



Human Origins and Humanity's Future: Past, Present and Future of the Anthropocene Public Symposium · March 5, 2022

Co-chairs:

Leslie Aiello, University College London (*Professor Emerita*)
Charles Kennel, Scripps Institution of Oceanography and University of Cambridge

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ABSTRACTS

Honoring Paul Crutzen, A Personal Appreciation

Veerabhadran Ramanathan, Scripps Institution of Oceanography, UC San Diego

I have had the privilege and pleasure of collaborating with Paul for more than 40 years. During the year 2000, when he announced to the world about his Anthropocene concept, Paul and I were in the midst of a major field study on Atmospheric Clouds over the Indian Ocean. He is one of the most creative, innovative and original geo-scientists of his generation. I describe the Anthropocene using the lens of a climate scientist. I conclude with my speculation about how and when we will transition from the current adolescent age of the Anthropocene subject to multiple assaults on the environment to a mature, sustainable and safe Anthropocene.

How Humans Evolved the Capacity to Change the Entire Planet

Leslie Aiello, University College London (*Professor Emerita*)

The human capacity to change the planet is not something new, but is rooted in our deep evolutionary past. One of the hallmarks of humans is our large brain size, which began to expand about 2 million years ago. This expansion did not come without consequences, and two are particularly important. The first is the additional energy requirements needed to fuel this larger brain size together with the concomitant life history factors such as shorter interbirth intervals, more dependent offspring and longer periods of growth and development, and longer lifespans. The second is the solution to these energy requirements that involve cooperative breeding and the development of the high risk/high return hunting and gathering foraging strategies. From this foundation we trace the increasing capacity of humans to extract more energy from the environment through the development of a reliance on fire, the agricultural revolution leading to the industrial revolution and modern times.

The Domestication of Crops and the Anthropocene

Michael Purugganan, New York University

Domesticated species are an interesting group of organisms that have co-evolved with *Homo sapiens*, and have begun important in human survival and fitness. We trace the origin and spread of these domesticated crop species over the last 12,000 years, discussing both their impacts on human society as well as to the climate and human evolution. We will also present the challenges in modern agriculture and food security.

ABSTRACTS (continued)

Ants and the Anthropocene

Mark Moffett, Smithsonian Institution, National Museum of Natural History

This talk considers the effects of the most aggressive ants on the environment, arguing that certain invasive species resemble humans in their capacity for global conquest and environmental destructiveness.

The Coming Crisis of the Anthropocene

Charles Kennel, Scripps Institution of Oceanography and University of Cambridge

Connections between past and present human exploitation of the environment, the coming crisis of the Anthropocene and what we humans can do to alleviate the crisis.

The Ecology and Evolution of Infectious Diseases

Vanessa Ezenwa, Yale University

Climate change is one of the hallmarks of the Anthropocene. Rising global temperatures are having profound effects on ecosystems and the organisms that inhabit them, including disease-causing organisms such as viruses, bacteria, and parasitic worms. Indeed, the effects of climate change on the distribution and severity of infectious diseases are now widely appreciated. However, much less is known about the potential for infectious agents to contribute to changes in climate. Many infectious agents have the potential to affect greenhouse gas emissions via effects on their hosts. In my talk, I explore the idea that interactions between climate change and infectious diseases are not solely unidirectional, specifically, that climate change can increase disease prevalence in human and animal populations, but disease, in turn, may exacerbate climate change. Uncovering the potential for positive feedbacks between climate and infectious disease is relevant for understanding both the ecology and evolution of infectious organisms and the health implications of climate change for humans and other animals.

Human The Oceans and the Anthropocene

Nancy Knowlton, Smithsonian Institution, National Museum of Natural History

The ocean is enormous, indeed so large that for centuries we assumed that there was nothing we could do to substantially harm it. Unfortunately, we now know that this is not true. Every year brings new scientific studies and media reports documenting the scale of the damages that the ocean has suffered and grim assessments as to what lies in the future. Less well known, however, are some of the successes we have had in ocean conservation. This is a problem, because bad news without solutions can lead to apathy rather than action. We are having success on some fronts, such as saving species from extinction, protecting ocean waters, fishing more sustainably, and restoring damaged ecosystem by replanting critical species and reducing pollution. Even actions on land, such as removing dams from rivers and rats from islands, can make an important difference to marine life. Of course, we still need to do much more, and do it faster. In future, we can turn to new tools drawn from the natural and social sciences. Big data and genetic interventions have a role to play, as do ocean-based renewable energy sources and new financing schemes. Perhaps most important is the growing recognition that success depends on empowering local communities in efforts to create a healthier ocean. Thus, it is highly fitting that putting people at the center of ocean conservation is the linchpin of the just launched United Nations Decade of Ocean Science for Sustainable Development.

We Alone: How Humans Have Conquered the Planet and Can Also Save It

David (Jonah) Western, African Conservation Center, Nairobi Kenya

Conservation is common to all societies which learned to live within ecosystem limits. In breaking the evolutionary and biological straight-jackets constricting other species, we became the ultimate multi-niche free-ranging species. Our rise to global conquest and ecological emancipation from nature through domestication and manufacturing expanded conservation for survival to saving whales, elephants, the Acropolis and Mono Lisa. The universal rules for overcoming a tragedy of the commons locally offers hope for combating global warming and sustaining the diversity of life globally—if we use our unique capacity for cooperation and planning.

ABSTRACTS (continued)

The Potential Utopian and Dystopian Futures

Martin Rees, University of Cambridge

This century is the first in Earth's history when the catastrophic threats to the entire planet can be induced by one species, humans. We have an ever-heavier collective footprint on the planet. We're empowered by ever more powerful technologies that can be hugely beneficial, but which if misapplied could trigger calamitous setbacks to civilization. Such events could be global: we're so interconnected that no continent would be unscathed. It's an ethical indictment of humanity that the gap between the actual state of the world, and the way it could be, is widening rather than narrowing, COVID-19 has been a wake-up call; it has shown that our increasingly interconnected civilization is vulnerable; but also that well-directed science can be our salvation.