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MAKING THE GREAT TRANSFORMATION PARDEE CONFERENCE SERIES FALL 2003

MAKING THE GREAT *Transformation*

The Pardee Center *Conference Series*
Fall 2003

Frederick S. Pardee

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MAKING THE GREAT *Transformation*

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Co-organized by

Cutler Cleveland

and

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FOREWORD

by Cutler Cleveland

Two simple but important observations of human history are that transitions happen and that transitions matter. Transitions are those wide-ranging changes in human organization and well-being that can be convincingly attributed to a concerted set of choices that make the world that was significantly and recognizably different from the world that becomes. Of most interest to us are those grand transitions where the human fingerprint is clearly evident and which have the profound effect of, to use a cliché, "changing the world as we know it." Transition scholars argue that history does not just stumble along a pre-determined path, but that human ingenuity and entrepreneurship have the ability to fundamentally alter its direction.

Transitions matter not only because they dramatically alter the human condition, but also because they reveal potentially identifiable motors of change and levers that can bring about such change. That is, there are key innovations and decisions that can dramatically affect everything else in such profound ways that we can claim a significant change in the direction of global human organization and well-being. Moreover, the claim that transitions matter is made on the trajectory of existing trends and arguing that business as usual will impose undesirable "transitions" on humanity unless concerted effort is made in moving toward desirable transitions. As one example, scholars who study human development warn of widespread system collapse–itself a type of transition–being triggered by widening economic disparities and the increasing number of people living in abject poverty, disease, and hunger.

A critical unanswered question is: Can transitions be made to happen? The "transitions community" suggests that this is possible, that we can "will" and determine the direction of the next transition. But this remains an open question. None of the previous grand transitions was "willed" in any systematic fashion, even though most had very recognizable human fingerprints. The desire for certain types of transitions is broadly shared across the globe. However, despite a number of good intentions and valiant efforts, our ability to "will" such transitions remains in doubt. These doubts cannot be removed and the central question cannot be answered until we have a better understanding of how transitions work.

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INTRODUCTION AND WELCOME

Adil Najam

I would like to welcome you and tell you something about what hopes David Fromkin, Cutler Cleveland, and I have for this conference. Essentially, we want whatever you want. That is, we would like a group of interested people to continue a conversation that has been going on for some time now concerning how the great transformations that have improved the human condition happen. By the end of this conference, we hope to compile a collection of essays that reflect the ideas in our conversations and dialogues.

Let me also make a few short remarks on the way we have organized this conference. First, we want to focus on issues of global change and large-scale transformations of the human condition, emphasizing ways to design them to have an optimal benefit. Second, we are particularly interested in the kind of systemic changes that affect the very trajectory of human events. Third, we would like to focus on events that trigger large, transformative processes, even if they sometimes appear to be insignificant in themselves. Lastly, we will be paying attention to the large idea of change in the human condition.

To accomplish these goals, we have in mind a kind of visioning exercise that attempts to understand the nature of the great transformations in the past and the future. From vision, we would like to move on to insight and to focus on the question of how major changes, especially in the energy sector, occur. Then we will consider the issue of triggers to such transformations.

We will be looking at transformations that were planned as well as those of a more spontaneous nature. The Green Revolution, which was a planned exercise, is particularly interesting in the way it involved a very high level of international cooperation and coordination. It would be extremely important to look at the history of this revolution and understand the kinds of things that worked and those that failed. Finally, we will turn our attention to contemporary transformations.

Whatever conclusions and generalizations we reach, we hope that we will find ourselves in a place that is more interesting than where we began.

KEYNOTE ADDRESS

Human Development Report 2003

Millennium Development Goals: A Compact Among Nations to End Human Poverty

Sakiko Fukuda-Parr

The Human Development Report was started in 1990 by Mahbub ul Haq and Amartya Sen, who were struck by the fact that up until then progress was measured by per capita GNP, while the quality of people's lives is not always dependent on the size of the economy. GNP does not measure such valuable things in life as the way we bring up our children, household events, or the quality of poetry that people write. Many countries improve people's lives without making actual economic progress. Countries in East Asia, for example, have been transformed in a single generation from being illiterate to being among the most educated countries in the world.

The Human Development Report assesses the state of the world by looking at improvement in human lives in terms of Sen's theory of capabilities. Some of these capabilities are universal, like the ability to survive, read, or enjoy a decent standard of living, while others, like the capability to enjoy political freedom and participate in society, are not included in the index.

Let us look at this year's Human Development Report, which is called *Millennium Development Goals: A Compact Among Nations to End Human Poverty*. These goals are derived from a declaration of the Millennium Summit of the year 2000, which was a unique general assembly of over 150 heads of state committed to such goals as democracy, human rights, peace, and development. They committed themselves to taking responsibility globally for reducing poverty, for which they set specific quantitative targets and timetables.

Since the year 2000 there has been important progress in international agreements. A framework was laid down in the Monterrey Consensus when rich countries agreed to provide aid if poor countries did their part by putting the right kinds of policies into place, removing corruption, etc. One of the eight millennial goals was developing a global partnership for development. The United States is rather lukewarm about this goal, and in some instances has not acknowledged it as a legitimate goal. These goals are to be achieved by 2015.

These goals are not going to be achieved by letting business go on as usual. Progress in poverty reduction is far too slow, and what progress we can point to may be due almost entirely to events in China. In Africa the goal of reducing hunger will not be achieved until 2165. Life expectancy, as an indicator of how people's lives have improved, has grown quite steadily, although it is very badly distributed by region. In the 1990s we see new trends of reversal and stagnation.

Several observations are possible. First there is a staggering stagnation and reversal of progress in some countries over a wide range of indexes. We can no longer talk about the developed and the developing world. In 54 countries, there has been a decline in per capita income as well as in such other indexes as health. This decline is a broad phenomenon. The whole picture, however, is not entirely gloomy. Some countries are making great progress in infant mortality or life expectancy goals. The international community should therefore be focusing its attention on those groups of countries that are in fact going backwards. Most of these priority countries are in Africa.

Why do certain countries do badly? Sometimes it is because of internal violent conflict. But most often it is due to certain economic and geographical characteristics. Priority countries are frequently small and exporters of primary commodities, which do not support a viable position in a global economy. Many are hard-hit by AIDS, geographically landlocked, or heavily indebted. Development policies of the 1990s focused on issues of macroeconomic policy and governance. While these are important, they did not address other kinds of disadvantages that some countries face. Geographical factors, unsustainable debt burdens, unfair trade rules, or conflict and violence often cannot be addressed by the countries themselves.

The Millennium Development Goals can make a difference because they raise ambition and spur effort. Some goals have failed entirely, while others, like the eradication of smallpox or polio vaccination, have been spectacular successes. Goals have a chance of succeeding if they are backed up by commitment. We need to have this kind of campaign here. Poor countries have to help themselves, but rich countries can contribute in essential ways in aid, debt relief, greater market access, and fairer trading rules.

SESSION ONE: WHAT ARE GREAT TRANSFORMATIONS?

On the Well-being of Nations
by Robert Prescott-Allen
Presented by Adil Najam

Robert Prescott-Allen was scheduled to be our next speaker, but an unavoidable emergency made it impossible for him to attend. My talk is a summary of the paper he intended to deliver here today. Dr. Prescott-Allen has been an insightful and innovative consultant on development issues for a long time. He is the author of *The World Conservation Strategy II,* a publication of the World Conservation Union. His consuming interest is in measuring the well-being of nations, which has resulted in his book, *The Wellbeing of Nations.*

A central idea in Dr. Prescott-Allen's thinking is that the ecosystem is like an egg. It surrounds and supports people the way the white of an egg does the yolk. Apart from some debate whether people live within the ecosystem or are an integral part of it, it is generally agreed that the system is good and running well if both ecosystem and human beings share an essential well-being. Historically, people once lived as integral parts of the ecosystem and depended on it for what they needed to survive. The prehistoric agricultural revolution was the first of the great transformations of this early, integrated system. The yolk began to exert a greater influence on the white, although both parts remained in a mutually synergistic relationship. With the Industrial Revolution of the 18th century, the second great transformation, the two became detached and human beings began to overwhelm the ecosystem. This process of detachment continues today to widen the cognitive divorce between culture and nature. More and more energy and ingenuity are being devoted to the pursuit of wealth, while the production of real human well-being declines.

Part of the importance of Dr. Prescott-Allen's work is his attempt to quantify these ideas, most notably in his measurement of human well-being and ecological sustainability. The fact that these two stand presently at odds is not historically inevitable, but represents the outcome of a series of decisions and trade-offs. It is important to emphasize that increasing human well-being does not necessarily compromise the quality of the environment. Dr. Prescott-Allen argues that today a third great transformation is needed in order to reestablish the union between culture, nature, and human well-being. According to the egg metaphor, high levels of human well-being are quite compatible with a healthily functioning ecosystem. Ecosystems support life.

Once the relation of human to ecological well-being is understood, we can develop the political and social motivation to optimize both. Regular assessments of these two factors are necessary in order to plan for the future, assess our present situation, and correct the course that society is presently taking. Dr. Prescott-Allen is using approximately 300 different indicators of well-being which relate to each other in complicated ways. But from these statistics, he argues that a clear and simple message should emerge that can be clearly understood by society and its decision makers. Arriving at such measures involves more than measuring wealth. It requires us to address such difficult and complex issues as culture, knowledge, values, and the ideas of happiness, community, and justice.

Such a statistical approach will allow us to assess our present situation and then think cogently about the progress we are making. We can then focus in on what is slowing the rate of progress. Such information would be extremely useful for policy makers.

SESSION ONE: WHAT ARE GREAT TRANSFORMATIONS?

*Contours of the Possible: Global Scenarios and Great Transitions**

Paul Raskin

The premise of this paper is that civilization is in the midst of a fundamental historical transformation whose outcome remains profoundly uncertain. Some form of planetary society will crystallize over the coming decades as a result of interacting global factors—economic globalization, cultural influence, information technology, geopolitical and social fissures, and alterations of critical biogeochemical cycles. But depending on how conflicts are resolved, global development can branch into dramatically different pathways. Possible scenarios include *Market Forces,* where social and environmental concerns remain secondary, *Fortress World,* with elites in protected enclaves and an impoverished majority outside, and *Policy Reform,* with strong governmental intervention for social and environmental goals. All are problematic: *Market Forces* would risk socio-ecological crisis, *Fortress World* would signal the failure of inclusive global development, and *Policy Reform* would need to overcome great technological and political hurdles to deliver change at the required pace and scale.

Great Transition scenarios envision the emergence of a new global development paradigm that would challenge both the viability and desirability of conventional values, economic structures, and social arrangements. It would be rooted in the values that emphasize quality of life, human dignity, affinity with nature, and global solidarity. A *Great Transition* would involve multiple and synergistic sub-transformations in values, institutions, and technology. Various social agents would need to act in concert to drive such a transition, including global actors such as intergovernmental organizations, transnational corporations, and civil society. This shift would seem to require the emergence of a strong global polity of citizens engaged in a common project for a new planetary compact based on pluralism, tolerance, and global identification. To crystallize such a movement, the discourse on global sustainability and development would need to transcend the advocacy of better technologies, poverty alleviation, and

*The paper is based on "Great Transition: The Promise and Lure of the Times Ahead" (Raskin et al., 2002), an essay that grew out of the work of the Global Scenario Group, an international body convened by the Stockholm Environment Institute in 1995 to analyze the requirements for a transition to sustainability.

> incremental adjustments to market-driven development. It would need to bring the questions of human values, lifestyles, and institutions to the forefront of debate and action, and offer a positive vision of a civilized form of globalization for the whole human family.

Civilization is in the midst of a transformation as fundamental as the great prehistoric agricultural revolution and the later Industrial Revolution. A form of planetary society seems to be developing, but its ultimate character remains uncertain. Some predict a gloomy future of impoverished people, culture, and nature, but I remain optimistic about the possibilities. We create our own future, and it is possible for us to choose enriched lives, human solidarity, and a healthy planet. This argument is further developed in "Great Transition: The Promise and Lure of the Times Ahead" by the Global Scenario Group *(GSG.org).*

Transitions and phase shifts, with their periods of gradual development, rapid transformation, and states of relative stability, can be found everywhere in nature. Cultural development, however, which is characteristic only of human history, causes these shifts to take on a different character. Human history was molded by two grand transformations: the development of Stone Age culture 100,000 years ago and the rise of the Modern Era, which took place over the last millennium. Over long periods of time society has become more complex across many dimensions. It moved from tribe to city-state and nation to planetary system, from hunting and gathering through settled agriculture to industrialization and the global economy, from the evolution of language through writing and printing to modern information technology.

The defining feature of the present transition to a planetary system is increased global connectivity. We see it in such developments as the formation of the United Nations, the revolution in information and communications technology, the collapse of the Soviet Union, the increasing hegemony of capitalism, economic globalization, a new awareness of planetary ecology, and the emergence of globally linked NGOs as an important force in world affairs. On the negative side, we note the emergence of globally connected terrorism.

Predicting the future is difficult because of three kinds of uncertainty. The first is our ignorance of current conditions and forces. Second, even if we knew everything we needed to make predictions, we live not in a deterministic system, but one that contains the potential for emergent behavior, novel phenomena, and unexpected events. Third, the future depends partly on choices that still have not been made. That is why we are trying to develop scenarios about the future that combine the richness of narrative with the rigor of quantitative modeling. As the global system becomes more connected, the fates of local regions and nations become more tightly coupled to that of the global system.

There are essentially three classes of scenarios for the future. The first I call Conventional Worlds. It envisions continued evolution of the present situation, with its dominant forces of globalization, economic interdependence, spreading dominant cultural values, and the gradual adoption by poor nations of the consumption and production patterns of rich ones. The Conventional Worlds scenario emphasizes the power of market forces and policy reform, which respond respectively to the exigencies of economic growth and to government initiatives to constrain and direct the global economy.

The second class of scenario is Barbarization, where social polarization, environmental deterioration, and economic instability lead to a general global crisis and an erosion of civilized norms. It can take the form of a Fortress World, where authority responds to the threat of a global crisis by establishing apartheid with its protected enclaves designed to keep impoverished masses under control. The other form Barbarization might take is Breakdown, where conflicts spiral out of control and social institutions collapse.

In the third class, Great Transitions, people respond to the problem of sustainability by developing a different set of fundamental values, which include a sense of human solidarity and a deep respect for nature. Two forms are possible. Eco-communalism is a form favored by local subcultures that favor anti-globalist, anarchist viewpoints. The second form, the New Sustainability, seeks to change the character of global civilization for the better rather than retreat into localism. It validates ideas of global solidarity, cultural cross-fertilization, and interdependence as it seeks to encourage humanistic and ecologically aware transitions.

These three visions of the future are rooted in the rich history of philosophical and political ideas. Although the debate among them continues, the real enemy of a decent future is the large number of unaware, unconvinced, and unconcerned people who entertain no ideas at all about the future. But for those who do care, the great question is whether we can find a non-traumatic transition to a sustainable and desirable future.

The utopian vision of a globally integrated free market may succumb to its own contradictions. In the future, environmental degradation may proceed despite technological advances, human desperation despite a growth in aggregate wealth, and cultural polarization despite increased global interdependence. The resulting environmental stress, inequity, resentment, conflict, and xenophobia would result in a Fortress World that denies the four great aspirations that have developed in the 20th century: peace, freedom, material well-being, and a healthy environment.

Analysis suggests that it is feasible in principle to achieve these goals. Necessary technologies and policy instruments are available, but the project of bending highly unsustainable trends would impose immense technical and managerial challenges. Even if we could resolve these issues, we still must ask if we presently possess a genuine vision of a desirable future. Would we want to live in a world where fewer people starve but human exploration and contentment have died out? It is important that we begin to place the quality of life before the quantity of things. There are multiple pathways to modernity, and many of them are based on local traditions and customs.

Conventional world strategies act on the proximate drivers that directly influence demographics, economics, technology, and social institutions. They themselves are responsive to short-term interventions. A Great Transition would have to deal with the ultimate drivers of society, which are subject to the large political and cultural processes that expand possibilities by changing the very basis for human choice. Specifically, a Great Transition would attempt to break the traditional link between well-being and consumption. In addition, it would encourage a reconsideration of such ideas as individualism, materialism, and the domination of nature.

Possible agents of change include intergovernmental organizations, civil society, and the private sector, but the most crucial factor is the awareness and engagement of the citizens of the world. The first wave of the attempt to achieve sustainability centered on technology, the alleviation of poverty, and incremental changes in market-driven development. We now require a more profound second wave that will spark a general debate on human values, lifestyles, and institutions. In other words, we require a new paradigm of global development that has at its center the vision of a better life.

SESSION TWO: HOW DO TRANSFORMATIONS HAPPEN?

Public Health in the Time of Great Transition

David Ozonoff

Public health is the science and discipline of health and disease in populations. Its salience for a transition to a planetary society is evident, especially as the high degree of interconnectedness has led to a qualitatively different set of public health problems. Public health in the US has undergone a number of changes in the last 150 years and is undergoing yet another today. We contend that the direction public health is taking is especially dangerous and make some suggestions as to how the current state of public health reality can guide us in a more sensible direction.

I have been involved in medicine and public health for forty years, but I have always worked at immediate problems. What I am going to say about the longer-range future of public health is therefore the product of my thinking out loud. In fact, the subject of public health in the next 40 years is a relatively neglected subject. There is, however, a great deal to be done in this area, especially since public health seems presently to be headed exactly in the wrong direction, not only in this country but around the world. We are on the threshold of a fundamental transformation into a planetary society, but the shape and consequences of that transformation are very uncertain.

Clinical medicine is different from public health. In the first, we deal with people one at a time; in the latter, with groups of people. In addition, public health undertakes public enterprises that affect communities, groups of communities, and groups of groups of communities. Let me start with a little history. In the latter half of the 19th century, public health was concerned primarily with the social conditions of populations. It believed that human nature was at least partly a function of social conditions and could therefore be altered by changing these conditions. Although health required a clean environment, it was also necessary to convince the poor to adopt moral lifestyles that coincided with those of the American middle class.

This morally explicit point of view collapsed between 1890 and 1920, undermined by three developments. The first was Germ Theory and the new science of bacteriology, which could dispense with morality in its project of improving con-

ditions. The second was the transformation of the medical profession from a low-status, faction-ridden marginal profession to a high-status, self-regulating professional organization. The third was the tremendous social upheaval of the period, which included labor unrest and violence as well as socialist ferment and organization. Responding to these three pressures, public health reconceptualized the source of disease and turned away from an interest in dangerous environments and toward dangerous people. Typhoid Mary is a dramatic emblem of this shift, but it was quite deep and general.

When this shift occurred, people who would have belonged to the previous movement simply turned away from public health and moved into the conservation movement. They left the world of people and moved into the wilderness, leaving policy to be formulated by technocratic scientists who sought the origins of disease in the pathology of individual people. Thus, another effect of this shift was to place public health under the domination of the medical profession.

People who work in public health today do not recognize the picture I am sketching, but it nevertheless accurately describes the field up until the 1960s. Things changed for the better then, and the field is now considered a form of social engagement which draws on a moral vision that also informs political action. As a result of the upheavals of the 1960s, many bright young people go into public health as a way of finding work that is consistent with their moral values.

There are two lessons to be learned from this history. The first is that our own experience of public health belongs to a specific historical moment. The second is that our present era of public health has already gone. Public health is now being marginalized, its resources cut, and its prestige undercut by the appointment of leaders whose main qualification is their ineffectiveness. In addition, new sciences like the Human Genome Project are reversing some of the progress we have managed to achieve. Most recently, public health is being reorganized into a militarized hierarchical system that serves foreign policy goals primarily. This represents just another cycle in the history of public health, but it comes at a very bad time. Worldwide, rates of infectious disease have almost doubled in the last 20 years, and not only because of AIDS. We may well ask if this trend is just an anomaly or if it represents something more fundamental.

It may be that the patterns of social relationships of our species are undergoing a phase of transitions, which are tipping points, like when water turns from a disorganized liquid into a highly organized crystal called ice, or when metals become paramagnetic. Tipping points also describe other more complicated networks and are relevant to the kinds of analyses we do in public health. For example, continents are infecting each other with diseases the way countries, cities, or individuals do. While this is happening, we are transforming the public health system into a form of the Fortress World by adopting command and control policies like quarantine rather than encouraging a spirit of interdependence and support.

If we are to make the transition to a planetary society, we need to see ourselves as embedded in a highly interconnected system, in which no community or single person is safe unless we all are. Large numbers of people are presently laboring at making communities safe, healthy, and comfortable without thinking of themselves as public health workers. After September 11, I tried to organize a new kind of public health institution, where disparate kinds of knowledge and skills could be brought together to solve practical problems. Scientists studying infectious diseases conferred with scholars studying the spread of rumors; transportation engineers learned from taxi drivers.

The project was going pretty well, but then it disappeared when a feeding frenzy instigated by the Bush administration caused institutions to scramble for homeland security money. People with genuinely good instincts and the wish to contribute to a better world were left with nothing to do. Instead of adopting a language and a vision of nurturance, the country retreated into a bunker mentality.

There are certain public health topics we need to start discussing. The first is the longer-range future of public health. Another is that the most widely admired and effective humanitarian groups operate without national borders. Issues of race and ethnicity are also extremely complex issues. While we should oppose their political use for nationalistic or tribal interests, they have their uses. There are many forms of the human family. People are different, and their uniqueness and diversity are fundamentally important to pre-

serve. Last of all, we need to emphasize what we have in common rather than what sets us apart. We are just about arriving at the global village of the future. We had better get our bearings straight pretty quickly or we are going to be lost.

SESSION TWO: HOW DO TRANSFORMATIONS HAPPEN?

The Demographic Transition: Instinct, By-product, or Design?
John Haaga

Beginning in the late 18th century in Western Europe and North America, one population after another has experienced a demographic transition. From a situation of high mortality and high fertility rates, with extremely slow growth rates, populations have progressed, at different times and speeds, to an end-state of low mortality and low fertility rates, with slow or even negative growth rates. In between these two states, population growth can be extremely rapid. Profound change need not be slow: the demographic transformation is much more recent in what are now the rich countries of the world than is commonly realized, and it is fresh in the memories of old people in most developing countries. The momentum of growth (due to changing age distributions) ensures continued growth of the population in developing countries long past the achievement of low fertility.

How did the transformation happen? In particular, what were the respective roles of private, small-scale decision making and collective action? How much of the demographic transformation is a by-product of contemporaneous economic change and the spread of mass education? Should we be optimistic about the prospects for finishing the transition within the next few decades, as most population projections imply?

The answers to the "how" questions differ in important ways between the populations which began the process early and those which began after 1945. The transformation has become more a product of conscious choice as it has spread. The "demonstration effect" has changed expectations of government, to include health services and in most places accessible and safe control of fertility. The prospects for the future seem better for mortality control than for fertility control, though in each case,

there have been serious setbacks and delays in different parts of the world. Political will may not have set the transformation in motion, but lack of it may delay its humane completion.

[Editor's Note: Dr. Haaga's presentation relies significantly on graphs, charts, and other visual representations, which are not reproduced here.]

I would like to discuss the possibility of changing demographic regimes through a combination of collective action and individual choices. First I will discuss the transition and then go on to two of its components, mortality and fertility declines. I would also like to pay some attention to the question of how fast populations reach their presumed stable end states. In our thinking it is important that we not reify the idea of transition, since reversals are quite possible.

Parenthetically, although the question of what makes people happy is difficult to answer, one of its components that is almost universal is that people wish to die in the correct order. That is, they want each generation to follow the other in a kind of natural progression. It is only recently that this idea has been democratized and spread throughout the world.

Let us start with the classic model of the demographic transition. One of its striking characteristics is urbanization. For the first time in world history, people living in villages and hamlets no longer form a majority. This demographic transition was classically described by Frank Notestein, who shortly after World War II plotted crude birth and death rates. Populations grow very slowly, as do the development of familial institutions, economics, and cultural traditions. Fast transitions begin when mortality rates start to fall. The gap between birth and death rates is the rate of population growth. Early writers on the transition recognized an early state with high mortality and fertility rates, and a late stage with low mortality and fertility rates, both of which sustain low rates of population growth. The middle stage, however, is characterized by high population growth. We are interested in how long and painful that middle stage is.

Notestein's model, which contradicts Malthus's, proved to be remarkably prescient for the Third World, although it was not a very good model for European and North American development. Demographers are seeking to explain the pace

and interrelation of the two declines. No country looks exactly like the stylized model. When we look at population growth in the United States and Mexico, for example, we notice a dramatic difference in time scale. The transition that took two centuries in the United States required only a couple of decades in Mexico. In general, developing countries have very fast rates of growth, while those that started their transition earlier have slower rates. While the gap between the mortality and fertility rates never got that big for early starters, it can be enormous for developing countries. With a four percent growth rate, for example, a population will double in a single generation, thus putting gigantic strains on social institutions. Fertility transitions often occur without being fostered by public health systems or effective medical practices. Easy explanations for what has triggered a transition often prove false and are historically uninformed.

General trends in life expectancy have grown in the last 30 years, and international differentials have closed. Patterns of growth by individual countries or cultural and ethnic groups, however, are far more disorganized. Once transitions begin, they proceed at very fast rates. For example, in my father's lifetime life expectancy in this country has risen from a level that characterizes present-day Ghana or Togo. Rates are even faster in developing countries.

Declines in mortality rates are often triggered by governments that impose law and order, suppress violence, avoid or mitigate famine, and control the worst excesses of epidemics. Much of this is conscious and intended and can involve managing famines, building railroads, or encouraging effective child care. In the past, education did not affect infant mortality rates significantly, but nowadays it has a tremendous effect. Programs of immunization and control of infectious diseases have also become important factors.

As for the fertility transition, around 1980 half the world sustained a fertility rate of approximately four. Only 16 percent lived in countries where fertility was below replacement levels. By 2000, these proportions had reversed. These aggregate measures are, of course, largely affected by what has happened in China and India, but fertility declines are now spreading all over the world, including to Muslim countries that once resisted them.

What about collective action? Each country has its own story to tell. Nowadays over half of all married women in developing countries of a reproductive age use some form of modern contraceptive. The decline has started everywhere, except in West Africa. The effect of the International Family Planning Movement and the International Planned Parenthood Foundation has been terribly important.

Is the end in sight? Some claim that the crisis is over and that the real problem now is population aging. They are mistaken. The diagram Notestein published in 1945 is still valid, although the rates of change are faster than we had expected. Pace matters. For example, an uncertainty period of plus or minus ten years affects billions of people. There are presently 1.2 billion teenagers, one of the three or four largest generations that will ever exist. They will put enormous strains on social institutions and will have to work extremely hard just to stay in place.

To conclude, people often argue for what they consider the single most important trigger for transitions. It may be curative or preventive services, women's education, wars, or revolutions. But the situation is not so simple. Each trigger is a necessary precondition for the others. In addition, new technologies and managements respond to periods of crisis. As for proximate and ultimate drivers of change, we have found in our work that behavioral and attitudinal change occur in tandem. Finally, I would like to caution you not to pay too much attention to social scientists. I myself have issued warnings about the difficulty of change, and then everything changed. Let us recall J. P. Morgan's words to his lawyers: "Damn it, I did not hire you to tell me what I can and cannot do. I hired you to tell me how to do what I want to do." That is our function.

SESSION TWO: HOW DO TRANSFORMATIONS HAPPEN?

Energy Transitions Past, Present, and Future

Cutler Cleveland

The history of human culture can be viewed as the progressive development of new energy sources and their associated conversion technologies. These have increased the ability of humans to exploit both additional energy and also other resources, and hence to increase the comfort, longevity, and affluence of humans, as well as their numbers. In particular, there are three important ways in which energy is related to human development: a) energy as a source of environmental stress, b) energy as a principal motor of macroeconomic growth, and c) energy as a prerequisite for meeting basic human needs. Significant changes in each of these aspects of human existence are associated with changes in energy sources, beginning with the discovery of fire, the advent of agriculture and animal husbandry, and, ultimately, the development of hydrocarbon and nuclear fuels. The eventual economic depletion of fossil fuels will drive another major energy transition; geopolitical forces and environmental imperatives such as climate change may drive this transition faster than hydrocarbon depletion would have by itself. There is a diverse palette of alternative energies including a new generation of nuclear power, myriad solar technologies, and hydrogen. A wide range of opinion exists on the economic, political, technological, and environmental attributes of these energy systems. Hence, projections of the nature and timing of future energy transitions show a wide range of possible futures. This paper discusses our current and future energy situation in the context of previous transitions and their impact on the trajectory of human culture.

Changes in the ways people have used energy have been fundamental in shaping every aspect of human existence and the environment. Energy prices and usages are tightly linked to macroeconomic growth, unemployment, and inflation. It is also an important motor of overall economic growth in the way it determines stock market performance. As we all know, it causes environmental change on

local, regional, and global scales. Recently, we have come to think about energy as a fundamental social force that provides basic life support service, education, clean water, and so forth. The impending depletion of fossil fuels and the way energy usage is affecting climate will have major effects on the coming transition.

History has witnessed many energy transitions. I would like to list a few of them. A major shift occurred away from living off the sun and the products of photosynthesis toward using nonrenewable hydrocarbons. Corresponding to this shift was a change in energy converters from animate sources–human and animal–to inanimate ones such as the steam and internal combustion engines and turbines. We also moved to better qualities of energy and to more useful heat units when we switched from wood to coal and then to gas and electricity. This resulted in a great net energy surplus as energy production increased faster than the energy consumed to extract it. We have also seen a shift from noncommercial trade in wood to commercial energy traded in formal markets. This trend has accompanied a general shift from rural to urban. Looking ahead, we can foresee a similar shift as the demand for energy moves from the North to the South. In general, energy is being used more efficiently and the amount of carbon released per heat unit has decreased.

I would like to speak about a couple of these transitions and develop some scenarios about what is technologically possible, economically feasible, and socially desirable. The first was the Industrial Revolution, where animate energy converters (men and draft animals) and renewable energy sources (primarily wood) gave way to machines and coal. The second occurred between the First World War and the 1960s, when oil and natural gas replaced coal. The accompanying unprecedented economic growth was driven by this shift from coal to oil and natural gas. Human beings can generate about one-tenth of a horsepower, a draft animal ten times more, and steam engines hundreds or thousands times more. From a physical perspective, this is what the Industrial Revolution was about. Internal combustion engines and electric generators made the second wave of that transition possible.

These transitions were extremely important from an economic point of view, as the surge in productivity since the beginning of the Industrial Revolution led to higher expectations among workers. One of the reasons poor nations remain poor is their use of low-quality energy sources and animal energy converters. Of course, these progressive changes have deleterious consequences as well, especially in the area of climate change. If we are serious about stabilizing the climate, we will have to devise almost astronomical changes in the way we use energy.

Our present social environment relies on an extremely high density of production and consumption systems. Shifting to energy sources with lower power densities than fossil fuels will involve restricting the free allocation of energy. Related to this is the problem of productivity. In almost all industrial nations and in some developing countries, we are more efficient at converting energy by shifting from low- to high-quality fuels. Other recent developments include the substitution of capital and labor for energy as well as the encouragement of energy conservation. These, however, are not autonomous technical changes, but technical change of a certain character. Specifically, in the future, three-quarters of energy demand will be located in the South. It is unclear how we will finance such a massive capital investment, or even if the free market can generate and sustain this type of transition fast enough, especially if climate stabilization becomes a principal issue.

Let me sketch some future scenarios. The first I call "Coal is King Again." If climate stabilization does not become a primary issue, this is not an unlikely scenario, since 90 percent of the carbon still in the earth's crust is coal, not oil and gas. This particular scenario both relies on very high rates of economic growth and technical change and disregards environmental consequences. It postulates the generation of large amounts of wealth, which it hopes to distribute relatively fairly. The distinctions between the developed and the developing world therefore disappear, and new technologies would control the effects of pollution.

The second I call "Oil and Gas Forever," which employs the same economic scenario as the first, but concentrates on extracting as much oil as possible from the earth. Eventually this supply will be exhausted and some kind of Grand Transition will have to occur, which will employ a high degree of international cooperation and many policy instruments to deal with climate change. A carbon tax will be enacted, which would produce an economic drag on the North. On the whole, people would be a little less rich, but everyone would overall be better off.

Other scenarios have been developed that depend on the exploitation of biomass, as well as renewable energy and hydrogen to generate electricity. They envision great technological improvements in gas turbines and predict no significant adverse effects on natural systems. There are also nuclear scenarios that begin with conventional boiling water and pressurized water reactors. In 30 or 40 years, however, natural uranium will be depleted, and there will be a shift to plutonium or thorium systems. In any case, this scenario requires a massive project of building new nuclear plants.

Comparing these scenarios reveals great differences in what is economically feasible and desirable. Investment costs can be huge, perhaps amounting to $100 trillion by 2050. Much of that sum will have to come from private markets, but energy projects tend to have low rates of return and are considered risky investments. Equity issues are also difficult, especially in the rural sections of developing nations. On the other hand, all these models assume continuous and significant cost reductions to follow new energy technologies. Those that involve nuclear power will have to reduce their costs significantly.

Finally, the free market will not lead the way. There is still too much cheap fossil fuel left in the earth's crust to make these innovations likely. If climate change is a serious issue, significant international cooperation and commitment will have to develop non-carbon-based sources of energy in a relatively short period.

SESSION THREE: WHAT DRIVES TRANSFORMATIONS?

Shifting Public-Private Involvement: A Public Good Perspective

Pedro Conceição

I will be presenting for Inge Hall, who though very eager to participate, was not able to attend. She is one of the founders of the Human Development Report Office at UNDP who introduced the concept of Human Development. She and I worked together on this presentation.

I would like to say a few things about the concept of global public goods, beginning with the notion of the shifting involvement between public and private. Then I go on to the concept of global public goods. And finally, I will try to show how this concept can be used to provide suggestions for mobilizing policy making.

The idea of shifting between public and private comes from work published in the 1980s by Hirschman, who claimed that societies tend to shift back and forth between public issues and more private individual concerns. In our own work at extending these ideas, we have found that this shifting essentially involves state and market. Over time there is a trend towards more market and less state involvement.

Although previous work emphasizes this shifting between public and private, we have also found it useful to look at the concept of public and private goods. We contend that well-being depends on the consumption of such private goods as food, clothing, shelter, and so forth, as well as such public goods as peace, security, a healthy environment, etc. In the longer range, public goods become more and more important. For example, no matter how much money we spend on private goods, our security can be threatened by international terrorism. Another example is infectious disease. In other words, the public domain can have a vast influence on our sense of well-being.

The examples I have just given are negative, but the concept of public goods does not imply a value judgment. The general trend, however, indicates that over time we are deriving more and more negative utility from the public domain. This is because the transition to planetary interdependence is causing an interlocking of public domains. Individual well-being cannot be safeguarded by private actions alone. So the ideal change in the relationship of private and public would have oscillations with low amplitudes and trends that move toward a bal-

ance between public and private goods. In order to achieve that goal, it will be necessary to change policy making so that it favors the provision of public goods, especially global ones, but the problem is very complex given the absence of international government.

Before I can make specific recommendations, I have to say a bit more about what public goods are. In economics, public goods are defined as non-rival–that is, if I consume them, others also can consume them in the same proportion–and non-excludable–that is, it is impossible to preclude any person from consuming them. This is true theoretically, although it may not be the case in fact. Some goods are excluded from being considered public by this definition. Our innovation is to suggest that goods can be brought into the public domain through deliberate policy and design. Education or health care are examples. In other cases, things can slip into the public domain through neglect and ignorance. Environmental pollutants are an example. We have two suggestions: First, public goods are related to each other by their inherent characteristics. Second, policy choices should be involved in many cases. These measures are especially important in the case of global public goods, which are public goods that have a trans-border nature and affect more than one country or generation.

Providing public goods has many implications for policy making. First, who makes the choices? Second, how are these goods produced, assembled, and distributed? These problems are especially acute in the case of global public goods, since we have no international or global government with the power and resources to accomplish these goals. In order to understand the problem better, we have to divide it into two aspects: a political one that deals with the choices that have to be made, and a technical one that addresses the production of these goods.

I would like to make a few recommendations. I urge extending the subsidiary principle or the equivalence principle of public finance to the global, international context. Decision making should be done by those affected by decisions. Presently, there is a mismatch between the circle of stakeholders and that of decision makers, most dramatically in the case of world finance. As for the production side, we have found it useful to think specifically about how goods

are produced. International building blocks are involved here: international regimes and regulations as well as national and regional ones. The production of public goods involves private individuals, households, governments, firms, and civil society at large. All of them need to be engaged. To sum up, we are involved in a multi-level, multi-actor world. Once we understand and act on this insight, the oscillations I spoke of earlier are likely to have less amplitude and long-range trends will become more beneficial.

SESSION THREE: WHAT DRIVES TRANSFORMATIONS?

The World Is a Third-World Country

Tariq Banuri

I will avoid presenting power points and instead concentrate on the gut feelings that the idea of change summons up in us. I will be interested in narrative as well as data. Our approach to subjects like great transformations is affected to a significant degree by our point of view. Today, by utilizing several metaphors and figures of speech, I would like to suggest some points of view that have not received the attention they deserve. The first is that the future is not a place we are going to, but something we are creating. The particular way we enter a planetary phase of civilization will reflect the ways we think about ourselves as a collectivity. We might start by thinking through the very ideas of global community and global identity.

When we think about human beings, birth is a beginning and death the end. With communities, on the other hand, death is often the beginning. The death of an eponymous martyr can crystallize a national or ethnic identity. When in the future we look back at the present, we may well think that a global identity coalesced around September 11 rather than more positive developments like the Internet or the convening of important international conferences. We should also pay attention to our own hubris. Almost all discussions of globalization evoke a sense of arrogance and uniqueness. We have heard this tone before in places like India and Pakistan around the time of independence. Such feelings have negative consequences if they foster a sense of arrogance, but they can also be positive if they encourage a sense of responsibility for the world.

Before I begin my major thesis, I would like to recall an idea of Ortega y Gasset, who suggested that the history of civilization is the story of taming the instincts of the collectivity. We externalize our sense of ourselves as individuals onto the collectivity, which then operates by means of collective drives. But the animal that we have placed in the cage of civilization escapes from time to time. We thought we had placed capitalism in a cage for good, but we are now faced with the project of retaming it so that it serves us rather than eats us.

I would urge us to think of the world today as a kind of developing Third-World country that is undergoing a fundamental crisis. The tremendous wealth that is being generated by the transition to a global community is now causing an ever-increasing inequality. The world as a whole, in fact, is far more unequal in the distribution of goods than any one country, and it is growing more and more unequal. We have no political community currently that can respond to issues of injustice, unfairness, and inequality. The world is struggling to overcome a fundamental dualism between modern and traditional sectors. The first is corporatized, dynamic, and connected to the global economy. The traditional sector, on the other hand is biomass based, poor, and excluded from power. Though the conflict between these two sectors is muted in rich countries, it is quite obvious in developing countries of Africa, Asia, and Latin America.

Seventy percent of the world's resources are used by the top ten percent of the world's population. The bottom 40 percent enjoys only the most basic of technological advances. This conflict puts the world into the position of a dualistic country with two different economic, cultural, and political systems. Power is confined to the metropolis, while the countryside remains in a pre-industrial, pre-democratic apartheid state, where large groups are excluded from power and access to their fair share of resources. It is not at all certain if people will remain in this position much longer. When we consider social change we should not think of Switzerland, Norway, or the United States but rather of a developing Third-World country.

Ben Anderson distinguishes between what he calls popular nationalism and official nationalism. Popular nationalism is a creation of a collective identity which operates through popular intellectual or economic processes. The develop-

ment of the printing press, the spread of literacy, and all the beneficial cultural changes that followed are examples. Today, the Internet takes the place of the printing press, and cross-country migration replaces rural-to-urban migration. Official nationalism, to the contrary, is created intentionally by census (putting people in categories), map (creating national and ethnic boundaries), and museum (fostering a historical cultural identity). Popular nationalism unifies people, while official nationalism divides them and places them under the direction of elite groups that enjoy access to power and privilege.

The experience of the South suggests that democracy can be used to bypass the people rather than include them in decision making. Nowadays, decisions are made by elite groups in Washington, the World Bank, or the IMF. Contemporary democratization bears interesting and instructive resemblances to colonialism and imperialism. Although several imperial powers like England moved from exploitative forms of colonialism to more liberal ones, many today fear a return to old, exploitative forms of colonialism. A country can be united by the popular hatred of its government. The sense of a collectivity can therefore take the form of resistance to open democratic processes. This may lead to a kind of guerrilla democracy, which need not be illiberal in nature, but may allow NGOs and other ad hoc groups to come together to form politically effective alliances.

We who are part of the global elite need to engage with new sensibilities that are moving to globalization through processes that are characteristic of the Third World. Its preconditions are almost identical to conditions of previous developing countries. Fear of returning to colonialism can retard progress towards globalization, as can a general distrust of official nationalism or a lack of confidence in the market. In the South, civil society has played an important role in the development of collective identities by building social capital, providing services, rights and advocacy, fostering legitimacy and trust, and placing the concerns of the poor and disenfranchised at the center of their programs. This new sensibility will most appropriately bring about the planetary phase of civilization. As part of civil society, it belongs among nongovernmental organizations.

Heraclitus said, "There is only one struggle in the world, and that is justice. Justice is the strife." Planetary society cannot be built unless a planetary group forms that is centrally committed to justice.

SESSION FOUR: TRANSFORMATIONS IN THE MAKING

*Defining and Pursuing a Multidimensional Sustainability Transformation**

Barry Hughes

This paper describes work done within the International Futures (IFs) project towards better understanding the potential for a global transition to sustainability in the 21st century.

It begins by quickly sketching progress in defining the sustainability transition across three dimensions: human life condition, social capacity, and environmental quality. The body of the paper builds an analysis of the potential for transition across the three dimensions.

The paper further argues that five key pillars support human grappling towards a successful transition: human condition knowledge, increasingly clear goals, dynamic system understanding, enhanced levers for action, and sociopolitical engagement. The body of the paper uses the first four of those pillars in its own analysis of the prospects for success with respect to the transition. Specifically, it uses an integrated global model that draws on the large body of knowledge about the human condition, that embodies considerable accumulated understanding about global systems, and that facilitates the experimentation with leverage in pursuit of goals. The aim of the larger IFs project is to enhance the sociopolitical debates through such contributions. It is not enough to call generally for the exertion of collective social will in the pursuit of sustainability goals. It is critical to help define the path for such efforts.

I have listed key elements for facilitating a sustainability transition, which I have named "The Value Chain." It has several links. The first is defining the human condition, which involves developing measures, data, and indices. The second is establishing clear goals and developing scenarios to envision the future. The third is understanding the dynamics of the systems we are working with. Finally, there is understanding the social and political environment and engaging broad public support. Integrated modeling has a great deal to con-

*The discussion in this paper was heavily influenced by discussions of the TERRA project. Thanks to TERRA colleagues. In particular, Robert Pestel generated ideas at a pace that was impossible to match in implementation. Yet those ideas fundamentally shaped the work described here.

tribute to this effort. I will focus on the third and fourth of these links, using an integrated model to investigate the leverage we do presently possess. I will also be using a great deal of information about the human condition, as well as maintaining an awareness of the kinds of scenarios and goals we can use to develop an integrated global model.

Developing scenarios and how they should frame investigations of leverage involves understanding technology and the environment. Although we possess some leverage with respect to environment, we have to assume its robustness or fragility as a given and a context for our own interactions. That is also true for the issue of technological advance. We struggle to accelerate it although use of energy per dollar of GDP is something we cannot control. On the other hand, we have substantial control of human agency, which structures scenarios involving different sets of dimensions. Scenarios of the environment and technology and discussions about sustainability begin with perspectives on the limits to growth like that of Malthus.

Another way of organizing this conceptual space is to pay attention to human agency. We can distinguish between market-driven worlds and those led by institutional state actors or international actors. We can also distinguish between competitive, conflictual patterns of interaction and more cooperative patterns of interaction. For example, Fortress World scenarios are generally characterized by agencies acting on their own behalf in a competitive world in an attempt to protect private interests.

Starting with computer simulations of these representations, I developed a slightly different structure, the International Futures simulation, which is available for download on the Web. It is a kind of scenario tree, which allows us to put together blocks of assumptions and interventions in more flexible ways and to develop an almost infinite range of scenarios. We can bring up assumptions and change them, parameters that we can set, and interventions we can alter. It allows us to ask what leverage we have available with respect to sets of assumptions about our model. We think about what kinds of levers we might use to arrive at a more sustainable world by paying attention to structure, agency, and how they mutually inform each other.

For example, the TERRA project attempted to define sustainability in terms of three dimensions: the human condition, growth and equity, and environmental quality. Sustainability means advancing the human condition, while achieving growth with equity and improving the quality of the environment. We identified a number of leverage points and applied them both individually and collectively in patterns to see their effect in an integrated system. Our analysis suggested that we possess considerable leverage to achieve a bit more economic growth and enhance equity. We were able to simulate satisfactory results by developing human capital. We were also able to achieve modest progress in democratization, reforestation, and controlling carbon dioxide in the atmosphere, although we could not stop its accretion until the end of the century.

Overall, we need to understand the human condition, the dynamics of the systems, as well as particular kinds of interventions. Doing so would contribute to public debate, analysis, and mobilization of the general will.

SESSION FOUR: TRANSFORMATIONS IN THE MAKING

Connecting Bangladeshi Villages

Iqbal Quadir

Government programs designed to alleviate poverty often do not work because they look at things from the top down and see the poor as a target, not as a resource. The economies of developing countries are more likely to develop in a bottom-up process. The key to raising economies is engaging people in commercial activities. In other words, the problem is not feeding the poor but putting them to work. The growth in the number of cellular phones in Africa or Asia is an example of a single technological advance empowering millions of people.

How can we adopt a worm's-eye view of the situation? For one thing, connectivity between people increases productivity. This is especially true in poor countries, where even a small investment in empowering people can have an extremely large return. Specialization leads to productivity, but you can specialize only if you depend on other people. The more you can connect people, especially at increasing distances, the more you expand your economic sphere. In other words, connectivity leads to dependability, which leads to specialization and an increase in productivity.

The importance of connectivity is not limited to developing countries. Even in countries where connectivity is extremely high, investment in communication keeps increasing although the cost of each connection has gone down. Rich countries continue to invest in communication because by trying to optimize and specialize, they are trying to discover more opportunities to produce.

My experience in Bangladesh is instructive. In 1993 there were two phones per thousand people, and these few phones served urban pockets. It was also expensive, as compared to developed countries. It occurred to me that if a service really does increase productivity, then part of that productivity can be channeled back to pay for that service. In other words, this could constitute a business. Still, I wondered why there were so few phones. Part of the problem was that the poor did not have buying power. But if having a phone increased production, then the increase in production could be used to pay for the phone. We could think more about what increases production than who presently can afford technological advances.

If initial buying power is low, we should consider shared access, where a whole community uses a service. Once basic needs are taken care of people themselves can decide how they will allocate resources. We must not decide for them but allow them to raise the level of their income. Since the lack of other infrastructures often inhibits the emergence of a particular technology, we can model growth in technology on simple, indigenous businesses. I was able to convince investors that introducing a cellular phone in a small village could have the same effect in stimulating economic activity as financing the purchase of a cow. We now have a network that covers Bangladesh. Of the more than one million phones, 37,000 are in villages, which alone represents a coverage of more than 50 million since each phone serves more than a thousand people. This also allows local businesses to widen the geographical scope of their activity.

We were able to accomplish these goals by seeing the poor not as recipients of aid, but as utilizers of resources, whose involvement in production reduces the cost. Their involvement also provides them with an education. When people see that they can earn from something new, they are very keen to learn.

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Professor Anderson began his career at Boston University as a student, teaching assistant, and research assistant. He then became a professor at McMaster University, where he later served as Director of the Institute for Energy Studies. He returned to Boston University in 1998 as Professor and chairman in the Department of Geography and Professor in the Center for Transportation Studies.

His areas of interest include economic geography; transportation studies; urban geography; energy and environmental studies; urban and regional economic modeling; interregional and international migration; international trade; and quantitative methods.

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Dr. Banuri's work focuses on sustainable development policy, and includes theoretical as well as applied work in the areas of climate change, conservation strategy development, governance, institutional development for the environment, and regional cooperation for sustainable development (focusing especially on the South Asia region). He has broad experience in Pakistan in policy development through a combination of research and analysis, and organizing and leading multi-stakeholder participation.

More generally, his work has focused on conceptual as well as practical issues in sustainable development—including the analysis of macroeconomic and trade policies, institutions, governance, legal systems, and community development. He is a leading member of two of the largest professional networks in this area: the Inter-governmental Panel on Climate Change (IPCC), in which he is a convening Lead Author; and the IUCN, the World Conservation Union, where he is the elected chair of the Commission on Environmental, Economic, and Social Policy (CEESP).

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Professor Bard's research interests include the late prehistory of Egypt, the origins of complex societies and early states in northeast Africa: Egypt, Nubia, and northern Ethiopia/Eritrea, and the Red Sea trading network in the Bronze and Iron Ages. She received the National Geographic Society's Chairman's Award for Exploration in 1998.

Professor Bard is co-director of the joint BU/IUO (Istituto Universitario Orientale di Napoli) project at Aksum, Ethiopia, which excavated a number of sites, including a large elite residence and cemetery on Bieta Giyorgis Hill to the northwest of Aksum, dating to the late first millennium BC and first millennium AD. She is also co-director (with Rodolfo Fattovich) of excavations at the Middle Kingdom port of Wadi Gawasis, on the Red Sea in Egypt.

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Frank Catanzaro is a cofounder and senior partner in the Arcturus Research & Design Group, and a charter member of the Millennium Project, where he is chair of its experimental cyber-node. Frank's pioneering work integrating computer and communications technologies with new social inventions won a first-prize award in the Kawasaki, Japan, international design competition for Advanced Information Cities. His early pioneering work in computer-mediated communications was cited by the International Studies Association for its ground-breaking implications for transnational communications and nuclear peacekeeping.

Frank's public sector work has included consulting on a Library of Congress study on the role of hypermedia in the future of libraries, participation in the Congressional Peace Academy hearings, and being appointed as a voting delegate to the White House conference on Libraries and Information Systems. His current work with the American Council of the United Nations University and its Millennium Project involves researching the state of the art in online collaboration tools and cyber futures. Specifically his focus is on Web services, the semantic and ontologic Web, distributed grid, mesh, and ad hoc computing as drivers for the emergence of new social and economic futures.

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For twelve years, Dr. Clapp worked as Director and then consultant at the JSI Center for Environmental Health Studies. He joined the Environmental Health Department full-time faculty in 1993, where he is now based. He currently works part time as a consultant at the Tellus Institute, a nonprofit environmental consulting organization in Boston. His research interests include the health effects of dioxin, radiation, and environmental exposures to toxic chemicals. He serves on several advisory boards and is on the Governing Council of the International Society for Environmental Epidemiology. He teaches environmental epidemiology and environmental health courses, and advises graduate students.

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Cutler Cleveland holds a BS in Ecology and Systematics from Cornell University, a MS in Marine Science from Louisiana State University, and a PhD in Geography from the University of Illinois at Urbana-Champaign. He currently is the Director of the Center for Energy and Environmental Studies at Boston University, where he also holds the position of Professor in the Department of Geography and Environment. He also is Co-Director of the Project on Human Development in the Pardee Center for the Study of the Longer-Range Future at Boston University. Dr. Cleveland is Editor-in-Chief of the *Encyclopedia of Energy,* and Editor-in-Chief of the journal *Ecological Economics.* Dr. Cleveland is a member of the Scientific Planning Committee for the International Human Dimensions Progamme on Global Environmental Change-Industrial Transformation. In 1992–93, he was a Lecturer in the European Economic Community's Advanced Education Programme on the Environment, and currently is a participant in the Stanford Energy Modeling Forum. He has been a consultant to numerous private and public organizations, including the Asian Development Bank, Charles River Associates, the Technical Research Centre of Finland, the U.S. Department of Energy, and the U.S. Environmental Protection Agency. His research has been supported by the National Science Foundation, the National Aeronautics and Space Administration, and the MacArthur Foundation.

Dr. Cleveland's research focuses on the ecological-economic analysis of how energy and materials are used to meet human needs. His research employs the use of econometric and systems dynamics models of oil supply, natural resource scarcity, and the relation between the use of energy and natural resources and economic systems. Dr. Cleveland publishes in journals such as *Science, Ecological Modeling, Energy Systems and Policy, The Energy Journal, The Annual Review of Energy, Resources and Energy, The American Association of Petroleum Geologists Bulletin, The Canadian Journal of Forest Research,* and E*cological Economics*. He has won publication awards from the International Association of Energy Economics and the National Wildlife Federation. Recent lectures include an Expert Group Meeting on Environmental Reviews of Trade Policies, sponsored by the United Nations and the World Bank, a workshop on property rights and the performance of natural resource systems sponsored by the Beijer Institute for Ecological Economics, the Royal Swedish Academy of Sciences, and one on the Environment, Development, and Government Policy, organized by the Institute for Social Research of the Fundação Joaquim Nabuco and the Ministry of the Environment in Brazil.

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Pedro Conceição's main interest is, specifically, on knowledge as a global public good. Prior to joining ODS, he was an assistant professor at the Technical University of Lisbon, Portugal, teaching and researching on science, technology, and innovation policy. His academic work also includes research on the relationship between technological change, economic growth and income inequality, spanning both empirical and methodological work on the measurement of inequality. He has degrees in Physics (licenciatura) and in Economics (master's) from the Technical University of Lisbon and a PhD in Public Policy from the LBJ School of Public Affairs, the University of Texas at Austin.

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Before moving to Vermont, Robert Costanza was director of the University of Maryland Institute for Ecological Economics and a professor in the Center for Environmental Science, at Solomons, and in the Biology Department at College Park.

Dr. Costanza is cofounder and past-president of the International Society for Ecological Economics (ISEE) and was chief editor of the society's journal, *Ecological Economics,* until 2002. He serves on the editorial board of eight other international academic journals. He is president of the International Society for Ecosystem Health. He was selected as a Kellogg National Fellow, was awarded the Society for Conservation Biology Distinguished Achievement Award, and was also selected as a Pew Scholar in Conservation and the Environment. He was awarded the Kenneth Boulding Memorial Award for Outstanding Contributions in Ecological Economics and received an honorary doctorate in natural sciences from Stockholm University. He has served on the Scientific Steering Committee for the LOICZ core project of the IGBP, the U.S. EPA National Advisory Council for Environmental Policy and Technology (NACEPT), the National Research Council Board on Sustainable Development, Committee on Global Change Research, the National Research Council, Board on Global Change, the U.S. National Committee for the Man and the Biosphere Program, and the National Marine Fisheries Service Committee on Ecosystem Principles. He is the author or coauthor of over 300 scientific papers and 16 books.

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Dr. Dewar has been at RAND for 22 years. He has been a pioneer in the development of Assumption-Based Planning, a widely used strategic planning methodology. He received the Military Operations Research Society's highest prize for *Non-Monotonicity, Chaos, and Combat Models.* His clients have included large corporations, institutions of higher education, and the Department of Defense. Professor Dewar is also RAND's Director of Research Quality Assurance.

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Professor Fromkin served for three years as a First Lieutenant in the Judge Advocate General's Corps, United States Army, stationed in Verdun, France, where he was a trial observer in French courts pursuant to the NATO Status of Forces Agreement. As prosecutor and defense counsel, he fought more than one hundred contested courts martial. He began his civilian career as an associate of the Wall Street law firm of Simpson, Thacher & Bartlett. After a varied career in law, business, and politics, he turned to writing works of history and studies of world politics. His shorter pieces have appeared in *Foreign Affairs,* the *New York Times,* and other publications. He is the author of seven books, including the national bestseller *A Peace to End All Peace* (1989), chosen by the editors of the *New York Times Book Review* as one of the dozen best books of the year and shortlisted for the Pulitzer Prize. His most recent book, published in March 2004, is *Europe's Last Summer: Who Started the Great War in 1914?* He has been a member of the Council on Foreign Relations since 1976.

Professor Fromkin is also the Director of the Frederick S. Pardee Center for the Study of the Longer-Range Future and the Center's first Frederick S. Pardee Professor of Future Studies. In addition, Professor Fromkin holds appointments as a University Professor, Professor of International Relations, Professor of History, and Professor of Law. He served three years as the Director of the Center for International Relations and Chairman of the Department of International Relations at Boston University.

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Sakiko Fukuda-Parr is the lead author of the *Human Development Report, 2004: Identity, Cultural Diversity and Globalization.* She has been director of this United Nations Development Programme flagship publication since 1995 and has worked with Nancy Birdsall, Richard Jolly, Amartya Sen, and Mahbub ul Haq in leading the last ten annual reports covering diverse themes. She has written and spoken extensively on the human development approach to development, especially on technology and development, human rights, gender, and poverty. She is editor of *The Journal of Human Development.* Sakiko Fukuda-Parr's work in international development cooperation has spanned more than 25 years. In the 1980s she spearheaded UNDP's policy work on technical cooperation effectiveness and capacity building. She lead the 1993 publication *Rethinking Technical Cooperation, Reforms for Capacity Building in Africa,* one of the most comprehensive reviews of technical cooperation effectiveness that offers proposals for radical reforms, and is co-editor of its 2002 revisit, *Capacity for Development: Old Problems, New Solutions.* Earlier, she worked on agriculture and rural development projects in North Africa and the Middle East.

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Professor Gerring's areas of specialization are comparative politics, American politics, methodology, and political theory. He is the recipient of several grants and fellowships, a member of the School of Social Science, and received the Dr. Virginia McClam Prize in International Relations at the University of California, Berkeley. He is the founder and Director of the Boston Network on International Development, a nonprofit organization promoting exchanges among members of the international development community in the greater Boston area. His publications include: *Party Ideologies in America, 1828–1996,* a book which traces the changing ideological content of the two major parties as they campaigned for office from the early 19th century to the present, and *Social Science Methodology: A Criterial Framework,* which is both a general introduction to the subject of methodology and an argument about how we might resolve methodological differences in the social sciences today. He is currently working on issues related to qualitative methodology and political history, good governance, and human development.

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Jerome Glenn has worked for over 30 years in futures research with governments, international organizations, and private industry in science and technology policy, economics, education, defense, space, and forecasting methodology. He has worked on decision support systems with the Committee for the Future, at the Hudson Institute, and has his own firm, the Future Options Room.

In addition, Jerome Glenn has been Deputy Director of the Partnership for Productivity International, involved in national strategic planning, institutional design, training, and evaluation in economic development in Africa, the Middle East, Asia, the Caribbean, and Latin America. He founded CARINET computer network in 1983 (now owned by CGNET) and personally introduced data packet switching in 12 developing countries. He is an independent consultant for USAID contractors, World Bank, and futurist consultant for UNDP, UNU, UNESCO, US/EPA, the government of Canada, and USAID. He was also a Peace Corps Volunteer in Tuberculosis & Leprosy, Malawi.

Jerome Glenn invented the "Futures Wheel" forecasting technique and Futuristic Curriculum Development, was instrumental in the SALT II section that banned the first space weapons (Soviet FOBS), and was named by *Saturday Review* as among the most unusually gifted leaders of America for his pioneering work in Tropical Medicine, Future-Oriented Education, and Participatory Decision Making Systems in 1974.

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Dr. Haaga directs the Population Reference Bureau's projects that provide information on US population trends and their implications and educational activities for students and educators in American schools. Several of these projects are funded by the Annie E. Casey Foundation supporting the KIDS COUNT network of child advocates, and a collaborative project with the Russell Sage Foundation to publish a series of Census 2000 Bulletins. He served as director for PRB's MEASURE Communication project.

Dr. Haaga is currently Secretary-Treasurer of the Population Association of America. He teaches in the School of Public Affairs at the University of Maryland, and has also taught courses in public policy at Georgetown University and the Defense Intelligence College. Before joining PRB, he was the staff director of the Committee on Population at the National Academy of Sciences, where he developed and implemented research projects on both US and international population issues. He has also directed a large research project for the Population Council in Bangladesh to improve family planning programs, worked as a health policy analyst for RAND, and was deputy director of the Nutritional Surveillance Program at Cornell University.

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Before becoming Professor at the Graduate School of International Studies at the University of Denver, Dr. Hughes taught for ten years at Case Western Reserve University. His principal research interests are in the areas of world politics; computer simulation models for economic, energy, food, population, environmental, and socio-political forecasting; policy analysis; and global futures. He is the creator of a computer simulation called International Futures for the study of long-term issues by students and policy makers.

Dr. Hughes has consulted for the governments of Germany, Iran, Egypt, the US, and the European Union. He has taught courses in Costa Rica and China. His publications include *The Domestic Context of American Foreign Policy* (1978), *World Modeling* (1980), *World Futures* (1985), *Disarmament and Development* (1990), *Continuity and Change in World Politics* (1991, 1994, 1997, 2000), and *International Futures* (1993, 1996, 1999), as well as numerous articles.

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Professor Kaufmann's areas of interest include world oil markets, global climate change, and ecological economics. His current research focuses on land-use change in China; temporal and radiative forcing; carbon sink appendix; the temporal relation between radiative forcing and surface temperature; and time series analysis of emissions, concentrations, and temperature. Before coming to Boston University, Professor Kaufmann was a senior economist in the Energy Department at Wharton Econometrics and a research scientist in the Complex Systems Research Center at the University of New Hampshire. He has published numerous articles and has coauthored three books.

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Laura MacLatchy is interested in the evolution of ape and human locomotor adaptations. She has been active in the study and recovery of fossil primates, as well as in the analysis of the morphology and locomotion of living primates. Her field experience includes paleontological work in Chad, Egypt, Kenya, Malawi, Pakistan, and Uganda and behavioral studies in Ecuador.

She currently directs a multidisciplinary paleontological project in Eastern Uganda, and her interest in locomotor evolution has also led to a study of suspensory and upright behaviors in ateline primates at the Tiputini Biodiversity Field Station in Ecuador, which Boston University co-operates with the Universidad San Fransico de Quito.

Dr. MacLatchy teaches courses in human and primate evolution and anatomy.

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Professor Maître has been a lecturer for the University of Nigeria, a freelance correspondent and Editor for *Die Welt,* Chairman and Associate Professor of German at McGill University, the Editor of *Die Welt des Buches,* a Press and Olympic Attaché for the Olympic Games of 1976, and editor-in-chief of *Die Welt am Sontag,* the *Axel Springer Verlag,* and the *Ullstein Buchverlag*. He has been a national fellow at the Hoover Institution (Stanford University) and a National Endowment for the Humanities Fellow. He is a specialist both in security affairs and in reporting on security affairs, and teaches in the College of Communication's Department of Journalism as well as in International Relations. He is the founder and Director of Boston University's Center for Defense Journalism, and is the Editor of the Center's journal, *Defense Media Review.* He is also the Director of the Division of Military Education, which oversees Boston University's Reserve Officer Training Corps (ROTC) programs.

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In addition to teaching at Tufts, Professor Najam has also taught at MIT, UMass-Boston, and the School for International Training. In 1997 he was the winner of both the MIT Goodwin Medal for Effective Teaching and the International Political Science Association's Stien Rokan Award. He is Director of the Board of Governors of the Pakistan Institute for Environment-Development Action Research, on the International Advisory Board at the Center for Global Studies at the University of Victoria, and a member of the International Advisory Board of the Pakistan Center for Trade and Sustainable Development. Professor Najam is an editorial board member of *Ecological Economics, Nonprofit and Voluntary Sector Quarterly, Yearbook of International Co-operation on Environment and Development,* and *Annual Editions: Environment*. In addition, he was Chapter Lead Author for the Intergovernmental Panel on Climate Change in 2001.

His primary research interests are in international multilateral negotiation; sustainable development; human development and human security; international environmental politics with a particular focus on developing countries; global climate change policy; trade and environment; and nongovernmental organizations (NGOs) in international development.

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Before coming to Boston University in 1977, Professor Ozonoff taught and did research work at the Massachusetts Institute of Technology, where he was a Mellon Fellow. He was also a Macy Fellow in the History of Medicine and the Biological Sciences at Harvard.

In 1977, he moved to Boston University where he became the first chair of the Department of Environmental Health in the new School of Public Health. His research work centers on health effects to communities of various kinds of toxic exposures, especially from hazardous waste sites, new mathematical approaches to understanding the results of small case-control studies, and the use of scientific evidence in court. He has been principal or co-investigator of a number of major studies of waste sites, including the Silresim Superfund site and a large case-control study of cancer on Cape Cod, Massachusetts. As Director of the Superfund Basic Research Program, a multidisciplinary effort to understand basic scientific problems connected with the Federal Superfund Program funded by the National Institute of Environmental Health Sciences, he oversees the Center's administrative and outreach cores, is principal investigator of his own project involving new methods to use maps in environmental epidemiology, and coordinates the work of eight other senior investigators and their projects. He is also PI of a Cooperative Agreement with CDC and ATSDR to devise an instrument to assess environmental stress on children in communities with toxic exposure problems. He also works with the Center for Discrete Mathematics and Theoretical Computer Science at Rutgers University on a Special Focus effort to bring mathematicians together with epidemiologists.

In partnership with Philippe Grandjean, he is co-Editor-in-Chief of a new online journal, *Environmental Health,* and serves on the editorial boards of several other journals. He is an elected Fellow of the Johns Hopkins Society of Scholars and a Fellow of the Collegium Ramazzini. In 2002 he received the Scientist for the Public Good Award from the Clean Water Action Alliance of Massachusetts.

Frederick S. Pardee

Special Guest

A native of Massachusetts, Frederick S. Pardee received both a bachelor's and a master's degree from the Boston University School of Management in 1954. He worked for 13 years at the RAND Corporation as a systems analyst, studying long-term economic forecasts. He then spent several years working as an independent consultant, primarily for the government. In 1974, he turned his professional attention to managing his real estate investments while actively maintaining his interest in analyzing the future as a hobby.

Through Mr. Pardee's generous endowment, Boston University has established the Pardee Professorship and Visiting Professorship in Future Studies to focus on the long-term effect of the future on lifestyle and social trends. In recognition of his interest and knowledge in the area of future studies, Boston University has dedicated the Frederick S. Pardee Center for the Study of the Longer-Range Future.

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Professor Phillips's research focuses on global change biology, plant physiological ecology, scaling eco-physical processes, fractal treatment of forest structure and consequences for mass/energy transfer, tree physiology, and hydraulic architecture. His current projects include global vegetation height prediction based on hydraulic constraints, separating gravity from path length in constraining plant height using model organisms (palms, lianas), effects of age class on forest function, and constructing a canopy access facility for research and education in a New England forest. He has served as principal investigator on several different projects, the most recent being on environmental data acquisition and communications improvements at Sargent Center, New Hampshire.

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Professor Post's research interests include public affairs management, corporate citizenship—issues and strategies, nonprofit management—strategies and public accountability, governance in business, and government and nonprofit organizations. His most recent publications include *Business and Society: Corporate Strategy, Public Policy, Ethics, 10th edition* (with Anne T. Lawrence and James Weber, 2002) and *Redefining the Corporation: Stakeholder Management and Organizational Wealth* (with Lee Preston and Sybille Sachs, 2002).

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Robert Prescott-Allen is a consultant in sustainable development based in Victoria, B.C. He is a member of the World Conservation Union's International Assessment Team and of the Expert Group on Indicators of Sustainable Development for the UN Commission on Sustainable Development. He is the author of *The Wellbeing of Nations,* a survey of 180 countries and the first global assessment of sustainability.

Robert Prescott-Allen was the Senior Consultant and Writer for the International Union for the Conservation of Nature's sequel to the World Conservation Strategy, *Caring for the Earth: A Strategy for Sustainable Living,* published in partnership with the United Nations Environment Program and the World Wide Fund for Nature in 1991. Subsequently he has been applying the principles espoused in the strategy at the regional and local level including the Province of British Columbia.

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Iqbal Quadir holds an MBA and an MA from the Wharton School at the University of Pennsylvania, and a bachelor's degreee with honors from Swarthmore College.

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Dr. Raskin's work focuses on illuminating the requirements for a transition to sustainability at global, regional, and national levels. By blending economic, environmental, and social dimensions into an integrated assessment framework, he examines the risks and opportunities of alternative development strategies. To advance sustainability methods and build capacity, Dr. Raskin has developed and disseminated such widely used models as the Long-range Energy Alternatives Planning (LEAP) system, the Water Evaluation and Planning (WEAP) system, and PoleStar, a comprehensive framework for exploring alternative global, regional, and national scenarios.

He has conducted projects throughout the world for numerous governmental and non-governmental organizations, foundations, and multinational agencies such as the United Nations, World Bank, and OECD. He has been a member of the Board on Sustainable Development of the US National Academy of Sciences, a lead author for the International Panel on Climate Change, and an expert advisor to the Millennium Ecosystem Assessment and the Convention on Biodiversity. In 1995, he organized the Global Scenario Group, an international and interdisciplinary body whose work has guided numerous international assessments of social and environmental futures such as the UNEP's Global Environmental Outlook. Dr. Raskin has published numerous articles and books. He was lead author on the Global Scenario Group's 2002 synthetic essay, "Great Transition: The Promise and Lure of the Times Ahead."

Dr. Raskin received a BA in Physics from the University of California at Berkeley in 1964 and a PhD in Theoretical Physics from Columbia University in 1970. He taught at the university level until founding the Tellus Institute in 1976.

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Since 1993 Dr. Saundry has been the Executive Director of the National Council for Science and the Environment, a nonpartisan organization of scientists, environmentalists, business people, and policy makers working to improve the scientific basis of environmental decision making.

Dr. Saundry is also Treasurer of Global Children's Health and Environment Fund (GCHEF), a non-profit international organization based in Washington, DC. In 1995, he was elected to the World Academy of Art and Science. He has also served as a Congressional Science Fellow with the US Senate Appropriations Committee, has chaired the Sierra Club Clean Coastal Waters Task Force in Los Angeles, CA, and was a member of the Management Committee for the Santa Monica Bay Restoration Project, a part of EPA's National Estuaries Program.

Dr. Saundry received a PhD in Physics from the University of Southern California in 1991, an MS in Physics from Adelphi University in 1984, and a BS in Physics, with honors, from Southampton University, UK, in 1982.

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Dr. Ian Sue Wing is an Assistant Professor in the Geography Department at Boston University (BU), and a research affiliate of the Center for Energy and Environmental Studies at BU and the Joint Program on the Science and Policy of Global Change at the Massachusetts Institute of Technology. He holds a PhD in Technology, Management and Policy from MIT and a MSc in Economics from Oxford University, where he was the 1994 Commonwealth Caribbean Rhodes Scholar. Dr. Sue Wing conducts research and teaching on the economic analysis of energy and environmental policy, with an emphasis on climate change and computational general equilibrium (CGE) analysis of economies' adjustment to macroeconomic shocks. His current research includes investigation of the sources of long-run change in the energy intensity of the US economy, the theoretical and empirical performance of absolute versus intensity-based emission limits under economic and environmental uncertainties, the implications of trade-mediated international productivity spillovers for global carbon emissions and leakage, and the performance of different methods of representing endogenous technological change in CGE models for climate change policy analysis. He is currently supported by a grant from the Department of Energy's Office of Science.

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Professor Thacker's areas of expertise are international and comparative political economy, governance, development, Latin American studies, and Mexican political economy and politics. His research and teaching focus broadly on questions of political economy and development, with particular emphasis on Mexico and Latin America, the North American Free Trade Agreement (NAFTA), governance, and human development. His recent books include *Big Business, the State, and Free Trade: Constructing Coalitions in Mexico* (2000), and *Good Government: A Centripetal Theory of Democratic Governance* (forthcoming). He is also working on projects on state capacity, and democracy and human development. He has published articles in the *British Journal of Political Science, Business and Politics, International Organization,* the *Journal of Interamerican Studies and World Affairs,* and *World Politics.* He also has an ongoing interest in the politics of foreign aid and lending, and the International Monetary Fund. He is a Faculty Affiliate of the David Rockefeller Center for Latin American Studies at Harvard University and a Fellow at the Frederick S. Pardee Center for the Study of the Longer-Range Future at Boston University. He has been a Susan Louise Dyer Peace Fellow at Stanford University's Hoover Institution and a Fulbright Scholar. He has also received grants funded by BU's Pardee Center, the Mellon Foundation, the Tinker Foundation, and the University of North Carolina. He taught at the Instituto Tecnológico Autónomo de México before his appointment to Boston University.

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Tracy taught history for six years at the private Hotchkiss School in Lakeville, CT., before becoming Headmaster of BU Academy. From 1994 to 1995 he was a visiting fellow in Yale University's history department. He has also taught history courses at UMass-Boston.

A native of Boston, Tracy received a bachelor's degree in history and religion from UMass-Boston in 1984 and a PhD in American history from Stanford University in 1993. His 1996 book, *Direct Action: Radical Pacifism From the Union Eight to the Chicago Seven* (1996), was nominated for the American Historical Association's award for best book of the year in American history and is currently being adapted into a documentary film.

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Before coming to Boston University in 1984, Professor Woodcock was a research Associate at Hunter College at the City University of New York and at the University of California, Santa Barbara, and was a part of the NASA Graduate Researchers Program at the Johnson Space Center. At BU, he has served as Acting Director for the Center for Remote Sensing and Chair of the Department of Geography. He is currently Director of Geographic Applications for the Center for Remote Sensing and a Research Fellow in the Department of Cognitive and Neural Systems.

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He is the author of *The Future of Freedom: Illiberal Democracy at Home and Abroad* (2003), a book on global political trends, and *From Wealth to Power,* a provocative examination of America's role on the world stage, which has been translated into several languages. He is co-editor of *The American Encounter: The United States and the Making of the Modern World.* He is a former managing editor of *Foreign Affairs*. Zakaria recently joined the ABC television show "This Week" and also appears as an analyst on several other ABC News programs. In addition, he has been a guest on such programs as "Charlie Rose," "Firing Line," "The NewsHour with Jim Lehrer," "The McLaughlin Group," "BBC World News," and "Meet the Press."

Zakaria has written for *The New York Times, The Wall Street Journal,* and *The New Yorker,* and was the wine columnist for *Slate.* He is the recipient of numerous awards, including the Overseas Press Club Award, the National Press Club's Edwin Hood Award, the Deadline Club Award for Best Columnist, and a lifetime achievement award from the South Asian Journalists Association.

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Andrew Zolli founded Z + Partners in 2001. He is a forecaster, design strategist, and author. He is a Futurist in Residence at *Popular Science,* and a contributor to *Wired* and *NPR*'s Marketplace. He is also the Chair of the annual Pop!Tech conference. He edited the *Catalog of Tomorrow* (2002). His next book, *In Good Company,* is forthcoming. He is a network member of the Global Business Network, and was recently named a Visiting Fellow of the Woodrow Wilson Foundation.

Andrew Zolli is the former Chief Marketing Officer of Siegel & Gale. He has served as an advisor to such varied companies as TRUSTe, the leading Internet privacy organization, and The Doctors' Company, a leading healthcare insurance concern. He currently advises the communications technology firm Brand Experience Lab, the longevity research foundation the Methuselah Mouse Prize, and Ludicorp, an Internet game development company, among many others. Zolli speaks and writes widely on the subjects of technology, design, social issues, and long-term forecasting. He has edited several books on new technology and his work, ideas, and writing have appeared in publications such as the *New York Times, Wired, I.D., The Industry Standard, Eye* magazine, and on National Public Radio.

He is currently a visiting lecturer in Clark University's Graduate School of Management, where he teaches courses on branding, design strategy, and communications. He is a past board member of the American Institute of Graphic Arts' New York chapter.