

# The Politics of Science Concerning Sustainable Development: Marcuse's New Science in the 21<sup>st</sup> Century\*

*Katharine N. Farrell*

## Introduction

The arguments presented in this essay build on the work of the critical theorist Herbert Marcuse, in order to address the role of science in environmental governance. The main focus of the essay is the *simultaneous* domination of humans and non-humans—of “man” and “nature”—that takes place in the course of building and maintaining industrial systems of economic production.

The core thesis is that postnormal science, a discourse on scientific methodology and its related techniques, can be understood as a realization of the new modality of science that Marcuse predicted in *One-Dimensional Man*, where: “pacified existence...the repressed final cause behind the scientific enterprise... were [it] to materialize and become effective, [is accompanied by a situation where] the Logos of technics would open a universe of qualitatively different relations between man and man, and man and nature.”

The proposition that postnormal science is a manifestation of Marcuse's “new modality of science” is significant for the study of 21<sup>st</sup> century environmental politics, because Marcuse proposed that this new modality of science might provide a means for escaping the oppression of one-dimensional thinking.

Following Marcuse, it is proposed that the humanity/nature dialectic of 19<sup>th</sup> and 20<sup>th</sup> century industrial societies will be historically surpassed as they become late industrial societies (in the course of the latter part of the 20<sup>th</sup> and early 21<sup>st</sup> centuries) and begin to encounter a situation of “pacified existence.” By this time, he predicted, the physical task of achieving liberation from the vagaries of “nature” would be replaced by the intellectual task of achieving liberation from a social system created to conquer nature. Judging the scientific method of reduction and falsification to be intimately related to the development of industrial manufacture, Marcuse proposed that its logic is embedded in the technologies to which it gives rise. He then argued that, due to the ubiquitous and fundamental presence of these technologies, the scientific logic that they reify achieves an implicit ideological function, reinforcing what is and what is not appropriate to think and to do.

Although basic needs like water, shelter, and food are met for almost all members of a late industrial society, the insidious regularity of technology obstructs fulfillment of the basic human needs for intellectual freedom and self-determination, because it structures not only people's actions but even their thinking.

Marcuse's prediction that the means for achieving liberation from technology as ideology might be found in the emergence of a new modality of science is directly related to his position that technology as ideology has its origins in the logic of the Western science that supported the Industrial Revolution:

...what is at stake is the redefinition of values in *technical terms*, as elements in the technological process. The new ends, as technical ends, would then operate in the project and in the construction of the machinery, and not only in its utilization. Moreover, the new ends might assert themselves even in the construction of scientific hypotheses—in pure scientific theory.

By arguing that technology functions as the dominant ideology in late industrial societies, Marcuse suggests a shift in the location of political power and in the location where political leverage can be applied. Specifically, he predicted that the seeds of liberation from technology as ideology might eventually be found in a new form of scientific logic, one that might emerge as scientists begin to engage with new problems that arise along with the conditions of late industrialization.

Could such liberatory possibilities now exist in the form of postnormal science? If so, then there is a case to be made for political theorists and postnormal scientists to work together to explore how new theories of human liberation might be built through combining a critical environmental politics with innovative scientific methodologies. To that end, the main aim of this paper is not to advance a new political theory but to state a case for the work of weaving together these two bodies of knowledge.

### **Late Industrial Environmental Issues and a New Modality of Science**

The postnormal discourse, introduced by Silvio Funtowicz and Jerome Ravetz, is concerned with situations where the lines between science and politics, facts and values, truth and perspective are irrevocably blurred. Where scientific results are inherently uncertain and/or highly politically charged (e.g. model predictions about global climate change or assessments of the impacts of nanotechnologies and genetically modified organisms), the principle that all scientific problems have identifiable solutions is called into question.

Postnormal science draws its name from “normal science:” a term introduced by Thomas Kuhn in 1962 in his philosophy of science text, *The Structure of Scientific Revolutions*. The concept of normal science is part of a more general theory regarding the establishment and overthrow of scientific paradigms. While it is neither appropriate nor possible to summarize Kuhn's theory here, a brief overview of the general argument is useful to point out some basic insights underlying postnormal science.

Among other things, Kuhn argued that scientific knowledge advances through socially mediated paradigm shifts, and that its progression is both regular and repetitive. Starting with normal science, where the rules are agreed, most science is about solving puzzles. In time, important rules are called into question by a few

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scientists trying to solve problems that push the boundaries of the established rule set. New rules are developed by these scientists to cope with the problematiqués that concern them. Eventually, if the new rules hold up to more general scrutiny, over time a new normal science comes into being, where these rules are accepted, and the scientists involved turn toward solving a new set of puzzles. A simple illustration of this is the Copernican revolution: First Copernicus' idea of a solar system was largely ignored (not in the rules). Subsequently Galileo was deemed a heretic, basically for adopting Copernicus' system (rules called into question). Today, the theory that the earth is part of a solar system is taken as given (new rules).

The “revolutionary” thesis of postnormal science is the proposition that under certain conditions, “normal” puzzle-solving science is not a scientific approach, because sometimes the puzzle in question cannot be solved: “We have seen the man behind the curtain and objectivist realism is now compromised.” Postnormal science situations arise when human societies are confronted with scientifically entailed questions that are highly politically charged and/or epistemologically complex. Social stakes may be high (e.g. due to grave public concerns or the presence of a range of conflicting interests), and/or scientific knowledge may prove intractably uncertain (e.g. because scientists lack suitable theories to explain something or suitable tools for measuring it).

A community of scientists and political actors confronted with a postnormal science problem is facing a Kuhnian revolution of a different character: the daily practice of scientific knowledge production has become an unavoidably political activity.

Postnormal science can be understood to have arisen, in part, because modern science has reached its epistemological limits, and, in part, because late industrial societies place new demands on science. From the scientific methods perspective, observation of the physical world has reached into the minutest of details and any fundamental propositions of fact that still remain uncertain cannot be verified empirically. From the social perspective, communities in late industrial societies are no longer focused on straightforward, fact-based survival problems like averting hunger and securing shelter but are instead calling upon science to help address value-laden, judgment-based, late industrial quality-of-life problems like defining “acceptable levels” of pollution and ensuring the quality and safety of processed foods.

Under conditions where “facts are uncertain, values in dispute, stakes high and decisions urgent,” Funtowicz and Ravetz write, the quality of scientific insights is no longer determined solely by a scientific peer community but through an “extended peer review” process. In this expanded arena, insights and conclusions are evaluated not only by a scientist's immediate peers but also by scientists from other disciplines and people from outside scientific society, all of whom are interested in and involved in contributing to the reification of the facts in question.

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In the case of applied ["normal"] science, decision stakes and systems uncertainty are minimal; it is rare for a policy decision to depend on a single research result. For professional consultancy, the stakes and uncertainty range from moderate to severe; the medical doctor normally cares for the health or life of a single patient but may also protect a wider community as with epidemiological problems. The engineer must consider the welfare of a client, and in connection with safety, that of a wider community.

### **Figure 1: Postnormal Science in Perspective**

Source: included here with permission.

When science falls into the postnormal frame (Figure 1), where decision stakes and/or uncertainties are high, it no longer makes any sense to talk about purely technical or simply scientific matters. Here, the production of good quality scientific knowledge requires systematic and *procedural* reference to the purpose for which the knowledge is being produced. Since the designation of purpose is not the task of science but of political society, the production of good quality postnormal science needs to be supported by a structured combination of scientific knowledge production and political discourse. In their foundation text on the topic, Funtowicz and Ravetz refer to this as the challenge of democratizing expertise, and engaging with this challenge can be understood as the main task of postnormal science methodology.

Of course, the idea that what qualifies as truth is situation-specific, and thus is historically and culturally defined, is not new. John Dewey discussed this tension at length and articulated his own pragmatist vision for "democratizing expertise" in his 1927 book, *The Public and its Problems*. Drawing inspiration from the poet Walt Whitman, he spoke of a discourse that spans disciplines, bringing together scientists and poets, and experts and laypersons. Looking on from the other side of the Great Depression and World War II, Dwight D. Eisenhower addressed the same issue with a bit more skepticism:

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The prospect of domination of the nation's scholars by Federal employment, project allocations, and the power of money is ever present—and is gravely to be regarded. Yet, in holding scientific research and discovery in respect, as we should, we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite.

Max Horkheimer points out that this reflects a basic historical tension:

On the one hand, neither the direction and method of theory nor the object, reality itself, is independent of man, and on the other hand, science is a factor in the historical process.

In the postnormal science discourse, this tension between the constitution of reality and its correct observation becomes an operational problem; one might say that it has moved from the position of context to that of content. As Joan Martinez-Alier puts it:

[Environmental g]overnance requires the integration into policy (whether greenhouse policy or European agricultural policy or local urban policies) of scientific and lay opinions, some contradictory among themselves, relevant for different scales and different levels of reality. Who then has the power to decide the procedure for such integrated analysis? Who has the power to simplify complexity, ruling some languages of valuation out of order?

In practice, a community of scientists and policy makers concerned with developing strategies for achieving sustainable development is inevitably confronted with “the impossibility to define in absolute terms the optimal way to sustainability,” 1) because the aim of identifying what constitutes optimal sustainability is scientifically problematic and 2) because sustainability is a politically charged problem. Under these conditions, a new modality of science can be understood to be operating for which new modes of scientific method and new standards for measuring the quality of these methods are required.

There is a wide range of work of varied quality presented under the banner of postnormal science. However, core methods like the Numeral, Unit, Spread, Assessment, Pedigree (NUSAP) reporting system, Generalized Likelihood Uncertainty Estimation (GLUE), and other forms of statistical model sensitivity analysis, as well as various multi-scale and participatory approaches to integrated assessment are all concerned with the practical problem of how to effectively and rigorously address politically entailed, complex, scientific problems. Postnormal science is first, and perhaps even foremost, an empirical observation and a set of associated attempts to theorize and cope with both the political and scientific aspects of a new set of late industrial problems, since the inherent complexity of the objects of investigation (river basin systems, human cloning) and/or their political sensitivity (mega-contaminated sites, genetic engineering, climate change) reveal traditional—a.k.a. normal—scientific methods to be inadequate. Thus, the normative postnormal science prescription for democratization of expertise rests on an empirical observation—that facts and values are, in some instances, irrevocably intertwined. This has consequences for methodology

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and compels a shift from searching for the truth to developing good quality descriptions of reality. In this respect, the original and core body of work on postnormal science comes from within precisely the kind of “pure science” context that Marcuse predicted.

### **Marcuse ‘64: Technological Rationality and One-dimensional Thinking**

Marcuse’s *One-Dimensional Man* is a monumental work, and it would be both naïve and vulgar to attempt a summary of that text here. It would, on balance, be equally naïve to suggest that discussion of this one text constitutes a discussion of the entirety of Marcuse’s thought on science and society. What *is* possible here is to follow the progression of a core argument from *One-Dimensional Man* concerning the potential liberating role of an anticipated new modality of science: Marcuse defines the conditions that constitute technology as ideology, describes the non-dialectical character of the one-dimensional thinking that operationalizes technology as ideology, and argues that in late industrial societies, even critical scholars including himself are constrained by this one-dimensional thinking. Then, in an attempt to escape the trap of one-dimensional thinking, he explicitly shifts his discussion from the level of social theory to the level of pure philosophy. Finally, he presents the idea that emergence of a new modality of science may be one possible route out of the collectively experienced trap of one-dimensional thinking. But, before we can consider what potential liberating role(s) this new modality of science might have, we must first consider the conditions that give rise to one-dimensional thinking in the first place.

### **Human/non-human Nature: A Dialectical Relationship**

The relationship between human and non-human nature (“man and nature”) is a fundamental topic in philosophy and a constant point of discussion in environmental politics. It is also the first major dialectical relationship that Marcuse explores in *One-Dimensional Man*, attributing the one-dimensional thinking of late industrial societies to dynamics associated with the historical progression of an oppositional relationship between “man” and “nature.” Marcuse’s conceptualization of this progression is elegantly elaborated by Albert Camus in a short philosophical work where he set out to understand how the liberation-oriented revolutionary moments of 20<sup>th</sup> century Europe ended in the establishment of authoritarian states in Germany and the Soviet Union.

Camus explores *l’Homme Révolté* and his/her rebellion within the context of the personal confrontation between slave and master, reviewing the series of revolutionary movements that mark what is usually assumed to be the march toward human liberation in Europe. His basic proposition can be understood as follows: when I am enslaved and I reject the presumption that my master has a right to enslave me, I am affirming two propositions: 1) that we are at least equal and 2) that it is not acceptable for one of two equals to enslave the other. When I act on this affirmation, *because* I am enslaved I must subdue my master in order to gain my freedom. In so doing, I offend myself. I do precisely that for which I have condemned my master: I enslave him/her, even if only temporarily. The contradiction arises in that I must oppress my master in order to gain my freedom.

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The human/non-human nature relationship as conceptualized by Marcuse in *One-Dimensional Man*, can easily be understood within this framework. The stage of late industrial development that Marcuse describes is like the moment when Camus' rebel has subdued his/her master; the very material facts of late industrial life—the washing machine, the television, the computer—have become positive values, liberating humans from oppression by “nature.” But they are also negative values, because they subjugate “nature.” In late industrial societies, the material battle between humanity and nature, the daily struggle to secure the basic requirements for survival, is won: “It’s a good way of life—much better than before—and as a good way of life, it militates against qualitative change.”

In these societies, the greatest challenge is no longer to meet the basic material needs of humans (securing food and shelter, a safe place to raise young, etc.) but to achieve intellectual freedom from the one-dimensional thinking of technological rationality, which, in liberating humans from the oppressions of “nature,” now claims authority over both nature and humans: this is a world in which technology is both a force of material domination and an ideology.

Marcuse focused on everyday life in the 1950s U.S.A and U.S.S.R. when proposing that the success of the technological revolution substantively transformed the world. Here, the automobile, television, vending machine, and washing machine become part of the basic framework through which individuals interact with the world around them. Under such conditions, technology has *become* reality, and the one-dimensional, linear, mechanical character of technology has become the basic frame of reference for understanding. Ordinary daily life is liberated from the vagaries of “nature” through the application of reductionist science and the technological industrialization to which it gives rise. The character of the ensuing domination is fundamentally related to the character of that liberation.

These central notions of modern science emerge, not as mere by-products of a pure science, but as pertaining to its inner conceptual structure...In this project, universal quantifiability is a prerequisite for the *domination of nature*.

Technology is ubiquitous, and technological rationality is insidious.

Viewing himself and his analysis as subjects of this domination, in a search for critical footing, Marcuse explicitly shifts his focus from describing the social and political conditions of late industrial societies, which are characterized by an “overwhelming *concreteness*,” to the abstract level of pure philosophy.

He begins the philosophical stage of his argument through reference to the original role of negation and opposition in Western philosophy—the assignment of meaning. Whereas “[d]ialectical thought understands the critical tension between ‘is’ and ‘ought’ first as an ontological condition, pertaining to the structure of Being itself,” “[u]nder the rule of formal logic, [the first step on the long road to Western scientific

thinking,] the notion of the conflict between essence and appearance [between is and ought] is expendable if not meaningless.” The distinction between desirable and undesirable is replaced by a distinction between rational and irrational. Rational is associated with the production of facts, the success of science and the conquest of nature. It is implicitly treated as good and desirable. Irrational, defined only through negation, is the absence of rationality and is associated with subjugation to the forces of nature. It is implicitly treated as “other” from good and not desirable.

Looking for a form of negation that is accessible even to thinkers subjected to technology as ideology, Marcuse picks up on a distinction between Reason in art and Reason in society, which he finds in Alfred North Whitehead’s 1925 text, *Science and the Modern World*, and related 1929 lecture, *The Function of Reason*, noting that: “[i]n Whitehead’s definition of the function of Reason, the term ‘art’ connotes the element of determinate negation.” He proposes that as technology and science became ever more identified with Reason, a schism between science and art was created, where “art was granted the privilege of being rather irrational—not subject to scientific, technological and operational Reason.”

In late industrial societies, where science is concerned with reason, art is concerned with not-reason, science with facts, art with values, science with truth, and art with aesthetics. Focusing on the consequences of this schism enables Marcuse to develop a critical position with respect to technological rationality, which can be located historically and analytically within Whitehead’s schematic, as a product of the 18<sup>th</sup> century European identification of Reason with rationality. Eventually, via this route, he arrives at the following assertion: “At the advanced stage of industrial civilization, scientific rationality, translated into political power, appears to be the decisive factor in the development of historical alternatives.” Approaching this observation with Whitehead’s distinction in mind leads Marcuse to pose the question: “...does this power tend toward its own negation—that is, toward the promotion of the ‘art of life’?” This leads him finally to the proposition that liberation from one-dimensional thinking might come about through basic transformations occurring *within* science. If grounds were to arise from within scientific logic that justify reincorporating non-instrumental and non-rational thinking back into Reason, then perhaps the reductionism that gives technological rationality its form could be undermined.

## **The Way Out**

Marcuse explicitly identifies the distinction between facts and values—the so-called “great achievement” of modern science—as the dialectical schism giving rise to one-dimensional thinking in late industrial societies. The scientific method, which he views as *a priori* to industrialization, takes the integrity of facts as its highest value. Facts and figures are the heroes in man’s struggle with nature. In their purest form, they become the greatest good and the ultimate measure of value in late industrial societies. Their rise is accompanied by the banishment of non-factual values, which are associated with superstition, irrationality and subjugation to nature. The reification of their status as

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“highest value” constitutes a step in the progression of their alienation from the non-factual values that are their dialectical companions.

The quantification of nature, which led to its explication in terms of mathematical structures, separated reality from all inherent ends and, consequently, separated the true from the good, science from ethics... If the Good and the Beautiful, Peace and Justice cannot be derived either from ontological or scientific-rational conditions, they cannot logically claim universal validity and realization... [in a world where science is the only adjudicator of truth,] the ideas [of The Good, Beautiful, Peace and Justice] become mere *ideals*, and their concrete, critical content evaporates into the ethical or metaphysical atmosphere.

In late industrial societies, the capacity to discern complex truths that are constituted through an interplay between facts and values is lost, and related complex ideas like The Good are closed out of the picture in deference to the technologically rational truth of a one-dimensional world of facts. In this respect, the increasing politicization of 21<sup>st</sup> century science is not so much chosen as it is experienced:

“Neutral” scientific method and technology become the science and technology of a historical phase which is being surpassed by its own achievements—which has reached its determinate negation... this development confronts science with the unpleasant task of becoming *politica*—of recognizing scientific consciousness as political consciousness, and the scientific enterprise as political enterprise.

Keeping closely in line with Marcuse’s arguments, it is precisely the need to reintroduce consideration of the interplay between facts and values, in order to grasp the complexities of 21<sup>st</sup> century environmental problems, which motivates the postnormal science project of the democratizing of expertise. Here the challenge is to replace methods aimed at the production of “true facts” with ones that can support the constitution of good quality, complex descriptions of complex matters of concern.

For Marcuse, the role of scientific rationality in the subduing of nature is intimately related to the role that it plays in controlling human behavior and thinking in late industrial societies. As “the struggle for existence and the exploitation of man and nature become ever more scientific and rational,... [s]cientific-technical rationality and manipulation are welded together into new forms of social control.” But liberation from these new forms of social control is exceptionally difficult to achieve, because the one-dimensional thinking that operationalizes them is, by definition, non-dialectical. Not only does it not hold within itself the seeds of its own negation, it holds its negation inadmissible and out of order: logic has become the logic of domination.

Continuing the search for a position from which he can mount a critique of one-dimensional thinking, Marcuse moves on to consider how it has impacted the philosophy of his contemporaries. He does this through a discussion of behavioral linguistics, the details of which need not concern us here. What is relevant is the strategy he employs for developing his critique, because it illustrates the precise “way out” that he

found within philosophy, which turns out to match up very well with the way that postnormal science works.

Critiquing his colleagues for undertaking a sort of positivist behavioral linguistics with an exclusive focus on recording and reporting of discourse, Marcuse argues that this leads to philosophy “without any explanation.” Wishing to develop both analysis and explanation, he asks, what is missing from the behavioral linguistics frame? His answer is, substantive universals. Pointing out that “no particular entities whatsoever correspond to these [substantive] universals[,]” he observes that they cannot be described or discussed through exclusive reference to behaviors. Using the irrefutability of their existence (the State, England, Beauty) as his foil, Marcuse forces back onto the table for discussion an object of thought that opposes the logic of one-dimensional thinking: an empirically verifiable, complex whole.

This focus on understanding complex wholes is mirrored in the discourse on postnormal science, where development of new strategies for regarding the epistemological and social complexity of late industrial problems is a central methodological concern.

### **Purchase Gained**

Having established a critical position with respect to one-dimensional thinking through recourse to the idea of substantive universals and through a dialectical conceptualization of the relationship between facts and values, Marcuse returns to his original discussion of the daily practice of technology as ideology. With positivist scientific methods (normal 20<sup>th</sup> century science) identified as the historical force giving rise to one-dimensional thinking, Marcuse predicts that if a critical position is to be gained, it will arise from scientists rejecting the universal quantifiability that has served as a prerequisite for the domination of nature.

It seems unlikely that Marcuse had an explicit structure in mind for the “new science” of which he spoke in 1964, since it was his view that this was positioned in his future and therefore as much subject to the forces of history as he, his objects, and his own works would be. What does seem clear is that he expected this new logic of science to somehow engage with the vanishing of a firm distinction between facts and values in late industrial societies, a phenomenon he referred to as “technology as ideology.” Since this is the core methodological challenge faced in postnormal science, there is clearly a relationship here.

Following Marcuse’s logic, one might expect that this new modality would see scientists calling for complex, holistic descriptions of late industrial problems, conducting explicit discussions of substantive universals, and giving attention to the dialectical rapport between facts and values. These are precisely the tasks that the postnormal science discourse puts onto the methodology table for discussion, and it does so specifically with respect to the kind of late industrial social and material issues that arise as consequences of “successful” industrialization—e.g. cloning, anthropogenic

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climate change, human-induced floods and soil erosion, nanotechnology, and nuclear waste management.

Insofar as postnormal science constitutes a manifestation of the new science that Marcuse envisioned in 1964, there are grounds for discussing its methods as a form of potentially liberatory political action, positioned to resist the oppression of one-dimensional thinking and technological rationality but also capable of ushering in new forms of domination. So there are grounds for proposing that the quality of postnormal science methods should be assessed both with respect to scientific and political criteria.

Exploring how the liberatory potential and political legitimacy of postnormal science methods might be formally assessed is a task for the future and cannot be pursued here in any detail. However, there is a great deal of material within both postnormal science and environmental politics that can be approached or re-approached using the arguments presented here. For example, there remain big unanswered questions in the area of extended peer review methodology where political theory might prove particularly helpful regarding questions of how differences of understanding and perspective can be mediated, respected and put to good use; how the political power wielded by participatory science forums can be democratically legitimated; and how the people making decisions in these forums can be held democratically accountable.

Closer attention to some of the political subtleties of postnormal science methodology could also prove fruitful for developing critical environmental political theory. For example, deliberative democracy has been widely proposed as a procedure for supporting the organization of complex, multi-stakeholder dialogues about complex environmental problems encountered in late industrial societies. The basic political theory underpinning most postnormal science methods and deliberative environmental politics derives from work by Marcuse's younger colleague, Jürgen Habermas, on communicative rationality and discursive ethics, mainly as elaborated by John Dryzek. As history unfolded, Habermas expressed serious differences with Marcuse's analysis of science and technology, only to converge with his views in later life. The twists and turns of late critical theory offer grist to the mill for further research. The aim of this present paper has been to begin laying the foundations for that future work by showing how postnormal science can be interpreted as a manifestation of the new modality of science predicted by Marcuse.

## **Conclusions**

Where the subduing of nature is no longer the main project of human existence, the consequences of that project become existential phenomena with which human societies must contend. Coping with these consequences is one of the tasks taken up in environmental politics *and* in postnormal science. Where the "big" environmental management problems of late industrial societies are concerned, scientific knowledge will inevitably be one of the key sources of data contributing to their resolution, even though, with respect to these problems, scientists are unable to make the kinds of truth claims that have historically been expected of them.

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If the claims that scientists can make about these postnormal science problems are to be constructive, a reconceptualization of the relationship between science and politics is required. So long as science and politics remain clearly distinguished from one another, then while the historical status of the laws of science is permissible (e.g. the Copernican Revolution), the historical status of the logic of science is not. However, it is precisely the logic, as opposed to the laws, that is called into question under postnormal science, just as it is precisely a change in the logic of science that Marcuse imagined might give rise to a liberating change of thinking in late industrial societies.

The use of political theory to justify postnormal science methodologies is now fairly widespread, and the arguments presented above reinforce the idea that critical political theory can be used to improve postnormal science methods. But, with the historical and political positioning afforded through reference to Marcuse's arguments from 1964, it begins to appear that postnormal science does not come to the political theory table empty-handed. Perhaps with careful steering (good governance) and a sturdy craft (empirically robust, genuinely complex knowledge), the direction in which the scientific method is leading late industrial societies might be altered. Perhaps, where the purpose of scientific method changes, from facilitating attempts to repress and control the complex bio-physical systems of human environments to supporting human collaboration with them, this power *will* tend toward its own negation—that is, toward the promotion of the “art of life.”