Need Structures and Technological Development

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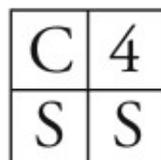
Center for a Stateless Society

I have [argued before](#)[1] that scarcity is manufactured in many industries by the deliberate cultivation of economic demand through structures of artificial need. Given the importance of technology in these industries it should not be surprising that the manipulation of technological development plays an enormous role in the manufacture of these structures.

The idea that the malaise of the world has a strong technological aspect is, of course, by no means unprecedented in the literature of anarchism and adjacent ideological regions. The works of Jacques Ellul spring to mind, *The Technological Society* being a definitive example. Likewise Ivan Illich (e.g. *Tools for Conviviality*), Lewis Mumford (e.g. *Technics and Civilization, The Myth of the Machine*), E.F. Schumacher (e.g. *Small is Beautiful*), Leopold Kohr (e.g. *The Overdeveloped Nations: The Diseconomies of Scale*), and the "neo-Luddite" Kirkpatrick Sale (e.g. *Human Scale*). All of these resonate with the position I take here, though I differ in certain respects from each. For anarcho-primitivism I have, in this instance at least, no use.

Notably, Ellul and Illich quite rightly characterize technology as a cultural system rather than a quantity of artefacts, and as rightly emphasize the pervasive nature of that cultural system and thus warn against such spurious ideas as "responsible use"; but in so doing loses sight of the possibility of quite viably lifting, as it were, the artefact out of what might at this moment be its native context. Hence we might have technology *qua* cultural system, i.e. Ellul's *La Technique*, as well as technology *qua* my or your capacity to create this or that. The boundary between them is exactly the point where Illich's idea of "[radical monopoly](#)"[2] kicks in. I mean to show that *the active cultivation of radical monopoly is the predominant factor which currently determines the sort of technological development that happens*, and that it is therefore a function of the modern government-corporate state. From this two things may be deduced: First, that many technologies may be "cleansed" of the character of radical monopoly simply by removing the state – here properly understood to encompass the large industrial corporations as well as government; and second, that perhaps as many technologies, however freely available they might become to you and me, would be quite pointless without radical monopoly, as they arose and exist mainly for the sake of cultivating radical monopoly.

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1 Manufacturing Scarcity, http://c4ss.org/content/16839
2 The Radical Monopoly of Industry, http://www.preservenet.com/theory/Illich/EnergyEquity/THE%20RADICAL%20MONOPOLY%20OF%20INDUSTRY.htm

1.
Our lives are characterized by sequences of instrumental and contingent needs; I need *x* for the sake of *y*, *y* for the sake of *z*, and so on. The processes of converting labour into benefit has become complex by the introduction of intermediate conditionalities. Thus, while we might characterize the life of the ideal free peasant as maximal directness between labour and benefit – that is where most labour is expended (almost) directly on producing the thing sought – our own experience tends to be quite the opposite. We might spend our days inducing people in China to make little teddy-bears, for instance, for the sake of neither the Chinese nor the teddy-bears but in order to maintain a *job*, an arrangement whereby someone will periodically give us money with which to buy not only what we need to stay alive but also all the indirect tools necessary to maintain the job, i.e. car, phone, computer, appliances, etc. On very little reflection this complexity takes on a fanciful and gratuitous character; it is not unavoidably complex given the task at hand but as complex as possible, the nature of the task at hand being such as to necessitate the greatest complexity of need that can technically be produced. And it is alienating because one does not of oneself have any cause to want someone on the other side of the planet to make teddy-bears or anything else: but it is something that some inexplicably find themselves *practically* needing to do. One does not particularly want to go to another place ten miles away every morning and return every afternoon, but the vast majority of us daily need to do so.

Note that these are real needs, not delusionary compulsions. We really are in this knot of conditionalities that requires of us to do things at best irrelevant to – at worst contrary to – our best interest. In this study there will be the constant temptation to understand what I mean by instrumental and contingent needs as something psychological. This is not the case. I mean the physical, practical needs that arise from our way of living and working subject to the conditionalities set up by the power concentrations inherent in the modern capitalist state.

To express the matter metaphorically: the world is full of walls that stand in our way, but the world is ready to furnish ladders with which to scale these walls, though getting hold of the ladders sends us on other errands with other walls to scale, which have their own respective conditionalities, to the point that we have almost forgotten where we wanted to go in the first

place (though *that* is not for me to say). I emphatically do not mean that we have been "brainwashed" into wanting ladders for their own sake and therefore live only to increase our private collections of ladders.

It is important here to distinguish between need structures as such and the desirability of any given kind of need structure. I have in the past had occasion to remark that the problem with the world is not that we have needs but that we have the wrong needs, by which I am not trying to be obscure for the sake of it. Insisting that we *ought* to have a need for creative fun *as well as* ample ways of satisfying it, as much as a need for wholesome food as well as ample ways of satisfying that (barring fanciful technological developments the desirability of which seem to me debatable at least), suggests that the best structure of needs is not necessarily the simplest. But compared to the status quo the difference between the best and the simplest might indeed seem like splitting hairs.

Increasing awareness of the situation is not enough to solve the problem, but though it is in itself wholly insufficient it is an essential first step. For not only the shape but the very existence of our need structures often has a cryptic character; they are invisible *as structures* to the typical observer. People are generally aware that they have needs, but they seldom realize that those needs are subject to conditions and circumstances that can change and be changed.

Indeed the most common understanding of our need structures is that they "just are"; either that they arose simply out of the passage of historical time or that they always existed in some plausible historical analogy.

The language of fashion does us a great disservice here. Note how it is said that hemlines rose in this year and fell in that. No-one ever says that fashion designers created shorter garments in one year and longer garments in another. The implication is that hemlines themselves determine their altitude and that fashion designers are their mere slaves. The passive voice masks the frivolous randomness of the designers' compulsions and lends a sense of inevitability to humbug that should nevertheless be obvious to all of us. But is the language of history and science not exactly the same?

It is strangely unremarkable to say that anything that is made in the 21st century will be made in China, and leave it at that. The very question of

why this should be so seems nonsensical; that of it may be predicated no cause and certainly no purpose – and it is the intellectuals who insist most militantly on this attitude. The casual labourer complains that certain things are done. The professor knows that they just *happen.* But *cui bono*?

Skinny trousers return in the 2010s. Smart-phones become common in the 2010s. Family dogs die in the 2010s after police bullets appear in their bodies. We are expected to accept that this is simply because that is how the 2010s are.

Implicit in this self-ontological view is the failure to consider need structures, or indeed technological development as such, as functions of the prevailing economic system. If these things came about simply through themselves the possibility of their character or even their existence being determined by the current system of economic power, i.e. the modern state, does not arise. For while, barring intellectual posturing, the notion that fashions and patterns of need "just happen" is merely lazy, the idea that technological development and the process of scientific discovery is likewise self-ontological is closely bound to a "forward thinking" self-identity and therefore too often precious to intelligent people who ought to know better. The idea of an irresistible macro-historical "force of discovery" only slightly influenced by commercial interests can be very seductive. The current processes of science and technology are however recent in kind and for the most part determined wholly by state-corporate agency.

As erroneous, but perhaps more innocent, is the view that the conditions that now obtain did not so much arise of themselves but always existed in some or other form. This view seems to me a peculiarly American one, arising from a popular historical perspective which consigns everything before the late 18th century to a sort of quasi-prehistory. Thus the 19th-century railway suburb appears to the American student of urban form *almost primal*, but to the European already fairly advanced in the capitalist process of urban metamorphosis from human habitat to capital-machine. It doubtless comes of a lack of peculiarly American "formal" history before the 18th century combined with enough clout to favour American history over any other (South Africa has the former – substituting the 17th century – but not the latter). Yet Americans are not alone in yielding to the temptation to draw parallels between different technological forms in different historical contexts.

After all, the popular myth of technological progress is that successive technologies performed *the same* task better and better as time passed. This implies that there has been the same task to be done since time immemorial. It also implies that the same process of incremental improvement has applied from then until now, if perhaps at an ever-accelerating rate. But this does not hold water: for it requires that a thing be done so badly at the very beginning that it would probably have been pointless doing it at all, if the task had simply been the same. It leads us to regard an unworkable historical condition as normal.

It is clear that the current process of technological development is something different to what had obtained for many centuries in that at some point successive technologies began to change the task they are meant to do, that is, the kind of need structure in force. Moreover, the character of technological development now *primarily concerns* creating new tasks and only secondarily new ways to perform them. Hence we cannot see the automobile as a vastly improved horse, for instance, because the automobile is associated with a radically different mobility regime, different in fundamental kind and not merely in degree, to what had been before.

Suffice it to say that any or all of these attitudes result in an understanding of the world which does not invite a clear conception of our everyday practical needs as a structure, and therefore subject to critical analysis. This in turn enables a number of errors which cannot but exacerbate the original failure in understanding.

It is perhaps understandable that we should seek escape from the erosion of our liberty by cultivating an exaggerated sense of our own agency. Hence we imagine that we can set all to rights by adopting a different "lifestyle". Yet there is no recognition that the factors that make our way of living problematic lie outside our immediate range of choice.

For many there is an unspoken principle, according to which all activities related to gainful employment are excluded from consideration. Like income tax, morality and principle are exempted from the things we do in the course of our jobs. The very term *consumerism* carries the widespread understanding that it applies solely to the sphere of leisure: what I consume for fun is "consumerism" but the far greater quantities I consume in the course of salaried employment paradoxically is not. Thus the idea of

ecological guilt for the "insatiable appetites" of "mankind" has become common. Unspoken therein are firstly the idea that the problem arises from substantially free, individual choices we make, and secondly that these choices are made in the context of leisure. That is to say, the problem arises from what we want, not from what we need; we are told that the solution therefore lies in wanting something else, rather than in needing something else.

It is certainly consistent with the conviction, particularly rife in "New Age" thinking, that the true solution to all this *must* (conveniently happen to) lie within the range of options immediately and individually available to us. But this is much like the drunk looking for his keys under the street-lamp because it is too dark in the alley where he lost them. This invites a bit of analysis.

"New Age" spirituality is perhaps to be expected in a society in which parallelity of subjection – however cryptic – rather than reciprocity has become the predominant relationship between neighbour and neighbour. It seeks to transform the world by parallel reform of discrete individuals without regard to the structure of the relationality between them. This is doomed to failure for reasons which should be obvious. Thus unlike the great religious traditions and despite its "forward" overtones, the new spirituality has in its disregard for the structural aspects of the lot of the poor an affinity with the ideologies of the radical right, which I suspect will become more clearly plausible the deeper one digs – for which this is unfortunately not the occasion.

Thus we see the historical quietism that gives rise to the popular view coexisting strangely with the exaggerated sense of agency that results from it. For though the structure of the needs to which we are subject is not a thing that lies within our immediate individual power it is not a thing that "just is" either. It is a constructed thing; therefore it is a thing that can be dismantled. To return to our metaphor, we mistake the walls for natural outcrops; but then we imagine ourselves giants capable of crossing mountains in a single stride, and berate one another for not doing so. But these walls are built of bricks: they can be broken down by people, because they were built by people – though not by the same people. Once this is understood it should be plain that there is no relief in a ladder that embodies "efficient new technology" because its price pays for building the walls higher. The walls exist only to create demand for ladders.

2.
The methods of mass-production are central to the existence of economic and political power in the modern capitalist state, not because of any intrinsic efficiency of economies of scale but because the difficulty of achieving a sufficient scale to use these methods profitably *in itself represents capital* to the large industrial organization – as long as no serious alternative is available. The large industrial corporation is uniquely capable of employing certain techniques and *developed specifically to be* uniquely capable of employing those techniques. It therefore has an interest in those methods remaining unattainable by all but the similarly-sized organizations that have come to comprise the modern industrial oligopoly. It also has an interest in the unavailability of alternative methods, and will aggressively strive to ensure that alternative methods – some of them ridiculously obvious – remain practically unavailable. This is why the large industrial corporation will not follow the apparently sensible practice of using the easiest available method to produce the desired quality of product, but will go out of its way to use the most difficult method it can technically achieve with any consistency.

And because the profitability of mass-production methods depends on the rate and volume of output, the large industrial corporation has an interest in there being enough economic demand to consume that output.

Eugen von Böhm-Bawerk used the term *roundaboutness* to refer to the extent to which industry produces capital goods in order to produce consumer goods, rather than consumer goods directly. According to the Wikipedia entry:

> "The Austrian economist Eugen von Böhm-Bawerk argued against both the Ricardian labor theory of price and Marx's theory of exploitation. On the former, he contended that return on capital arises from the *roundabout* nature of production. A steel ladder, for example, will be produced and brought to market only if the demand supports the digging of iron ore, the smelting of steel, the machines that press that steel into ladder shape, the machines that make and help maintain those machines, etc."[3]

For von Böhm-Bawerk roundaboutness was a measure of industrial health,

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3 http://en.wikipedia.org/wiki/Roundaboutness

not a potential social ill and fairly obvious Bastiatian "[broken window](broken-window)"[4] (a condition that here depends at least in part on the degree to which the capital goods constitute a radical monopoly, again to use Ivan Illich's term.) It is therefore understandable that state policies should expand the principle into the consumer sphere as a way to ensure the viability of mass-production methods, everywhere touted in glorious visions of the future as "efficient", by creating demand where none existed. One thinks not only of the privileges afforded the American railways in the 19th century, for instance, or the various roads development programmes of the 20th, but also of the "new Keynesian" thinking in response to the economic woes of the early 21st century.

And thus endowed through the state with the ability to manufacture demand barely sufficient to ensure the viability of its chosen technological basis of production, industry soon finds itself able to manufacture over time as much demand as it could possibly want: a process that continues to this day at an ever-increasing rate. And the world as we know it is a product of this process: through the intentional cultivation of structures of instrumental and contingent need the world has in effect been rebuilt over the last century to become a demand factory, a needing-machine.
(The world has been radically reconfigured, with ease and impunity, for ill; yet we are told that to reconfigure it however laboriously for good is impossible. Any proposal that involves "changing the world" even in minor detail is seen as "Utopian" despite the world daily being changed wholesale before our eyes.)

A moment's reflection will reveal that this is precisely the same thing as the [Enclosures](enclosures)[5] by which huge areas of European common land became exclusive private land, especially from the 16th century on. In all wise, but most notably in its aspect of imperial colonialism, the phenomenon is characterized not only by the loss of (access to) land but also the destruction of means of relative self-sufficiency and, hence, the creation of dependency on wage income. But while the most salient effect, indeed very often the stated aim, of the earlier enclosures was to create a pool of artificially needy labour to work capitalist industry cheaply, the new enclosures serve to create a pool of artificially needy consumers to consume its product.

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4 https://en.wikipedia.org/wiki/Broken_window_fallacy
5 The Subsidy of History, http://c4ss.org/content/13192

It would be difficult to assess the extent to which the instrumental and contingent needs to which we are commonly subject are the product of artificial cultivation, and that to which they are in any intelligible sense spontaneous or natural. The difficulty is likely to lie in defining what we take as a default condition, as this is near impossible to predict. Even the broadest terms are subject to debate. If, however, we posit a "directness" economy characterized by small organizational scale, local reach, technologically-augmented small mixed organic farming on a generous "subsistence-plus" basis, equally technologically-augmented local artisanal manufacturing, community-scale diversified energy reticulation, and primarily pedestrian-based mobility, and moreover express need in terms of consumption of energy and resources, I might hazard a guess that typical instrumental and contingent needs might be less than 10% of what we are generally experiencing now.

If this is true, only a tenth of what we now daily need to do actually serves our own enjoyment. Nine-tenths of what we daily need to do serves only to keep the machine going. Of course these figures constitute a mere guess, but the error in them may well be on the side of caution given the incremental and compound nature of the need structures to which we are subject. Thus obviating one need might eliminate an entire complex of other needs, and so on.

There is hardly a function today popularly thought the proper province of the state that does not play a substantial role in the maintenance and expansion of this edifice of needs. How ironic the question so often posed by the defenders of the state, who will build the roads? when the roads constitute one of the greatest sources of engineered dependency, which is to say, artificial demand, when combined with a system of land use designed to generate the greatest possible need for mobility.

And indeed the form of the 20th-century city gives us a perfect microcosm of the matter. The idea of the city comprising a commercial and institutional core surrounded by a broad dormitory residential periphery as known to us all is erroneously seen to be the basic, primal default-form even though it is historically quite recent. While the suburban shopping mall and the greenfield office or industrial park are correctly recognized as new developments the much more fundamental characteristic types of this urban form, the office block and the modest non-agricultural villa are not so recognized: anachronism in this abounds in every field of fiction that

involves any appreciable invention in setting. This ontological obscurity of the urban form neatly reflects the cryptic nature of instrumental and contingent need structures as such.

But in this way to see the modern city as basic and primal blinds us to the idea that the urban form we know was consciously developed in response to a specific agenda. The only things to distinguish the actual historical process from a dark conspiracy are the general lack of secrecy and the idea of a future vision. For if land was zoned and roads were built it was not done consciously to breed consuming-fodder for a greedy industry but (often with greater violence) to force people into "how we shall live in the world of tomorrow!" The very shape of that world confronts its inhabitants at every turn with the practical need to consume something.

I have hitherto said very little about the role of marketing, as I really believe that it is generally overstated in most critical discussions of the capitalist state. My very thesis here is that it is the cultivation of practical needs that lies at the root of the thing, not the generation of psychological ones. I do not think that people are generally so easily swayed that the machine can rely solely or even primarily on marketing.

More accurately, I believe that the primary role of marketing is strategic rather than tactical. Advertising does not make people go out and buy things. What it does is to form their expectation of what their world is becoming. It does not tell people what they need, but what they are going to need very soon. Though formally akin to saturation bombing it has as its real target the decision-makers: the planning committees, the new-broom bureaucracies, the freshly-appointed officials, would-be civic saviours slightly out of their depth but excited like children unable to wait for Christmas morning. It is on these that the future vision is to work its magic; not in secret but all the more easily if its content is known to all.

I enjoy old episodes of Star Trek as much as the next person, but I believe that Gene Roddenberry has a lot to answer for. A recent post on Facebook read, "Star Trek: predicting the future since 1966" over a number of innovations uncannily presaged in the early show. But by popularizing a very graphic idea of life in the future did it not dispose decision-makers to bring about the structure of needs implicit in that world, thus creating opportunities for the same means of satisfying those needs? If Star Trek presaged the cellular phone, is it not because a generation of decision-

makers who grew up on Star Trek have built a world that *needs* cellular phones?

And if this retains the dignity of genuine prophecy it merely requires the briefest comparison to the world presented in things like General Motors' [Motorama](http://www.macsmotorcitygarage.com/2013/06/19/video-introducing-the-1953-gm-motorama/)[6] exhibits of 1949-61. The world of Star Trek was only as real as the seductive fantasy visions of corporate capitalist industry a decade earlier. And *cui bono* there?

Thus the familiar form of the modern city was constructed through the incremental acts of decision-makers acting under the influence of a future vision which was prophetic rather than normative in its purported character. It held out a promise rather than a duty: combined with the pervasive suggestion that the world as it stood was unbearable, a problem that required a solution. It contained a paradox that ought to be familiar to any student of Marx: the heroic struggle to bring about the inevitable; but it is the idea of inevitability that allowed The Future to be presented as a land of wonder, El Dorado, Shangri-La. It allowed an idea of steady approach and by implication anticipation, tantalization.

This did rather collapse in the years leading up to 2000. As late as 1989 the very number *2000* bore implications of being ahead of the game, ahead of the herd, closer to the Futureland, the mystical kingdom where things would be fundamentally different because the year begins with the numeral *2*. Any initiative could be made to seem innovative and fresh just by appending "2000" to its name. But by 2001 it was fairly obvious that 21st-century rain was as wet as 20th-century rain, and 21st-century rocks as painful to one's toes as 20th-century rocks; though some of us always knew that. It is nevertheless clear that new ways have been found to keep us starry-eyed about the stars.

The form of the modern city was constructed to have work in one place and living in another, and all respective other things elsewhere still. This created not only the need for devices and systems of mobility, first the heavy machinery of the railway, metro, and tram, and subsequently the automobile; but also for the means to maintain special kinds of land tenure if one is to do business; also for means of communication to deal with relationships subject to this ongoing geographical dispersion; for systems of record-keeping and confirmation to keep track of each and all of these; for

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6 http://www.macsmotorcitygarage.com/2013/06/19/video-introducing-the-1953-gm-motorama/

ways to amuse oneself in the absence of spontaneous fellowship. And the establishment of these, and more, each generated its own complex of subsequent needs.

This is of course not to suggest that all this was dreamed up in a night by someone at General Motors. The early 20th-century history of the concepts of urbanity embodied in such as the writings and theoretical designs of Le Corbusier[7] and others is well enough known. But it was the acceptance in that intellectual climate of state-capitalist industry as inevitable, after the basically historically-critical medievalist-socialist-anarchist *milieu* of Arts-and-Crafts[8] and Art Nouveau, and the positive projection thereof into a "heroic" vision of a world radically changed, which created a complex of ideas ready to be exploited by state-capitalist industry.

And exploit it they did, in ways ranging from the blatant nefariousness of the Roads Gang of 1936-1950 and the General Motors streetcar conspiracy,[9] to the ostensible legitimacy of the New Deal infrastructure construction programmes.

Strategic rather than tactical marketing of another kind is used to service the needs of war. Mass-producers may be assured of threshold demand if the public may be persuaded to buy, through taxation, all manner of expensive equipment and to have it blown up in other countries. It is not as if anyone is expected to go out and buy a tank; merely not to object that state revenue is thus employed. Nor are jet fighter aircraft churned out with sheet-metal presses; a "war effort"[10] will nevertheless consume huge amounts of diverse stuff people would otherwise probably keep in use, but might now require those sheet-metal presses to replace. And war generally involves a lot of rushing hither and thither, arm-waving, and bumping into one another, all of which tends to use up auxiliary kit, mostly common civilian goods, at an alarming rate.

Then there are guns. What war consumes with the greatest vehemence, however, is not guns but rounds of cartridge ammunition: little mass-produced disposable cannon, designed to be fired from a thing that is really not so much a weapon as a mere bracket, albeit a sophisticated one. The machinery of mass production, both technical and organizational, embodied

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7 http://www.archdaily.com/411878/
8 https://en.wikipedia.org/wiki/Arts_and_Crafts_movement
9 http://www.lovearth.net/gmdeliberatelydestroyed.htm
10 http://www.nebraskastudies.org/0800/frameset_reset.html?http://www.nebraskastudies.org/0800/stories/0801_0130.html

in the ammunition factory is as crucial to modern warfare as modern warfare is to it. The manufacture of ammunition on the modern pattern simply will not work unless a fairly high rate of consumption is assured.

It is something to keep in mind when it comes to weapons in a stateless world, for the defence of the person or the community, especially against the re-emergence of the state. It is little good being able to 3D-print a weapon that relies on mass-produced ammunition and all that that entails. Indeed it is easy enough to machine a gun out of billet or rough castings: the gun itself is not where the production problem lies. I suggest that it would be worthwhile to explore other avenues. The high-powered airgun is one; a micro-robotic lock loading and firing a simple expendable ball is another, perhaps using an injected liquid fuel in lieu of powder – or perhaps so simple an expedient as a mechanism which retrieves spent shell casings for home recharging.

However much artificial demand is manufactured, there remains the chance of it being met as long as durable goods really can be used indefinitely, given occasional repairs. Industry has to ensure that its own product does not collapse the demand that has been engineered and employs various methods to ensure that this does not happen.

Much has been written on the subject of planned obsolescence, once the stated policy of corporate capitalist industry everywhere and nowadays either denied outright – such hiding in plain sight is by no means unusual in the context, if one compares the popular view of the early 20th century history of American labour, for instance – or grudgingly admitted as the inevitable result of self-ontological technological progress and no fault of its own. And it is no mere matter of cheaply-made crap being designed to break: the absence of the expected competitive manufacturer of a durable alternative, at whatever price, should tell us that all is not as it seems.

Indeed, planned obsolescence lies not in deliberately making something that is going to break but – though cheaply – failing to bother to make something that will not, safe in the knowledge that the durable alternative will not be made. And it is not that the durable alternative is so expensive to make, either: durability is a function partly of material quality and sound design, and partly of service and repair. All products fail. A durable product is one whose failure can be postponed beforehand or corrected afterwards. Durable products are ones designed to be serviced, designed to be

repaired: but these are activities that can easily be considered "tampering" for the purposes of much modern legislation.

They are also activities too near in character to the processes of manufacture themselves for corporate capitalist industry's comfort. What can be fixed in a domestic double garage can likely also be made in a domestic double garage, or relatively little more. And what is designed not to be fixed in a domestic double garage can often be cut open and fixed anyway in a domestic double garage, though the design would then be altered substantially and, nowadays, quite possibly illegally.

Vernacular ingenuity will always tend to subvert corporate capitalist industry's agenda, decisively were it not for the state. There is an ongoing process whereby people try to absorb, master, vernacularize the technology embodied in the products of corporate capitalist industry, and corporate capitalist industry acts in collusion with the state to resist these attempts. If corporate capitalist industry is effectively to cultivate instrumental and contingent needs to ensure enough demand for its products, it is crucial that the technology embodied in its products remain foreign and mysterious to consumers – and the more precipitous the edifice of needs becomes, the stranger their products must become to us. The consumer is to stand helpless before the product; the consumer is in no wise to engage with the process of manufacture by engaging physically with the mechanism of the product. The consumer is to be nothing but exactly that: an absolute consumer.

(Does that conjure images of feedlot cattle or battery chickens? Good. Our modern captivity makes us not so much slaves as livestock.)

It is thus in the interest of corporate capitalist industry that the technology which predominates is constantly and rapidly changing. To this end it seeks actively to develop new technologies which are not only unfamiliar to the consumer population but also technologically better suited than had gone before to corporate capitalist industry's unassailable position. That is, technologies chosen for development are chosen specifically for their intrinsic resistance to vernacularization, compared to other technologies.

The use of electronics to control all manner of consumer goods represents something of a holy grail for corporate capitalist industry, for up to the emergence of electronic control the sort of reliability that people require of

a product could only be attained by building-in a fair amount of durability as well. Electronic control has enabled reliability, i.e. near-absolute consistency of operation, to be combined with an absolutely finite product life. The product will perform consistently until the electronics fail, and will thereafter not perform at all. It has no process of gradually deteriorating performance to motivate adjustment or repair. And subsequently, it cannot be repaired easily – thanks largely to the microscopic and protocol-dependent nature of the electronic components.

Corporate capitalist industry would have us believe that technological innovation is adopted due to a pressing need for enhanced functional capability, for greater "efficiency". In the real world technological innovation is mostly adopted because that is what is available. We buy new computers when the computers we have break down, and cannot be repaired without effectively turning them into a newer sort of computer. All we want is for the computer to do this afternoon what it had been doing until the day before yesterday. This is all we need it to do; this is all we are willing to pay for right now. But most often this is not possible.

The situation is worse as regards the software on the computer, as intellectual-property considerations lead to a sort of software that resists being backed up elsewhere *as an installation*. Old software often cannot be copied onto a new hard drive wholesale in an already installed state without considerable difficulty, if at all. In most cases a new computer or a new hard drive means a lot of new software – again because the software hitherto in use is no longer available, or would in any event be unsuitable for the new hardware or, more probably, other new software. And that new software will most likely represent less efficient use of processing power and memory: it will require much faster processing and generate much bigger files to do only slightly more than the software it replaces. Thus greater capability is adopted in the vast majority of cases solely in order urgently to restore lesser capability which had hitherto been and remains more than adequate.

That this should be the case in a field where technological development is particularly rapid should indicate to us very strongly that the dominant conventional view that technological development happens in response to consumer demand for greater functional capability is erroneous. In computing as a broad phenomenon technological development happens despite being largely unwanted by consumers.

The electronic microchip has a number of characteristics that make it a fertile source of obsolescence. It is microscopically tiny, it is relatively delicate, it embodies a negligible pure-material value, it requires quite substantial capital to manufacture, and it requires an extreme level of model-conformity. It is therefore something that you and I can neither make nor repair using common hand or power tools, it is quite easily ruined, it is relatively cheap to buy, and it has to be *just so* if it is to work at all. This makes it very easy for a small cartel of manufacturers to control what sort of microchips are available on the market. It makes it very easy to ensure that the next generation of electronic components will not work with anything we have now.

Those who see in electronic control the possibility of ecological restoration through efficiency fail to understand that, as the technological regime is currently constituted, electronic control means perpetual obsolescence, perpetual replacement not of components but of entire systems. What is gained in energy conservation is lost many times over in waste.

Likewise the use of plastics, with their known tendency to embrittlement over time, combined with snap-tab-based detail design which relies on the elasticity of the material for its functioning (besides eliminating the component costs of traditional fasteners like screws and the labour cost to install them properly, and moreover imparting a smooth, opaque, "magical" appearance) enables products which become more likely to break irreparably during repairs the older they get.

Significantly, both electronic controls and plastics allow deterioration through the mere passage of time to be separated from deterioration due to use, i.e. wear and tear. This tends to incentivize intensive use of a product over a short period of time, in order to get sufficient service out of the product to justify the investment before the product becomes unfit for use due to age. As products are seldom used in isolation this in turn incentivizes intensive use of other products, thus contributing to the complex and compounded nature of the structures of instrumental and contingent need. It disincentivizes attempts to spare or reserve service against future need.

Obsolescence undermines our possession, in any meaningful sense, of means of production by rendering it ephemeral, and in this constitutes

theft. It changes our concept of material possession. Material goods are reduced to paraphernalia accidental to a privileged agency's performance of a privileged function at one's expensive behest. Ownership is reduced from a (socially recognized) right of possession to a privilege dependent on the favour of the corporate elite. Thus we effectively rent the means of production at purchase prices from agencies that effectively retain the deep ownership of those means. Obsolescence is enclosure.

The above are two examples of technologies that have received the sort of development investment they have had because of the possibilities they present for corporate capitalist industry's programme of cultivating instrumental and contingent need. The viability of this programme depends on two factors. Firstly, it needs the active participation of the state, not only to enable the context for the need structures to be constructed, but also forcibly to prevent the efforts of people to get around those structures. And secondly, it requires a pervasive acceptance of the currently predominant view of technological development; which, as we have seen above, is that it is self-ontological, inevitable, ancient, continuous but accelerating, linear, and driven wholly by incremental gains in performance.

3.
I mean to suggest that, though it has a basis in reality, this view of technological development is erroneous on each of these points. That is, I mean to suggest that technological development arises from different causes at different times and that its character varies accordingly; that the path taken in any instance is always one of many possible; that it has in many cases been driven by factors other than simple and obvious product improvement; and that the current rapid rate of change is largely the result of the active cultivation of conditions favourable to rapid change for its own sake. In other words, technological development is not independent of its political-economic context.

As noted above there is the constant temptation to project onto history the processes of technological development now prevalent. This is erroneous in almost all cases, the notable exception being that of military technology. Historically obsolescence has in most fields been gradual and incidental: innovation provided a steady broadening of technical options which co-existed quite easily, even though gravitating over time towards those which worked better in practice. This is certainly the case with, for instance, the change from throat-collar harness to shoulder-collar harness in the Middle

Ages. The introduction of the latter induced no great urgency to dispense with the former (except perhaps on the part of draught animals themselves). Over time, however, the shoulder collar came to prevail. Even so, that did not render the manufacture and use of throat collars impossible.

I can think of a few reasons why this should be so. Competition among peasant farmers, even if heavily burdened by feudal imposition, is not fierce. In peasant farming a surplus, however generous, with which to trade is secondary to direct provision for subsistence. If survival, safety, comfort, and fellowship are all provided outside the monetary economy, monetary wealth is much reduced as an incentive. Thus the advantage offered by the shoulder collar was not monetary profit through increased production but a saving in time and effort which, though obviously desirable enough to effect gravitation to that technology, did not have in it that sense of competitive urgency which so often characterizes technological change in our time.

Indeed, it may be said that this mild, time-preference-heavy peasant competition is closer to the "perfect competition" of classical economics than competition under the capitalist state is. It tends to corrective balance, not to victory manifested in monopoly. When competition involves cutting throats and eating dogs one may be sure that the modern state is a part of it.

Also, harness for draught animals was made by hand, subject to a traditional system of technical communication. The cost of introducing a new type of harness was largely a matter of saddlers learning how to make it – obviously without thereby forgetting how to make earlier types. There was no appreciable tooling cost, no design-specific capital investment, no production volume threshold, and therefore no advantage in eliminating wholesale the harness then already in use. Saddlers were free to manufacture only so many of the new pattern of harness as demand induced by real direct advantage to buyers required. There was therefore no economic incentive to prevent the new technique from simply being added to the existing technological vernacular.

Nor did the new type of harness require the use of new species of draught animal, or *vice versa*. That would just have been silly. But it was only because the technological economy then in force did not allow schemes for replacing horses with thousands of pigeons to pass without the fraudulent

manipulation being plain for all to see that such things were not done as blithely as they are now.

The great exception is, as I have said, military technology. Weapons always have to respond to the weapons of the anticipated enemy. New weapons can instantly render the enemy's defences obsolete. An example is the emergence of cannon, which effectively made castles of the tall, "romantic" type useless for military purposes within a few decades. A military establishment will thus always have an interest in the ability to generate technologies that are different to what predominates. In this technological change for its own sake is as important as any specific gain in the effectiveness of a weapon: the ability to make the enemy change the way it does things is in itself strategically advantageous.

It should be obvious that this process was an important enabling factor in European colonialism, as sudden encounters between cultures not hitherto involved in *the same* arms race is likely to give one – most probably the one with ships that allow long-distance navigation – a military advantage over the other.

The ability perpetually to generate technological alienness is a crucial one for a colonial power. For here we first find the race against technological assimilation, i.e. vernacularization. Once established the advantage afforded by technological alienness had to be maintained, at least in part through the same process.

While the political context of European colonialism remained predominantly monarchistic this was a mere matter of fact. The second phase of European colonialism under the dominance of the British Empire, whose parliamentary constitutional monarchy required the manufacture of popular support for its colonial adventures, necessitated the creation of a mythology around technological development, which would serve to justify the subjection of other people in the eyes of the home population.

A mythology was necessary to recast the concept of civilization in terms not of social institutions but of technological development which was by then already increasingly a factor of specifically military technological development. It is a conception which remains powerful today; and I think that ancient Greeks would think us mad to hear us speaking of civilization as something mainly concerned with piped water and tarmac.

But from military might arising from a cultivated arms race describing a superior civilization it is but a small step to identifying that with moral superiority; whence flows the idea of the "white man's burden" and all that is implicit therein. It is a complex of ideas that lies at the root of the idea of the nation-state itself and, hence, the capitalist state.

Thus we see two (at least two) radically different processes of technological development, innovation, and obsolescence. It is necessary for the success of the abovementioned myth of cultural superiority that the two should be conflated with each other, so that the processes that engender military advantage become an intrinsic and characteristic component of the now-common popular history of technology, which begins with cave-men inventing the wheel etc. It makes it possible to see the world in terms of a sort of temporal shift between the "first world" and the "third world", as if by some mystical cataclysm the latter has lost two centuries of time, which is purported to justify the colonist's attempts to drag the subject population "kicking and screaming into the nth century". The vernacular mode of technological development is thus aligned to "the savage". The two modes are mythically cast in sequence rather than parallel, so that the military mode of technological development itself becomes a (military) innovation intended to render the vernacular mode as a whole obsolete, while nevertheless maintaining an illusion of organic flow from the one to the other.

The project of European colonialism is the same project as both the Enclosures and the modern cultivation of consumer demand. The same myth runs through them, with incremental gains in depth and sophistication, all the way to the modern Futureland.

The image in the 1968 film *2001: A Space Odyssey*,[11] of the shard of bone thrown up by the ape-man's victorious bone-smashing turning into a spacecraft or artificial satellite orbiting the earth, is a particularly poetic expression of this mythical tradition. It implies a continuity between the ancient act and the (then) futuristic one, and by implication with everything in between. However consciously it came through Arthur C. Clarke's techno-Nietzschean thinking, I believe that the image is false.

We are served by the peasant or vernacular mode of technological

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11 http://www.imdb.com/title/tt0062622/?ref_=nv_sr_1

development, albeit slowly, for it affords no benefit that is not immediate in the sense that it comes in some way free of charge. This is because it will not happen at all unless it is able to fit readily into an existing praxis with the least possible concomitant change. We are not served at all by the military mode of technological development unless we are specifically situated to benefit from the concomitant radical transformation of the dominant praxis, which we might expect to be unlikely given that military technological development is aimed precisely at catching the world unprepared. And we should be reasonable in expecting our peaceable lives to be characterized much more strongly by the vernacular mode than the military mode of technological development, but this is the experience of none of us today.

It is however not surprising if we consider the integration of military technological development into modern industry. This too may be traced to the Enclosures and the European colonial project, in that everyday manufacturing became increasingly the exclusive preserve of a state-privileged capitalist elite whose connection to the state lies precisely where industrial technology meets military demand. In a sense the most crucial military weapon of the modern state is its industrial capacity itself – effectively enclosed as it is. Hence the state has a strong military interest in an industry characterized by a military mode of technological development: precisely the [military-industrial complex](https://en.wikipedia.org/wiki/Military-industrial_complex)[12] of which Dwight Eisenhower spoke.

Thus we find the symbiosis which is the essence of the modern state: the state draws military might from the same cultivation of military-mode technological development as corporate capitalist industry draws an almost infinite capacity to engineer demand. And the more this develops the more the capitalist state is cemented and the more emphatically the military mode of technological development describes its character.

Now, the state has no interest in technological development that is not in the military mode and would thus that as much technological development as possible of that which happens be in the military mode. At the same time corporate capitalist industry needs to maintain threshold volumes of production and therefore cannot afford for any production to take place outside its own domain. Between them there is a strong incentive to stamp out any substantial technological development which occurs in the

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12 https://en.wikipedia.org/wiki/Military-industrial_complex

vernacular mode. The capitalist state characterized by the military mode of technological development is indeed militant in the sense that it is aggressive in the elimination of alternatives to its industrial agenda, e.g. by ostensible health, safety, and environmental regulations, product standards, inspection regimes, burden-of-proof requirements, import restrictions, etc. These are constantly responsive to the emergence of any substantial vernacular movement, either to crush it or to assimilate it, with the necessary transformations, into corporate capitalist industry.

The cultivation of rapid technological change, which might be wholly random but for the requirements of the myth of a race to a paradisiacal Futureland, represents a further refinement of the project of planned obsolescence. Corporate capitalist industry is able to avoid the conspiratorial odour of the thing by thus rendering obsolescence self-planning. Technological development is made to generate the conditions for its own obsolescence.

As long as we remain under the spell of the myth of the Futureland the machinery of the capitalist state's domination will remain opaque to us. Until we understand how the character of technological development is determined by its political-economic context we shall remain powerless against it. The myth of the Futureland has become so pervasive as to be invisible; it has come to describe absolutely the terms in which we understand the world in which we live, to such an extent that many of the questions that need to be posed are almost impossible to articulate.

As an aside, I must confess that I do not comprehend the status of Richard Buckminster Fuller[13] as a countercultural icon. If, as I suggest, the vision of the Futureland is a product of the state establishment with a specific and largely nefarious intent, Fuller was either its cynical advocate or its unwitting stooge. Certainly there is in Fuller's programme nothing contrary to the establishment agenda, if we correctly understand that to be *an agenda of change*. Indeed we may identify the projection of the establishment (or *a* fictitious establishment that is partly a caricature of the truth) as something static, intent on maintaining the status quo in detail rather than on constant expansion of its power, to be an integral part of the Futureland myth. The establishment does not in fact seek to resist change but to enforce change of a specific sort and no other. Thus the Futureland myth is able to mobilize the tendency of the youth to rebellion, in itself a

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13 http://designmuseum.org/design/r-buckminster-fuller

healthy process of creating selfhood, to serve the interests of the establishment. Drawing on Marx it asserts that the new ideas are the ideas of the new people, conveniently omitting that the fundamental property of the new people is that they grow up – and eventually become old people. It is as if to say, notice how all the new people are babies? One day, therefore, we shall all be babies.

It was perhaps because Fuller presented his ideas in a romantically eccentric light that the youth-conscious countercultural movements of the 1960s should come to embrace the geodesic dome as its peculiar architectural image. By being graphically different from established building forms which, in line with the abovementioned idea, could be made to represent an obstacle to "the ideas of the new people" as manifest, for instance, in the easily dystopian '60s "plug-in city"[14] fantasies of such as Archigram,[15] the geodesic dome became readily associable with youthful rebellion as heroic historical struggle.

Certainly the geodesic dome offers no advantage specifically compatible with the organic aspirations of that culture: it represents the antithesis of the proportional basis of setting-out to which any thoroughly organic conception of construction will necessarily gravitate. It is instead quite heavily dependent on a fixed system of measure and a distinctly heavy-industrial separation of manufacture and assembly. If the domes of "drop city"[16] are charming it is because, through the constraints of the found objects and salvage materials used in their construction, they represent geometric failure as domes. And despite that charm they remain ecologically inappropriate to almost any climate in which they are constructed: too light for deserts, too thin for temperate zones, too difficult to ventilate liberally – given a constant orientation to prevailing winds – for tropics.

His Dymaxion[17] house design of three decades earlier was if anything worse. Its main advantage was not to its end user but to the purposes of transporting its constituent parts from a centralized and Enclosed factory to the site where it was to be assembled. There is no point to making a house lightweight when as its occupant we want it to stay put, especially if we are thereby expected to forfeit the thermal mass that is an obvious and

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14 http://www.archigram.net/projects_pages/walking_city.html

15 http://www.archigram.net/about.html

16 http://materialinnovations.files.wordpress.com/2011/09/drop-city.jpg

17 http://www.archdaily.com/401528/

inexpensive asset in many climates. The Dymaxion house was no instrument of liberty but a seductive fantasy by which to further the remaking agenda of corporate capitalist industry.

Even Fuller's language is suspect. It is the language of a mind-control cult leader in graduated sunglasses; it makes my flesh creep. Terms like "worldaround" instead of "worldwide" represent simultaneously worship of history as a force and contemptuous ignorance of history as fact, for a scholarly consensus on a substantially spherical Earth has been pervasive for longer than the English language which produced the word "worldwide" has existed. Flat-earth belief is here a clichéd identification of the "old" people which has no basis in fact but serves only to provide a way to identify as "new" people. Through Fuller the Futureland myth seeks to enslave us by presenting itself as a means of escape *from itself*.

But be that as it may.

The importance of intellectual property law in this should by now be quite obvious. Constantly to maintain a position of privilege through mechanisms which are tied to a limited term favours the cultivation of rapid contextual change. Corporations have an interest in ensuring that patented technologies are thoroughly useless – or otherwise illegal – by the time the patents expire. Corporations also have an interest in ensuring the real-world impracticality of anything that is in the public domain.

Freed from the idea of a natural single line of successive improvements we become able to conceive of other models of technological development. The readiest metaphor ceases to be that of a column of soldiers marching straight to a destination, driven by the necessity of solving this or that problem, but that of growing tendrils variously and simultaneously describing different sinuous paths, which may be stimulated or nipped, according to our expectation of the fruit it might bring forth in its season.

It is necessary to contextualize empirical constructs like "Moore's Law",[18] that is, to pick out the circumstances under which they hold and, more importantly, the vast array of circumstances under which they would not. It is necessary to contextualize the desirability of its content: when would we (variously, of course) deem it a good thing? When would we deem it a bad thing?

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18 https://en.wikipedia.org/wiki/Moore%27s_law

4.

I wish to propose the term *playgrounding* to denote the tendency of technologies to offer breadth of possibility in use to compensate for the denial of depth of possibility. I draw the metaphor from the provision of a playground at a school as a corollary to compulsory lessons as well as a playground being only as good as the range of games one might play in it. The sense is that of partial appeasement in order to deflate the force of any objection one might have. I see this as a spontaneous characteristic of recent technological development rather than a conscious strategy on the part of manufacturing corporations, though I have no doubt that there have been deliberate programmes to the same effect.

The success of playgrounding depends on the abovementioned tendency to exaggerate our sense of agency in response to our actual captivity, which leads to the curious notion that we can put all to rights by adopting this or that "lifestyle". If the playground is large enough we might forget that there are regions out of bounds, and we might imagine ourselves to be free, and thus be less inclined to defenestrate our elders and betters.

Another image is provided by the eponymous city of Fritz Lang's 1927 film, [Metropolis](https://en.wikipedia.org/wiki/Metropolis_%281927_film%29),[19] which comprised an idyllic upper city functioning by means of an invisible, dystopian under-city beneath it. The intended social symbolism is clear and moreover poignant: the overclass are able to exploit the underclass because the latter are invisible to the conscience of the former, while the former are presumably physically inaccessible to the potential rage of the latter; a "playground" functions by the sweat of those labouring in the "mill" below. The image may also serve as an illustration of how we relate to many technological artefacts, however, in which case the emphasis shifts. As "overclass" we are no privileged elite but held captive by a cultivated dependence on the "working bits" hidden beneath our feet. The mechanisms on which our lives depend are not only hidden from our view but physically out of bounds: the "playground" surface world's idyllic character needs to be maintained lest we get it into our heads to start digging.

With the exception of the most basic, all technologies are dependent on layers of enabling and prerequisite technology. It is thus possible to understand technological possibility horizontally, i.e. in terms of alternative

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19 https://en.wikipedia.org/wiki/Metropolis_%281927_film%29

options that relate in the same way to enabling/prerequisite technologies and themselves represent the same enabling/prerequisite technologies to other technologies; or vertically, i.e. in terms of options enabling/prerequisite to the option under consideration, or to which that option is enabling/prerequisite. Thus in a specific situation sand-casting of iron might relate horizontally to, say, die-casting, additive sintering, or fabrication from cut stock; and vertically to mining and beneficiation of iron on one side and machining or heat-treatment on the other. In other words, *given* beneficiation of iron, sand-casting, die-casting, etc. are available technological options.

We have seen that a social process of technological vernacularization is constantly striving to subvert the enclosure of industrial technology, as people figure out how industrial processes work and devise ways to replicate them at accessible scales. We have also seen how some techniques are more susceptible than others to this process. It is in the nature of technological vernacularization to engage with technological possibility in both the horizontal and vertical senses, and may thus be characterized as "shallow" or "deep" according to the extent that it penetrates technological possibility vertically.

The shallowest vernacularization concerns only the technological component of variables designed into the artefact in question. A large population who are *au fait* with the use of MS Excel barely counts as vernacularization at all, but a large population capable of adjusting the mixture on an SU HS4 carburettor or setting the timing on a small-block Chevy engine represents vernacularization of very little greater depth, as both those adjustments are designed into the respective machines. Deep vernacularization goes beyond variables designed into the artefact, first to more or less radical modification thereof contrary to the intention of the original design, and finally to independent parallel manufacture. The closer a process of vernacularization gets to the raw materials involved, the deeper it may be said to be.

The difference between the computer software example and the automotive examples is subtler than it might appear. The difference in the actual depth of vernacularization is slight, though in the automotive examples the approach towards the raw materials is softened by the fact that only physics is negotiated therein. In the electronic example the approach is blocked by the intermediary existence of *protocol*. In the former

case vernacularization does not vary by kind as it becomes deeper; in the latter case it does. There is a brittle bottom at a relatively shallow depth, which requires a change of discipline to penetrate.

The insertion of protocol has the effect of replacing the departure from in-built variables to another (thick) layer of in-built variables. A large part of our engagement with the material world is thus consumed by a mode of apprehension hitherto restricted to riddles, puzzles, codes, and ciphers, the importance of which lies not in obscurity of meaning but in the fact that someone had gone before and laid a trail for the express purpose of our subsequently following it. The danger in this is that we have come to expect protocol in every sphere and instance, and can therefore no longer go anywhere unless a trail has specifically been laid. We have become like the joke about how many computer programmers it takes to change a light bulb: "Can't be done; it's a hardware problem."

This is largely parallel to the insertion, in our apprehension of the material world, of a third class of things between the "natural" and the "man-made", in terms of which we have understood the world since time immemorial. This is the class of things made by powerful industrial agencies that cannot be properly characterized as merely human. Our apprehension of the natural world was of things that occurred fortuitously. Our apprehension of artificial things was of the products of the deliberate efforts of beings much like ourselves, different in the specifics of strength, skill, and talent but essentially similar to us. Now a large part of our world consists of things that are neither "natural" in the common old sense but simultaneously no product of any agency even remotely like you or me.

And as a consequence a generation has grown up with the perception that the products of industry grow in shops as prior generations have known fruit to grow on trees. Industry has become something in which there is no industry, no deliberate effort to produce – wherein again the means of production have been stolen. This runs deeper than the blindness that comes with affluence: the world has become filled with industrial products that *just are* in the same way that mountains and sunshine just are. Corporate capitalist industry's hubristic usurpation of God's domain should not be lost even on the most vehemently irreligious.

Of all industrial products, none *just is* as the electronic microchip just is. The Futureland myth has grown in sophistication by becoming geek gospel, in

terms of which the next generation of processors will simply come with the dawn. It will simply be there; it will not be made by exploited south-east Asian labour nor be sold for sums of scarce money to our resentfully needy selves.

Thus playgrounding offers us a horizontal proliferation of technological possibility in order to deny us the vertical expansion of technological possibility associated with deep vernacularization, which we have seen to be detrimental to the maintenance of artificial demand. This is very common in the field of consumer electronics; to the extent that the entire functionality of internet-connected electronic devices may under some circumstances be considered to exist as playgrounds, though there have been playgrounds in other fields. I think for example of the "musclecar era"[20] of American automobile manufacturing, c. 1964-72, during which relatively light vehicles were fitted with the largest engines in the corporate range, though in many cases deliberately underdeveloped in order to enable buyers to extract greater power outputs through fairly easy modifications. This was accomplished at a minimal cost simply by combining parts out of the corporate parts-bin in rather extreme ways. The strategic sense here was twofold: firstly to frighten environmental and safety advocates into demanding a very cozy privileged relationship between the major automobile manufacturers and the state, and secondly to generate animosity between hot-rodders and hippies, who had been growing closer around the sport of drag-racing and the custom car show circuit throughout the '60s, by building goodwill among the former against the latter. This dangling of technological trinkets left hot-rodders unpoliticized and therefore unable to counter the manufacturers' regulatory manipulations effectively. If hot-rodders were willing to join hippies in their opposition to the motor industry over air quality in southern California, the motor industry might not have succeeded in pushing through their technical-regulatory solution, creating the real possibility of a land-use/transport-infrastructure-based solution which would have undermined their need-creating capacity severely.

Another example which cannot but spring to mind is Lego.[21] This was a perennial favourite toy of mine as a child, despite the occasional frustration at my inability to make my own Lego blocks in formats outside the range provided by the manufacturer. My parents certainly did not encourage me

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20 http://www.carsdirect.com/car-buying/a-historic-look-at-the-muscle-car-era
21 http://www.lego.com/en-us/

to take up home resin casting. I barely suspected that such a thing was possible, so I didn't express any interest. I believe that if I had, however, my parents would have preferred that I content myself with Lego's designed-in range of possibility instead lest I ruin the carpet or poison myself.

Certainly the emphasis was on the range of possibilities Lego provided. I wonder however if the erosion of that emphasis since my day, in favour of pre-designed kits intended to build a much narrower range of models, did not arise precisely from the dependence of the system on the exact interface form and material elasticity, at high levels of precision and model-conformity: that is, the protocol content of the system. Note that this aspect of the product is kept remote from the user both by the requirements of the techniques of mass-manufacturing involved and by aggressive use of intellectual-property law.

And I am convinced that the level of creativity in children's play has diminished greatly since the rise of protocol as a significant component of the world we inhabit.

The benefit of much technological development is undeniable. Medical technology is an obvious example. The unhindered, decentralized exchange of information and opinion through the Internet has already amply demonstrated its political worth. Yet we have seen how deeply the current processes of electronic-artefact production and development are embedded in the power base of corporate capitalist industry. The information and electronic industries represent a more extreme example of radical monopoly than Ivan Illich could ever have imagined.

I am certain that, given free rein, a thoroughgoing countervailing process of deep vernacularization is capable of eliminating the factors that today enable radical monopoly. There is a direct parallel to the principle that a radical liberation of markets would wholly eliminate capitalism: indeed it is the exact same set of relations at work. But just as the "anarcho-capitalist" vision of a stateless society as resembling Wal-Mart minus the state is erroneous, just so erroneous is the futurist vision of technological development in a stateless society as resembling Silicon Valley minus the state. Removing the mechanisms that suppress vernacularization would change the need/demand aspect of technological development and thereby alter its character radically – to my mind for the better.

5.

Technological development is beneficial in so far as makes attaining our needs and desires easier. Measured against existing need (leaving aside the cause of the need for the moment) at the time a technological innovation appears, almost any technological development seems desirable. Yet if our needs were consequently to increase, the benefit would be limited to the extent to which the increase in our power to satisfy our needs exceeds the increase in our needs.

If I have 1 hour to travel 50 miles, travelling at 50mph will satisfy my need. If I am offered a way to travel at 100mph I gain half an hour, but only if my destination remains where it is. If it subsequently – or consequently – changes to a venue 25 miles further away I gain only 15 minutes. If it moves another 25 miles I gain nothing at all; and if it moves 75 miles from where it was at the beginning I am worse off than I had been before, for I shall be 15 minutes late.

Our everyday perception of the world tends to miss the way technological development has a direct causal influence on our range of needs. It is often hard to describe, because our assumptions surround the former being self-driven and the latter being random; but once seen the mechanisms are for the most part not mysterious. In the above example of travel time, as in urban roads development, the mechanism is quite simple: building a new road which significantly eases travel over a greater distance encourages new commercial development on hitherto-cheap land, at the expense of existing businesses nearer where we are. Well-capitalized property developers are thus able to attract the big-box widget store, which is able to undercut the existing neighbourhood widget store, which closes down. Thus for widget-shopping purposes the new ease of travel ceases to be benefit pure and simple but is offset by a new burden of distance, which may be mitigated temporarily by lower widget prices until that advantage is eroded by the lack of a more conveniently-located competitor. This is, of course, contingent upon the existence of a need for widgets, but this will be found to be subject to the same sort of processes, as will all the needs generated by the increased need for mobility.

Or, with my six-foot ladder I am barely able to scale the seven-foot walls that have been built around me, given that my frame doesn't bend as well as it used to. I get myself one of the new-fangled ten-foot ladders, only to come back and find that the walls are now eleven feet tall. Or eight, or

fourteen feet tall.

There can be no rule describing the tendency of an innovation to engender need which does not account for my individual level of technological power relative to the society in which I live. Opportunity arising out of technological development does not, to be viable, require that the entire population be able to respond to that opportunity, but only a significant minority of the most technologically powerful. And because relative technological power is generally a function of affluence, that means the rich. Thus a given innovation will represent a net benefit to a part of the population at the wealthier end and a net burden to a generally much larger part of the population at the poorer end. The point at which an innovation has zero net benefit can therefore be expressed as a level of affluence.

In terms of the new widget store: those who have new, reliable cars will be able to make the most of the new store. Those who have to use telekinesis to keep their cars from breaking down will have significantly less benefit, as they no longer have an alternative that allows them to avoid taking the car out and walk instead. And those who have no car at all also have no access at all to a widget shop (unless they develop a fix themselves, as they invariably will unless – and often even if – that fix is promptly outlawed. But that is nothing but vernacularization.)

There would be no relief in magically endowing the poor with technological power, for that would open up even wider vistas for ever-wilder exclusive opportunity, which would again leave the poor at a disadvantage, only now at a more precarious height of technological power. In fact, is this not a precise illustration of our current situation?

The systemic operative or characteristic level of technological power must always be higher than the zero-benefit level of affluence: might I suggest the level of affluence corresponding to the mean net-positive benefit value? In concrete terms, the "way things work" is determined by the everyday praxes of people who are affluent enough to benefit significantly from recent technological development. And the greater their technological power is in absolute terms, the greater the distance between the "way things work" and the condition of absolute abject poverty, and the poorer the poorest effectively are as a result.

All of this presupposes the mode of technological development peculiar to

corporate capitalism and the suppression of countervailing mechanisms through the state. The tendency to generate needs in excess of benefits is intrinsic and crucially necessary to the way corporate capitalist industry functions.

We inhabit a technological landscape which came about through over a century of artificially magnified technological development cultivated specifically to benefit the capitalist state. We can only speculate as to what it might have been without that influence. Absent means by which a privileged elite may engineer need, it seems reasonable to expect that technological development would have been driven solely by the prospect of immediate net benefit to those individuals expected to partake of it. In other words, it would have been technological development in the vernacular mode.

And, as in vernacular technological development historically, it would have necessitated adjusting to pre-established praxes that work well enough to be perpetuated. In so doing it would embody a great deal of technological redundancy, a thing which is desirable because it represents clear technological benefit against need, moreso when we consider the scale of the thing. If the benefit of an innovation is free and clear, as it were, it may be far-reaching even though the innovation itself might be relatively modest.

In denying that technological development today arises from a pressing inadequacy of the world as it is I am not proposing *necessity*, at any greater conceptual depth or otherwise, as a measure of whether any given technology is justified. I envisage no institutional mechanism by which such sanction could be given effect, as my anarchist vision has no place for it. The attitude that a thing ought to be disallowed if its necessity cannot be demonstrated is anathema to me. But I do suggest that absent the mechanisms which today drive technological development many innovations that now exist might not have arisen at all, or might have been either rarer or more common, or might have taken a radically different form. And because I insist that the current mechanisms of technological development are unjustified, being a function of the structure of state capitalism, I do not believe that the Promethean glory surrounding our current technological condition is sufficient to justify the levels of dependence on which it relies.

What, indeed, do we do with technological forms as they have developed? I for one see no cause for a puritanical emphasis on provenance, however nefarious we come to understand it to have been. There are forms of technological manifestation, if not technologies as such, we might have been better off, on balance, had they never existed. Nevertheless many of these have acquired accretions of meaning over time; and as there is no freedom more fundamental than the freedom to ascribe meaning, these accretions would be necessarily justified even if they were not for the most part benign. And if the freedom to ascribe meaning is my own, so is the freedom to re-ascribe meaning. Putting, by stigmergic processes, the past typal products of state-capitalist technological development in conceptual places that are at least harmless is well within our capacity, given freedom. We can make "jet fighter" mean whatever we want it to mean. More practically, dismantling the global petrochemical industry and the complexes of artificial need associated with it does not mean that you can't have a motorcycle.

It certainly does not mean that you ought henceforth to stop wanting one. We can eliminate "car culture" as an urban-structural Enclosure of mobility but retain "car culture" as a focus of interest and enthusiasm, as contrary to popular belief neither necessitates the other. After all, people fly hot-air balloons without a "balloon culture" coming to dominate the practicalities of our daily lives as a result.

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The way in which technological innovation, being subject to a virtually infinite potential for subsequent technological change, allows the affluent to determine the dominant praxis at the expense of the less affluent may be restated in terms of energy consumption and, hence, ecology, when the innovation entails sudden increases in unitary efficiency. The result is an instance of both Jevons' Paradox,[22] because great improvements in unitary efficiency result in increased energy consumption in the system overall, and Bastiat's Broken Window Fallacy, because both conventional economics and conventional ecology fail to recognize the problem in this.

As if this were not enough, the regular periodic achievement of such magical gains in efficiency relies very much on the maintenance of the state-capitalist scale advantage, the abovementioned cultivation of technical challenge to ensure that only the established oligopoly can

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22 https://en.wikipedia.org/wiki/Jevons_paradox

achieve the required technological performance, which in turn is the basis of the state-capitalist demand machine.

Thus, in the pursuit of (unitary) efficiency we have far more of any given activity happening than anyone really wants, and being done in a way determined by nearly the greatest available level of efficiency despite that level being attainable only by a small minority. As a system this is grossly inefficient.

And it profits us nothing to suppose that the poor will "catch up" in time, and then be capable of the levels of efficiency of which the rich are capable, because by the time that happens the required level of efficiency will have moved on again. The poor remain on a perpetual back foot. Nor do we gain overall in efficiency; we do not see a reduction in consumption despite the perpetual rise in the typical unit efficiency.

It is common to forget that efficiency is a ratio, the ratio of output to input. It is hoped that by increasing efficiency, current output may be obtained with a reduced input, but it is as possible and perhaps more probable to have a greater output from the same input. In practice, what happens is that we are constantly required to get more and more out of the same allocation of resources. This is because the tasks which confront us are determined by those more powerful, who have the incentive to expand their capability but little incentive to conserve their resources.

The approach of 100% efficiency is another red herring, which leads us grossly to underestimate the effect of the diminishing return which remains. The closer we approach 100% efficiency, the greater the increase in consumption with every step as a result of this mechanism. It is common to think that, for any output, input can only go to zero and no lower; we forget that, for any input, the output which may be demanded is virtually infinite.

The world we inhabit has been built, or rather rebuilt, to require that blood be drawn from stones. In money and energy alike, this is a far more expensive business than, say, drawing orange juice from oranges. The quest to save the planet through improved efficiency is going to come back and bite us all in a place best not described.

In this study I have hitherto proceeded from a deep-seated conviction that the interests of true ecological sustainability and true political-economic

liberty will tend structurally to converge. In this the recent emphasis on energy-efficiency is surprisingly problematic. Historically, the concepts of sustainability and efficiency came to be conflated only as corporate capitalist industry became involved in ecological discourse, at least as overt participant rather than covert *provocateur*, near the end of the 20th century. In prior ecological writings the lust after efficiency was more likely to be seen as the philosophical cause of the crisis, e.g. in Schumacher and Illich, than a possible solution. By the time we had the "low-hanging fruit" argument one finds in [Amory Lovins](https://en.wikipedia.org/wiki/Amory_Lovins),[23] for instance, the conflation had imperceptibly become well cemented.

(The problem with the "low-hanging fruit" argument is that the fruit is very heavy and the tree is very elastic; plucking the low-hanging fruit removes its restraining weight and causes the tree to whip the rest of the fruit up far out of reach. A moment's reflection will reveal that this rather fanciful elaboration of the metaphor is entirely accurate. But be that as it may.)

Nor is the conflation logically inevitable. Ecology deals with closed systems, to which the terms "input" and "output" do not apply. In fact inserting the concept of efficiency into the principles of ecology must have required some fairly creative surgery. It is an interloper from the world of engineering; of steam-engines in particular, far away from the regions in which ecology first grew.

This is true whether we mean overall or unit-specific efficiency. If a cow were such an efficient converter of chemical energy, why does cow-dung burn so well as to be considered a useful fuel in itself? Ecosystems rely not on the greatest achievable efficiency but on efficiencies appropriate to the position of the entity in the system. "Inefficient" cows make cow-dung available for other functions, be it soil fertility or a sustainable fuel source for humans or, ideally, both and more. Cows operating at efficiencies that would satisfy Victorian railway engineers or modern corporate capitalist eco-tech spin doctors would be an ecological disaster.

As soon as we understand this, understand that we encounter energy demand as a thing already grossly magnified, understand that we ought to have the freedom to determine our energy requirements according to the resources to which we have easy access, it becomes clear that sustainability does not rely on any particularly impressive feats of

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23 https://en.wikipedia.org/wiki/Amory_Lovins

efficiency. Given modest enough demand, sustainability is more readily achieved at a lower than a higher level of efficiency. In automotive terms, I might suggest that a fairly good European car of c.1970 – in non-smog-controlled European spec – represents about the optimum. If this is so, the typical car on the road today is far too efficient to exist spontaneously in a sustainable context.

Unfortunately the common view of energy demand suffers from the same misapprehensions that plague the common view of economic demand, i.e. that it "just is", that it changes for no reason but the passage to time, and/or that it has something to do with what ordinary people ultimately need or even want. When energy demand is recognized as the real variable in the equation, because dismantling artificial need structures would eliminate their concomitant energy components, the issue of efficiency becomes moot. Once activities become really optional their efficiency becomes irrelevant within fairly wide limits, as the frequency of the activity is then free to adjust itself to the resource cost.

The effect of the structures of incidental and contingent need that surround us is that they render many activities and artefacts which are technically optional practically obligatory. We are not compelled by law to partake of them but the practical consequences of not doing so are disproportionately severe. Owning a mobile phone is not really optional for very many of us; owning a kite is. One result of this is that there are far more mobile phones around than kites; and in so far as any social or ecological problems arise from either, those arising from mobile phones are more severe than those arising from kites. Taken further, fairly minor problems arising from mobile phones are more important in the scheme of things than fairly severe ones arising from kites. In so far as flying a kite is an exceptional activity our systems are likely to absorb readily all but the very worst effects of kite-flying. As long as this is so there can be no pretext, no ostensible need, to regulate kite-flying specifically.

Once we account for concentrations of activity arising from artificially cultivated structures of instrumental and contingent need, it becomes clear that dismantling these structures would allow by far the greatest part of all we do to be likewise really optional and exceptional, and consequently to revert to a scale of activity which is socially and ecologically unproblematic.

Though we have seen that the design of the products of corporate capitalist

industry has developed specifically in order to define the product as that which is most favourable to the chosen methods of manufacture, the product itself is most often conceivable in terms contrary to that manifestation: though this in itself will necessarily alter the character of the product. Thus we can have cars without dormitory suburbs, but to the extent that current cars are designed specifically for the daily commute and/or exurban errand run, the cars we'd have would probably be of a wildly different character. Absent the need to overcome the economic handicap induced by the geographic dispersion of the dormitory suburb pattern, and absent the denial of time preference through salaried employment out of an artificial glut of labour, cars would be designed to be optional; which is to say that they would be designed for there to be few of them about, and best to be made in very small quantities, but not remarkably efficient. And this would be perfectly fine.

Thus we see an ecologically sustainable system arise out of the removal of the artificially magnified need that drives the current system to unsustainable overproduction, yet manifest in details quite contrary to what many believe such a system would look like. In particular, the emphasis would lie not with efficiency but with creativity. Freed of the state-capitalist requirement to reproduce every innovation millions of times and then find – or make – a market for all of it we might expect an explosion in variety, and a lavish sufficiency even while absolute output falls to a fraction of current production.

This wealth of variety would tend to militate against universal solutions, though there would doubtless be details and principles that are near-universal because they are capable of as great a variety in application. Local peculiarity would abound, be it in the strict geographic or any other culture-specific sense. Thus the intuition of many that snap-together, modular systems might be appropriate to this sort of context may be erroneous. I am more inclined to expect a renewed emphasis on interstitial fabric, connective tissue as it were, capable of co-ordinating any interface it is likely to encounter, as has been the common principle in vernacular technology thus far.

If we proceed from the idea that, given fairly obvious structural arrangements and some very basic further requirements, a simple life is really quite splendid, any innovation on top of this would be a pure bonus – provided it doesn't induce or rely on the induction of artificial needs all over

again. That would represent a real surplus of individual technological power, and its proper manifestation would be no achievement-of-mankindery, no vaguely fascistic species-jingoism, but a chaotic and colourful profusion of immediate creative opportunity for you and me.