

PROGRESS, DESTRUCTION, AND THE ANTHROPOCENE

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Abstract: Enlightenment era optimism that technological and educational developments offer a progressive path to plenty and liberation supports a hope that human toil may be progressively reduced. The Development Thesis defended by G. A. Cohen is a piece of that Enlightenment optimism. The Development Thesis holds that productive forces tend to develop throughout history. The tendency for such an increase in productive forces to occur is, according to Cohen's argument, due to persistent facts about human nature. If Cohen is correct, there is a tendency toward progress of an important sort, and this progress is due in significant part to human nature. But the development of productive forces also destroys nonhuman natural value. In the era of the Anthropocene this is occurring on a planetary scale. The simultaneous development and destruction entails that claims of progress must rely on an all-things-considered judgment. But due to the plurality of the relevant values, which cannot be compared according to a common metric, rational disagreement about the existence of progress and our progressive nature can be expected to persist.

KEY WORDS: The Anthropocene, destruction, Development Thesis, forces of production, instrumental value, intrinsic value, nonhuman natural value, pluralism, progress

The hope of reducing human toil is at least as old as the story of the curse of Adam.¹ Enlightenment era optimism that technological and educational developments offer a progressive path to plenty and liberation supports that hope. The Development Thesis defended by G. A. Cohen is a piece of that Enlightenment optimism. According to the Development Thesis, major improvements in human productive capacity can be explained in part by human intelligence and rationality. A tendency toward progress, in the form of increased power to produce, which either enlarges the output of valuable goods or reduces the toil by which they are obtained, exists due to our human nature. If this is correct, we have some reason to hope that the future may be better than the past.

Cohen's defense of the Development Thesis occurs within his interpretation and defense of historical materialism, and, as he sees it, historical materialism is a theory of the social barriers to the general rule that increasing productive forces results in an improved human condition.

¹ I would like to thank the participants of a Liberty Fund workshop on progress for comments on an earlier version of this essay, and the organizers of the workshop. I am also grateful for the comments from an editor of this journal and an anonymous reviewer. A version of the essay was also presented at a workshop on "What is so Disturbing about Climate Change" at the Universität Duisburg-Essen and the University of California, San Diego. I am grateful to the organizers for the opportunity for discussion and to the participants for feedback. I benefited from feedback from Simon Caney, Kok-Chor Tan, Allen Thompson, and Patrick Tomlin.

In other words, historical materialism explains hurdles to progress. I am not interested in assessing Cohen's case for historical materialism. His defense of the Development Thesis interests me because if it is correct, we are in one important way a naturally progressive species. But the kind of progress that we tend to produce — and which Enlightenment optimism heralds — would result in the steady transformation of nature by humanity. Although from the vantage point of certain theoretical orientations inspired by Hegel or Marx that might be thought of as de-alienating, such progress necessarily results in some loss of what we have reason to value.²

That last thought raises the central question of this essay: How do we reckon with natural destruction in a calculation of progress and of our progressive nature? The steady increase in productive forces has yielded the intended effect of satisfying human needs and wants. But the increase of productive forces has also had vast unintended effects. The mark left on the planet has been sufficiently pervasive and long-enduring (on a geological time scale) to suggest a new geological epoch, the Anthropocene. This is an era marked by the permanent destruction of nonhuman natural value. Is this progress or destruction, or both? And how shall we understand and appraise ourselves and our capacities that have brought this all about?

I. THE DEVELOPMENT THESIS

The Development Thesis holds that productive forces tend to develop throughout history.³ By “productive forces” Cohen means something specific. Something is a productive force only if it is “a facility . . . capable of use by a producing agent in such a way that production occurs (partly) as a result of its use, and it is someone's purpose that the facility so contribute to production.”⁴ This category includes the premises of production, the means of production, including raw materials and technology generally, and labor power, including strength, training, education, and science. Development of the productive forces increases the ratio of the size of the product of labor over the amount of labor required to produce it.⁵ The idea that such an increase occurs as a result of the increase in productive forces and that it occurs according to human purpose entails that, as a general rule, an increase in productive forces promotes what we have reason to

² For the de-alienation view see Steven Vogel, *Thinking Like a Mall* (Cambridge, MA: MIT Press, 2015), 88–94. Additionally, Ernst Bloch speaks of the “naturalization of man, humanization of nature” as the concrete utopia, the realm of freedom, the ultimate object of hope. See his *The Principle of Hope*, Vol. 1 (Cambridge, MA: MIT Press, 1986), 204–5.

³ G. A. Cohen, *Karl Marx's Theory of History: A Defence*, expanded edition (Princeton, NJ: Princeton University Press, 2001), 134.

⁴ *Ibid.*, 32.

⁵ *Ibid.*, 57.

value: either more valuable goods and services or less effort spent working without satisfaction to get the goods. The tendency for such an increase in productive forces to occur is, according to the argument, due to persistent facts about human nature, comprising a need and capacity to increase productive forces — although the need could in principal be satiated. According to this view, human nature and our circumstances conspire to produce the tendency to fulfill human needs and desires. That sounds like a diagnosis and prognosis of social progress.

The Development Thesis states that productive forces tend to develop throughout history. This might look like a straightforward empirical generalization, but it is not. The claim is not that productive forces have developed throughout history, but that there is a tendency for them to develop. A tendency to develop must be constituted by some kind of reliable mechanism. Hence, the defense of the claim needs to plausibly identify the mechanism. The claim also is not that productive forces necessarily develop throughout history. So, although the mechanism producing development must be reliable, it need be neither the effective mechanism advancing productive forces in every instance nor invincible in its power. A tendency can be ineffectual or defeated. The better team generally prevails in football, but not always. So, the reliability of the mechanism that produces the development depends on the assistance of circumstances that are usually propitious. In that regard, if the Development Thesis is true, the tendency of productive forces to grow bears a resemblance to the tendency of tulip bulbs to bloom; once the tendency has been identified, its realization is the norm, and cases of failure require special explanation. This suggests that the plausibility of the tendency will depend not just on identifying a possible reliable mechanism, but on the existence of a sufficient number of cases that the mechanism is supposed to explain. If the failure of the tendency to be realized is the norm, the existence of the tendency is called into question.

Cohen argues that the following three facts constitute the tendency for productive forces to develop:

- (1) Humans are rational in the sense that insofar as they know how to satisfy compelling wants, they are “disposed to seize and employ the means” of doing so.⁶
- (2) The historical situation of humans is characterized by scarcity such that unless they spend the better part of their time engaged in labor, which is not experienced as an end in itself, they will not satisfy their wants.
- (3) Humans possess sufficient intelligence to enable them to improve their condition.

⁶ Cohen, *Karl Marx's Theory of History*, 152.

According to Cohen, these three facts plausibly constitute the tendency in the following way: Fact (2) suggests a durable reason to improve our circumstances; fact (3) amounts to the human ability to discern possible strategies for improvement; and fact (1) is the basis for believing that the strategies for improvement will be employed once discovered. Hence, humans are able “to effect cumulative improvements in their habitats, with each generation building on the achievement of its predecessor.”⁷

Each generation could not very well build on the achievements of the preceding one if the effort was to rebuild beach sand castles that the waves periodically washed away. There would be little evidence to verify a tendency toward more-sophisticated design or less alienated labor in these circumstances. That suggests an incompleteness in Cohen’s account that could be remedied by appeal to the following:

- (4) Circumstances are such that when humans labor, improvements can be passed on to at least some successor generations.⁸

Failing fact (4), there could be plenty of human intelligence and rationality directed toward production or labor savings in each generation, but not any tendency for the productive forces to grow intergenerationally because each generation would start anew. If the natural environment did not permit the products of our labor to be at least partially handed down to our descendants, there would be no tendency for productive forces to grow. Couldn’t technical know-how, a productive force, increase even if the products of labor were continually destroyed each generation?⁹ Perhaps for a brief period of time, but it is hard to imagine continual increase in know-how without some preservation of products that could be improved. If each generation must rebuild sand castles that are washed away, a long-term tendency to increase the knowledge of sand castle architecture is unlikely.

Cohen’s argument that the three putative facts constitute a historical tendency for forces of production to develop has been criticized for employing a “transhistorical meaning for ‘rationality’ and ‘scarcity’, and thus a transhistorical notion of human beings’ interests that likely cannot be sustained.”¹⁰ Andrew Levine and Erik Olin Wright contend that scarcity is not a transhistorical phenomenon but at least sometimes the product of relations of production. They invoke the example of feudal European society. They doubt whether scarcity would have existed if there had been redistribution from the parasitic classes to the peasantry. And they

⁷ Ibid., 152–53.

⁸ My thanks to thank Simon Caney for a discussion about how to formulate this idea.

⁹ I owe the thought to Patrick Tomlin.

¹⁰ Andrew Levine and Erik Olin Wright, “Rationality and Class Struggle,” in Alex Callinicos, ed., *Marxist Theory* (Oxford: Oxford University Press, 1989), 37.

contend that the incentive to improve production in feudal Europe came not from a rational desire to improve productive power under conditions of scarcity, but from military competition among feudal lords.

To glean a possible response available to Cohen, his argument must be further elaborated. He does not rest the case for the Development Thesis solely on the three assumed facts cited above but also on the following historical claim: Productive forces not only are rarely replaced by inferior ones but are frequently replaced by better ones.¹¹ He then considers two possible explanans for that. One is based on social inertia: People adapt themselves to what they are accustomed to. The second comprises the three alleged facts that constitute the Development Thesis. Social inertia could explain the lack of regression, but only the second explanans can account for why change in productive forces is typically in the direction of their development. So, the idea is that the three putative facts support the existence of a tendency of productive forces to develop. Such a tendency is further supported by the fact that productive forces rarely contract and normally expand.

This suggests two responses to Levine and Wright. First, the Development Thesis is consistent with historically local factors and explanations. Feudal military rivalries might result in the development of productive forces. But that need not be the only impetus for development. And scarcity under feudalism might have the features it does because of the way in which entitlements were distributed. Indeed, Cohen offers a response of that sort when he claims that, "while the tendency to productive improvement is realized if and only if there are recurrent particular instances of improvement, it does not follow that the explanation of each instance must be the tendency to improvement."¹² Second, the primary explanatory power of the Development Thesis is not directed to the expansion of productive forces at every given point in a history, but the long-term trend in human history toward progress. Particular epochs and particular societies might facilitate or hinder the tendency, but the claim is that the tendency is at work in the long arc of human history.¹³ In order to explain that arc, an account that eschews transhistorical factors would have to patch together various accounts of tendencies toward development in various epochs. That would seem to leave only the fortunate conjunction of different historical tendencies, which have brought about the long term trend of rare regression and more common progression. A fortunate conjunction of events is not impossible. But unless there is independent reason to doubt the Development Thesis, it seems credible in light of its superior explanatory power.

¹¹ Cohen, *Karl Marx's Theory of History*, 154.

¹² G. A. Cohen, "Forces and Relations of Production," in *History, Labour, and Freedom* (Oxford: Oxford University Press, 1988), 21.

¹³ See *ibid.*, 26.

Perhaps, however, we don't have reason to count the kind of development characterized by the Development Thesis as progress. To consider that, we must better understand the concept of progress. I turn to that in the next section.

II. PROGRESS

The Development Thesis defended in the fashion of Cohen is not merely a claim about history. Rather, the claim that humans have a tendency "to effect cumulative improvements in their habitats, with each generation building on the achievement of its predecessor" takes us to be a progressive species. It is part of our nature, a consequence of our rationality and intelligence, given our circumstances, that we tend to improve our productive capacity. Unlike other earthly animals, progress is, as it were, written into our nature.

Such a bold claim cannot be fully assessed without greater clarity regarding the concept of progress.

I favor an ecumenical approach to conceptions of progress. A conception of progress picks out a change that we have reason to value. Conceptions might vary in several ways, by, for example, the change that is picked out or the time period over which they range. But change that we have reason to value is perhaps too broad a category. When the spring warmth brings crocuses into bloom, that's hardly progress, despite our reasons to value the lovely blooms and all that they portend. Plausible conceptions of progress must be more limited than that. For one, there does not seem to be progress absent human causation. But more than causation is also necessary. If I should slip and fall and thereby rattle my cell phone in a way that causes it to work more reliably, is the unintended benefit of my fall a mark of progress? It seems a stretch to consider accidental benefits to be instances of progress. When I luckily draw the right cards and thereby defeat my opponent, I have not improved my card game. But if I use my winnings to take lessons and thereby play consistently better, I have made progress in the game. The progress would not have occurred without the good fortune, but the accidental positive result itself is not progress. Progress, then, may result in part from accidental causation, but not entirely from it.

What must the arc of progress be? Imagine a map with a curve moving from the lower left corner up to the right. The y axis represents the amount of the valuable good, the x axis units of time. (We do not need to specify the units since it is the concept of progress that is under discussion, not a conception applicable at some point in time.) Now consider two questions:

1. Must each point on the curve be higher along the y axis than all previous points (as in Figure 1) in order for the curve to represent progress? Or does it suffice that the point farthest to the right is highest of all (as in Figure 2)?

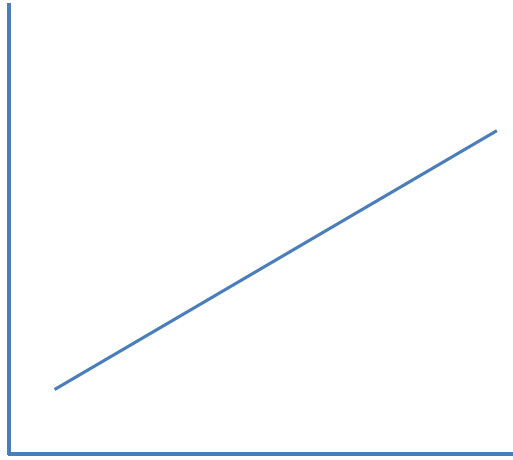


Figure 1. Continual Progress

2. For any two curves representing progress, over the same period of time and from the same starting point on the y axis, to the same ending point, does the curve with the greatest area under it represent more progress?

Answering the first question requires consideration of trade-offs and the point in time at which progress is judged. The second question raises issues of maximization. The answer to question one may constrain the cases that can be considered in question two. For example, if a curve (see Figure 2) in which at least one point is lower than at least one point to its left (even if the farthest point on the right is highest) does not represent progress because of the dip, then consideration of question two will not allow the comparison of a curve that contains such a dip but then proceeds upward again, even if the area under it is greater than other curves to which it is compared.

William Nordhaus offers an example that can shed light on some aspects of both questions. His climate wrinkle example is a case in which one generation's well-being is sacrificed (let's assume that it falls below the well-being of at least one previous generation) but the well-being of subsequent generations improves: "Suppose that scientists discover a wrinkle in the climate system that will cause damages equal to 0.1 percent of net consumption starting in 2200 and continuing at that rate forever after. How large a one-time investment would be justified today to remove the wrinkle that starts only after two centuries?"¹⁴ The dip in the curve

¹⁴ William Nordhaus, *A Question of Balance: Weighing the Options on Global Warming Policies* (New Haven, CT and London: Yale University Press, 2008), 182.

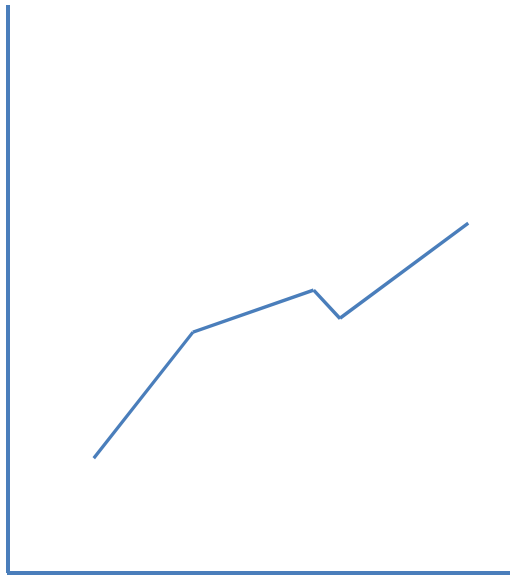


Figure 2. Overall Progress

in Figure 2 could represent such a one-time investment to prevent a climate wrinkle.

To the first question. Let's refer to the time at which the generation takes the hit to its well-being as " t ," represented by the dip point on Figure 2. Let " $t-1$ " and " $t+1$ " refer to the immediately preceding and succeeding times. Moreover, let " G_n " represent the generation at t , which takes the hit, and " G_{n-1} " and " G_{n+1} " refer to the immediately preceding and succeeding generations at $t-1$ and $t+1$ respectively. Finally, let the y axis represent the well-being of each generation. W_G refers to the well-being of a particular generation. In filling out the example, we assume, as in Figure 2, that the right end point of the curve is higher than the left beginning point. At t one might have no confidence in an upward trend — especially if W_G is very far below W_{G-1} . At that point, then, it would seem implausible to predict that additional progress would ensue. Did progress end at $t-1$ just before the dip? If so, from the perspective of a generation at the end of the curve, one could speak of two separate periods of progress, one ending at $t-1$ and the other beginning at $t+1$. Alternatively, in light of the whole curve, perhaps we might claim that progress did not end at $t-1$, but rather there is a single progressive curve.

Two questions must be distinguished. The first is what is the reasonable judgment at t ? The second is what is the reasonable judgment about the whole curve, from the point of view, as it were, of a person at the endpoint? Regarding the first question: since t is the point furthest to the right, and since it is not highest of all, it would be wrong to describe the curve

segment up to t as representative of progress overall. The curve segment from $t-1$ to t represents a regressive period. Progress stopped at $t-1$. But in similar cases, assuming that at t one is not at the end of the process of change, hope for renewed progress is often not false. Assuming, as we do, that the whole curve ends with the endpoint being higher than all other points, it seems reasonable to claim that the curve represents overall progress. Continual progress, in contrast, ends when the curve begins to decline. If the curve fails to regain a position on the y axis that is higher than all previous points, progress has ended. Of course, even in a period of regression, after the curve has reached its high point, there could be segments of regress and progress.

According to the forgoing discussion, a judgment of continual progress requires each point on the curve to be higher than all the points to its left. An alternative conception is that of overall progress. According to this conception, a judgment of progress requires only that the endpoint on the curve be higher than all others. There may be dips as long as the recovery exceeds the high point before the decline. The conception of overall progress seems most reasonable in the case of history because any plausible judgment that there has been progress — from, say, the Roman Empire onward — has to allow for the existence of downturns.¹⁵

Not unlike Aristotle's claim that a person's life cannot be judged happy until it comes to an end, so according to the overall conception of progress, a path of change cannot be confidently judged as progressive or not until it has finally run its course.¹⁶ Definitive retrospective judgments of overall progress in the long arc of history would be possible only at the end, if anyone were around to give them. Epistemically that's the bad news. The good news is that there may be grounds to hope for progress where belief cannot be adequately justified, as when, for example, it would be reasonable to believe that a mechanism produced a tendency toward historical progress.

The second question above was about how to make comparative judgments of progress. Suppose a society could choose between two development paths, from the same starting point, over the same time period, and with the same ending point (and, of course, that the right end point of the curve is higher than the left beginning point). So, both paths are progressive. See Figure 3.

If progress is measured by the amount of increase in what we have reason to value, then neither curve represents greater progress. For they both start and end at the same points on the y axis. But there are reasons independent of how much progress occurs to value some paths of progress more than others. In other words, progress can be better even if not necessarily greater. A course of change that provides more of what is

¹⁵ Patrick Tomlin helped with the distinction between overall and continual progress.

¹⁶ Aristotle, *Nicomachean Ethics* 1100a5. See *Nicomachean Ethics*, H. Rackham trans., Loeb Classical Library, Aristotle XIX (Cambridge: Cambridge University Press, 1982), 47.

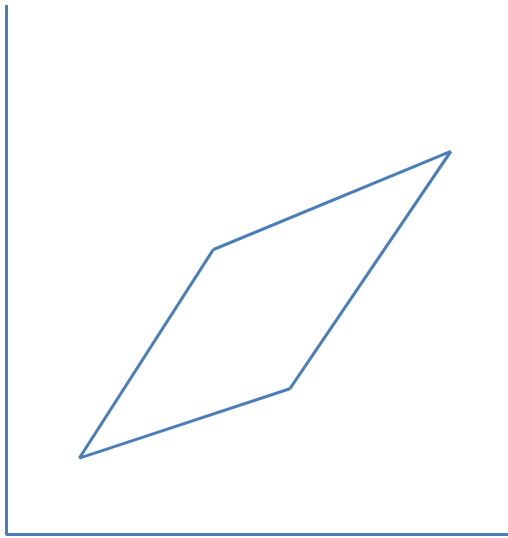


Figure 3. Kinds of Equal Progress

valued sooner (as represented by the top curve in Figure 3) will provide more of what is valuable overall. That is represented by the curve with greater area under it in Figure 3. All else being equal, there is greater reason to pursue such a path since it provides more of what is valued.

Whether the development of productive forces constitutes overall progress seems to require a judgment about whether it results in more of what we have reason to value generally. And because we have reason to value not only productive forces, the judgment must be an all-things-considered one. Making it requires considering also the value destroyed by the growth of productive forces. I discuss that issue in the next two sections.

III. DEVELOPMENT AND DESTRUCTION

Our concern is not only with the kind of progress that the development of productive forces is, but also with an all-things-considered judgment about a tendency toward progress resulting from our nature in light of the destruction of nonhuman natural value that occurs as a result of the increase in productive forces. The kind of destruction that is especially relevant to our discussion of the development of the forces of production is the human caused elimination of what we have reason to value. Destruction of this sort, unlike progress, need not be intentional. Loss of value, regardless of intention, is destruction. When I slip, fall, land on my cell phone, and it no longer works as a consequence, there is as much destruction as when the malfunction occurs because someone smashes the cell phone with a hammer.

One manner in which destruction occurs as a result of the development of productive forces is through the consumption of greater quantities of raw materials for increased production. The extinction of species, the elimination of natural habitats, and the depletion of natural resources are instances of such destruction. Another manner in which destruction occurs is through the despoliation done to natural systems by the introduction to them of the waste that results from production and consumption.

Although at the time of the writing of this essay final scientific determination is still pending, the scientific case for the Anthropocene as a distinct geological era is mounting.¹⁷ The evidence of human alteration includes a stratigraphic human signature on sediments and ice, including “technofossils” composed of concrete and plastic elements, the waste arising from the use of new materials, and the worldwide dissemination of black carbon, inorganic ash spheres, and spherical carbonaceous particles, which are remainders from the burning of fossil fuels. Geochemical signatures from the use of fertilizers include soil nitrogen and phosphorus levels in lake strata and Greenland ice that are higher than at any time in the last one hundred thousand years. Atmospheric concentrations of CO₂ and CH₄, due to the burning of fossil fuels, exceed those of the Holocene era, and average temperature increase and sea-level rise since 1850 exceed Holocene fluctuations. Extinctions rates are now far above background rates since 1500 and “invasions and changes associated with farming and fishing, [are] permanently reconfiguring Earth’s biological trajectory.”¹⁸

Can it be reasonably claimed that the changes that are constitutive of the permanent alteration of the planet amount to destruction? To claim that elimination within a natural system has been caused by human action seems to require some sort of comparison of different states of the system. But, in nature everything changes; in the long view of things atmospheric chemistry alters, ecosystems change, and species come and go in a Heraclitean flux. Equilibrium points are only pauses in a very long process of change. Consider a temporal conception of destruction according to which to claim that something within a natural system is destroyed by human action is to claim that what was once there has been eliminated by human action. But natural systems are in flux. Destruction so conceived might not pick out a difference from the natural course that the system would have taken. When species go extinct due to human development, it might seem reasonable to claim that the ecosystem has been adversely affected. But the system itself is changing in any case; the change might have produced the same extinction.

Can the destruction be compared against a vector of change? When a boot crushes a budding plant, the effect can be compared to the direction

¹⁷ See Colin N. Waters, et al., “The Anthropocene is functionally and stratigraphically distinct from the Holocene,” *Nature* 351, no. 6269 (2016): 137–47. DOI: 10.1126/science.aad2622.

¹⁸ *Ibid.*, 137.

of change the plant might have taken but for the force of the boot. The claim of destruction in this case might be based upon a counterfactual conception of destruction. The example is compelling in part, however, because the vector of change is known. But unlike the bloom-producing process of a particular species of plant, the direction in which ecosystems and other natural systems are changing is often unpredictable. How can destruction in such a dynamic system be identified? The problem is epistemological. How can destruction be claimed if the counterfactual vector of change is unknown? *Via negativa* may be a plausible approach. The idea is that we need not know the exact direction of change to be sufficiently confident that it would not have been as it is after anthropogenic forcing. We may be confident that a particular vector of change has been halted, even if we are uncertain of its direction. It is enough to be confident that change would not have been in the direction it now is. Destruction could in that way be identified, even if not precisely measured. When a habitat is destroyed and a species that once lived in the habitat goes extinct, it is normally not epistemically heroic to attribute the extinction to the habitat loss, even if over a longer period the ecosystem in the region might have registered changes.¹⁹

Even if the *via negativa* approach makes sense in particular instances, perhaps it is inadequate on a global scale. The skeptic might claim that, like the effects of climate change, attribution of destruction to the Anthropocene is often not possible; there are simply too many variables to fix attribution to the Anthropocene with a sufficient degree of probability. There are two problems with that skeptical challenge. First, attributing destruction to the Anthropocene is simply shorthand for attributing it to the various anthropogenic processes that constitute the Anthropocene. So, for example, destruction might be attributed to climate change, rather than the Anthropocene writ large. Second, whether we can attribute the destruction with a high degree of probability to an anthropogenic process will vary and our powers of attribution may increase as the science becomes better. It might be difficult to attribute a particular drought to climate change, but there is little doubt that ocean acidification, which causes coral reef bleaching, is caused by CO₂ in the atmosphere. And increasingly it is possible to attribute to climate change the additional risks of severe weather events.²⁰ As a general criticism the skeptical challenged

¹⁹ There are some parallels between destroying natural items and harming persons, but an analysis of harm in the latter case applies only imperfectly to destruction in the former. We needn't worry about questions of degree, absolute versus relative, or multiplication, and so on. These are discussed in Matthew Hasner, "The Metaphysics of Harm," *Philosophy and Phenomenological Research* 77 (2008): 421–50. I'm grateful to Patrick Tomlin for discussing these issues with me.

²⁰ Allen Thompson and Frederike E. L. Otto, "Ethical and Normative Implications of Weather Event Attribution for Policy Discussions Concerning Loss and Damage," *Climatic Change* 133 (2015): 439–51.

is implausible. Our ability to attribute any particular perturbation of a natural system to anthropogenic processes will vary. But at least sometimes, there is sufficient reason to believe that the outcome is due to the various processes that constitute the Anthropocene.

IV. NATURAL VALUE

Various parts of nonhuman nature — not necessarily reducible to individual organisms — are intrinsically valuable. That is, they are valuable not merely insofar as they contribute to other values.²¹ Standing at the edge of the Grand Canyon one is overcome by awe before its immensity and one experiences delight in the beauty of the color of the rocks. The riot of birdsong while walking through the woods is enjoyable. The relative equilibrium of an ecosystem maintained by relations of predation and mutuality presents a complexity and unity that is wondrous. Coming to understand that an individual organism is a store of genetic information passed on through billions of years of evolution leaves one amazed. The awe, delight, enjoyment, wonder, and amazement are not merely, or even mainly, expressions of the value of nonhuman natural items or systems because of their contribution to something else that is valuable. Rather, these are all experiences of appreciating the intrinsic value of that which is experienced. Some writers lay stress on the importance of the attitude of respect in appreciating the intrinsic value of nature.²² Such stress, I believe, is either too narrow or imprecise.²³ As the examples above suggest, there are a variety of attitudes appropriate to the recognition of intrinsic value generally, and to the intrinsic value of nonhuman natural items and systems in particular.

I claim that these nonhuman natural items and systems have intrinsic value. Some writers supplement this with the claim that the appreciation of such value is partially constitutive of human well-being or flourishing. This makes the argument for the importance of nonhuman natural value more robustly anthropocentric. And it ensures that preservation is a matter of moral concern. Building up from an argument about the value of natural processes, Robert Goodin goes on to claim that “natural processes, and our relation to them, serve to fix our place in the external world” and to locate ourselves “in a deep psychological sense that matters enormously to people.”²⁴ In contrast, I stop at affirming the intrinsic value

²¹ See John O’Neill, “The Varieties of Intrinsic Value,” *The Monist* 75 (1992): 119–37.

²² See Paul Taylor, *Respect for Nature: A Theory of Environmental Ethics* 25th Anniversary ed. (Princeton, NJ: Princeton University Press, 2011) and Dale Jamieson, “Climate Change, Responsibility, and Justice,” *Science and Engineering Ethics* 16, no. 2 (2010): 431–45.

²³ See also chapter two of my *The Moral Challenge of Dangerous Climate Change: Poverty, Values, and Policy* (Cambridge: Cambridge University Press, 2014).

²⁴ Robert E. Goodin, *Green Political Theory*, (Cambridge: Polity Press, 1992), 39.

of certain nonhuman natural items and systems. The anthropocentric addition is controversial since the role of natural value in human flourishing varies a great deal among reasonable conceptions of human flourishing. Moreover, my argument does not rely on the claim that the preservation of nonhuman natural value is a moral duty. That something is valuable is a reason to preserve it, even if the reason is not deontic. Hence, it is enough to establish that nonhuman natural value is valuable independent of any contribution it makes to other valuable items. In this case less (anthropocentrism) is more (plausible).

An element — although certainly not all — of what is valuable in each of the items or systems mentioned above is that it is fundamentally a product of nonhuman natural forces, even if affected by them.²⁵ An immense ditch of approximately the same size as the Grand Canyon dug in the desert surface might be compelling, but it would not elicit the same response as the Grand Canyon; equilibrium may be an interesting feature of certain social systems, but that it can come about in ecosystems by nonhuman forces merits a different kind of appreciation; biotechnology can produce compounds that are worthy of study and learning, but they do not leave us amazed at their long and haphazard lineage. It is not a question of the *amount* of value in items that come to be through nonhuman natural forces in comparison to the amount value in artefacts. I am not asserting that nature is more valuable than culture or technology. Nor am I supposing that there is a common currency of value by which all of these valuable items could be priced. My claim is rather, and only, that the items that are the objects of the experiences in the previous paragraphs are valued in part — but only in part — because they have an origin independent of human action. If we have entered the Anthropocene, all such items have been affected by our productive activities, but they do not originate from them.

If it is the case that part of the value of the items under discussion is that they do not derive from human intention or accident, then a certain kind of humility seems to be to some extent an appropriate response to their value.²⁶ In valuing them we are appreciating that they are not wholly human artefacts. We could not produce the same kind of valuable item if we tried. The kind of humility that I am speaking of is not the recognition of a defect in our nature, sometimes appealed to as a Christian virtue.²⁷

²⁵ See also Robert Elliott, *Faking Nature* (New York: Routledge, 1997). Reiterating the point of the previous paragraph, however, unlike Elliot I do not claim that nonhuman natural value is a source of moral obligation to nature.

²⁶ See also Thomas E. Hill, "Ideals of Human Excellence and Preserving Natural Environments," *Environmental Ethics* 5, no. 3 (1983): 211–224.

²⁷ See St. Augustine, *The City of God against the Pagans*, ed. and trans. R. W. Dyson (Cambridge: Cambridge University Press, 1998), bk. 14, chap. 13, p. 609, in which humility is defended as a response to turning away from God and as the chief virtue of the City of God.

Nor does it involve taking a point of view in which humans do not matter.²⁸ It is rather the appreciation of a limitation. Some of what we value, we value in part because we *could* not produce it. A huge ditch dug in the desert or a series of computer-generated tones varying in pitch might impress. And if they managed to replicate the Grand Canyon or some bird song sufficiently, their perceptual properties might lead us to value them as well. But they will not have the same value as the natural originals.

Nonhuman natural items or systems might be thought of as elements that comprise states of affairs of the world. Some theories of value affirm the view that the appropriate action regarding all intrinsically valuable states of affairs is to promote them.²⁹ If promoting necessarily includes playing an active role in producing, then such theories of value are false with respect to nonhuman natural value. The appropriate response to intrinsically valuable nonhuman natural items and systems cannot be for us to promote them in that sense since it is a constitutive element of their value that they come to be not by human action. Care, protection, preservation, limited use, and restoration all seem to be better candidates for the kinds of actions appropriate to the intrinsically valuable nonhuman natural items and systems.

Are such experiences of awe, delight, enjoyment, wonder, amazement, and humility veridical? Perhaps such experiences deceive us because nothing of intrinsic value is *really* experienced. I want to avoid as much as possible metaethical questions about the objective or mind-dependent nature of that which is valued intrinsically. Regardless of whether the intrinsic values are “out there” supervening on natural facts or whether they are expressive responses to natural facts, the experiences can be veridical enough for their relation to natural facts to be so fixed that anyone would have reason to have such a response. In other words, the experiences are veridical if it is the case that there are norms that require them regardless of the whether the force of the norms is due to objective circumstance or human projection. The relevant question then to ask is whether, for example, one has a reason to respond with awe and delight when facing the Grand Canyon. And there is, I think, no way to establish that one should so respond other than to point to the natural properties of the Canyon that seem worthy of awe and delight.³⁰ The art historian-turned-naturalist, John C. Van Dyke, once described the Canyon this way:

The rock forms are florid, fantastic, flamboyant, and yet planned on so vast a scale that they are impressive and commanding through sheer mass. The colors are hectic, sky-flushed, fire-fused, perhaps leached

²⁸ In contrast to Stan Godlovitch, “Icebreakers: Environmentalism and Natural Aesthetics,” *Journal of Applied Philosophy* 11, no. 1 (1994): 15–30.

²⁹ This is how T. M. Scanlon characterizes teleological conceptions of value in *What We Owe to Each Other* (Cambridge, MA: Harvard University Press, 1998), 80.

³⁰ See also Scanlon’s buck-passing account of value in *What We Owe to Each Other*, 96–98.

and bleached by rain or flung off in vivid tones by blazing sunlight. Sometime a vermilion-red glows beside a fire –green, while at other times, so subtle is the blend that you cannot draw line between gold and orange or purple and mauve.³¹

Van Dyke captures the experience well, and his description highlights the many properties of the Canyon that give us reason to experience awe and delight.

Are all of the products of nonhuman natural forces intrinsically valuable to some extent? Cohen claims that, “If an existing thing has intrinsic value, then we have reason to regret its destruction *as such*, a reason that we would not have if we cared only about the value that thing carries or instantiates.”³² But if universal vaccination led to the elimination of poliovirus in the wild, that would be a most welcome outcome and a reason for rejoicing. In light of that example, we might want to take back the claim that all products of nonhuman natural forces are intrinsically valuable. But is that the only plausible conclusion to draw? There are two other possibilities. Perhaps all products of nonhuman natural forces are intrinsically valuable, but either, *contra* Cohen, not all destruction of things that are intrinsically valuable is a reason for regret, or even when we have reason for regret, we have might also have overwhelming reason for rejoicing. The latter seems plausible to me. There is nothing incoherent about claiming that although we have reason to value something intrinsically, that reason is so much outweighed by its instrumental disvalue that we have reason to destroy it. For example, when we euthanize a rabid dog it is not because the dog is not intrinsically valuable. In the case of the dog it seems clear that we also have reason to regret our destructive action, even though we have sufficient reason to do it. Still there is no reason for rejoicing in that example. So, another is needed. When fascism was militarily defeated in Europe there was reason for rejoicing but also for regretting the moral costs incurred. There is nothing incoherent about thinking that even when we have greater reason to rejoice, we may still have reason to regret. To think otherwise would be to think that we live in world in which the good gained never comes at a price that we would like not to have had to pay. That does not seem to be our world.

I have claimed that part of the reason some intrinsically valuable things are valuable is that they are not human artifacts. If that conclusion is true, then the case of the poliovirus forces us to conclude either that Cohen is wrong about the reasons for regret whenever something intrinsically valuable is destroyed or that there may be cases in which the reasons that

³¹ John C. Van Dyke, *The Grand Canyon of the Colorado: Recurrent Studies in Impression and Appearances* (New York: Charles Scribner and Sons, 1920), 6.

³² G. A. Cohen, “Rescuing Conservatism: A Defense of Existing Value,” in *Finding Oneself in the Other* (Princeton, NJ: Princeton University Press, 2013), 153.

we have to regret the destruction of a valuable item are so weak (although extant) in proportion to the instrumental disvalue of the item as to be in practice inconsequential. I've argued for the plausibility of the second disjunct. In these cases, it would be odd to criticize a person who did not have the feelings of regret appropriate to the destruction of intrinsic value. It seems implausible to claim that someone feeling no regret at the destruction of the poliovirus should be for that reason criticized. But we don't need to decide between the two disjuncts since we are mainly interested in cases in which the intrinsic value of the natural item is not accompanied by massive instrumental disvalue. In that case, the reason for regretting the destruction of the item will be strong and important in practice. In such cases, agreement about whether progress has occurred may seem particularly difficult to obtain. I discuss that problem in the following two sections.

V. PROGRESS, DESTRUCTION, AND COMPARABILITY

The development of productive forces would be a kind of progress if we had reason to value their development. I believe we do have such reason. The development of productive forces allows us to have more or better goods and services that we value or to have them with less labor. Historically, labor has for most people not been an activity of intrinsic value, but has rather usually been done out of a need to survive and often with little to no control over its conditions. The development of productive forces is then instrumentally valuable insofar as we value that which is produced or disvalue the wearisome or alienated labor typically required to produce it.

If the development of productive forces is an instance of progress, is the all-things-considered judgment of progress falsified by the destruction of nonhuman natural value that is caused directly or indirectly by the development? Recalling the maps in Section II, would the slope of the curves flatten or become negative if the destruction of natural value were factored in? If the progress and destruction could be compared on a common metric, a commonly accepted answer to the question could be given. One approach to valuing natural systems, the ecosystem services approach, could allow for such a comparison. Let's suppose that the growth in productive forces can be measured in terms of the economic value of the products generated plus the value, measured, say, in the willingness-to-pay in foregone production, for any reductions in labor afforded by that growth. Now if the natural value destroyed could be adequately captured in the monetary value lost due to the loss of ecosystem services, then the extent to which the development of productive forces were progressive could be measured. Imagine a map in which the y axis would be the net economic value of the added value due to the growth of development forces minus the loss of value due to the destruction of ecosystem services. Progress would

exist as long as the value of the growth in productive forces minus the disvalue of the loss of ecosystem services yielded a curve with a rightmost point higher than every point to the left.

There is, however, a fundamental problem with asserting that natural systems are valuable simply as services that can be priced. For that is to take these systems as merely useful, as merely instrumentally valuable; it is to ignore their intrinsic value. The opportunity to experience awe is not the valuable service provided by the properties of the Grand Canyon. Rather the awe is an appropriate response to the value. To assume that the value of nonhuman natural items and systems can be fully captured in terms of their service value is to fail to appreciate their intrinsic value. It is to misvalue them. Any valuation of natural systems as services is at best an incomplete valuation. If their value is claimed to be exhausted by their value as services, that is to misvalue them.

Another means by which progress in the form of the development of productive forces and the destruction of nonhuman natural value might be compared on a common metric is if the latter causally counteracted the former. In this regard, recall the claim that I defended in Section I. The tendency of the forces of production to develop requires the following:

- (4) Circumstances are such that when humans labor, improvements can be passed on to at least some successor generations.

One of the effects of the destruction of nonhuman nature that constitutes the Anthropocene is to weaken to some extent the capacity of the natural environment to preserve improvements for subsequent generations. Think of the potential of climate change to turn back advances in the development of productive forces through the destruction of infrastructure wrought by more intense tropical storms, or the destruction of agricultural yields due to drought and the salinization of soil from sea level rise.

In cases such as those mentioned in the previous paragraph, the destruction of natural value may to some greater or lesser extent counteract the tendency of productive forces to develop over time. Insofar as those counteracting forces are themselves the unintended consequences of a certain path of development of the forces of production, any tendency toward progress might be weakened. Lack of sufficient foresight could ultimately undermine the plausibility of the Development Thesis. If rationality and intelligence are not brought to bear in sufficient time to avoid the worst effects of anthropogenic climate change, productive capacity could be substantially undermined. We have not yet begun to reduce the emission of greenhouse gases globally. So, it could be too early to tell whether we are a species progressive by nature.

The two comparisons of the development of productive forces and the destruction of nonhuman natural value just surveyed differ in one important regard. The first calculates a disvalue for the destruction of nonhuman

natural value in terms of the monetary value of its service and subtracts it from the monetary value of the development of productive forces. The second comparison, in contrast, does not calculate any disvalue of the destruction of nonhuman natural value. Rather, it calculates the disvalue of the effects of that destruction on the monetary value of the growth of productive forces. The second comparison does not misvalue nonhuman natural value; it simply does not assign any value to it. There is then no disvalue to natural destruction in the absence of effects on the forces of production. The two approaches are instructive for efforts to develop an accounting method that takes into consideration the destruction of natural value when assessing progress in the development of productive forces. In order to render the value of the growth of productive forces comparable with the value of nonhuman natural items and systems, one either assigns a value to the latter that fails to capture its true value or assigns no value to the latter and measures its destruction solely in terms of the effects it has on the growth of productive forces. If these two approaches exhaust the possibilities, then an adequate accounting method is not available.

The basic reason to doubt the availability of an adequate accounting method for a broadly acceptable all-things-considered comparative judgment of progress in the present case is that the relevant values are incomparable. If the value of the intrinsic value of nonhuman natural items and systems is captured neither by valuations of the service they provide nor a subtraction of the value of productive forces caused by the destruction of natural systems, and if productive capacity cannot be instrumentally valuable to the production of nonhuman natural value, which does not originate from human activity, then there is compelling reason to doubt that there can be a common metric against which the intrinsic value of nonhuman natural items and systems and the instrumental value of the growth of productive forces can be measured.

An increase in productive forces is valuable in virtue of more valued products or less disvalued toil. Both of these can be priced. The intrinsic value of natural items is not captured by their service to us in affording goods and experiences. Nor can that value be produced by us. Hence, the value of natural items is incomparable to productive forces on metrics of products, leisure, or money.³³ However, such incomparability does not entail that individuals cannot rationally affirm a schedule of trade-offs between the values. It seems plausible that a person's schedule of trade-offs between values is irrational only if there is a reason that should compel her to reject it in favor of another schedule.³⁴ The absence of a common metric between values is consistent with a person not having a reason

³³ See also Ruth Chang on covering conditions of commensurability in her "Introduction," in Ruth Chang (ed.), *Incommensurability, Incomparability, and Practical Reason* (Cambridge, MA: Harvard University Press, 1997), 1–34.

³⁴ See also Joseph Raz, *The Morality of Freedom* (Oxford: Oxford University Press, 1986), 339.

to reject her schedule of trade-offs between those values. The problem for argumentation or discourse is that the absence of a reason to reject a schedule of trade-offs does not entail that there is a reason to affirm that schedule. Hence, the absence of a common metric makes it possible that two (or more) people might each rationally hold a schedule of trade-offs, and although the schedules differ, neither person has a reason that should compel the other to give up her schedule. In assessing the full value of the development of productive forces over time, then, two people might rationally maintain contrary views, with neither having a reason that could convince the other.

VI. THE POSSIBILITY OF A MAP OF PROGRESS

The assessment of progress is important for a common understanding of the character of our projects and, insofar as the putative progress derives from aspects of our nature, for a common understanding of who we are. The arguments of the previous section suggest principled limits to common understanding of both sorts in cases when we must judge the value of the development of forces of production against the disvalue of the destruction of nonhuman natural items and systems.

According to the arguments of Sections IV and V, when it comes to assessing progress in the development of productive forces, any map of progress such as those in Section II would be necessarily misleading. A curve that represents the development of the forces of production over time by subtracting the disvalue of the destruction of nonhuman natural items and systems from the value of the development of productive forces does not accurately account for the loss of intrinsically valuable nonhuman natural items and systems.

Perhaps an alternative map in which both kinds of values are represented does a better job. The map in Figure 4 represents two indifference curves.

Suppose that the *y* axis represents forces of production and the *x* axis the preservation of nonhuman natural items and systems. Suppose further that a person has a rational weighting of the values of growth in productive forces and the preservation of natural values — she has no reason to reject the weighting — that is represented by the indifference curve on the left. That person should judge as progressive a social change that makes possible a schedule of trade-offs of the kind represented by the right hand curve. However, by the arguments in Section V, for multiple people there may be multiple rational schedules weighing the values of growth in productive forces and the preservation of nonhuman natural values. In other words, there may be multiple curves representing those schedules. There could not be as many curves as the set of all possible indifference curves since absolutism with respect to either the instrumental value of the forces of production or the intrinsic value of nonhuman

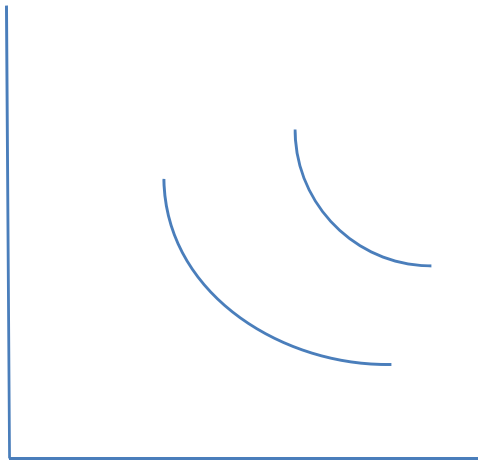


Figure 4. Indifference Curves for Growth of Productive Forces and Natural Value Preservation

natural items and system would be unreasonable. Although a curve could approach either axis asymptotically, it could not intersect or be tangent to it. For that would be inconsistent with the reasons we have to value instrumentally the growth in productive forces and to value intrinsically non-human natural items and systems. Still, within those constraints perhaps any curve is in principle a possible representation of rational trade-offs.

If we have reason to value the development of productive forces and to disvalue the destruction of nonhuman natural items and systems, then in policy discussions there would seem to be reason to pursue the kind of policies that both do not slow the development of productive forces and preserve more natural value. When economists argue that climate change mitigation is optimal in comparison to nonmitigation, they are arguing that mitigation policies are of that kind.³⁵ When policy makers stress the conservation gains from certain kinds of community development programs involving eco-tourism, they are making proposals of that kind.³⁶ And when Aldo Leopold advocated preserving as wild the idle strips bordering farms and highways, he was making a proposal of that kind.³⁷

The win-win policies mentioned in the previous paragraph suggest a different possible way to map progress. There may be a range of policies that make improvements to one category of value without destruction in the other. That can be represented as a rectangle on the map with the y

³⁵ See Nordhaus, *Balance* and Nicholas Stern, *The Economics of Climate Change, The Stern Review* (Cambridge: Cambridge University Press, 2007).

³⁶ David Schimdtz, "When Preservationism Doesn't Preserve," *Environmental Values* 6, no. 3 (1997): 327–39.

³⁷ Aldo Leopold, *A Sand County Almanac, with Essays on Conservation* (Oxford: Oxford University Press, 2001), 85.

axis representing productive forces and the x axis the preservation of non-human natural items and systems.

In Figure 5, any change from the point at the lower left hand corner of the rectangle to any other point within or on the perimeter of the rectangle should be judged an improvement. Perhaps progress over time could then be represented by a series of connected maps. The point of improvement within or on the perimeter of the rectangle could become the lower left corner of a new rectangle, and so on.

Although Figure 5 maps the space of win-win policy proposals from a given status quo — represented as the point of the lower left hand corner of the rectangle — a series of connected maps of that sort would be insufficient as a map of progress. Representing a space of possible win-win policy proposals represents the possible improvement against the status quo. But it is open to any critic with rational weightings of the instrumental value of the forces of production and the intrinsic value of nonhuman natural items and systems to reject that starting point. According to the argument of Section V, there do not seem to be grounds for criticizing the schedule of trade-offs the critic makes. We can understand this by imagining that the status quo cannot be represented as a point on an indifference curve (like those represented in Figure 4) that the critic endorses. A rectangle of the sort represented in Figure 5 with the lower left hand corner representing the status quo point will not then cover the identical area as a rectangle whose lower left hand corner is on a curve of a schedule of rational trade-offs that the critic endorses. In that case a move made to a point within the rectangle based on the status quo point will not necessarily be a move to a point within a rectangle that has the lower left hand corner as a point

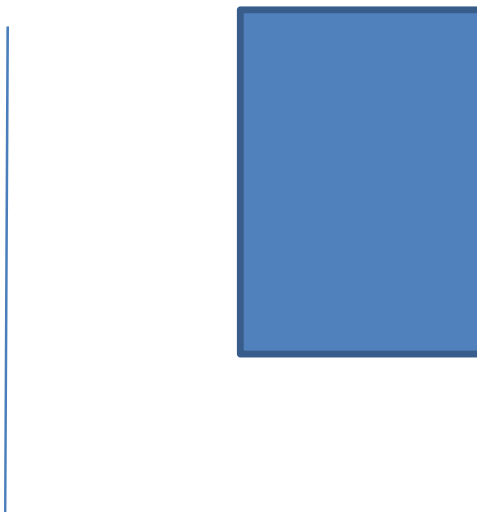


Figure 5. The Space of Progress

along her indifference curve. Since a plurality of curves representing rational trade-offs is possible, a plurality of rectangles representing the space of progress is possible. In principle there may be multiple maps of progress when the relevant values are the development of productive forces and the preservation of nonhuman natural items and systems.

VII. CLOSING REMARKS

We have reason to value prosperity and freedom from toil. But non-human nature also presents us with a magnificent treasure of wonder and beauty. And insofar as a path to wealth and freedom from alienated labor depletes and despoils that treasure we have reason to regret that path. The present destruction of nonhuman natural value might yet undermine the basis of our prosperity. In that case, agreement that we are not on a path of progress would be easy. Failing such a decline in the forces of production, there is room for a plurality of rational evaluations of our path and of our progressive nature. The source of this plurality of evaluations is a pluralism of values having no common metric.

The picture, however, need not be one of irreconcilable conflict between two domains of value. Since the development of productive forces can be productive of more or better goods and services with the same amount of work but also of the same value of goods and services for less work, there is no reason to think that progress in the development of the forces of production necessarily increases the depletion or despoliation of valuable natural items or systems. Indeed, the ratio of the size of the product to the amount of labor can continue to increase even as the size of the product falls, as long as the amount by which labor is reduced is sufficient. So, a tendency for the productive forces to increase is in principle consistent with less depletion and despoliation. The age of the Anthropocene could perhaps yield a world-historical reconciliation between the forces of production and destruction.

The reconciliation just imagined is, however, unlikely to come about without being preceded by additional destruction. In a world still marked by desperate poverty, the aim of poverty eradication is not morally optional. And there must be a dramatic increase in the production and distribution of energy and modern cooking fuels in order to achieve that aim. But even when the expansion of production is necessary to achieve morally mandatory aims like poverty eradication, appropriate regard for the intrinsic value of nonhuman natural items and systems gives us reason to seek means that are not carelessly destructive. Still, it would be incredible to believe that the achievement of the noble aim of poverty eradication, assuming we achieve it, will not also be an occasion to regret the non-human natural value destroyed along the way.