

Technical Autonomy

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Summary

Civilization's justifying narrative has always been the myth of Progress, or the idea that civilized modification of nature is good and therefore a moral obligation. In our present time the dominant progressive narrative is a humanist one—that is, artifice is justified by the good or supposed good it does for humans. However, most people support Progress because of an associated myth that alleges humans can control the direction of Progress. Thus, when some individual or group questions technical development, most respond that technics have just been used improperly, and what we really need to do is add ethical direction. The myth of rational control rests on four faulty assumptions: (1) that human reason is sufficient; (2) that rational blueprints will be implemented properly or at all; (3) that the blueprints will go as planned; (4) that the blueprints won't have unintended consequences. This article examines these assumptions and, showing they are false, outlines their implications for the myth of Progress.

1. Introduction

“Progress” is the word used to indicate civilization’s dominant mythology: the civilized modification of nature is good and therefore a moral obligation. In terms of techno-industrial society, or late industrial society,¹ the dominant progressivist narrative is a humanist² one, so justifies civilized artifice by arguing that it is good for humans. At base, irrefutable critiques of Progress have to emphasize the value of wild nature—a normative challenge to progressivists’ normative claims. However, an associated myth that validates Progress in the minds of many is descriptive: humans believe and are told that they can direct Progress, that it is the result of their reason. If this claim was shown to be false, fewer people would be enthused about technical development, since they often believe that it fails because of improper guidance and respond to failures by trying to get people with their own values in power, or by trying to enforce their values through social movements. They would also be less enthused because it means that humans are dominated by technics³ just as much as non-human nature is.

Since the associated belief—the myth of rational control—is descriptive, it can be invalidated through scientific reasoning and empirical evidence. And it is indeed false, resting on four faulty premises:

1. It assumes that rational blueprints can be sufficient.
2. It assumes that rational blueprints, when sufficient, will be implemented properly or at all.

¹ “Techno-industrial society” or “late industrial society” (also referred to as “post-industrial society” or “the information age”) is the phase of industrial development that began roughly around WWII. It differs from the previous phase of industry in several respects, notably, its emphasis on information, its megalithic technologies, and its increased reliance on propaganda. For some general reasons why, see Hanlon, 2014; Beniger, 1989.

² “Humanism” is the dominant progressivist ideology, united by the values of solidarity between all humans, equality for all humans, and the integration of victimized classes. Left-wing movements (and the libertarians on the right) are commonly known for enforcing the humanist concern for victims, while right wing humanists often accept a more practical view that still favors the nation as an ethical reference point. Humanism was birthed from Christianity and has birthed animal rights ideologies, progressive ecocentrism, and transhumanism.

³ “Technics” is a general word referencing means by which natural energy is harnessed for an efficient end. In common language people often substitute the word “technology,” but because of its ambiguity, I only use “technology” to refer to material tools, machines, and apparatuses that harness natural energy for an efficient end. “Techniques” are methods to do this. While any species can have technics, only human technics are called “artifacts.”

3. It assumes that rational blueprints, when implemented, will go as planned.
4. It assumes that rational blueprints, when they go as planned, will not have unintended consequences.

In reality, technics develop autonomously of any human being, group of human beings, and humanity as a whole. That is, technics *evolve*. For the purposes of this essay, the actual mechanisms by which technics evolve is irrelevant; a confluence of evidence indicates that it does so nonetheless, and that the mechanisms are merely a puzzle waiting for a solution. In fact, some scientists are already working on that puzzle. Here I only outline our knowledge of the theory of technical evolution so far in order to demonstrate that regardless of the mechanisms, the four premises of the myth of rational control are false. This puts technical development out of the hands of human beings and has great repercussions for progressivism.

2. The Four Faulty Premises

2.1 Rational Blueprints Aren't Sufficient

In order for the myth of rational control to be true, humans have to know enough to change society without too many uncontrollable, unintended consequences. But that is not the case. This critique includes knowledge on the individual, group, and species level—that is, it applies even to collective knowledge through, for instance, computing systems.

Some of this is clear through abstract reasoning about the issue. If a system is devised so that it can properly understand and predict phenomena in a given society, any society that possesses it necessarily becomes more complex, and it then must devise a second system to understand and predict phenomena in “society plus the first system.” This is because the first system will itself affect the goings-on of a society and contribute more complexity. Thus, it is never possible to have absolute self-knowledge.

Of course, this does not mean that prediction is impossible, but there are practical limits. Societies are complex systems, which means that miniscule differences in their starting conditions can result in drastic differences later on. Thus, predicting social phenomena is a lot like predicting the weather or the economy, which also deal with a complex system. And as everyone knows, weathermen and economists frequently make inaccurate predictions.

In other words, those who argue that technical progress can be good if only we had the proper institutions to direct it must explain how the group of people given authority to determine “good” will make their decisions. Since they will be like weathermen, we can be sure that their predictions will almost only be accurate in the short term, not even considering “unknown unknowns” and unintended consequences. For instance, at the time cars or cellphones were invented, no one knew the far-reaching changes they were going to bring to society, and no one could have known. How, then, could any group of people have directed these inventions to ensure that their consequences were “good” ones? As a practical example for our current time, how would anyone go about properly predicting and assessing the consequences of biotechnics?

There are numerous examples supporting the position that no one actually can. For instance, a recent article entitled “Why aren't urban planners ready for driverless cars?” one planner was quoted as saying, “We don't know what the hell to do about it. It's like pondering the imponderable” (Jaffe, 2015). This *may* be fine when it comes to benign technical inventions, of course, but in our current world of massive technologies

with far-reaching, global consequences this is unacceptable, and not what most would call “sufficient knowledge.”

Furthermore, it is impossible for humans even now to understand many technical systems on which industrial society depends. A common example is the stock market, almost 70% of which now depends on “black box trading” or “algo-trading.” Black box trading is a practice whereby algorithms do the actual trading between businesses and brokers. It is an almost entirely automated process, and very efficient. But nobody actually knows what algorithms are running the stock market. In fact, it is the job of some companies to go in, pick out algorithms, and give them cute names like “the knife” so that we can know what, precisely, is determining the outcome of your pension. This obviously comes with some problems. In May of 2010, an event now known as the Flash Crash of 2:45 occurred, during which 9% of the stock market just disappeared. To this day, no one knows exactly what happened. Something similar occurred in 2015, and as a result stocks from PepsiCo, JP Morgan, and Ford Motor, among others, declined up to 20%. A 2013 article from *Nature* described this algorithm-run stock market as a “machine ecology beyond human response time” (Johnson, et al., 2013).

We also can’t forget that social systems consist of humans and are dependent on human behavior, other complex phenomena, and this introduces an inherent amount of instability that only decreases with more complex social systems. So consider that in 2010, when the AP Twitter account was hacked to announce that the White House had been attacked and Obama injured, the stock market suffered another flash crash that resulted in a 130-point plunge in the Dow Jones Industrial Average (Matthews, 2013).

Perhaps if industrial societies were not yet dependent on these technical systems, advocates of rational control could make a stronger case for ethical direction of technical progress. However, our already-established dependence severely weakens this argument, since we’ve arguably reached a point where the practical knowledge required would not be sufficient for proper ethical direction.

Lest someone think that this only applies to the stock market, consider the example of airplane Traffic Alert Systems. One article (Arbeson) explains,

Despite the vastness of the sky, airplanes occasionally crash into each other. To avoid these catastrophes, the Traffic Alert and Collision Avoidance System (TCAS) was developed. TCAS alerts pilots to potential hazards, and tells them how to respond by using a series of complicated rules. In fact, this set of rules — developed over decades — is so complex, perhaps only a handful of individuals alive even understand it anymore.

In fact, even technical systems not composed of metal qualify as beyond our control, like bureaucracies. Who really understands the dynamics of a US government or a large, international NGO? Nobody, of course. That doesn’t keep these things from operating, but it does mean that any attempt to direct them for “good” has to face possibly insurmountable practical problems.

Finally, humans can't hope to ever predict some technical developments. For instance, the moment an AI becomes as intelligent as a human is the moment it becomes more intelligent. After that, no one can predict or even understand what the AI will do; that is absolutely outside of our ability. This means that for AI and technical developments like it (e.g., biotech, nanotech, etc.), a large part of the "improvement" actually can't be judged as so until after the fact, and maybe not even then. For instance, if an AI (or a whole AI system on which industrial humans are dependent) becomes malicious, there may not be much we can do about it. Saying that we could just turn them off is like saying the monkeys could just turn us off because we keep destroying their habitats. Indeed, many from the technician class know this, yet pursue technical development regardless. For instance, Claude Shannon, the founder of information science, said, "I can visualize a time in the future when we will be to robots as dogs are to humans...[and] I'm rooting for the machines" (Liversidge, 1987).

2.2 Rational Blueprints Often Can't Be and Aren't Implemented Properly

Even if humans did know enough to direct technical progress, they often cannot or do not properly implement their plans.

2.2.1 Let's Play a Game

For instance, let's assume that directing technical development is possible in the context of a nation-state, which is really the highest level of control most people can argue for without proposing a universal government. In this case, if technics are just a tool in the hand of the "good" prevailing power, then they are just as much a tool in the hand of a "bad" prevailing power. And technics are difficult to control, some, like computer code, practically impossible. Short of a global government, and an extremely well managed one at that, we can be sure that at least some "bad" state actors will get ahold of technics that are quite powerful. And the real question is whether technics can reach a certain level of power that the risk of "bad" actors getting ahold of them simply isn't worth it. Nuclear proliferation was a major example of this for a long time, but newer technics make nuclear look like child's play. Biological weapons, nanotechnology, and artificial intelligence all present much graver threats. Few people realize how simple it is to build a biological weapon. If we consider that not even a global government could prevent terrorism, and if we consider that these technologies give a tremendous amount of power to rather small and organized groups, the answer we should tend toward becomes clear.

In fact, the actors in question don't even need to be "bad." Game theory and various other cooperation puzzles reveal that even "good" or neutral actors could unwittingly engage in behaviors that lead to their demise. The classic example is the tragedy of

the commons, a puzzle in which actors use a given resource according to their own self-interest, but also in ways which deplete the resource for everyone using it. Several other puzzles, like the prisoner's dilemma or wars of attrition, illustrate that proper control over technical development is simply not possible, and things are bound to get out of control. Once again, this need not be true in an absolute sense. It is enough to note that technics are getting so powerful that even the threat of things getting out of hand is simply too much of a risk; and, of course, it invalidates many fantastical schemes for controlling Progress that some argue "ensures" that we can do good with technics.

2.2.2 Accidental Progress

Stemming from the fact that humans can't know enough to direct technical development, accidental inventions or chains of events also cause problems for implementing rational blueprints. Consider that many technics and scientific discoveries were invented or discovered by accident, including anesthesia, x-rays, dynamite, electromagnetism, ozone, radioactivity, and penicillin. Many times these accidental inventions or discoveries change the technical landscape profoundly, invalidating any previous blueprint or efforts to implement it. This is unavoidable; no scheme could overcome such a limitation.

2.2.3 Human Folly and Human Limits

Then there's the fact that humans simply aren't primarily rational creatures, so their attempts to implement blueprints are going to suffer consequences that stem from their inept wetware. Of course, this was far less of a problem in the Pleistocene environment under which our brains evolved, but in our modern, mismatched environments human reason suffers some serious setbacks that together are called "bounded rationality."

The psychologist Daniel Kahneman illustrated a series of such problems in his excellent book, *Thinking, Fast and Slow*. One example he gives recalls an experiment in which he and the psychologist Amos Tversky told participants about an imaginary character named Linda. Linda, the story went, was single, smart, and outspoken on the issues of discrimination and social justice. After explaining this, the two psychologists asked if it was more probable for Linda to be a bank teller or for Linda to be a bank teller who was active in the feminist movement. Of course, basic lessons in statistical probability would reveal that the first answer is the correct one. Only a subset of all bank tellers are feminist bank tellers, so adding the extra detail will necessarily decrease the probability. But most participants said the second answer was correct.

Another phenomenon Kahneman reports is called the "availability heuristic," which means that the easier something comes to mind, the more probable the human mind will judge it to be. For example, Kahneman and Tversky (1973) asked participants in one experiment to judge whether words that began with the letter k were more

probable, or whether words with k as their third letter were more probable. Because we recall words by their onsets, words beginning with the letter k are easier to recall. Thus, the duo predicted, rightly, that participants would judge words beginning with k as more likely, even though the opposite is true. One could repeat this experiment using almost any letter.

The availability heuristic helps explain why people seem to fear things in a way that is totally incongruent with statistical probabilities. For example, death by falling furniture is much more likely than death by murder, but because it is easier to recall instances of murder, perhaps from the news or even novels, people fear it significantly more. This may explain why individuals in nations with extremely low crime rates but oversaturated with news media suffer from undull anxiety about crime.

These heuristics have implications for moral reasoning as well. In his book, Kahneman describes two kinds of systems in the human brain. System 1 is intuitive, fast thinking, and it utilizes various shortcuts in order to come to conclusions. For all its imperfections, System 1 can be surprisingly accurate, especially when making decisions closer to the kinds our Stone Age counterparts would have made. In contrast, System 2 is analytical, slow thinking, the part of the mind that humans use to write or do complicated math. Kahneman argues that the fast, intuitive system is more influential and that individuals often act on its conclusions without the analytical mind ever even knowing about it. But just imagine what this means for humans making split-second moral decisions with big consequences, like dropping a bomb or initiating a drone strike. Or even just imagine what this means for humans who run large and ostensibly benign systems that might also require split-second decision-making, like nuclear facilities.

Finally, there are the most unsettling biological limitations of all, which also happen to be the ones that brush up against the topic of morality most directly. One of the most striking of these is our inability to reason about moral obligations to large populations. For example, Slovic (2007) once conducted an experiment in which he told volunteers about a starving girl, measured their willingness to donate, and then told the same story to another group but with the added detail that millions of others were also starving. The second group gave around half as much money as the first. In fact, Slovic found that even adding just one more person would begin the process of “psychic numbing.”

Slovic’s finding that humans have a hard time reasoning about large numbers of people is in some ways unsurprising. In fact, it is a hallmark problem of population ethics. Churchland (2011, p. 178) put it this way: “no one has the slightest idea how to compare the mild headache of five million against the broken legs of two, or the needs of one’s own two children against the needs of a hundred unrelated brain-damaged children in Serbia.” The evolutionary explanation for this is that humans have never had to deal with such large numbers of people, so conditions didn’t encourage the evolution of mental mechanisms that would allow us to do so intuitively. It may be that we can use Kahneman’s analytical System 2 to conquer the problem, but it may also be that our analytical mind isn’t equipped to deal with it at all. Whichever happens

to be correct, it is clear that humans are unlikely to provide proper ethical direction to technical development.

2.3 Rational Blueprints Do Not Go As Planned

For three decades, we've sought to solve [these] problems...and the more the plans fail, the more the planners plan. —*Ronald Reagan*

As is to be expected from a world where human knowledge is limited and human ability constrained, even when some individual or group attempts to implement their blueprints in all the right ways, their blueprints rarely go as planned.

2.3.1 Calendar Reform

Some great examples of this include numerous attempts at calendar reform. The Gregorian calendar is notoriously inefficient, especially for industrial economic purposes. Indeed, the inefficiency has resulted in loss of large sums of money and several lives, motivating many to popularize calendars much more suited to their industrial purposes (99% Invisible, 2015). They have all failed. This includes the *Positivist calendar*, created by August Comte; the *Pax calendar*; the *International Fixed Calendar*; the *World Calendar*; the *French Republican Calendar*; the *Invariable Calendar*; the *World Season Calendar*, created by Isaac Asimov; and the *Tranquility Calendar*. To give a sense of the scope of their failure, some of these were even proposals in international organizations like the League of Nations but nevertheless failed to be implemented.

2.3.2 Failed Utopias

City planning is also a field notorious for failed schemes. It's not that city planning doesn't work—it often does—but perhaps more than any other field it demonstrates how rational blueprints can work only when they are limited in scope and when they aid technical and economic developments already under way. For instance, most successful city planning projects focus on aesthetics and the general structure of a city, and even then usually only in cities where the economy is already functional. Attempts to build cities and then build an economy have to my knowledge always failed, and this is demonstrable especially in utopian schemes of over-zealous planners.

A famous example is Paolo Soleri's "Arcosanti," a city he designed from scratch in order to demonstrate the principles of "arcology," or ecologically-informed architecture, the dogma of modern "green planners." Arcosanti is an odd, futuristic city that, although capable of supporting around 5,000 humans, has only a population of around 80, mostly dreadlocked alternative-culture types. The Japanese corporation Shimizu tried to implement another arcological project in 2004, but it has similarly failed (Keller, 2015).

These examples reflect the similar and ubiquitous failure of utopian communities that became common in the U.S. in the 1800s. The Nashoba community, for instance, closed its doors within a year of its debut; and only months after the creation of New Harmony, one of the most famous utopian communities, various groups splintered off from each other and the project failed.

With all these examples, it should not surprise anyone that the most striking planning project of all was met with equally striking failure. I refer, of course, to communism. Harris (1992) explains, for instance, that Soviet communism failed precisely because its ideologically-derived social structure was not suited to infrastructural conditions, something communist dogma ignored. Whether or not Soviet communism equals real communism is irrelevant; the point is that the management scheme that *was* attempted failed, and for probably similar reasons that calendar reform, utopian cities, and ambitious city planning projects frequently fail as well: humans just aren't as powerful as they think.

2.3.3 Biosphere 2

One might, of course, argue that there are at least some cases where humans have knowledge and power enough to control some system. Indeed, humans have already attempted to gain such a level of knowledge and power in creating a now-infamous project known as "Biosphere 2." And it too failed. Twice.

Biosphere 2 was an attempt by some scientists to create a totally controlled ecological system with five biomes roughly equal to most biomes on Earth. It was a highly popularized project, with implications for biologists, ecologists, and various technicians' dreams of space colonization, because it offered, or was to supposed to offer, a way for scientists to carefully control variables and learn how, precisely, ecosystems work.

However, Biosphere 2 suffered from frenzied CO₂ levels that caused many species to die, including most vertebrates. Pest insects prospered, and some species killed off and dominated other species. The humans inhabiting the system ultimately had to leave. (And some scientists are still considering geo-engineering as a response to climate change!)

The second time around failed largely because of disputes between the scientists, compounded by alleged vandalism by some of the more upset individuals. This may seem irrelevant, but it is in fact highly germane, since it reminds us to temper our planning schemes with greater awareness that it is humans coming up with and implementing them.

Tainter and Patzek (2012), in their book about the *Deepwater Horizon* oil spill, summarize all these points thusly:

The *Deepwater Horizon* was a normal accident, a system accident. Complex technologies have...ways of failing that humans cannot foresee. The

probability of similar accidents may now be reduced, but it can be reduced to zero only when declining [energy returns] makes deep-sea production energetically unprofitable. It is fashionable to think that we will be able to produce renewable energies with gentler technologies, with simpler machines that produce less damage to the earth, the atmosphere, and people. We all hope so, but we must approach such technologies with a dose of realism and a long-term perspective.

2.4 Rational Blueprints Always Have Unintended Consequences

The chief source of problems is solutions. —*Sevareid's Law*

Ultimately stemming from the fact that humans don't know enough, even rational blueprints that are perfectly implemented always have unintended consequences.

Let's assume that industrial medicine, a highly successful industry by most accounts, was rationally implemented and not evolved. Even it suffers from profound unintended consequences like antimicrobial resistance, which is creating an increasingly dangerous situation. One might also note that medicine has itself caused medical problems. As one article puts it, "There is increasing evidence that the [mismatch between human biologies and civilized conditions] fosters 'diseases of civilization' that together cause 75 percent of all deaths in Western nations, but that are rare among persons whose lifeways reflect those of our preagricultural ancestors" (Eaton, Konner, & Shostak, 1988).

Or consider that most technical innovations supposed to decrease human work have actually increased it. For instance, cell phones and PCs, by making communication and several other business functions more efficient, did not decrease the workday; instead, the workday began bleeding into the home, often without wage compensation.

Or consider the related Jevon's Paradox, whereby increased efficiency in production will actually lead to more consumption, not less.

Tenner covers many of these unintended consequences in his book *Why Things Bite Back: Technology and the Revenge of Unintended Consequences*. He focuses especially on medicine, but also agriculture, sports, and office work. In the end one is thoroughly convinced that unintended consequences are simply a part of technical development, especially because so many depend on the oddities of human behavior. He writes, for instance, "when a safety system encourages enough additional risk-taking that it helps cause accidents, that is a revenge effect." In the end, however, he falls into the trap most do: he proposes more "finesse" and "moderation" in developing and applying technology—a technical system to control the technical system! By now, however, it should be clear that such a thing is impossible.

3. An Alternative Model of Technical Development

One might wonder how technical development proceeds if humans don't control it. Luckily, the budding field of cultural evolution, as well as some old insights from Marx, Darwin, and Malthus, provide us with some paths for investigation. Within this field of cultural evolution is the specific problem of technical evolution, which holds that technics are not directed, but evolve, and the illusion that they require an intelligent designer is akin to the same illusion produced by complex biological systems.

As of yet there is no comprehensive theory of technical evolution. We do know, however, that it will involve a synthesis of at least two domains—cultural ecology and sociobiology—and that it will involve a resolution of the controversy between group selectionists and kin selectionists in evolutionary theory. What follows is a brief review of our current knowledge.

3.1 Cultural Materialism

The best theory in cultural ecology, by scientific standards, is Marvin Harris' "cultural materialism," a synthesis of the cultural evolutionism of Leslie White, the findings of Darwin, the scientific aspects of Marxist theory, and the demographic emphasis of Malthus. The most in-depth exposition of Harris' theory is in his book aptly entitled *Cultural Materialism: The Quest for a Science of Culture*, in which he describes the theory's epistemological foundations, its basic principles, and reasons why it prevails over the alternatives.

For our purposes, the most relevant part of the theory is his outline of the universal structure of society. He argues that cultures are composed of three components: an infrastructure, a structure, and a superstructure, each metaphorically stacked on top of each other, and each of the bottom layers probabilistically determining the character of those higher up.

The infrastructure is composed of two elements. The first, the mode of production, consists of the material technics and economics by which a society harnesses natural energy for efficient production of necessities, like food and energy. Common modes of production are hunting-and-gathering, pastoralism, agriculture, and industry. The second, the mode of reproduction, is the sexual and reproductive practices of a society, like birth control and infanticide. These two elements together, plus the given natural

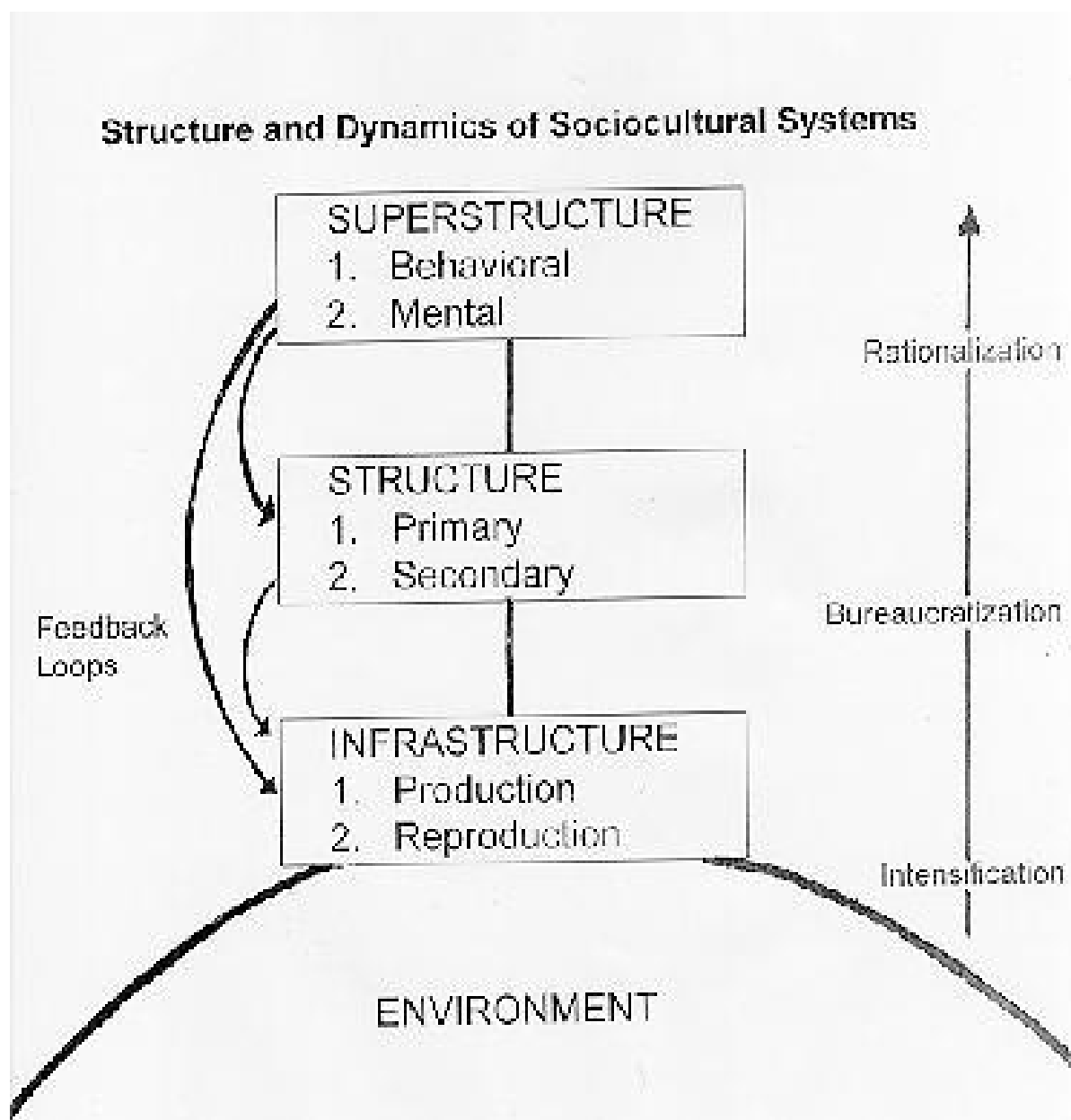


Figure 1. Demonstration of Harris' "universal structure of society," from Elwell.

context of geography and ecology, make up the raw materials on which a society is built. As a result, no element of society can transcend these infrastructural limits, and in attempting to explain a certain culture, we should look to the infrastructure first. Jared Diamond's *Guns, Germs, and Steel* is one example of this approach.

The second level of society, the structure, is the pattern of social relationships within a given infrastructural context, meant to properly distribute, secure, and stabilize the use of the infrastructure's products. This includes things like certain economic institutions, divisions of labor, governments, NGOs, etc.

The final level of society, the superstructure, is the collective mythology of a culture—its science, its religion, its cultural narratives, and so forth. These secure an individual's commitment to the structure's way of managing resources, and they are, again, probabilistically determined by the structure and infrastructure.

The implications of the theory are what one would expect. Humans, for instance, have reduced agency, something that many have criticized Harris for, but which seems to be correct, regardless of how unsettling it is to some. Since superstructure is determined by lower levels, it cannot be a source of large-scale social change. That is, simply changing men's minds will do nothing if the actual structure of a society doesn't change, and a structure can't change if infrastructural limits don't allow it. There are feedback loops between each level, especially since the higher levels maintain the stability of human being's relationship to the lower levels, and affecting these feedback loops can determine the character and speed of social collapse. But overall humans are still very much at the whim of elements much more powerful than their own power and will. Furthermore, because societies are complex systems, it is not always clear how feedback loops function, so the effects of an ideological social force on the structure and infrastructure are frequently unpredictable. This is why the determinism is "probabilistic."

3.2 Sociobiology

One thing Harris got quite wrong was his position on human nature. He advocated a "blank slate" idea of nature, believing it to consist of only basic desires and believing that that primary method by which humans respond to their environment is through cultural adaptation. This idea was in vogue when he was devising his theories and is still quite strong among some academics. However, the cognitive revolution and the new science of sociobiology have demonstrated that the theory is wrong, and that human nature is actually not very blank at all (Pinker, 2002).

Often a broad argument employed by blank slatists is the "complexity" of human social life, something that they can't accept is the result of "instinct" alone. But apart from the fact that sociobiology does not rest solely on the concept of "instincts," this is a weak argument. Animals who it is generally agreed have only instincts are incredibly complex social creatures—ants, whales, dogs.

Then there's the success of sociobiology in explaining *altruism* (Pinker, 2011; Wilson, 1975; Barkow, Cosmides, & Tooby, 1995; Dawkins, 1976), *cultural universals* (Pinker, 2002), *incest taboos* (Barkow, Cosmides, & Tooby, 1995; Shepher, 1971), *infanticide* (Daly & Wilson, 1988), *human violence* (Rice, 2013; Pinker, 2011; Wilson, 1975; Daly & Wilson, 1988), *rape* (Thornhill & Palmer, 2001), *facial expressions* as a form of social communication (Ekman, et al., 1987; Eibl-Eibesfeldt, 2007), etc., and in such a way as to yield fruitful and accurate predictions. This would be impossible if the theory was not very accurate itself. By all accounts, then, it has won, despite the controversy that met it at its birth (Alcock, 2003).

In fact, sociobiology is such a well-researched and established science that any synthesis between it and cultural ecology is likely to subsume cultural ecology than the other way around. Indeed, dual inheritance theory, also gene-culture evolution, is the most promising place for synthesis, and is based primarily on sociobiological insights. It argues that genetic and cultural evolution influence one another, the research possibly making our understanding of the aforementioned "feedback loops" more concrete than now. For more on dual inheritance, see Lumsden & Wilson, 2005 and the work of Boyd & Richerson.

3.3 Group Selection versus Kin Selection

One of the main hurdles for any synthesis is the conflict between kin selection theory and group selection theory. The former, which is the dominant view in the biological sciences, holds that behaviors, like altruism, evolve because of "inclusive fitness," or the fact that a behavior will dominate when it benefits genes of related creatures. Dawkins and an earlier Wilson famously espoused this theory in *The Selfish Gene* and *Sociobiology*, respectively. In fact, kin selection is now dominant because of a critique launched by a cadre of biologists including Dawkins, John Maynard Smith (1965), and G. C. Williams (1966), who argued that group selection was not only weak and confused, but unnecessary to explain available data.

Group selection theory argues that natural selection sometimes operates on the group, not only the individual, as kin selectionists argue. Although overthrown in the 60s, it has since returned in its modern incarnation as "multi-level selection theory" and boasts big names, like David Sloan Wilson and now one of the formerly fierce defenders of kin selection, Edward Wilson. The latter's about-face has put him into public conflict with Richard Dawkins, but he has stood firmly by his view, and in a *Nature* article authored by two others, he laid out the reasons for his view, which elicited a negative response from more than 150 scientists.

Some have argued that the difference between the two theories may simply be semantic, not empirical, including one of the scientists who popularized the concept of inclusive fitness, W. D. Hamilton. This may be true in some simplistic sense, but the theories differ in one important respect, namely, where they grant causal priority.

Other differences, such as how the theories compare in simplicity and parsimony, also matter.

The conundrum is this: most of the work on cultural evolution and coevolution has been done on the basis of group selection theory. Luckily, because there is so much empirical overlap, kin selectionists need not dismiss all the work completely. They do, however, have more work set out before them.

Furthermore, it seems that at least some differences between kin selection and group selection are political. For instance, David Sloan Wilson, who has dedicated his life to defending group selection theory, unabashedly employs it in support of his progressivist politics, as has E. O. Wilson in his recent *The Social Conquest of Earth*. This greatly complicates the terrain any scientific view must master. The trick is to choose a theory regardless of political bias and do whatever work is necessary from there. Either way, the tension is one that needs to be resolved for any comprehensive theory.

3.4 Analogy and Example for Understanding

In order to understand the actual process of technical evolution, imagine human intention as the “motor” for much of the evolutionary process (although not all of it), and selection pressures that include more than and are more powerful than human intention as the steering wheel deciding the direction of collective human choices.

Consider this analogy. In a version of UNO I often play with my family on holidays, individuals keep a tally of how many points are in their hand after each round has ended. When someone surpasses 500 points, the game ends, and the winner is the person with the least number of points. However, if someone hits 500 exactly, they go back to zero. Sometimes individuals end up with a number of points very close to 500, and they begin to think they can manage to keep just the right amount of points in their hand so that when someone else goes out, they will have 500 points exactly, go back to zero, and have a shot at winning again. The problem is that no matter how much skill and reason someone puts into trying to reach 500 exactly, there are still an enormous amount of factors that the person could never control, and that ultimately determine whether he will actually achieve his goal. Reason isn’t enough. Cultural evolution works similarly.

Nia et al. (2015) provide a real example of this idea as applied to violin acoustics. They analyze 470 instruments across several centuries and note that the change of the shape of the “f-hole” on either side of the violin strings was “gradual—and consistent” (see Figure 2). They demonstrate that as each change provided superior sound, the creators replicated them at the expense of inferior designs. This occurred until the changes reached equilibrium with current f-shape. Note that the forces behind this change were not only or even predominantly human intention; instead, markets and physics were stronger determinants.

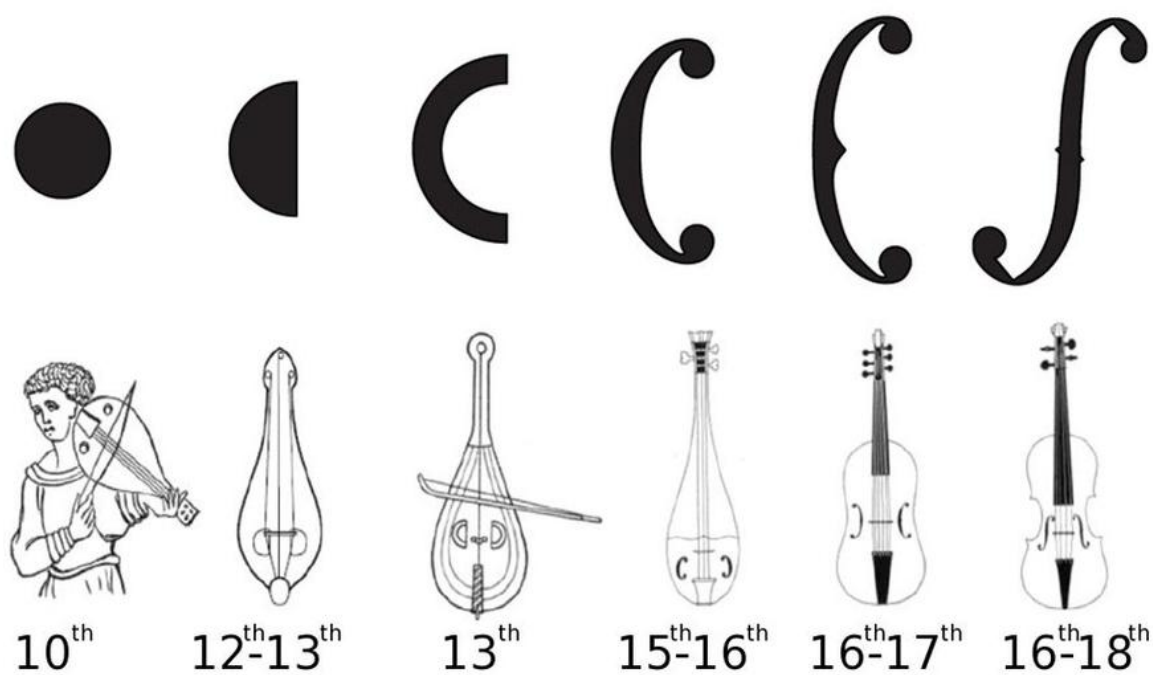


Figure 2. Development of the violin f-hole over time. From Nia et al. (2015).

A final example: in a fascinating excerpt from *The Evolution of Everything*, Matt Ridley points out some trends in technical development occur with such regularity that humans control is unlikely to be the cause. Instead, Ridley writes, these regularities suggest that technics evolve:

...some scientists have begun to notice that cities themselves evolve in predictable ways. There is a spontaneous order in the way they grow and change. The most striking of these regularities is the ‘scaling’ that cities show – how their features change with size. For example, the number of petrol stations increases at a consistently slower rate than the population of the city. There are economies of scale, and this pattern is the same in every part of the world. The same is true of electrical networks. So it does not matter what the policy of the country, or the mayor, is. Cities will converge on the same patterns of growth wherever they are. In this they are very like bodies. A mouse burns more energy, per unit of body weight, than an elephant; a small city burns proportionately more motor fuel than a large one. Like cities, bodies get more efficient in their energy consumption the larger they grow. There is also a consistent 15 per cent saving on infrastructure cost per head for every doubling of a city’s population size.

The opposite is true of economic growth and innovation—the bigger the city, the faster these increase. Doubling the size of a city boosts income, wealth, number of patents, number of universities, number of creative people, all by approximately 15 per cent, regardless of where the city is. The scaling is, in the jargon, ‘superlinear’. Geoffrey West of the Santa Fe Institute, who discovered this phenomenon, calls cities ‘supercreative’. They generate a disproportionate share of human innovation; and the bigger they are, the more they generate. The reason for this is clear, at least in outline. Human beings innovate by combining and recombining ideas, and the larger and denser the network, the more innovation occurs. Once again, notice that this is not policy. Indeed, nobody was aware of the supercreative effect of cities until very recently, so no policy-maker could aim for it. It’s an evolutionary phenomenon.

4. The Consequences of Technical Autonomy

When we see an animal behave differently in a zoo than in the wild, we reasonably attribute this behavior to the influence of the artificial environment, and very often there is an understanding that a caged animal is worse off than a wild one, or at least that caging animals is not a moral imperative. But when it comes to humans, this logic seems not to apply, often because people assume that technical development is fully an expression of human nature, that humans are optionally building the technical cages and then walking in them.

But technical autonomy invalidates this human exceptionalism. It is feasible, indeed much more probable, that humans are being caged, domesticated, and artificially dominated by technical environments just as much as wild animals are. Of course, progressivists argue that good things have come from this, like less violence overall and longer life expectancies. In fact, it is because civilization does these things that humanists argue for development and the civilizing process. But this would be like saying wild animals should be caged because most of them have longer life expectancies or because some of them become less violent (more lethargic) in captivity. In fact, many “self-actualizing” or “creative” endeavors industrial humans engage in from boredom have parallels for zoo animals, and animals that behave in such odd ways in zoos are said to have “zoochosis”—it isn’t a good thing.

We might also note that to combat these odd behaviors, zookeepers often put out distractions like toys, food that takes a long time to eat, and other such things. This is oddly similar to the video games, sports, and television programs meant to distract modern man from his unease. And I’m sure we’ve all heard of the need for “more social programs” so that local youth don’t “get themselves into trouble.” This is viewed as necessary, and of course it is if we are to preserve the city that is dependent on controllability.

To further extend the analogy to humans, which may or may not hold out as significant in actual research, we might note the similarity of odd behaviors in captive animals and industrial humans: self-mutilation, vomiting, over-grooming, increased stress, and abnormal sexual practices, just to name a few. And, just like humans, “the gorillas, badgers, giraffes, belugas, or wallabies on the other side of the glass are taking Valium, Prozac, or antipsychotics to deal with their lives as display animals” (Smith L., 2014).

These findings make the field of sociobiology highly relevant, since it and its sister and daughter fields reveal human behavior in wild conditions, possibly also revealing the ways that behavior changes in civilized and especially industrial conditions. This of course does not prescribe any moral view, but as the contrast between our wild and civilized conditions becomes clearer, the common value of *wildness* will likely become a core element of future moralities challenging technical development and progressivism.

5. Conclusion

Technical evolution is akin to biological evolution in that both purge from our minds the delusion of a rational creator guiding the process from above. In the case of biology this creator is God, of course; and in the case of culture, and more specifically technics, the creator is humankind.

I've presented several lines of evidence to support the fact that technical evolution is not only true, but necessarily true given material limits to human knowledge and ability. Humans can neither know enough to control technics, nor can or do they properly implement what they do know, nor do their implementations go as planned, nor do they ever implement plans without unintended side effects.

Unfortunately, we've yet to have a comprehensive alternative theory, but we do have several leads and quite a bit of groundwork covered. Mostly the present work is synthesizing the theoretical frameworks of cultural ecology and sociobiology and addressing the unresolved tension between kin selection and group selection theory.

The implications of technical autonomy are far-reaching, especially since they challenge the humanist argument that civilization is good for humans. This is not, of course, inherent in the empirical findings, but it is implicit since so many regard *naturalness* and *wildness* as desirable qualities, and they are consequently skeptical of attempts at domination through cages or domestication. As a result, it would be unsurprising to see a morality based around wildness become the dominant challenge to progressivism in upcoming years.

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