Why Do We Disagree on Climate Change?

with Mike Hulme, "(Still) Disagreeing about Climate Change: Which Way Forward?"; Annick de Witt, "Climate Change and the Clash of Worldviews: An Exploration of How to Move Forward in a Polarized Debate"; Lisa Stenmark, "Storytelling and Wicked Problems: Myths of the Absolute and Climate Change"; Jonathan Moo, "Climate Change and the Apocalyptic Imagination: Science, Faith, and Ecological Responsibility"; and Mary Evelyn Tucker, "Can Science and Religion Respond to Climate Change?"

CAN SCIENCE AND RELIGION RESPOND TO CLIMATE CHANGE?

by Mary Evelyn Tucker

Abstract. With the challenge of communicating climate science in the United States and making progress in international negotiations on climate change there is a need for other approaches. The moral issues of ecological degradation and climate justice need to be integrated into social consciousness, political legislation, and climate treaties. Both science and religion can contribute to this integration with differentiated language but shared purpose. Recognizing the limits of both science and religion is critical to finding a way forward for addressing the critical challenges of climate change. How we value nature and human–Earth relations is crucial to this. We need a broader environmental ethics in dialogue with the science of climate change.

Keywords: American Association for the Advancement of Science (AAAS); climate change; Earth Charter; ecosystems; fairness doctrine; flourishing; global ethics; intergenerational justice; Intergovernmental Panel on Climate Change (IPCC); precautionary principle; renewable energy; sustainability; technology transfer

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We are currently immersed in a global environmental crisis that has various manifestations such as pollution of air, water, and soil, along with the deterioration of ecosystems and massive loss of species. This is in part because of our explosion from two billion to seven billion people in one hundred years coupled with rapid industrialization, unlimited consumption, and overarching technological power. The effects of this on human health and planetary well-being are increasingly evident. The distinguished

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scientist Thomas Lovejoy calls our present moment an endgame in which the rapidly deteriorating global environment may not be able to support civilization itself (Lovejoy 2013).

Until recently, degrading nature for human use—clear-cutting forests, strip-mining mountains, depleting fisheries—was not considered a critical ethical issue. Polluting the atmosphere, soil, or waters was simply an external consequence of industrialization and a necessary cost of economic growth. But now our industrializing powers and economic systems are disrupting the carbon cycle and causing massive climate change. We have reached the limits of degrading the atmosphere, land, and oceans without significant consequence.

Although there is still denial in the United States regarding the reality of climate change, it is becoming increasingly visible as a major environmental challenge, especially with severe droughts in the west and the impact of hurricanes Katrina and Sandy. Yet this visibility has still not led to unanimity regarding the causes of climate change or clarity regarding solutions. This is partly because the fossil fuel companies and Koch Brothers–supported think tanks have spent millions in disinformation campaigns that have confused the American public. Appropriate action and the political will to move forward have thus eluded us in the United States, creating adverse impacts on the rest of the world.

All of this means that we still haven't embraced climate change as a moral issue, but Pope Francis' encyclical on the environment is raising new awareness. It may be the case that—like the abolitionist movement in the nineteenth century and civil rights in the twentieth century—until climate disruption is seen as a moral challenge, there won't be a sufficient response at the scale and speed that is required. The integration of the moral issues of ecological degradation and climate justice into social consciousness, political legislation, and international negotiations remains to be realized.

Two interrelated questions then arise: where do we begin and what can we build on? For each part of the world the response will be different. For the United States the task is far from easy and one of the main messages may be dismissed or ignored. The hard truth is that our hyper-inflated life style—our massive consumption of energy and goods—is having adverse effects on people and the planet, both at home and abroad. Moral awakening is critical, but will moral rebuke be the most effective tool? Or is evoking compassion for the Earth community—both people and planet—what is needed, more than guilt?

It is clear that we in the United States are, and have been for some time, a source of the destruction of the environment, both its intricate ecosystems and its myriad species. Whether intentionally or unintentionally, the consequences are that we are also a cause of increased inequity and injustice for the poor, the vulnerable, and the climate refugees who

are now suffering from the devastating effects of climate change. Several of the Small Island Nations are asking the high-emitting countries for just compensation for their forced migrations and loss of homeland. We are indeed at an endgame and what to do still eludes us as intergenerational justice looms on the horizon.

A way forward is to see climate change as an issue, which brings science and religion together as never before. We need both scientific knowledge and morality to confront this massive problem. The challenge is: How can we break through scientific complexity to moral clarity that gives rise to social and political change? But there are problems with science and with religion that we also need to identify.

Problem with Science: From Scientific Fact to Sociopolitical Action

The complexities of the issues surrounding climate change are undeniable. However, the consensus from the Intergovernmental Panel on Climate Change (IPCC) regarding the anthropogenic nature of climate change can no longer be dismissed. This report of over 1,500 scientists from around the world represents the largest collaborative scientific project in history. Some of these scientists are now calling for action. But even this call to action is contested, as scientists don't generally see this as their role ("Time to Act" 2009).

Indeed, a dozen years ago Richard Alley, a well-known climate scientist from Penn State, gave a detailed talk at Bucknell University on his Arctic ice core findings demonstrating current climate changes. At the end of the talk he made a very tentative statement: "I think it may be time that we consider the possibility of doing something about this situation." A well-respected geologist, Dick Nickelson, leapt up from his seat in the front row and said, "It is well beyond time that we do something about it."

This desire for knowledge to be translated into sociopolitical action has caused frustration and unease among scientists, including those studying climate change for decades at the Boulder-based National Center for Atmospheric Research (NCAR). Indeed, some of them have despaired of the American public waking up to the climate emergency and responding in a timely manner. They thought that scientific facts and graphs would change people. Some of them are in psychoanalysis because of their despair over this seeming indifference. As James Hansen puts it, there is a widening gap between what scientists understand and what the public knows. However, there are new openings. As Tony Leiserowitz, director of the Yale Project on Climate Change Communication, is reporting, in polls Americans are increasingly favoring policies to combat climate disruption and to move toward sustainable energy. Can we build on this? First let's identify the obstacles to public understanding that we have faced and are still facing in the United States.

Barriers to Knowledge and Action on Climate Change

Why has the urgency of the challenge of climate change and its moral implications been so poorly understood by many Americans? We can point to a variety of factors including: language, media, skeptics, business interests, lack of political will, and the academic divide between science and policy. Let me elaborate.

First, as many have observed, *language* can be a barrier in making complicated science clear to a broad audience. For example, the term "global warming" can be misleading as for some it suggests this might be good for the planet (Broder 2009).

Second, the media's misplaced concern in the United States to uphold the so-called "fairness doctrine" resulted in efforts for many years to present "both sides" of the science. This gave undue attention to climate skeptics and deniers. For over a decade they were allowed equal time along with research scientists who had studied the issue carefully and reported their findings to the IPCC. Moreover, meteorologists and television weather reporters in the United States rarely speak about climate change for fear of taking sides.

Third, it is now widely known that oil companies and other *corporate interests funded many of the reports of these skeptics*. Koch Industries, headed by brothers David and Charles Koch, gave nearly $50 million between 1997 and 2008 to some 40 groups that deny climate change and oppose clean energy policies and technologies (Greenpeace 2010).

Fourth, *economic concerns* have also made it difficult for legitimate climate scientists to be heard. The continual refrain that "attending to climate issues will hurt the economy" has gained currency in the business community. The Princeton economist Paul Krugman and many others have refuted that claim (Krugman 2010). The *Stern Review* published in 2007 by the British government suggested that not addressing climate change would be far more costly in the long term, specifically the costs of the two world wars combined.

The barrier to economic inaction is breaking down in the insurance industry, which understands what is at stake for people and the planet as ocean waters rise. Reinsurance industries, such as Swiss Re and Munich Re, cover climate issues extensively on their websites; some major U.S. insurance companies will no longer insure property along coastal waters; and securing insurance on Long Island is becoming increasingly difficult.

Fifth, *lack of political will* due to economic misperception has resulted in government inaction since 1997. Despite Al Gore's role in drafting the Kyoto Protocol, the Clinton administration failed to get it adopted. Then the attempts by the Bush administration to dismiss the IPCC report, to silence outspoken scientists (such as Hansen), and to refuse to sign the Kyoto Protocol caused the United States to lose years of important work

in mitigation and adaptation. President Obama has barely tackled climate change. However, it should be noted that states and cities in the United States have moved forward on climate issues.

Engaging Science: Toward Sustainability

Perhaps most problematic is the academic divide between scientific fact and policy action. Most scientists tend to see their research as ranging from pure to applied science but would not want to advocate for particular solutions. They are comfortable with objective description and wish to avoid ethical prescription. This is understandable, but when scientific reports don't translate into behavioral and legislative change we face a considerable impasse.

The so-called objective nature of scientific research should be respected and at the same time reexamined. This became clear at the American Museum of Natural History in 1998 when the curators realized they would have to rethink "neutral" research. This was the year that, among six finalists for an ornithology position, four had experienced their birds going extinct as they studied them. This was a wake-up call for the scientists who asked, what does it mean to do research within a global extinction spasm? The creation of the Hall of Biodiversity in 1998 was one response. The scientist and curator of this permanent exhibit, Niles Eldredge, highlighted the complexity and beauty of biodiversity, along with the threats such diversity is facing around the world. The exhibit combines what it sorely needed, namely, information on the problems as well as identifying potential solutions.

The plaque on the floor of the Hall of Biodiversity states definitively that we are in a sixth extinction period and that this is being caused by humans who have the potential to stem the tide of destruction. The exhibit shows both the destruction and restoration of habitat that is affecting biodiversity around the world. I would suggest that this Hall marked a new phase for science education, one that moved from only providing information toward showing solutions. The IPCC report likewise has forced this issue of pure research and active engagement with solutions into new light as natural and social scientists have struggled to work together. However, ethicists and the religious communities have remained on the sidelines.

Yet despite disciplinary obstacles in science and prejudices against religion, there has emerged in certain circles a growing sense of the vital importance of interdisciplinary dialogue of science, policy, ethics, and religion, especially as we face intractable environmental issues such as climate change. Over the last twenty years some efforts have been made that we can now build on. One of the earliest statements in this regard was the 1992 "Warning to Humanity" from the Union of Concerned Scientists, signed by over 1,500 scientists including some 200 Nobel laureates. This

was a call to the world's religions to enter the dialogue. Five years later the distinguished marine biologist and former director of the National Oceanic and Atmospheric Administration (NOAA), Jane Lubchenco, gave her presidential address to the American Association for the Advancement of Science (AAAS) at their annual meeting in Seattle. There she called for science to embrace a "new contract with society" in response to pressing environmental issues (Lubchenco 1998, 491–94).

The emerging field of sustainability sciences as developed by Bill Clark at Harvard along with Bob Kates and Bob Corell can be seen as a robust response to Lubchenco's challenge. Since their article in *Science* in 2001 there has been a growing interest in bringing the natural and social sciences together around a variety of pressing issues, including sustainable development and climate change. Many sessions at the AAAS have been devoted to this effort of bringing science together with policy for sustainability.

An interesting example of how this is being resolved appears in the January 2010 issue of *Science*. Scientists reporting on mountain top removal practices in Appalachia concluded that environmental impacts, especially with regard to water and streams, were so deleterious that mitigation could not address them. The scientists did not stop in simply reporting their conclusions but went on to make a policy recommendation, which is unusual: "The science is so overwhelming that the only conclusion one can reach is that mountaintop mining needs to be stopped" (Palmer et al. 2010, 148–49).

This tension between science and policy exists in many academic programs on the environment. I am suggesting this is one of the reasons that the moral dimensions of climate change are still invisible, both in academia and in the society at large. There are many other reasons for this: namely, that religion and ethics are marginalized in secular academia; that schools of theology have not made environmental issues and environmental ethics central to their curriculum; and that religion and ecology is still a new field in academia. Yet it is fair to say that this field has significant potential for becoming a moral force in society. The Pope's encyclical on the environment has done much to change this, as well by making action on climate change a moral imperative.

The Promise and Problem of Religion

We are assuming here that religions are necessary, although not sufficient, partners in seeking environmental solutions. This is why we developed dialogue partners in our ten conferences on world religion and ecology at Harvard and in the website of the Forum on Religion and Ecology at Yale over the last twenty years (www.fore.yale.edu, Tucker and Grim 2001; Grim and Tucker 2014). These include science, economics, and policy. We hope

this interdisciplinary dialogue gains further traction through conferences such as this one.

The problems and promise of religions should also be clearly identified. Those of us in the field of religious studies, or in positions of religious leadership, or members of religious communities, or in divinity schools also need humility to enter the environment and climate field. Important work in these areas has been going on for decades without us. Religions are indeed late, but their contributions may be indispensable for realizing a sustainable future for the planet. That is our challenge in the years ahead, to contribute to a moral awakening regarding the planetary emergency that faces us. This is not only about developing an ethics for homicide or suicide, but also for imagining an ethical response to biocide or ecocide.

To summarize the problems and promise of religions:

Problems	Promise
(1)	
Rigid/dogmatic	Flexible
Bound by tradition	Change over time
Afraid of modernity	Embraces modernity
(2)	
Exclusive claims to truth	Broad moral reach
Looking inward to orthodoxy	Looking outward to praxis
(3)	
Other worldly concerns	Valuing this world
Salvation in heaven	Incarnational
(4)	
Hierarchical/patriarchial	Equity, fairness, justice
(5)	
Present sectarian concerns	Future generational concerns
Preserving church membership	Supporting the full community of life
(6)	
Human rights	Rights of nature/creation
(7)	
Anthropocentric	Anthropocosmic

Engaging Religions: Toward Flourishing

Despite the problems with religion there is great promise in a partnership between religion and science around climate change. This is vital because we need to encourage a new sense of progress, one that is concerned not just with *sustainability* or economic growth but with the larger *flourishing* of the Earth community. The world's religions may offer some ethical norms for enhancing this larger flourishing of life.

For example, to do this we have to be able to think for the long term and for future generations, namely for broader interests than weekly stock

market indices or quarterly financial reports. This involves enhancing the quality of life, not the quantity of material possessions. In this framework economic progress is not measured by gross national product but rather by the Gross National Happiness indicator (as the government of Bhutan has developed). Religions can assist in this endeavor, as they are well equipped to point toward more lasting values and sources of deep joy. They understand well the efficacy of long-term thinking and have been attending to this for centuries. This needs to be directed not toward the next world but toward this world.

The long term now refers to the common good for the flourishing of the Earth community—land, water, air, soil, and all species—human and more than human. It means upholding the wonder, beauty, and complexity of nature for present and future generations. This sense of wonder is shared by religion and science and can help reorient our lives by grounding us in gratitude. Life is an extraordinary unfolding process of which we are a small but indispensable part.

Our essential ethical question, then, is what does the flourishing of the Earth community require in the face of climate change? We need to develop a moral framework within the world religions for responding to climate change that allows for common but differentiated responsibilities. The developed world has different responsibilities from the developing world and yet our common future depends on creating the basis for a shared and vibrant future. Otherwise, as Thomas Lovejoy reminds us, civilization itself is at stake.

I am suggesting that ethical responses to environmental issues such as climate change involve reimagining human–Earth relations on a scale that is locally differentiated, culturally sensitive, ethically grounded, and globally attuned. An awareness of place-based local concerns is indispensable, as is sensitivity to particular cultures and religions. From this basis an ethics can emerge that is grounded in place and culture, but also globally attuned.

Our biggest challenge to realizing this broader perspective in the United States (and some other Western-influenced societies) is individualism and a devotion to personal liberties over a sense of a common good. The unanswered question is how to move from a narrow devotion to individual rights toward an embrace of a larger sense of responsibility for the flourishing of life. We need to articulate and image a common well-being that is not hegemonic or totalizing but inviting, energizing, and participatory. The film and book on the *Journey of the Universe* has this possibility of bringing us together with a common story that respects differences while acknowledging that we are part of a vast unfolding universe and a living Earth community (Swimme and Tucker 2011). It is a perspective which affirms that "The universe is a communion of subjects, not a collection of objects," as Thomas Berry often observed.

The next sections present suggestions of principles, strategies, and tactics toward the flourishing of people and planet in the face of rapid and relentless climate change.

First Foundational Principle: Valuing Nature as Source Not Resource

(1) Intrinsic value of nature. We are moving from viewing nature simply as a resource for our own use to seeing it as the source of life and creativity. Instead of valuing nature from a utilitarian perspective we are learning to appreciate it for its intrinsic beauty and complexity. As the *Journey of the Universe* makes evident, Earth is a source of dynamic change and transformation bringing forth life over billions of years of evolution. Participating in the flourishing of life's creativity is a major fulfillment of human destiny. Destroying that creativity is diminishing the possibility for life's continuity.

(2) Environmental degradation as an ethical issue. Until recently, environmental degradation was seen as an inevitable consequence of economic growth and industrial progress. This view is being called into question in many circles, especially those of ecological economists. To stem the tide of destruction will require new economics and the extension of ethical concerns to nature as a whole and to individual species in particular. The role of humans in causing climate change through greenhouse gases is finally being acknowledged as ethically problematic. Our emissions (especially in developed countries) have adversely affected ecosystems, caused biodiversity loss, contributed to species extinction, and impacted millions of people around the globe. There have been moral responses to this by a Catholic Bishop's response to the extraction of oil in the tar sands in Alberta and by the Bishop's letters in the Philippines. The largest response is the Papal Encyclical on the environment.

Second Foundational Principle: Honoring Humans: Rights and Responsibilities

(3) Environmental rights: present and future generations. It will be thus be necessary to expand the notion of human rights to include environmental rights to a healthy atmosphere and biosphere for present and future generations, as Robert Bullard has argued. To do this we need to consider the rights to information, public participation, and justice regarding environmental issues. This was set forth in the Aarhus Convention in 1994. But clearly those families and individuals who are exposed to petrochemical and coal power plants and those who are affected by mountain top removal were never given information to ensure their health and safety or to guarantee their environmental rights.

(4) Environmental responsibilities: distributive justice. With environmental rights come moral responsibilities to those most vulnerable to the effects of climate change: the millions of impoverished people in the coastal region of Bangladesh, the 100,000s of African-Americans in New Orleans after Hurricane Katrina, the elderly in Europe during the summer heat wave of 2004 where some 50,000 people died, those in Darfur suffering climate-related drought and subsequent famine. The concept of distributive justice clearly requires further reflection regarding our moral obligation to people at a distance in space (in other countries) and time (in future generations). As the oceans rise and their countries are becoming endangered, the group of Small Island Nations in the United Nations is considering suing the developed countries as causing this catastrophe. Their peoples are becoming climate refugees; the population of Tuvalu is being relocated to New Zealand. How many hundreds of thousands of people will have to be relocated from coastal regions where most of the world's largest cities are located?

First Key Strategy: Thinking Consequentially, Short Term and Long Term

(5) Precautionary principle (source-oriented). Years ago, the scientist Barry Commoner made the commonsensical point that we ought to stop pollution at its source. This can be seen as an early iteration of the precautionary principle or principle of prudence. We should invoke this principle as a means of stemming climate change. We need to suggest that, rather than arguing about some of the details of the science or asking for further studies, the precautionary principle requires us to act now. Future generations and the future of life depend on this preventive action. Cap and trade (Nicholas Stern) or a carbon tax (James Hansen) are no doubt necessary economic incentives for change, but we need to develop a deeper sensibility regarding cutting back emissions at the source and seeing this as a moral responsibility.

(6) Unintended consequences (long-range orientation). A major question we face is not only source reduction at present, but also the consideration of the long-term effect of our decisions. We know we are already compromising the quality of life for many people—including our children and grandchildren. The consequences of our actions, intentional and unintentional, need to become more visible. This is especially true as the unintended outcomes of various proposed solutions to climate change are becoming evident, namely, geo-engineering schemes such as seeding the oceans or agricultural projects such as raising crops for bio fuels, which contributed to a global food crisis.

Second Key Strategy: Integrating Solutions: Energy and Technology

(7) Renewable energy. The development of safe renewable energies is of utmost importance as we make a shift from fossil fuels to energy from sun, wind, water, and geothermal power. Indeed, many are suggesting we are in the midst of an energy revolution. While we have much of the technology to make this change, this shift needs to be scaled up so that it can be done without adversely affecting those most vulnerable. This will require making renewable energy economically viable and thus providing economic incentives and investing in more research and development. The shift from nonrenewable and polluting energies, such as coal and oil, to renewables is one of the largest transformations in human history, and is a moral imperative. Fracking for gas and oil is harming our ecosystems, polluting our waters, and causing social disruptions around the United States and Canada. We must ask ourselves why have several European countries outlawed fracking on environmental grounds? And surely the Alberta tar sands and the Keystone pipeline are not answers to our search for clean energy.

(8) Technology transfer. Along with the large-scale move to renewable energy is the obligation for transferring appropriate technology to developing countries to assist climate change mitigation or adaptation. As we improve alternative energy and green technology in the United States and the developed world, how can we find the economic means and political will to transfer this knowledge to developing countries? This is a justice issue, not simply an economic issue, because the developing world by and large does not have the capital to create or invest in these technologies without assistance. Large-scale funds need to be set aside to allow this to happen. Such help has been promised in the past but not delivered.

First Interrelated Tactic: Ensuring Restraint: Curbing Consumption and Population

(9) Consumption/affluence. Moral restraint of individuals and groups will be needed in both consuming and producing. A key justice issue is that of overconsumption and the high levels of affluence in the developed world as factors that contribute to climate disruption. Because of an inflated life style, the United States with only four percent of the world's population contributes 25 percent of greenhouse gases. How can lifestyle change (using and consuming less) be seen as a moral issue? This will involve re-examining our carbon footprint, our building patterns, our transportation systems, our development plans, our clothing manufacturing, and most especially our agricultural processes, which depend largely on fossil fuels. The factory farming of animals and the

destruction of rainforests to raise crops to feed animals is contributing to climate change. The former head of the IPCC, Rajendra K. Pachauri, suggested, for example, that eating less meat will help reduce greenhouse gases.

(10) Population growth. How can the difficult topic of population growth be raised as a moral issue in relation to global warming? The planet clearly has limits to what it can support. By exploding from two billion to six billion people in one century we have caused massive disruptions to Earth's ecosystems and natural cycles. China has adopted a national policy to control population this still remains controversial in some quarters. However, as all United Nations agencies have observed, educating women for jobs and empowering women by providing birth control and reproductive health care are assured means of population reduction. These need to be seen as moral rights that will ensure that children are wanted, nourished, educated, and cared for. We cannot avoid focusing on this issue in conjunction with consumption, given that a person in the developed world will consume considerably more than a person in the developing world. Again, invoking the principles of justice and equity is critical.

Second Interrelated Tactic: Creating Law: Global Governance and Global Ethics

(11) Global governance. To be able to draft and enforce binding treaties on climate change we need to ensure democratic participation, accountability, and transparency. This requires the development of a new stage of global governance that will be bound by international law and enforced by institutions such as the World Court and the United Nations. While we are a long way from such global governance, the foundations of such a system are being established. This is sorely needed because environmental problems such as climate change transcend national boundaries and thus call for international cooperation that is binding, both legally and ethically.

(12) Global ethics. Finally, how can the Earth Charter, which was written in the decade following the Earth Summit in Rio in 1992, contribute to a more comprehensive ethical framework for envisioning solutions to climate change? The three sections of the Charter can be used as a context for refining a moral response to climate change. These sections include valuing: (1) ecological integrity; (2) social and economic justice; (3) democracy, nonviolence, and peace. This integrated framework is critical to a moral response that is comprehensive enough to address the global nature of climate change and to establish the conditions for the flourishing of the Earth community (www.earthcharter.org).

In addition, the Universal Declaration of the Rights of Mother Earth has been drafted at the request of the Bolivian government in concert with indigenous peoples who feel their rights have been violated in many parts of the world. The rights-based approach to nature may gain some traction in circles that hope to force action on climate change and other environmental issues. It may also be resisted by those who are hesitant to grant nature rights, but nonetheless wish to address climate disruption and the degradation of nature. It is increasingly clear, however, that a new Earth jurisprudence is needed.

Conclusion

As The Earth Charter states:

> We stand at a critical moment in Earth's history, a time when humanity must choose its future. As the world becomes increasingly interdependent and fragile, the future at once holds great peril and great promise. To move forward we must recognize that in the midst of a magnificent diversity of cultures and life forms we are one human family and one Earth community with a common destiny. We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace. Toward this end, it is imperative that we, the peoples of Earth, declare our responsibility to one another, to the greater community of life, and to future generations.

In this moment of great transition, we need science and religion to work together as never before for the flourishing of the Earth community.

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