmill *does not* “give you” society with the feudal lord, nor the steam mill society with the industrial capitalist, in any strongly causal sense.¹⁹ What Marx “really” meant by that notorious aphorism is up for grabs, but it would be consistent with his major works to read the causation in precisely the opposite direction to conventional understanding: the steam mill “gives you” capitalist society in the sense that it is only in a society dominated by the capitalist mode of production that one would find a steam mill employed in that society’s reproduction of itself; it gives you that society not in the sense that it causes it, but in the sense that it *implies* it, much as an ornately bejewelled dagger stowed in a burial site might “give you” a pre-historic class society with a fairly elaborate division of labour. That is to say, we may best read this line from an “archaeological” perspective, in which the form of a given artefact can be traced back to certain determinate sets of social relations.²⁰ That this priority of the social ought to be obvious has not stopped some important figures in the history of Marxism from equating technology with the “forces of production”, and thereby considering it the driving force of history.²¹

But if the social has priority here, that does not license a constructivist flight of fancy that would dissolve the significance of the material world’s forms into a nullity. It is obvious that the constitution of the physical world that we inhabit at the very least sets parameters for action.²² We may thus think in terms of orders of causation: the dominant patterns of the relations of production leave determinate imprints in the physical and technical world, which themselves in turn reinforce certain social patterns of activity which are, for the most part, compatible with the maintenance of the mode of production. This is essentially the problem with which we started: if this is the case, how can we — short of an apocalypse — imagine exiting this mode of production?

19. ‘The hand-mill gives you society with the feudal lord; the steam-mill, society with the industrial capitalist’ (*Poverty of Philosophy*, MECW 6, 166). Marx was in a heavily rhetorical mode in his confrontation with Proudhon, an opponent who was himself prone to mystifying rhetorical flourishes. Interestingly, according to Marc Bloch, Marx was wrong about the handmill anyway: feudal lords tried to suppress them, preferring watermills, since they were more compatible with the extraction of feudal dues (Bloch, cited in Donald Mackenzie, ‘Marx and the Machine’ *Technology and Culture* vol. 25 no. 3, 1984, 473).

20. A clue to Marx’s meaning which reinforces this interpretation may be found slightly later in the same text: ‘The hand-mill presupposes a different division of labour from the steam-mill’ (*ibid.*, 183).

21. See, for example, Bukharin’s *Theory of Historical Materialism*, criticised on this front by Lukács in ‘Technology and Social Relations’, *New Left Review* 1/39 (1966). Even Langdon Winner reads him in this way: Winner, *Autonomous*

ARTEFACT POLITICS

Insofar as what we are considering here is a matter of technology, this problem may be considered that of technical neutrality. Though from our perspective here it should seem obvious that the technical world is not neutral vis-à-vis modes of production or class power, this point is controversial enough to represent a significant theme in debates on the history and sociology of technology and science. What, after all, is the technical realm, if not something to be opposed in its rationality and objectivity to the flux and partiality of political contestation? The imperative to maintain the distinctness and neutrality of this sphere seems to be structural to capitalist society — an imperative that tends itself to produce a kind of meta-politics, from the Saint-Simonians through Thorsten Veblen to Howard Scott’s bizarre 1930s “Technocracy Movement” and on down to the post-2016 longing for an enlightened bureaucracy that will rescue us from the disorder of a fragmenting democratic consensus. Questioning it sometimes seems to offer a little *épater les bourgeois* frisson, or at least an air of contrarian eccentricity; note the provocative title of what is probably the most highly cited article in this area, Langdon Winner’s “Do Artefacts Have Politics?”, in which he delineates some of the ways in which technology can be non-neutral:

The things we call “technologies” are ways of building order in our world. Many technical devices and systems important in everyday life contain possibilities for many different ways of ordering human activity. Consciously or not, deliberately or inadvertently, societies choose structures for technologies that influence how people are going to work, communicate, travel, consume, and so forth over a very long time.

Technology: Technics Out-of-control as a Theme in Political Thought, (MIT 1977, 78).

22. This is the case with the inherited forces of production that Marx discusses in his famous letter to Annenkov, summarising the position of the *German Ideology*: ‘man is not free to choose his *productive forces*—upon which his whole history is based—for every productive force is an acquired force, the product of previous activity [...] The simple fact that every succeeding generation finds productive forces acquired by the preceding generation and which serve it as the raw material of further production, engenders a relatedness in the history of man, engenders a history of mankind’ (Marx, Letter to Annenkov 28 December 1846 (MECW 38), 96). What we are discussing here is somewhat wider than the forces of production, for it includes some things that are not directly employed in production, but the same general truth of course holds: history is caked into the physical world, providing both resources and constraints, which then themselves provide the basis for further historical development.

In the processes by which structuring decisions are made, different people are differently situated and possess unequal degrees of power as well as unequal levels of awareness. By far the greatest latitude of choice exists the very first time a particular instrument, system, or technique is introduced. Because choices tend to become strongly fixed in material equipment, economic investment, and social habit, the original flexibility vanishes for all practical purposes once the initial commitments are made. In that sense technological innovations are similar to legislative acts or political foundations that establish a framework for public order that will endure over many generations. For that reason, the same careful attention one would give to the rules, roles, and relationships of politics must also be given to such things as the building of highways, the creation of television networks, and the tailoring of seemingly insignificant features on new machines. The issues that divide or unite people in society are settled not only in the institutions and practices of politics proper, but also, and less obviously, in tangible arrangements of steel and concrete, wires and transistors, nuts and bolts.²³

Winner is right to register the extent to which the material world can be viewed as a vast agglomeration of imperfect and partial past decisions. But legal-political analogies in such arguments tend to obscure the extent to which technical decisions take place within the bounds of the capitalist firm, where tyranny reigns in a way that can't quite be grasped with a nod to simple power differentials.²⁴ How could the sort of collective deliberation over technical decisions that he gestures towards ever become a reality without a communisation of the means of production? If artefacts have politics, it is not just because they are a congealment of the choices of situated individuals, but because they are produced in the context of a determinate pattern of social relations which are structured in particular by the capital relation.

23. Winner, 'Do Artefacts Have Politics?' *Daedalus* vol. 109 no. 1 (1980), 127-8.

24. Lawrence Lessig is another example of a thinker who employs legal analogies in thinking about technology as a kind of non-neutral constraint (Lessig, *Code: Version 2.0* (Basic 2006), a rewrite of the 1999 book *Code and Other Laws of Cyberspace*).

THE MACHINE STOPS

A sense of the irrevocable social burdens of capitalist technology can be found in Marxist theory at least as far back as Engels's anti-anarchist polemic, *On Authority*:

The automatic machinery of the big factory is much more despotic than the small capitalists who employ workers ever have been. At least with regard to the hours of work, one may write upon the portals of these factories: *Lasciate ogni autonomia, voi che entrate!* [Leave, ye that enter in, all autonomy behind!] If man, by dint of his knowledge and inventive genius, has subdued the forces of nature, the latter avenge themselves upon him by subjecting him, in so far as he employs them, to a veritable despotism independent of all social organisation. Wanting to abolish authority in large-scale industry is tantamount to wanting to abolish industry itself, to destroy the power loom in order to return to the spinning wheel.²⁵

25. Engels, *On Authority* (MECW 23), 423.

26. *Ibid.*, 424.

It is notable, however, that the point of Engels's argument is precisely not to put technology in question, but rather to show that the social non-neutrality of technology renders the idea of abolishing authority in general a quixotic fantasy. He links the abstractness of any idea that we might simply break with the capitalist use of machines to the abstractness of anarchist critiques of authority because, for Engels, the operation of specific technical apparatuses requires corresponding social forms in which "authority" is an important dimension. Without a certain authority, "no matter how delegated", how else are the trains to be made to run on time? And how are we to handle ships on turbulent seas if there are no captains? Ships, trains and factory machinery in themselves imply some social hierarchy — and socialism, it seems, must involve all of the above.²⁶ If machines are non-neutral for Engels, this is a matter of power relations which are apparently detachable from the mode of production.

Marxism was for the most part silent on the "question concerning technology" through the first half of the 20th Century, but following

Raniero Panzieri's pathbreaking essays of the early 1960s and Braverman's 1974 *Labour and Monopoly Capital*, Marxists seized upon the specific non-neutrality of technology in the sphere of production. For Panzieri, citing Marx, "the development of technology takes place wholly within" a process of the separation of the worker from their intellectual potentialities; as such, "technological progress itself thus appears as a mode of existence of capital, as *its* development". The capitalist use of machinery is no "mere distortion of, or deviation from, some 'objective' development that is in itself rational", for it is capital itself that has "determined technological development". If this is the path of "progress", it follows that:

The *class* level expresses itself not as progress, but as rupture; not as "revelation" of the occult rationality inherent in the modern productive process, but as the construction of a radically new rationality counterposed to the rationality practised by capitalism.²⁷

We are, of course, back once again in our problematic of rupture vs transitivity, event vs process. And Panzieri's logic is consistent: if the entire process of technological development is in some sense internal to capital and at odds with the worker, then it makes no sense for working-class struggle to embrace technological progressivism. On the contrary, "there is no continuity to be asserted, across the revolutionary leap, in the order of techno-economic development".²⁸ Panzieri's position thus starts to look like a call for the apocalypse. Yet he steps back from the brink, appealing instead to a revolutionary action that subjects technological means to new ends: "the socialist use of machines".²⁹ Event and process are thus left hanging, as always, in unresolved tension: we must have the Great Break, but we must have it rationally, on the basis of what already exists.

Similarly for Braverman, machines represent not the enhancement of human control over the labour process, but of managerial control over workers:

27. Panzieri, 'The Capitalist Use of Machinery: Marx Versus the Objectivists' in Phil Slater (ed.), *Outlines of a Critique of Technology* (Ink Links 1980), 45-7.

28. *Ibid.*, 54, 58.

29. *Ibid.*, 57.

Machinery comes into the world not as the servant of "humanity", but as the instrument of those to whom the accumulation of capital gives the *ownership* of the machines. The capacity of humans to control the labour process through machinery is seized upon by management from the beginning of capitalism as the *prime means whereby production may be controlled not by the direct producer but by the owners and representatives of capital*. Thus in addition to its technical function of increasing the productivity of labour — which would be the mark of machinery under any social system — machinery also has in the capitalist system the function of divesting the mass of workers of their control over their own labour.³⁰

If the logic of such "political" readings of the labour process points towards a view of capitalist machinery as non-neutral, the Soviet adoption of Taylorism and Western industrial technology should, at the very least, be considered in a critical light:

In practice, Soviet industrialisation imitated the capitalist model; and as industrialisation advanced the structure lost its provisional character and the Soviet Union settled down to an organisation of labour differing only in details from that of the capitalist countries, so that the Soviet working population bears all the stigmata of the Western working classes.³¹

It would follow that to stand a better chance of success, any social revolution to come should put technology at stake, rather than merely accepting its capitalist inheritance on this level. If workers' control was what was lacking in the Soviet Union, perhaps it made sense to pursue the mathematical implications of Lenin's equation "communism

30. Braverman, *Labour and Monopoly Capital* (Monthly Review 1998), 133. This Marxist reading of machinery famously finds its brazen confirmation in Andrew Ure's *Philosophy of Manufactures*: 'High wages, instead of leading to thankfulness of temper and improvement of mind, have, in too many cases cherished pride and supplied funds for supporting refractory spirits in strikes, wantonly inflicted upon one set of mill-owners after another ... Mr. Roberts ... set his fertile genius to construct a spinning automaton. ... This machine confirms ... that when capital enlists science in her service, the refractory hand of labour will always be taught docility.' Ure, *Philosophy of Manufactures* (Charles Knight 1835), 366-8. Some historians of technology have, however, questioned the extent to which one can take the statements of figures like Ure at face value (MacKenzie, 'Marx and the Machine', 492).

31. *Ibid.*, 9.

is Soviet power plus the electrification of the whole country” as per the old Russian joke, and conclude against electricity—for it follows logically that “Soviet power is communism minus electrification”. Yet Braverman too senses and recoils from the apparent absurdity of imagining revolutions as clean breaks at the level of technology:

the same productive forces that are characteristic of the *close of one epoch* of social relations are also characteristic of the *opening of the succeeding epoch*; indeed, how could it be otherwise, since social and political revolutions, although they may come about in the last analysis because of the gradual evolution of the productive forces, do not on their morrow provide society with a brand new technology.³²

32. Ibid. 13.

Braverman’s classic no doubt catches something important in its analysis of the technological subordination of skilled workers. But the political quality of such interpretations may risk a certain distortion: are the negative implications of machines for workers traceable ultimately to the malign intent of capitalists? Don’t capitalists introduce new technologies under pressure from market competition, rather than simply to squeeze payroll?

Miriam Glucksman has criticised writing in the Braverman tradition for implicitly thinking of “conscious class aims” as the “motor of historical change”, and of the introduction of new technologies as “a mere strategy of employers in their struggle with the working class”. On the contrary, as in Glucksman’s account of women workers in the assembly lines of interwar Britain, capitalists are often reactive in their introduction of new methods of production, responding to competition or financial crisis.³³ There is perhaps after all an objective basis for the conventional association of technology with the simple, market-driven pursuit of efficiency and productivity.³⁴ Simplistic understandings of non-neutrality as a matter of capitalist bad intentions will struggle to grapple with the ways in which technological change may be forced not just on workers, but on capitalists too. Who then is the agent with the ill intent?

33. Glucksman, *Women Assemble: Women Workers and the New Industries in Inter-War Britain*, (Routledge 1990), 153.

34. As ever in Marxist critiques of capitalist thought-forms, we would do well not simply to assume we can refute

If it is capital, this can only be true at the total social level—the figure of capital as social meta-subject or *bad Geist*. Technological development is certainly deeply entwined with the dynamics of the capitalist class relation, but it is so in a way that is mediated by competition such that the intentions of individual capitalists are themselves subordinated to the general process. If capitalist technology is non-neutral then, this is not just because it has been formed intentionally to suit the ends of capitalists, but because those ends are in turn subordinate to the end of capital itself, as subject—which is to say, the valorisation process. If capitalist machinery is the kind of artefact that has politics, this is not reducible to the way in which it is deployed by particular capitalists to disempower particular workers, though that is certainly an important part of the picture. It has politics because it is a key mediation in the mode of production as a whole which helps to perpetuate the constitutive separations between planning and execution, owning and operating, producing and reproducing, wage labour and capital. As such it should be at stake in any overcoming of those separations.

But all of this still leaves open the question of where specifically to locate this non-neutrality in relation to the material body of the artefact itself. In its physical constitution, is the thing neutral, and merely overlaid with the values of the society that uses it? Is its non-neutrality ultimately reducible to the ends to which it is subordinate? If a machine embodies capitalist ends, what happens when it is taken out of a social context in which it can serve those ends? Andrew Feenberg has taxonomised the different modes of the critique of technology that one finds in Marx under the headings of product, process and design. *Product critique* attacks the ends which technology serves, while approving of the means; *process critique* finds technology non-innocent in the sense that it can be a source of danger; *design critique*—coming third, one anticipates a cry of *aufhebung!*—tackles the principles that are applied in the very design of artefacts, regarding them as “shaped by the same bias that governs other aspects of capitalist production, such as management”.³⁵

them politically. Just as commodity circulation considered in itself really is ‘a very Eden of the innate rights of man’ (MECW 35), 186, there are real reasons for the appearance of technology as neutral, apolitical and singular in its path of rational development, even if this appearance itself provides a useful ideological device for capitalists and bureaucrats. Penetrating to the real nature of capitalist technology will require first taking seriously such forms of appearance.

For Feenberg such design critique is exemplified in David Noble's important 1984 study of the post-war introduction of numerical control into the machine tools industry, *Forces of Production*.³⁶ What differentiates Noble's book from other works in this area is his identification of alternative technological paths that were available at the time. Though options existed which would not have been in fundamental conflict with the status of workers in the industry, and which made some economic sense, capitalists — backed by the American military — took the path of class conflict, choosing the design that would stand most to alter the power balance between workers and managers. Thus that design may be read as non-neutral, in the sense that, when other choices were available, it was picked specifically because it directly served the ends of capitalists and state against workers. Noble's is a particularly strong case of the political reading of labour-process technology, but we might question the extent to which general conclusions can be drawn from such cases: if capitalists and bureaucrats can sometimes consciously deploy a design that will disempower workers, that is certainly not the only way in which technological development occurs, and we should be wary of any implicit conclusion that what is *not* deployed in such an emphatically political way will be innocent. Beyond the "design critique" of technology, there is the possibility of an understanding of non-neutrality that depends less on conscious intent, and which nonetheless finds the very form of the artefact to be a "bearer of social relations".

Hans-Dieter Bahr's rich, ultra-dialectical response to the work of Alfred Sohn-Rethel, "The Class Structure of Machinery" attempts to push much further in this direction:

The historical development of the means of labour (*Arbeitsmittel*) as the transformation through labour of nature-given forms into the socially purposive forms of the labour process is simultaneously the "naturalization" of the social forms of instruments of use (*Gebrauchsmittel*). As a material thing, the means of labour not only mediate between *nature* and *subject* of labour, but also serve as the mediation, the "means", among those who carry out labour.

35. Feenberg, *Transforming Technology: A Critical Theory Revisited* (OUP 2002), 44–8.

36. Noble, *Forces of Production: A Social History of Industrial Automation* (Transaction Publishers 2011).

The fact that the tool can only serve the function of mediating the living relationship among workers if this living relationship is simultaneously severed is the reason why — in the form of private property — it can also "mediate" a social relationship between workers and non-workers, or between different types of labour. If the means of labour, as means of production, come to mediate between the ruling and the subordinate class, they must acquire a dual social character in the course of their historical development: the means of labour are a means by which the ruling class can directly satisfy its wants, but they are also the "purposive basis" for perpetuating the one-sided relation between worker and non-worker. As a means, therefore, the tool not only stands between nature, history and society, but also between different classes in society: it is not merely the *means*, but in fact the *purposive basis* for *one-sidedly* uniting the subject of labour with the subject of appropriation. Hence, the genesis of the means of production, as this objective basis, is in fact the process of the mediation of two asymmetrical social subjects.³⁷

In Bahr's reading, which is too subtle to be fully captured here, the material aspects of the labour-process are inextricable from the complex roles they play in mediating the relations of worker to worker, class to class, science to society, proletariat to its alienated intellect, and so on. The technical aspects of work are subordinated ultimately not to the ends of their operators — or even those of managers — but to an "autonomisation of the process of valorisation" which "produces its own structures of labour" that "can only yield use value through the mediation of the market".³⁸ Individual craft-workers had once finished off whole goods ready for use, which were thus illustrative of a certain transparent purposiveness, before having their work-process broken down into obscure fragments as capitalism advanced. But at a more advanced stage even individual capitals tend decreasingly to create finished commodities that have any direct relation to final use, for the market intervenes in the process, orchestrating the assembly of often vast numbers of components into

37. Bahr, 'The Class Structure of Machinery' in Slater (ed.), *Outlines of a Critique of Technology*, 101–2.

38. *Ibid.*, 119.

finished objects. The purposive agent behind the finished artefact thus starts to look like a social one.

What are we to make of the micro-component that is useless in abstraction from elaborate global supply-chains, such as, for example, the old iMac's 922-9884 Screw, T10, WH, DLTA, PT3X24MM? This thing would seem to be completely meaningless outside of the context of a very social valorisation process. It is probably not designed primarily with the subordination of workers in mind, but the specificities of its form are intelligible only in the context of global processes of capitalist accumulation. For sure, the screw *in general* could no doubt be employed to other ends — communist ones, for example — but one does not need to venture far into the concrete construction of any complex contemporary artefact to find relationships between technical parts that are thoroughly shaped by relations between firms in a global marketplace. Yet again, Unabomber armageddon beckons.

TECHNOLOGY BECOMING SOCIETY

Once we have ventured into considering this valorisation process at the social level, we are no longer looking solely at the politics of the labour process. From the 1960s onwards various Marxisms and feminisms of course began to question the assumed centrality of that process, with varying degrees of theoretical coherence. That turn at the level of theory found justification in real transformations in capitalist society, as the labour movement — and with it the hegemonic figure of the male industrial worker — entered into crisis. And it is reasonable to reconsider the Marxist critique of technology in a similar light: is it only class struggle within the (stereotypically male) workplace that marks the artefact indelibly? Even within the bounds of labour-process studies it is possible to raise the question of technical neutrality on levels other than that of class. Thus for Glucksman, once assembly line work was constructed as women's work, "the detailed division of jobs and the design of jigs and tools were made with the gender of the workforce in mind".³⁹ David Noble has even suggested that the urge to create autonomous machines might be explained not in terms of standard capitalist imperatives, but rather the masculinist desire to do without women, or *womb envy*!⁴⁰

39. Glucksman, *Women Assemble*, 221–2. It should be noted though that, in keeping with her arguments discussed above,

And if we extend our perspective beyond the workplace to take in the constitution of the built environment at large, other non-neutralities come into view. Architects and urban planners have long pondered the ways in which certain constructs might promote or hinder crime, affect social control and so on.⁴¹ Considerations of political upheavals and possible insurrections of course enter into some designs: one need only look at the construction of many government buildings or embassies around the world, or indeed the Hausmannisation of Paris. Constructing an analogy with the subtle tendencies of software to play a malign regulatory role, Lawrence Lessig identifies ways in which post-war infrastructural design reinforced racial segregation in the United States:

After 1948 local communities shifted their technique for preserving segregation. Rather than covenants, they used architecture. Communities were designed to "break the flow" of residents from one to another. Highways without easy crossings were placed between communities. Railroad tracks were used to divide. A thousand tiny inconveniences of architecture and zoning replaced the express preferences of covenants. Nothing formally prohibited integration, but informally, much did.⁴²

A classic example of such infrastructural non-neutrality is that of Robert Moses's decision to place "low-hanging overpasses" on Long Island to keep buses — and thus the racialised poor — off the parkways.⁴³ Another would be such "hostile architecture" techniques as sloping or divided public benches, aimed at preventing rough sleeping. Disabled struggles have had some success in demonstrating that many artefacts others take for granted are constructed in

Glucksman views the idea of any technical gendering of the work process with suspicion: 'The suggestion had even been made during the First World War that technical developments simplifying production methods were undertaken in order to suit the 'inferior' capacities of women. In reality, however, both technical and organisational advances, assembly lines and subdivision of labour, represented an intensification of pre-war developments in engineering, and were by-products of the demand for standardised mass produced goods rather than the need to accommodate technology to women.' (Ibid. fn 12).

40. Noble, *Progress Without People: New Technology, Unemployment and the Message of Resistance* (Charles H. Kerr 1993), 86–7. Note the inverted parallelism with another utopia of the artificial womb: Shulamith Firestone's *Dialectic of Sex* (Bantam 1971).

41. For example, Oscar Newman's *Defensible Space: Crime Prevention Through Urban Design* (Collier 1972), and Alice Coleman's *Utopia on Trial: Vision and Reality in Planned Housing* (Shipman 1985).

exclusionary forms which entrench certain social divisions, helping to push some people to the margins of the labour market and of society at large. If disability tends to coincide with labour-market surplusness, this surplusness is reinforced by the technical constitution of artefacts. Even the humble bathtub may be complicit in capitalist atomisation and the subordination of life to production:

This century, in the time of full mechanisation, created the bath-cell, which, with its complex plumbing, enameled tub, and chromium taps, it appended to the bedroom. Yet the fact cannot be lost from sight that this convenience is no substitute for a social type of regeneration. It is tied to the plane of simple ablution. A culture that rejects life in stunted form voices a natural demand for the restoring of the bodily equilibrium of its members through institutions open to all. [...] A period like ours which has allowed itself to become dominated by production, finds no time in its rhythms for institutions of this kind.⁴⁴

Particularly in a world where “technology” is something most of us carry in our pockets, consult for entertainment, employ for navigation and consumption, and through which we mediate our social lives and our learning, it no longer makes sense to consider the question of technical neutrality only in terms of the sphere of production. There is now a vast literature on the biases of social media and search algorithms, of advertising placements, AI training datasets, and so on.⁴⁵ If one of the major outcomes of modern capitalist development has been the girding of the Earth with layer upon layer of infrastructure, crystallizing the social itself in railways, roads, pipes, cables, satellites and data centres, we approach a point where the social and the technical are so imbricated that disputes over the politics of technology appear simply as one obvious kind of social contestation.⁴⁶

When we conduct our social lives largely via the contrivances of giant

42. Lessig, *Code 2.0*, 135.

43. Winner, ‘Do Artefacts Have Politics?’, 123–4.

44. Siegfried Giedion, *Mechanisation Takes Command: A Contribution to Anonymous History* (OUP 1948), 712.

45. Among many others, see for example Latanya Sweeney, ‘Discrimination in Online Ad Delivery’, *Communications of the ACM*, vol. 56 no. 5 (2013); Rodrigo Ochigame and James Holston, ‘Filtering Dissent’, *New Left Review* 11/99 (2016).

46. Rob Lucas, ‘The Free Machine’, *New Left Review* 11/100 (2016), 139–40.

American corporations that furnish the leading capitalist states with unprecedented troves of surveillance material, it can seem ludicrous even to ask the question of whether technology is “neutral”. It should be as obviously non-neutral as architecture. And increasingly, it is co-extensive with the entire strategic terrain that any revolutionary theory must confront.

TECHNOLOGY AS TOTALITY

This capacious consideration of the politics of artefacts has led us back to the indeterminate totality. Once again, it seems, the whole world must be put at stake, all at once. We will have to smash not just the factory machines, but also the bathtubs, datacentres, low-hanging overpasses... If it is so easy to construct a negative object of the entire technological world, it is perhaps unsurprising that behind debates on technology there always seems to lurk the ghost of Ned Ludd — or, more recently filling the same role, the anarcho-primitivist. Ned must constantly be exorcised, but he always comes back, now as John Zerzan, now Ted Kaczynski. Boo! Indeed, one begins to suspect that Ned represents yet another enduring structure in the thought-forms of capitalist society. At least since William Cobbett’s 1816 “Letter to the Luddites”, commentators — sympathetic or otherwise — have displayed a strange rhetorical tendency to totalise technological reality, as if with any specific challenge it was necessarily at stake in its entirety, and thus in need of a general defence:

[A]s to the *use of machinery in general*, I am quite sure, that there cannot be a solid objection. [T]he writers on the side of Corruption are very anxious to inculcate notions hostile to machinery as well as notions hostile to Bakers and Butchers. This fact alone ought to put you on your guard. These men first endeavour to set the labouring class on upon their employers; and, then they call aloud for troops to mow them down. By machines mankind are able to do that which their own bodily powers would never effect to the same extent. Machines are the produce of the *mind* of man; and their existence distinguishes the civilised man from the savage. The savage has no machines, or, at least

nothing that we call machines. But, his life is a very miserable life. He is ignorant; his mind has no powers; and, therefore, he is feeble and contemptible.⁴⁷

Odd that machinery should seem so fragile a thing as to need defenders like Cobbett. Surprising that even at the time of the historic Luddite movement, rhetorical structures were already coming into place by which this *particular* struggle against the introduction of *particular* machines — a struggle that rejected not technology per se, but rather “Machinery hurtful to Commonality”⁴⁸ — would somehow always conjure the spectre of opposition to technology in general. It would become a standard tic of bourgeois political economists to emphasise the benefits of machinery against an imaginary opponent who rejected it wholesale — a tendency that Marx rightly skewered:

[The bourgeois economist] saves himself from all further puzzling of the brain, and what is more, implicitly declares his opponent to be stupid enough to contend against, not the capitalistic employment of machinery, but machinery itself. No doubt he is far from denying that temporary inconvenience may result from the capitalist use of machinery. But where is the medal without its reverse! Any employment of machinery, except by capital, is to him an impossibility. Exploitation of the workman by the machine is therefore, with him, identical with exploitation of the machine by the workman. Whoever, therefore, exposes the real state of things in the capitalistic employment of machinery, is against its employment in any way, and is an enemy of social progress!⁴⁹

Luddism of course became a generic term of abuse, typically hurled at workers resisting one or another manifestation of Progress in the workplace.⁵⁰ But the left too has typically struggled to negotiate the identification of an indeterminately totalised “technology” with a vaguely defined progressivism —

47. Cobbett, ‘A Letter to the Luddites’, *Political Register*, 30 Nov 1816.

48. E. P. Thompson, *The Making of the English Working Class* (Vintage 1980), 579.

49. Marx, *Capital* vol. 1 (MECW 35), 444–5. Yet he was not completely immune to this tendency himself, for example seeing the Luddite rising as failing to ‘distinguish between machinery and its employment by capital,

something against which figures like Panzieri understandably railed. Some have waded into the debate totalising with wild abandon, and thereby provocatively fulfilling the old bourgeois fantasy that Ned Ludd is still out there somewhere, stalking the Nottinghamshire countryside. Marcuse’s 1964 *One-Dimensional Man*, for example, took aim at a hypostatised technological rationality that was practically coextensive with capitalist society itself.⁵¹ In some ways prefiguring the visions of figures like Jacques Camatte, anarchist theologian Jacques Ellul’s 1954 *Technological Society* imagined a “technique” that had entwined itself with humanity to such an extent that the human and the technological were effectively becoming identical; in which “technique is entirely anthropomorphic because human beings have become thoroughly technomorphic.”⁵²

We have completed our examination of the monolithic technical world that is coming to be. It is vanity to pretend it can be checked or guided. Indeed, the human race is beginning confusedly to understand at last that it is living in a new and unfamiliar universe. The new order was meant to be a buffer between man and nature. Unfortunately, it has evolved autonomously in such a way that man has lost all contact with his natural framework and has to do only with the organised technical intermediary which sustains relations both with the world of life and with the world of brute matter. Enclosed within his artificial creation, man finds that there is “no exit”; that he cannot pierce the shell of technology to find again the ancient milieu to which he was adapted for hundreds of thousands of years.⁵³

and to direct their attacks, not against the material instruments of production, but against the mode in which they are used’, thus suggesting a view of machinery in general as at stake in these struggles, and as neutral in itself if abstracted from its capitalist use (ibid., 432).

50. For example ‘The Press: Washington Luddites’, *Time*, 13 October 1975, on typesetters waging a last-ditch struggle against the introduction of machinery that would destroy their jobs. Noble, *Progress Without People*, 43.

51. See the critical discussion in Feenberg, *Transforming Technology*, 65–79.

52. Langdon Winner on Ellul in Winner, *Autonomous Technology*, 42.

53. Ellul, *The Technological Society* (Knopf 1964), 428.

The expansiveness of the term “technology” is itself perhaps symptomatic, referring not just to machines, but also techniques, methods, infrastructures, organisational forms...while philosophers such as Heidegger tend to represent it—in Langdon Winner’s words—“as a totally univocal phenomenon, a monolithic force in modern life”.⁵⁴

Let’s venture a hypothesis: that the technology which seems to dominate contemporary society so; which appears as autonomous and out of control in so much literature; about which bourgeois economists were always so defensive; which seems to range the whole of social reality under a single concept; which even threatens to subsume the human race itself... is but an avatar of capital.

54. Winner, *Autonomous Technology*, 9–10, 130.

INFRASTRUCTURE AND STRATEGY

If anything lends an ultimate unity to the malignancy of the bathtubs, datacentres, low-hanging overpasses and so on, it is surely the mode of production that has so profoundly shaped existing societies. It is perhaps not entirely unreasonable to espy a malevolent presence behind all these things. But when one finds oneself enumerating indefinite lists in such contexts, that is a sure sign one is peddling an indeterminate totality, and thus not yet operating in a properly theoretical mode. We may then stop and remind ourselves that not everything in such lists should be considered of equal strategic priority. The infrastructures in which capitalist social relations are mineralised have determinate forms, with some particularly important spots. Although tech-capitalist “cloud” ideology has done its best to obfuscate the materiality of current computing and communications infrastructures, the old coastal or riverine cities of global capitalism remain the leading sites of essential network infrastructure. The undersea fibre-optic cables upon which the global internet primarily depends largely hit land in port cities, following the same routes as previous generations of network infrastructure dating back to the telegraph.

Whole regions may be disconnected from the net by the simple snagging of these cables, as in fact happened to much of south and east Asia when an earthquake hit Taiwan in 2006.⁵⁵

And probably the most important route remains that linking New York to London, through which a vast

55. See Andrew Blum, *Tubes: Behind the Scenes at the Internet* (Penguin

proportion of global internet traffic flows. At the London end, the main cables come up in Telehouse, in the Docklands—the focus of at least one foiled terrorist plot, from al-Qaeda in 2007.⁵⁶ If the location of these links is unavoidably public knowledge—for a lot of people have to engage with them physically for work in one or another internet exchange or data centre—the organisations and states that are their custodians are unsurprisingly concerned for their security, and police, FBI and so on often seem to be housed nearby.⁵⁷ Indeed, the sites of the tech giants’ data centres are sensitive enough to have warranted a scoop from Wikileaks.⁵⁸

Real power is evidently embodied in this geography. It should be unsurprising that we find such places as New York and London dominant in the material body of the net: new networks tend to inherit the structure of old ones, and the form of infrastructure to a great extent directly reflects existing distributions of power both internationally and within individual states. Thus special microwave connections which approach the speed of light itself—the ultimate physical limit—now link Chicago to New York, London to Frankfurt, to give finance capital’s high-frequency trading algorithms just that little more edge.⁵⁹ This is another kind of non-neutrality: the dominance of these places is a material fact, written into the landscape. But rather than fantasising some *tabula rasa*, after the world is scrubbed clean of such blemishes, it makes sense to consider the determinacy that such definite structures must give to strategic thinking. Telephone exchanges represented key locations in the October Revolution and Spanish Civil War, and now the very same buildings often house internet exchanges.⁶⁰ Just as in the past, anyone in control of such places could fairly easily deprive whole regions of essential communications, and one might reasonably speculate that any revolution of the future will have to

2012), 200–1. On occasion, major disconnections have actually been deliberate, such as when the Sprint network ‘de-peered’ from Cogent in 2008, thereby cutting off 3.3 per cent of global internet addresses from the rest of the net (*Tubes*, 123).

56. David Leppard, ‘Al Qaeda plot to bring down UK internet’, *The Times*, 11 March 2007. This apparent attempt to blow up the internet was reminiscent of the ill-fated anarchist conspiracy to blow up time itself just across the Thames at the Greenwich Observatory in Joseph Conrad’s 1907 *Secret Agent*.

57. Ingrid Burrington, *Networks of New York: An Illustrated Field Guide to Urban Internet Infrastructure* (Melville House 2016), 70–4.

58. ‘Amazon Atlas’, Wikileaks, 11 October 2018.

59. Donald MacKenzie, ‘Just How Fast?’, *London Review of Books*, vol. 41, no. 5, 7 March 2019; Burrington, *Networks of New York*, 10–1, 35, 61–2.

60. See, for example, John Reed, *Ten Days That Shook the World* (Boni and Liveright 1919), 192–9 (among others); Hugh Thomas, *The Spanish* →

make a priority of co-opting the network engineers of organisations like NANOG (North American Network Operators Group).

This is not to rule out the deployment of alternative infrastructures in the midst of a process of struggle: the innovation of optical telegraphy in revolutionary France established fast communications between Paris and the frontline; the risk or reality of state intervention into wireless and cellular networks has prompted people to use peer-to-peer mesh networking apps such as FireChat in Iraq, Hong Kong, India and elsewhere.⁶¹ And amid the turmoil of revolutionary Chile, Project Cybersyn's newly-established telex networks played an important role in defeating a reactionary CIA-backed truckers' strike.⁶² Although the major internet services are now inextricable from towering capitalist firms which are tightly entwined with dominant states, early net-utopians were not wrong to identify something prefigurative in things like the TCP/IP protocol on which the internet runs. It is one thing to dream of assembling in advance a social force of the requisite scale and organisational capacity to be able to expropriate Google and Facebook — while at the same time presumably taking on US security forces — and another to assume that, given the availability of some physical network infrastructure, basic internetworking should always be possible.⁶³

That is to say that capitalist infrastructure should not be identified with the mode of production and considered non-neutral *en bloc* and all in the same way; its development has proceeded in layers, some of which may be more tractable than others. This is not simply fortuitous: there are some great dialectical ironies and ambivalences in the history of technology. The radically open-ended nature of TCP/IP, for example, was an important prerequisite for the development of the capitalist internet, since it enabled firms to focus on building higher levels of infrastructure, rather than constantly renegotiating the basics.⁶⁴ It is perhaps not stretching it too far to say that the

Civil War (Penguin 2013). On the conversion of telephone exchanges into internet exchanges see Burrington, *Networks of New York*, 64.

61. See Tom Standage, *The Victorian Internet*, (Berkeley 1998), 7–14; Hannah Kuchler and Simon Kerr, "Private internet' FireChat app grows in popularity in Iraq", *Financial Times*, 22 June 2014; Archie Bland, "FireChat—the messaging app that's powering the Hong Kong protests", *The Guardian*, 29 September 2014; "Firechat comes to UOH students' rescue", *Times of India*, 22 Jan 2016.

62. Eden Medina, *Cybernetic Revolutionaries* (MIT 2011), 141–69; Stafford Beer, *Brain of the Firm* (Wiley 1981), 311–29.

63. Internetworking: network connections between networks — such as between local networks and ISPs, or between ISPs — which constitute an internet.

development of dot.coms depended upon a layer of dot.communism that still underpins a thoroughly capital-dominated net, and which probably always will. As long as we do not identify them with the major centralised providers, basic technologies like email retain these birth characteristics, and there's always a subculture of hackers consciously assembling new alternative tools that have a similar constitution.⁶⁵ Regardless of Richard Stallman's muddled affirmations of "capitalism" in code production⁶⁶, free software too has played a role analogous to TCP/IP at the level of the servers that run much of the internet: a latent communism which, under capitalist conditions, inevitably ends up providing a very helpful layer of infrastructure *gratis* to capitalist firms, but which, under the right conditions, could plausibly shed its capitalist integument without too much trouble.

If current internet infrastructures are thoroughly lacking in political neutrality, deeply entwined with the dominant mode of production, Lessig views the process of inscription into these artefacts of new non-neutralities or capacities for what he calls "regulation" as an inevitable one, in which states follow where firms lead. On this reading, first came the open-ended internet which was capable of filling the ideological void left when post-Cold War market utopianism dissolved into the hard realities of "transition" in the ex-Warsaw Pact countries. Documents like John Perry-Barlow's 1996 "Declaration of the Independence of Cyberspace" are symptomatic of this moment, when the proliferating technology really was largely beyond the existing regulatory capacities of companies and states, and thus when the question of its intrinsic politics was up for grabs. But a relentless drive to commercialise the new technology soon began to lead to new infrastructural layers with more determinate "politics", which were also more amenable to state regulation.⁶⁷ For Lessig, the constraints

64. See Susan Crawford, cited in Lessig, *Code 2.0*, 112. That open-ended nature can itself be read as a pragmatic accommodation to the pre-existing telephone networks that engineers had to work with at the time (Blum, *Tubes*, 54). We might thus view this as a process in which underlying capitalist infrastructure produces a layer of latently 'communist' infrastructure, which in turn produces another layer of deeply capitalist infrastructure. Such wavering, ambivalent politics may be typical of these kinds of artefacts, and a real basis on which we can attempt to imagine another future. Even in the era of Big Tech, many internet exchanges are still run as cooperatives 'for the good of the internet' (Blum, *Tubes*, 111).

65. Speculation about, and experimentation toward, a re-decentralised 'Web 3.0' has been going on for a decade or so. Already in use are technologies such as the federated social networking technology 'Mastodon' (currently largely used by alternative tech people and the alt-right).

66. See Richard Stallman, "Talking to the Mailman", *New Left Review* 11/113 (2018), 83.

that “code” places on action are analogous to those of architecture; it is a new threat to liberty, comparable to that posed by states and markets in other periods.⁶⁸ Drawing on Roberto Unger, he concludes that the nature of code should thus be subject to collective deliberation, but—he assures the reader—this does *not* mean “collectivisation”.⁶⁹ Yet, as we saw with Langdon Winner, in a world where the major design decisions embodied in such technologies are taken within the despotic realm of the capitalist firm, it is hard to imagine how such deliberation could be achieved without specifically communising these spheres.⁷⁰

COMMUNIST TECHNOLOGY?

What then of communist technology? We have already seen that some aspects of existing infrastructure are at most ambivalently tied to the capitalist mode of production. In terms of affordances, these constitute paths of least resistance for struggle: their use will not run directly counter to revolutionary ends in the way that, say, use of Facebook to cultivate your ultra-radical self-image almost certainly will. Short of having a fully pre-organised world-commune-in-waiting, some terrains are simply intractable for struggle, but some are not. Any successful process of communication will pragmatically put to work those technologies that can open new possibilities, rather than hemming us in. And these deployments will have to work at whatever organisational scale the struggle is able to articulate, or—in cybernetic terms—at the level of *variety* that the struggle can cope with.⁷¹ Thus no particular scale should be fetishised: communism does not equal localism.

But those technologies that could only plausibly be appropriated at an epic scale of organisation will have to await the achievement of such scale.⁷² And it is plausible that a communising movement would

67. Lessig, *Code 2.0*, 2–3, 34–8, 72.

68. *Ibid.*, 121–4. The argument of Lessig—a liberal Harvard legal professor—here takes him amusingly close to perennial bogeyman Ted Kaczynski. See ‘Unabomber Manifesto’, *New York Times*, 26 May 1996: ‘The degree of personal freedom that exists in a society is determined more by the economic and technological structure of the society than by its laws or its form of government. Most of the Indian nations of New England were monarchies, and many of the cities of the Italian Renaissance were controlled by dictators. But... these societies... allowed far more personal freedom than our society does. In part this was because they lacked efficient mechanisms for enforcing the ruler’s will: There were no modern, well-organized police forces, no rapid long-distance communications, no surveillance cameras, no dossiers of information about the lives of average citizens. Hence it was relatively easy to evade control.’

69. Lessig, *Code 2.0*, 78.

70. Social demands for control over the technical realm can sometimes seem to have a certain

choose to break up such things in order to render them more amenable to communist ends. The existence of towering Big Tech monopolies, for example—which imply hierarchical structures of control as surely as do the ocean-going boats of Plato’s *Republic* and Engels’s *On Authority*—is an artefact of the capitalist subordination of the internet driven by a ravenous finance, and no revolutionary movement should accept them as given. Barely two decades ago it was still possible to imagine alternative arrangements even *within the horizon of capitalism*, so we should not now simply reconcile ourselves to fantasising socialist uses for such things as “Big Data”; capitalist tech does not need leftist ratifications. But the alternative is not blanket rejection or the dissolution of all structure into an abstract anarchism. To imagine so is to get led astray once again by the antinomies that we have traced through the course of this essay. No: communism implies *determinate* organisation to *determinately* negate the *determinate* totality of the capitalist mode of production, and to produce the *determinate* structures of a new world in the process.

For strategic reasons it makes sense to prefer more distributed arrangements where possible, for concentrations of technical power helpfully simplify the task of any organised enemy or would-be exploiter. As Gilles Dauvé puts it in *When Insurrections Die*:

The best guarantee against the reappearance of a new structure of power over us is the deepest possible appropriation of the conditions of existence, at every level. For example, even if we don’t want everyone generating their own electricity in their basements, the domination of the Leviathan also comes from the fact that energy (a significant term, another word for which is power) makes us dependent on industrial complexes which, nuclear or not,

unwittingly ‘transitional’ character.

71. See Stafford Beer, *Designing Freedom* (1974, Wiley 1995). Though he is in many ways a fascinating figure, one should probably take the precaution of holding Beer—a cigar-smoking, Rolls Royce-driving career management consultant prior to his revolutionary epiphany in Chile—with tweezers. In spite of his vocal support for workers’ autonomy, Eden Medina has suggested that his political position was closer to Fabian socialism than Marxism (*Cybernetic Revolutionaries*, 41), and he had a relatively warm, filial association with Taylorism and work study (*Brain of the Firm*, 384–5). Nonetheless, his strange, abstract cybernetic meditations can sometimes seem to offer a glimpse of a possible theory of revolutionary *virtù*—for example, *Brain of the Firm*, 349–95. For an intellectual portrait, see Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future* (Chicago 2010).

72. See Nick Srnicek and Alex Williams, ‘#Accelerate: Manifesto for an Accelerationist Politics’, *Critical Legal Thinking* (May 2013).

inevitably remain external to us and escape any control.⁷³

As Dauvé suggests, this does not imply the absurd idea that only individualised electricity generation will do. The key measure here is not the height of a single individual, but the level and scope of collective organisation that can be maintained. A world of renewables would be much more distributed at source than current fossil fuel and nuclear-based power in any case; this in itself may be enough — as long as the generator can be subordinated to communal control at the level of the area it serves. Even bracketing the enormous question of global heating, communist movements to come will have a strong interest in a speedy transition beyond fossil fuels, for these largely condemn us to violent, globe-straddling power-structures which will necessarily escape the organisational capacities of all but our fully pre-organised world-commune-in-waiting. It is, that is to say, probably best not to place bets on a communisation of Saudi oil fields and a defeat of the US military and its regional proxies *upfront*.

Again: this does not imply an absence of structure, but simply a different structure. Even highly distributed renewables may be “non-neutral” in the sense that in the most immediate material-technical terms they might tend to empower those who inhabit the site in which they are located over others.⁷⁴ But to imagine away such concrete geographical texture would be to imagine a communism of grey goo. The question is whether such matters are organisationally tractable outside of relations of class exploitation. Communism would thus not be the creation of a “neutral” technology in this sense. In the last analysis, what matters is whether a given thing can be subordinated to communal ends, and that is an organisational matter at least as much as a technical one. Even the fabled ship at sea, eternally in need of its captain, need not detain us long, for captaincy may be temporary, revocable, rotated, random, delegated or whatever formal nicety best fits its subordination to collective deliberation. What matters in this case is the broader set of social arrangements into which captaincy fits: it makes all the difference whether taking charge of a boat

73. Gilles Dauvé, ‘When Insurrections Die’, *Endnotes 1* (2008), 71.

74. They should also not be idealised as a perfect ‘communist technology’: they no doubt bear many markers of their birth under capitalist circumstances. The point of discussing them here is simply to consider the ways in which they would create an entirely different strategic terrain to the current dependence on fossil fuels.

in a storm represents the presumptuous act of someone with a specific class position or the obligation of someone allotted, by collective decision, a terrifying responsibility.

Dependency on fossil fuels and the atomised use of the combustion engine; on mass-surveillance platforms; on elaborate global supply-chains: much of the current technical structuring of the world is profoundly *anti-communist*, and struggles to come will have to work around such things until they can defeat or subsume them. Building that power will involve the establishment of new technical mediations and the repurposing of old, to the ends of a collective self-reproduction outside of class and an offensive expropriation of those who will attempt to reimpose relations of exploitation. It will require as its first priority the establishment of collective control over the production and distribution of means of subsistence, since this is the most important step in disempowering the enemy.⁷⁵ But this in itself already implies such things as control over means of communication; the first act of communisation is not rustication. And as long as their power is shored up by some artefacts and infrastructures, the agents of capital will have opportunities to regroup.

75. Clegg and Lucas, ‘Three Agricultural Revolutions’.

ERROR

In engineering, the gap between a specification of how things should function, and how they actually do is termed “error”. A cognate of the verb “to err”, error refers to a straying, a mistake, a lapse. Thus always a relation between two points at minimum: something right, something which deviates. In mathematics, when an exact value can only be ascertained at infinity, error margins can specify proximity to that value without depending on an assumption that the value itself could ever actually be obtained. Here, the gap that error identifies is no mere mistake. Let’s term “error” the objective gulf between the unavoidable abstractions of the revolutionary imaginary and the real conditions of any actual revolution. It’s a present incapacity that makes abstract speculation unavoidable here. But as that speculation starts to resolve into concrete practice the measure of error diminishes.

This gap is not confined to simple matters of epistemology. In statistics, the error term refers not to a shortcoming of measurement

or the failure of a model (that's the residual), but rather to any difference of the observed value of y from an unobservable "true" value — e.g. the value one would expect given full knowledge of y 's determinants. It can thus be seen as a disturbance term, measuring the extent of "true randomness" in the data-generating process. In computer science, error is often technically defined, categorised, given a code number: 404 not found. In instances of error, our technical means fall short of the ends we project, and the error we confront names this lack of possibility. The delimitation of error is a key aspect of the everyday practical world; a negative specification of the space of affordances in which particular ends may be pursued. In a fragile, interlocked world whose affordances are increasingly defined by the humourless literality of logic gates, you don't have to stray far from the pre-given cowpaths to bump into error.

Indeed, as soon as one attempts something not given by the affordances of the world, the state of error — as a measure of incapacity — appears absolute. But with reconstructive effort, error may gradually be pushed back to the limits or captured by a homeostat, defining a space of possibility. As lived activity errs from the vectors shaped by capital's worldly movement, new paths will already be being trodden, new uses found for existing things, old uses taking new tools. Communist use, we might say, is repressed by capitalist crud, hemmed in as error. Incapacity is the immediate condition faced in most instances of erring from the affordances written into the most intricate of capitalist infrastructures. But in running up against that incapacity, lived activity will have to find ways to drive the error back, carve out new affordances, such that erring becomes the path, and capitalist use becomes the error.