EARTH'S FUTURE: TAMING THE CLIMATE

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G. Michael Purdy, PhD, Columbia University
Introduction to Day 1

Introduction by Jeffrey Sachs

Jeffrey Sachs: To lead us off I'd like to introduce not only our first speaker but our host and organizer of this whole conference, the director of Lamont-Doherty Earth Observatory and your host for these two days, Dr. Michael Purdy, who is director of LDEO. Lamont-Doherty Earth Observatory is our great bulwark of the overall Earth Institute. It is by far the largest unit and the long-established and great scientific center for the study of Earth processes at Columbia University. Mike Purdy came to Columbia in 2000 as the director, and we're all thrilled with that. He is a graduate, a PhD in marine geophysics from Cambridge University, Cambridge, UK, and after receiving his PhD, he worked and then helped to lead Woods Hole Oceanographic Institution for the next twenty years. He was a scholar there, a researcher in ocean geochemistry, ocean seismology, and then became the director of the Department of Geology and Geophysics at Woods Hole Oceanographic Institution.

In 1995 Mike went from Woods Hole to the government to take up the directorship of the Division of Ocean Sciences at the National Science Foundation, where he was in the lead for the government in deciding on priorities and very effectively mobilizing resources to address critical issues of ocean science, including ocean-atmosphere interactions and the long-term climate. And then Columbia University was absolutely thrilled to be able to lure him from the NSF leadership position to the directorship of Lamont-Doherty in the year 2000. So it's a great pleasure to introduce Mike to you.

The Importance of Climate Change

G. Michael Purdy: Good morning, everyone. It's Earth Day today, very appropriate day to begin the third of the academic symposia that have been organized to celebrate Columbia's 250th. It took fiendishly clever planning to ensure that these two events occurred on the same day, but we were successful.
As Jeff said I'm director of Lamont-Doherty Earth Observatory here, and along with John Mutter I've led a small planning committee that's put together this symposium, and we've been helped substantially in this by colleagues Geoff Heal, Klaus Lackner, Roberto Lenton, who my personal thanks are due to all these good colleagues for the great help that they've given.

Our title is "Earth's Future: Taming the Climate." Intentionally this is a provocative set of words because we intend this symposium to be provocative, not for reasons of empty sensationalism but for sound reasons of social responsibility. The impacts that the ever-changing climate will have on our planet's inhabitants does not receive attention, or more importantly the action on a scale that is commensurate with the magnitude of the impacts. Decision makers in federal and local governments in this nation and others around the world do not place upon this issue the priority it deserves. In order to change that demonstrable fact, we need to understand why that is, what is limiting the use of the vast intellect and capability embodied in the human race from moving forward in a timely way to respond to the inevitability of climate change?

The problem has not been ignored, of course it has not. In our audience today and among the symposium's panelists are many of the world's leading climate scientists, economists, and policy makers who have contributed in major ways to the body of knowledge that exists today. But it is not our intention at this symposium to review the state of that knowledge, it's been done many times before, it's not the intention to plan new research paths. Rather it is to ask, Why is it that we are doing so little about it? The clear goal in tackling this question is to provide insights into how the roadblocks to progress can be surmounted or avoided.

The symposium title, like many great titles, contains a colon that appropriately provides two important themes. *The Earth's future*. There are few factors short of the catastrophic nuclear holocaust or major bolide impact that will more clearly and directly determine the future of our planet than will the changing climate. This is not conjecture or fantasy; you'll hear from our speakers and panelists today the meticulously verified evidence that establishes the magnitude of the shifts in climatic conditions experienced by our Earth. The climate will continue to change. We know this because we know that throughout Earth's history our climate has never been stable. Natural variability of climate over a few years is most commonly exemplified by the El Niño phenomenon. The most dramatic shifts are exemplified by the ice ages, of course, and recent research over the past decade has revealed a history of abrupt changes that can occur in time periods as short as a decade.

But added to this mix is a dangerous new forcing factor, the full impact of which is only very poorly understood, and that is the substantial increase in the carbon-dioxide content of our atmosphere due to the burning of fossil fuels, the fossil fuels that have energized our industrial revolution.
Actions Needed to Tame the Climate Beast

As was noted in my introduction, I have the privilege to be the director of Lamont-Doherty Earth Observatory. Beginning in the 1960s, we have been at the forefront of quantitative basic research on climate. The pioneer who brought us to that position of leadership is the legendary Wally Broecker, who appropriately is identified as the Columbian ahead of his time on the program for this symposium.

Wally has a compelling story that he may tell you later this morning that metaphorically portrays the climate system as an angry beast that is being harassed and annoyed by humankind's mindless addition of greenhouse gases to the atmosphere. This angry beast metaphor is excellent and should be considered seriously. This analogy accurately represents the climate as a profoundly powerful force that can respond destructively in unpredictable ways if inappropriate stimuli are applied. This is the source of the second phrase in our symposium title, taming the climate. We need to learn how to tame Wally's angry beast. This will require skill and persistence, and it will require a wide mix of approaches. A simple whip will certainly not do.

But leaving the metaphor behind before I destroy its elegant simplicity, the point here is that learning to protect ourselves from climate change involves a wide range of activities. We need to learn to adapt, changing the way we live, perhaps changing where we live. We must leave to mitigate against the effects of change in a wide range of human endeavors, from the control of the spreading of disease to the impacts of sea-level change. And yes, we will have to face up to the scary word of control. The reality is that we are meddling with the climate system today, but we are doing so wearing a blindfold.

We must bring this question of the management of our planet to the forefront. We must engage in a rigorous debate about the types of actions that humankind can take to ensure that its environment remains capable of supporting its population. And this is not science fiction. For example, you will hear over the next two days about mature and practical concepts for the removal of carbon dioxide from the atmosphere, an action that many believe is essential to stop the inevitable buildup of greenhouse gases resulting from the increased fossil-fuel usage that is required for the underdeveloped nations to reach the parity that they deserve.

And a central theme that will dominate most of our deliberations here will be the clear reality that the solutions to these awesome problems do not lie only in the physical sciences, nor only in environmental engineering. Vast economic resources are going to be needed to approach solutions, new policies at both the national and international levels will have to be crafted with a formidable degree of foresight.

Humankind must challenge itself to learn how to make decisions the benefit from which may not be evident for generations. Are we capable of that? We need to
talk about this. Climate science and climate engineering are not enough. Practical ideas for progress must be embedded in well-thought-out economic and political-science agendas that recognize the realities of human behavior.

So these are the things, these modest topics that we're going to talk about for the next couple of days. And then towards the end we are going to ask, What is stopping us from taking action? With all this knowledge of the profound impacts why are we not doing more to tame the mighty beast? What are the limiting factors? Is it the science and inadequate understanding of the natural system that disallows action? Is it the engineering? Or does it simply cost too much? Or is it an inability to make the tough decisions to reach the complex international agreements? Undoubtedly of course all these factors play an essential role, but it will be the charge to our concluding panel to use their solemn and like wisdom to probe these questions and try to identify the key roadblocks to progress.

**The Event Agenda**

But I've said enough here. I hope that I've convinced you that we're not running a piece of scripted theater. Our goal is to stimulate the complex and controversial debate that is essential to progress. We must bring the tough questions into the open and challenge our leaders to respond to the results of wisdom. We're trying something new here, so our deliberations may not be smooth or linear. We will undoubtedly follow a few tangents on our way forward, but I'm confident that our panel chairs will maintain the degree of focus necessary to assure progress.

Let me speedily review the agenda. The symposium's organized around five panels and four keynote speakers. The topics for the five panels are listed in your programs. They will each have an hour and a half during which to deliberate in the form of both presentations from the panel members and discussion, and I request that each panel chair try desperately to reserve five or ten minutes at the end of their sessions to entertain questions from the floor of the symposium. Microphones are provided in the aisles to facilitate this. It's essential that we use the microphones please as the symposium is being broadcast over the Internet, so this also is formal notification to anyone who speaks here that your words will be heard the world over. And also for the same reason I would ask everyone to turn off the ringers on their cell phones, so we're not transmitting cell phone rings over the Internet either. I will facilitate the questioning from the floor and do my best to keep us on time. Tomorrow this role will be taken on by my cochair, John Mutter.

The panels will by reviewing the basics of climate change science and progress through considerations of adaptation and mitigation issues, and in the end tackle the difficult question of what is limiting our ability to act. The panels are anchored by a set of four keynote speakers. Tomorrow we will hear from Eileen Claussen of the Pew Center on Global Climate Change at 9 a.m. As you've heard there’s been a change in the schedule. The governor of the State of New York, George
Pataki, will speak tomorrow immediately after lunch, at 1 p.m. He'll be introduced by the University president Lee Bollinger. And finally to wrap up the symposium Jeff Sachs will speak at 3:15 and provide a succinct overview of defined key steps for the way forward.