

Orders of Technics: Considerations on Lewis Mumford

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In my previous post, I illustrated how Deleuze and Guattari drew upon Lewis Mumford's figure of the "megamachine" to flesh out the relationship between capitalism and the state, and to detail in particular how the state props up capitalism by 'capturing' – or reterritorializing – the system's deterritorialized flows. Deleuze and Guattari were not the only critical theorists to turn to Mumford's work in order to better explore industrial civilization; the insights of the historian of technology and critical urbanist haunt the pages of many of Herbert Marcuse's most important writings, including "Some Social Implications of Modern Technology", *Eros and Civilization*, and *One Dimensional Man*. In a similar vein, Mumford's writings became popular in certain wings of the 60s counterculture – especially in 'radical engineering' circles, as described by Matthew Wisnioski in his fantastic book *Engineers for Change: Competing Visions of Technology in 1960s America*. (If you haven't read this book, do yourself a favor by picking up a copy and treating it like a Christmas present ahem to yourself).

Today, Mumford seems to be primarily associated with primitivist, anti-civ, and other anti-tech/tech-skeptical discourses and tendencies. I've heard more than one primitivist use the word "megamachine" and lump Mumford together with Jacques Ellul, everybody's favorite anti-technology theologian. And indeed, if someone was to pick up just one work of Mumford's, say, *The Myth of the Machine, Vol. 2: The Pentagon of Power*, then yes, one could easily interpret Mumford as being anti-technology, and would one have to be forgiven for it. This book in particular is a deeply pessimistic tome, and never fails to remind me of the loss of hope Benjamin Tucker experienced near the end of his life, uttering apocalyptic dirges like "We may last a couple of centuries yet; on the other hand, a decade may precipitate our finish. ... The dark ages sure enough. The Monster, Mechanism, is devouring mankind."

And it is true that in many respects, Mumford did tend to engage with some rather conservative sentiments, valorizing localism and traditionalism in a way that whitewashes any of the toxicity that can easily develop when the abstract 'community' is valorized as the end-all-be-all. In these passages he brings to mind the perspectives offered by Kirkpatrick Sale, an otherwise fine scholar when you set aside his fixation on the hyper-local and condemnation of organized agriculture. I would also lump Murray Bookchin in here too, though perhaps to a lesser extent; it seems clear enough to be that we can evacuate "libertarian technics" (a concept with its origins in Mumford's writings) and even social ecology from the parochialism that pervades his municipalism.

But I digress. What is important is not Mumford's dalliances with regressive ideas (insofar as we can expunge them while leaving other elements intact), but the other sides of his discourse. The very notion of the "megamachine" is still, I would argue, vitally important in that we 1) continue to be governed by an *increasingly* cumbersome regime marked by expansionist bureaucracies and technocracies; 2) are the subjects and targets of a vast surveillance apparatus and 3) are embedded into an global-scale technological superstructure that stands, in preliminary investigations, some 30 trillion+ tonnes. That this third element is plugged into, and operates in autopoietic conjunction, the first two tells us that the megamachine is alive and well in the current

era. Maybe it goes by a different name (Bratton's Stack and Stack-to-Come, perhaps?), or maybe it's not even worth trying to tie down a hyperobject down with a single name. But aside from this, even, Mumford's work has another side in that it hints towards another word, a new earth, that *could* have been – and maybe still can be! – had the unity of the state and technics not seized upon the very notion of development and redeployed it to its own ends (or, to put in Deleuzeguattarian parlance, had everything that escapes not been subjected to capture and overcoding). This is the same space where we might run afoul of Mumford's conservative traditionalism, but with these elements effectively scrubbed one can find a toolkit of important ideas and concepts.

As J. Jesse Ramirez points out in his essay "Marcuse Among the Technocrats", Mumford, during the 1930s, was associated with an informal network of writers, thinkers, and engineers that composed the left-wing of the Technocracy movement. With its roots in the writings of Edward Bellamy and Thorstein Veblen, among others, the Technocrats looked to push the then-current phase of technological development to its ultimate conclusions. This was, of course, the time of early Fordism and the Great Depression. The first ushered in a new division of labor around the assembly line, with a de-skilled labor force monitored and regulated by the prototypical "knowledge worker" – the earlier "industrial engineer". The latter, meanwhile, put forward the figure of the social engineer and pragmatic administrator. Take both together, add in Veblen's arguments for a "Soviet of Engineers" tasked with running the industrial economy, and you have the Technocracy movement.

Under Howard Scott, founder of the Technical Alliance in 1919 and Technocracy Incorporated in the 1930s, the movement would carry out its inevitable chug towards fascistic forms of politics. The left-wing of the Technocrats remained a marginal fringe overall, and had from the beginning been antagonistic towards the mainstream of the movement. Mumford himself, for example, attacked Veblen's notion of the Soviet of Engineers because of its association with top-down processes – though he nonetheless found that many of the Technocrats ideas were "legitimate conclusions", they were muddled by "the political callowness, historical ignorance and factual carelessness" by individuals such as Scott (*Technics and Civilization*, 469). If a just and peaceful society was to emerge, it would not stem naturally from the actually-existing path of development, as the Right Technocrats would argue. It would have to be assembled in contradistinction to it, right down to the levels of values:

...no working ideal for machine production can be based solely on the gospel of work: still less can it be based on upon an uncritical belief in constantly raising the quantitative standard of consumption. If we are to achieve a purposive and cultivated use of the enormous energies now happily at our disposal, we must examine in detail the processes that lead up to the final state of leisure, free activity, creation. It is because of the lapse and mismanagement of these processes that we have not reached a desirable end; and it is because of our failure to frame a comprehensive

scheme of ends that we have not succeeded in achieving even the beginnings of social efficiency in the preparatory work. (*Technics and Civilization*, 379)

To these ends, Mumford developed a schematic of modern technological development that unfolded through three partially overlapping periods:

- The **Eotechnic** phase, spanning 1000-1750 AD and marked by “a greater intensification of life: color, perfume, images, music, sexual ecstasy, as well as daring exploits in arms and thought and exploration.” (*Technics and Civilization*, 149)
- The **Paleotechnic** phase, spanning 1700-1900, and marked by “an upthrust into barbarism, aided by the very forces and interests which originally had been directed toward the conquest of the environment and the perfection of human nature.” (*Technics and Civilization*, 154)
- The **Neotechnic** phase, spanning 1900 through present day, which “bears the same relation to the eotechnic phase as the adult form does the baby”, while nonetheless being marked by “compromises with... the weight of vested interests that continue to support the obsolete instruments and the anti-social aims of the middle industrial era [i.e. the paleotechnic].” (*Technics and Civilization*, pgs. 212-213)

Each phase constitutes a unique *technological complex* (or *assemblage*, if you speak Deleuzeguattarian) of labor relations, social relations, and technical devices. Trending dangerously close at times to the ‘happy serf’ trope that is shared with other intellectuals of this period (looking at you, Karl Polanyi!), Mumford emphasizes the way small-scale craft production was the foundation of the economy, empowered by renewable resource such as water and wind, captured via mills. This was not only the period of guild systems (and of free cities and all those other fun things Kropotkin liked to talk about), but of immense technological discovery. It was, Mumford writes, “important period of preparation, when all the key inventions [of the paleotechnic and neotechnic] were either invented or foreshadowed”.

So how did we get from the eotechnic to the paleotechnic, from the “greater intensification of life” to the “upward thrust in barbarism”? Mumford places blame at the feet of the technological acceleration that occurred under the interests of the great centralizations of power, such as the militaries and armies, strong state, and mercantile interests – in other words, many of the various elements he would later assimilate in his far-broader schematic of the megamachine. The mining industries opened the gates for coal and iron to supplant water and wind as resources vital to the *production of production*; the invention of the steam engine ushered along with it an entirely new organizational system governing production itself. Thus we find ourselves at Marx’s history written “in letters of blood and fire”, but whereas Marx probed the relationship between classes in within “hidden abode of production”, Mumford was interested in the

relationship between man, machine, and productive output as it occurs technically and organizationally. To quote him at length:

...the steam engine tended towards monopoly and concentration. Water and wind power were free; but coal was expensive and the steam engine was a costly investment; so, too, were the machines that turned it. Twenty-four hour operations, which characterized the mine and the blast furnace, now came into other industries which had heretofore respected the limitations of day and night. Moved by a desire to earn every possible sum on their investments, the textile manufacturers lengthened the working day... Since the steam engine requires constant care on the part of the stoker and engineer, steam power was more efficient in large units than in small ones: instead of a score of small units, working when required, one large engine was kept in constant motion. Thus steam power fostered the tendency toward large industrial plants already present in the subdivision of the manufacturing process. Great size, forced by the nature of the steam engine, became in turn a symbol of efficiency. The industrial leaders not only accepted concentration and magnitude as a fact of operation, conditioned by the steam engine: they came to believe in it by itself, as a mark of progress. With the big steam engine, the big factory, the big bonanza farm, the big blast furnace, efficiency was supposed to exist in direct ratio to size. Bigger was another way of saying better. (Technics and Civilization, 161-162)

When the neotechnic era was imminent, Mumford suggested, there was an opportunity to exit the intrinsically authoritarian and bureaucratic frameworks that the paleotechnic necessitated. “[A] true mutation”, the neotechnic stood poised to resume where the eotechnic had left off and continue onwards with its largely decentralized model for production and distribution. The advent in electrical power – and the electrical motor in particular – opened a space where the gigantism of the coal-and-steam powered factory could have been rendered obsolete, making possible again a way to avoid concentration and monopoly. Likewise, decentralized production based on electricity had the potential to break wholesale with the incredible energy demands of the paleotechnic era, with water and wind once again emerging as completely renewable resources. Yet this was not to be:

Paleotechnic ideals still largely dominate the industry and the politics of the Western World: the class struggles and the national struggles are still pushed with relentless vigor. While eotechnic practices linger on as civilizing influences, in gardens and parks and painting and music and the theater, the paleotechnic remains a barbarizing influence... To the extent that neotechnic industry has failed to transform the coal-and-iron complex,

to the extent that it has failed to secure an adequate foundation for humaner technology in the community as a whole, to the extent that it has lent its heightened powers to the miner, the financier, the militarist, the possibilities of disruption and chaos have increased. (*Technics and Civilization*, 213)

It is Mumford's vision that the technological capacity of the modern era could be deployed in a decentralized, non-monopolistic, and ultimately bottom-up manner that makes both him, and his analysis of technological history, so important today. Against the situation wherein "the new inventions and devices have been frequently used to maintain, renew, and stabilize the structure of the old order", he asks us to consider the ways in which a properly deployed "neotechnic design promises so much greater efficiency than the old" – if only those "who control the destinies of industrial society, the bankers, the business men, and the politicians" would get out of the way or be overcome (*Technics and Civilization*, 266-267)

In Mumford's time, Ralph Borsodi was the great tinkerer with the possibilities offered by the emergent neotechnic era. A staunch critic of industrialized mass production and the top-heavy society that it generated in its wake, Borsodi argued that the new technologies were better suited to decentralized industry and *demand-based* production, as opposed to the dominant mode of production that required demand to be artificially created (a Situationist critique of the Spectacle lurks in this direction). Experimenting extensively with 'at-home production' via small electrical machinery, he determined that goods could be created at a lower cost per unit than massive factory production when combined with a shrinking distance between production and consumption.

Today, Kevin Carson has extended the arguments of Borsodi (who he does draw heavily on, as well as Mumford) in books like *The Homebrew Industrial Revolution* and *The Desktop Regulatory State*. As he draws out in extensive details, new developments in the possibility of desktop manufacturing make possible more dynamic and agile forms of microenterprise than ever before. When coupled with the growth of ICT platforms that could potentially replace many of the bureaucratic and obstructive – and almost always corrupt – regulatory divisions of the capitalist state, there appears, in the underbelly of our time, the possibility of an entirely different way of organizing the economy as well as social life. Such a scenario is a precise example of the possibilities that Mumford insisted was contained within the technological evolution of the neotechnic society.

It's worth saying a few words about the basis of Mumford's philosophy. Not only did he privilege the bottom-up and side-to-side over the top-down in terms of social relations, economic development and technical discipline: it was the very concept of *design* itself that had to be shifted, away from megamachinic stamp and towards the "processes of life, growth, reproduction" ("Landscape and Townscape"). Design needed to move within natural processes, not against it. The root of this discourse was the same

as analyses of technological and social missteps: *organicism*. Leo Marx points out in his essay “Lewis Mumford: Prophet of Organicism” that Mumford had been profoundly influenced by Alfred North Whitehead’s 1925 *Science and the Modern World*, even writing to his mentor Patrick Geddes that the book was “of first importance”, having provided “an ingenious solution to the problem of mechanism versus vitalism”.

To reduce it down to its most basic essentialism, the “mechanism versus vitalism” debate was a debate over the very functioning of the cosmos, or more specifically, how different aspects of the cosmos – typified by difference scientific disciplines – linked together. Vitalism, emerging prominently in medieval medicine, posed that there existed some non-physical force than animates living organisms and renders them distinct from non-living organisms. This would be replaced in the 16th and 17th centuries, primarily through the advent first of Cartesian dualisms, followed by Newtonian physics, with mechanism, “according to which matter is inert and all interactions in nature are produced by the impact of particles.” (quoted in Marina Banchetti “Ontological Tensions in 16th and 17th Century Chemistry: Between Mechanism and Vitalism”, 10) Yet as Donna Haraway illustrates clearly in *Crystals, Fabrics, and Fields: Metaphors of Organicism in Twentieth-Century Developmental Biology*, the debate was far from settled, and throughout 1800s and early 1900s the borderlands between mechanism and vitalism ebbed and flowed in the clashes between biology, physics, and chemistry.

The organistic turn, which Whitehead spearheaded, posed to solve this feud by suggesting an image of the cosmos in terms of an organic whole composed of many different parts, with these parts bound up in play and interaction with one another. Developed further by individuals Joseph Needham and the other members of his Theoretical Biology Club, this methodology avoided the mechanistic temptation to break everything down into individual objects that could be in turn reduced down into further discrete particles, but also avoided the vitalist impulse to inscribe all things with a metaphysical telos. To discuss processes would automatically entail other processes, opening the door to later forms of second-order cybernetics and systems thinking. But we’re getting a little ahead of ourselves there – what does this have to do with Mumford?

For Mumford, proper design would be one that is carried out in conjunction within an organicist framework, as opposed to a purely mechanistic framework. Paleotechnical (and neotechnical) forms of development – and the megamachinic schema as a whole – exemplify the mechanistic worldview: every elements atomized and isolated, reduced down to its barest function. If systems are to emerge properly, they emerged from the give-and-take of the variables in play, not through the *overcoding* and management of these variables. “In so far as modern architecture has succeeded in expressing modern life,” he wrote in a 1962 article for *Architectural Record* titled “The Case Against ‘Modern Architecture’”,

it has done better in calling attention to its lapses, its rigidities, its failures, than in bringing out, with the aid of the architect’s creative imagination, its immense latent potentialities. The modern architect has yet to come to

grips with the multidimensional realities of the actual world. He has made himself at home with mechanical processes, which favor rapid commercial exploitation, and with anonymous repetitive bureaucratic forms, like the high-rise apartment or office building, which lend themselves with mathematical simplicity to financial manipulation. But he has no philosophy that does justice to organic functions or human purposes, and that attempts to build a more comprehensive order in which the machine, instead of dominating our life and demanding ever heavier sacrifices in the present fashion, will become a supple instrument for humane design, to be used, modified, or on occasion rejected at will.

A more proper form of design would be that akin to landscape architecture of Ian McHarg, who garnered praise in the bibliography of Mumford's *The Pentagon of Power*. In works such as 1969's *Design With Nature*, he ushered in an understanding of environmental planning based on the principles of working *with* the natural environment; positioning himself starkly against industrial civilization, his approach entailed not only attention paid to social dynamics of the community in question, but a hyper-focus on the ecological substrate that upholds communities, ranging from soil composition to natural hydrology. Only by achieving a working understanding of the ecosystem could the design unfold *organically*. This was profoundly different from the dominant discourses of design, which privileged verticality, mastery, and Promethean excess.

Such a vision of design is as utterly essential to our current world as is the economic paradigm that runs from Mumford and Borsodi down through Carson. But this is also where Mumford runs into some problems, in that he seems to step sideways into some naturalistic fallacies. If design, development of productive forces, and unfolding of social life appear as bubbling up from the negotiations between forces operating in the environment, Mumford seems to be suggesting that they are outgrowths of the natural process. On one hand, this *is* correct, though in the broad and generalizing sense that development always entails a transformation of nature. On the other hand, Mumford ignores the way that "Nature", with a capital-N, was itself socially constructed, right around the time nature (lower case-N) became the raw materials for the paleotechnic take-off, i.e. the advent of capitalism and the modern nation-state (see: Jason Moore's *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*). Mumford thus valorizes natural processes in a Naturalistic register that is not wholly aligned with the actual unfolding of the nature-civilization relationship.

It follows, from here, that Mumford neglects the fundamental aspect of development and design itself: that they are artificial, general speaking. No matter how much the designer follows McHarg's template and studies soil erosion, traces the effects of climate, shapes buildings to form to contours of the landscape, this development is not a natural outgrowth of the ecological system itself. Capturing water in a mill is not naturalistic either; it is still a Promethean act, though one of considerably less magnitude than

that of the gigantic blast furnace and factory complex. Mumford's thought rightfully positions us *within* nature, but neglects that as long as we build enclaves in the face of entropy, we will always be *against* nature. The only thing that varies in the passage from a paleotechnic framework to an eotechnic and/or neotechnic framework is the degree of friction between civilization and nature.

This critical misstep also leads Mumford to make all sorts of unfortunate suggestions regarding society. In the final pages of *The Pentagon of Power* he condemns Dadist art, the 60s counterculture, psychedelic drugs, and all sorts of other forms of world-bending experimentations. Particularly egregious is his suggestion, contra the vision of revolution laid out by Marcuse in *Eros and Civilization*, that "all human activity" is bound to "the constant organic interplay (not dialectic) of repression and expression, of patriarchal and matriarchal factors" (*The Pentagon of Power*, 455). C'mon, Lew! We can do much, much better than that. Had he noticed the necessity of that friction between civilization and nature (to the degree that we can speak of these forces beyond abstraction), or that social, productive and economic developments stems from that undeniable drive "widen our aperture of freedom" through process of reengineering and transforming, as the Laboria Cuboniks wrote in the Xenofeminist Manifesto. Indeed, if nature is unjust, change nature – and there is no reason that this project must extend by way of paleotechnic or megamachinic logic.

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