

The Future of Scientific, Moral, and Economic Reasoning

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**Social Sciences and Humanities Facing the
Climate Change Challenges**

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Why stress these three types of reasoning?

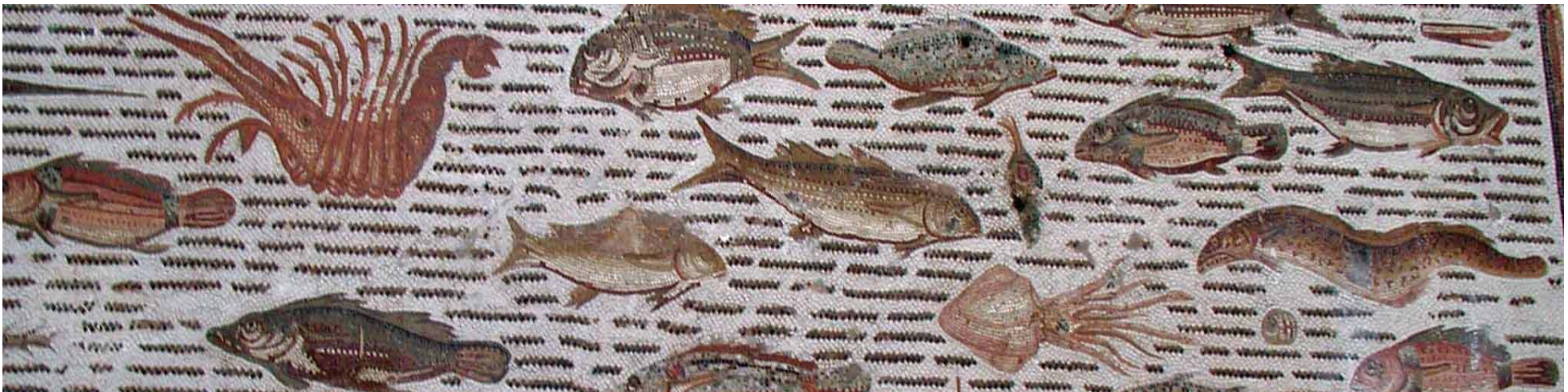
Scientific: Understanding and responding to climate change requires science, yet science is being challenged by economic / corporate interests and resurgent, fundamentalist “moral” communities.

Moral: Responding to climate change requires moral choices with respect to protecting the “rights” of future generations, current poor people, and perhaps other species.

Economic: Economics, the dominant social science, “lies” between science and moral reasoning, and thus is critical to addressing climate change.

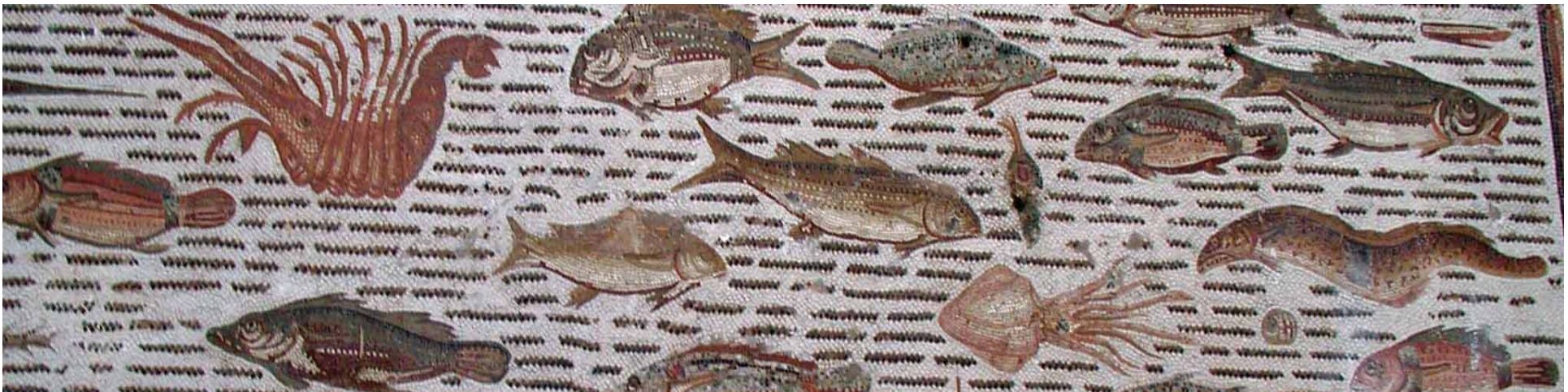
Favorable futures for humankind have typically been premised on citizens being empirical, reasonable, and benevolent (or at least being able to identify and defend their own interests).

In the United States, empiricism, reason, and benevolence -- let alone reasoned scientific, ethical, or economic arguments -- have been in especially short supply for quite some time.



1. U.S. was unreasonably slow to acknowledge the science of climate change,
2. Perhaps half of Americans still believe Iraqis were responsible for 9-11,
3. At least 15% of Americans do not believe in evolution and about twice that many think scientists should “teach the controversy.”

Though the U.S. is an important case, the *rise of unreason* is global.



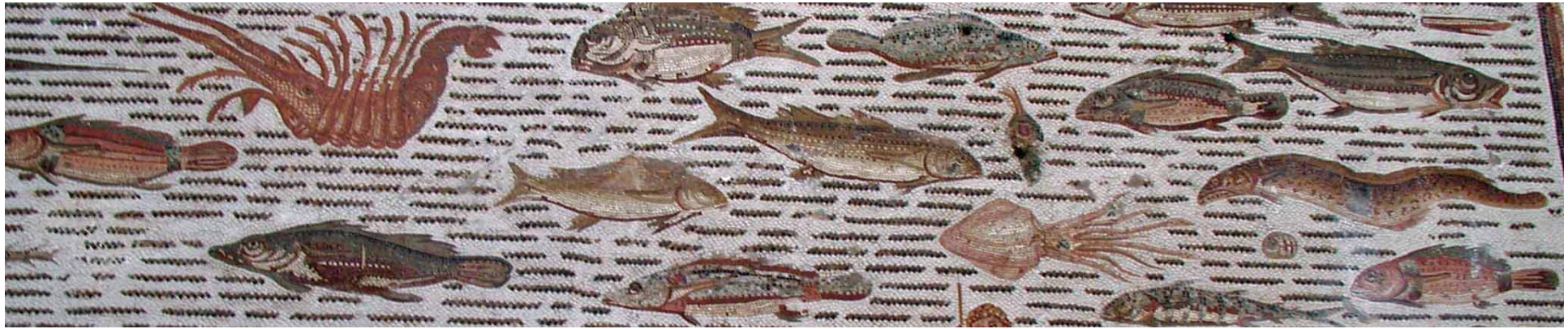
Modernity has not unfolded as it was expected to a century ago, yet “we”, at least as we operate through dominant academic and government institutions, presume that the departure from reason and evidence is a temporary detour.

We expected science to play a major role in defining the possibilities for and in implementing “human progress.”

□ Science still underpins our hopes, but scientific understanding is highly fragmented. The scientific community as a whole, let alone the public, does not comprehend the complexity of the challenges resulting from the interplay between new technologies, population growth, a dramatically expanding economy, and rapid ecological change.

At the end of the 19th century, modern people expected religious beliefs to come closer together through reasoned ecumenical discourse around appropriate moral behavior.

Instead, religious beliefs continue to become more disparate and fundamentalist beliefs are gaining adherents around the world.



We also expected science to “explain” the underlying principles of the cosmos and life on earth in a coherent manner and reveal how people fit into the natural order.

Few, however, are finding scientific answers sufficient while some are declaring their preference for religious explanations of the nature of the material world and of life.

<p>Years Ago</p> <p>% Human History Past</p> <p>Population (millions)</p>	<p>Event in Human History and Effects on Social Organization</p>	<p>Nature and Distribution of Knowledge</p>
<p>3 x 10⁶</p>	<p>Homo emerges, living in dispersed, small groups, little specialization or social hierarchy</p>	<p>Knowledge is generated entirely from experience that is shared, evolution of language facilitates transmission of knowledge.</p>
<p>1.5 x 10⁵</p> <p>95.0</p>	<p>Homo sapiens emerge</p>	
<p>1.0 x 10⁴</p> <p>99.67</p> <p>5</p>	<p>Agriculture arises and facilitates authoritarian hierarchy, soldiers, priests, artists, philosophers</p>	<p>Knowledge is still mostly derived from shared experience of working land with up to perhaps 3% of population specializing</p>

<p>0.5 x 10³ 99.983 500</p>	<p>Emergence of modern Western science</p>	<p>Still mostly shared experience of working land with perhaps 5% specializing</p>
<p>1.5 x 10² 99.995 1200</p>	<ul style="list-style-type: none"> - Democracy takes hold - Industrialization/markets affect specialization and social organization 	<ul style="list-style-type: none"> - Still mostly shared experience of working land with 10% specializing; - Disciplines appear in science
<p>1.0 x 10² 99.9967 1600</p>	<p>Svante Arhenius</p> <p>Democracy & markets begin to be complemented by progressive governance; experiments with scientific socialism get underway</p>	<p>Calculates effect of doubling atmospheric CO₂ on climate.</p> <p>Education and specialized knowledge become key to economic success, nevertheless, few are more than a generation or relative away from the farm.</p>
<p>2.0 x 10¹ 99.9993 5000</p>	<p>Soviet Union collapses. Other nations go from mixed government - market pragmatism to private property, "free" markets and globalization</p>	<p>Now specialization, scientific and economic, is rampant and there is little shared experiences or knowledge.</p>

Progressive governance as a model for insuring scientific reasoning has had clear problems:

- separate progressive agencies used fragments of science on discipline-specific aspects of problems to the detriment of the socio-ecological system as a whole,
- efforts to coordinate problem framing, planning, and action across agencies and disciplines have been a partial success at best, and
- moral choices, ostensibly reserved for democratic processes, were inevitably embedded in agency processes.

Partly in response to the difficulties of moral and scientific reasoning, economic reasoning increasingly sustained our faith in reason during the latter half of the 20th century. Economic reasoning girded global development, the formation of the European Union, and globalization.

(The failure of the USSR and transition to markets in China has been excessively portrayed as a failure of socialism as an economic model.)

But now people are actively inserting their personal religious beliefs into the “public” spheres of how science is funded and taught as well as into how “representatives of the public” should make decisions.

Around the globe, religious differences, or religiously “heated” differences, are replacing nationalist differences as a major source of violence.

And it is also now becoming clear that economic reasoning evolved into free market fundamentalism.

Economic reasoning has facilitated the creation of the tangible “universe” in which at least half of the world’s population now lives.

Economic reasoning provides the primary way of both grasping the nature of the socio-ecological system and one’s place in it and rationalizing what are ultimately moral choices.

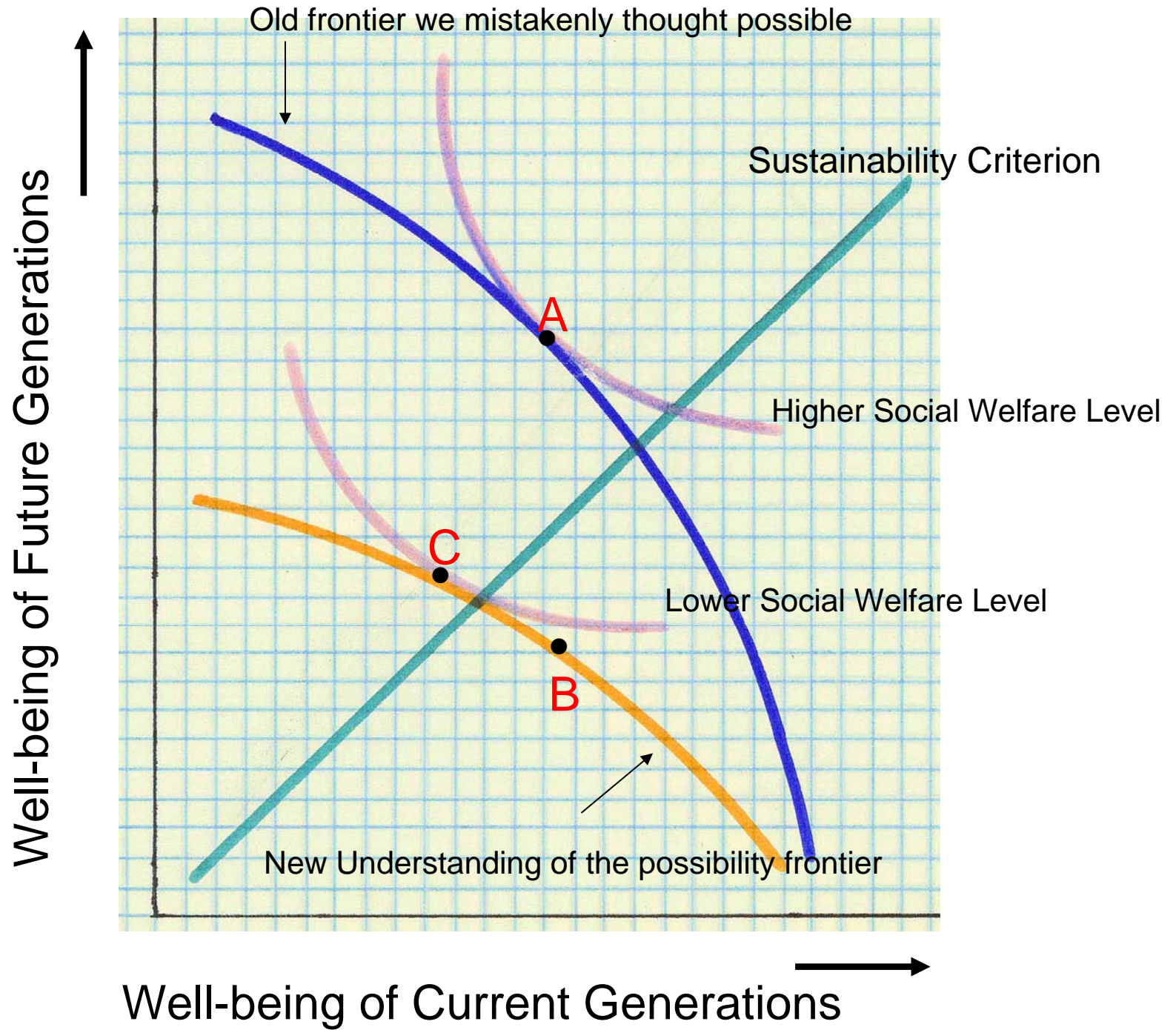
In effect, economics is the creator and the religion of the world of most people.

Economists, quite naturally, are the most seriously embedded in the view that the economy is our reality, think of prices as the “music of the spheres,” and the most convinced that economics is the way to understand reality.

Economists fallaciously argue that resources are not scarce if resource prices are declining, ignoring the fact that their own theories underlying their argument assume economic actors are fully informed of the physical reality (scientifically-informed empiricism) of resource availability and future demands, not simply following current market signals as are the economists themselves.

Economists, quite naturally, are the most seriously embedded in the view that the economy is “the world” and the most convinced that economics is the way to understand it (continued).

Economists fallaciously argue that we should base our public climate transition decisions on analyses using interest rates based on how the economy behaved before economic actors knew about climate change and that the public would insist on a transition.



Fundamental Problems of Modernity

1. The Gains from Separating Moral and Scientific Reasoning are now offset by the problems.

Since Galileo, we have “tried to act as if” science could be about the material world apart from moral choices and religion could be about the moral world apart from the material world.

Science, however, cannot be objective given that value judgments are inherent in the broader world views, choice of models, use of assumptions, and interpretation of results within each discipline.

Fundamental Problems of Modernity

1. The Gains from Separating Moral and Scientific Reasoning are now offset by the problems.

The efforts of economists to develop and apply economics as if it were objective and to portray it to the public as objective, even while it has been known since the French philosopher - mathematician Cournot (1837) that this was not theoretically possible, is a significant factor in our inability to address global inequality and our concerns with intergenerational inequality.

Fundamental Problems of Modernity

2. The Gains from Reductionism in science are now offset by the problems it has produced and the general lack of synthetic understanding among scientists and the public.

Reductionist methods have become established as the way real science is done.

Reductionist methods have produced particular technologies with systemic consequences.

While efforts to synthesize across the sciences are weak and not pursued seriously by academic and research institutions.

Fundamental Problems of Modernity

3. The Gains from Specialization and Trade are now offset by the losses in our ability to follow, see, and understand the consequences of our actions, empathize with those we help or hurt, to share experiential knowledge, and to form collective understanding around which we can make public choices.



Nevertheless, there is hope.

Scientists in the IPCC, Millennium Ecosystem Assessment, and similar environmental assessments on regional scales are learning how to collectively assess complex environmental systems by **breaking down disciplinary barriers**, questioning core disciplinary assumptions, sharing and debating their understanding across disciplines, building more appropriate models and assumptions, **and debating moral reasoning**, thereby reaching shared conclusions.

Nevertheless, there is hope.

Natural scientists have socially constructed a very interesting way of socially constructing scientific understanding of whole systems. Of course we cannot use “social construction” among natural scientists. Social scientists must be careful how we describe how scientists are now learning, testing and in many cases modifying or throwing out old knowledge, and generating new, deeper understanding.



Nevertheless, there is hope.

There have been numerous other participatory efforts between lay-citizens and scientist-citizens to bring in experiential knowledge and thereby reach deeper understanding of problems.

Nongovernmental organizations are proliferating rapidly and their scientists and lay representatives are interacting face to face, electronically, and in government facilitated processes.

Scientists and religious leaders are making greater efforts to communicate, especially with respect to climate and ecosystem change.

Many corporations are becoming quite aware that current trends cannot continue and are participating in shared learning efforts.

Annual expenditures on climate change research and assessments are immense, but still a small part of the science budget.

We are only beginning to train scientists for this aspect of science.

One of the major difficulties has been transferring the complexity and uncertainties of this shared understanding, or even their implications, from these global environmental assessments to policy makers and the public.

One has to participate in the process to understand its implications ... and so we probably need to dramatically expand the process among more and more scientists and policy makers to make it “work.”

But take this as an invitation to the birth of a new democratic order based on discursive learning and shared understanding rather than what we have now.

We have reduced democracy to corporate competition for voters' and politicians' attention and the counting of uninformed votes.

The new environmental assessment process that is occurring within science is a very interesting example of discursive democracy.

Discursive democracy could allow us to overcome the problems of reductionism in the sciences, the lack of overlapping experiential knowledge associated with specialization and trade, and the separation between science and collective action.

Perhaps we can facilitate the conditions under which scientific, moral, and economic reasoning, founded on evidence, can work wholly (honestly), still deeply, and also together.

We would spend more time in reasoned discourse, as smart and social beings, less in an economic world as material producers and consumers, and this could significantly reduce environmental pressures.

Or we might try continuing on as we have been and see how long people survive.

Either way, the challenges for the social sciences will be immense.

Personally, I would prefer exploring new directions and working on new challenges.