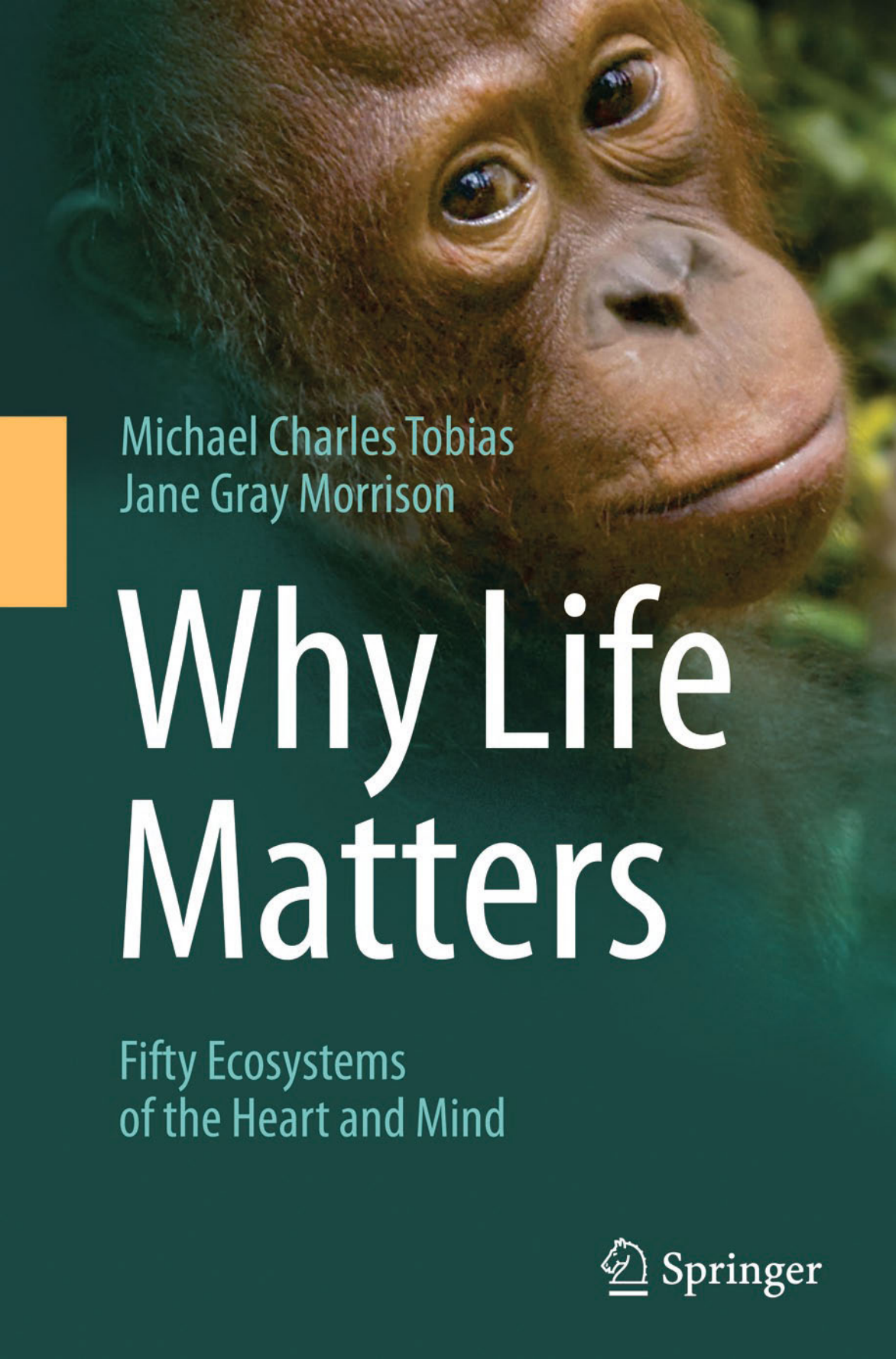

Michael Charles Tobias
Jane Gray Morrison

Why Life Matters

Fifty Ecosystems of the Heart and Mind

Springer

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Michael Charles Tobias • Jane Gray Morrison

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Michael Charles Tobias
Dancing Star Foundation
Los Angeles
CA
USA

Jane Gray Morrison
Dancing Star Foundation
Los Angeles
CA
USA

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Dedicated To Our Loved Ones

Introduction

Echoes and Appeals from the Heart & Mind

This collection of essays represents 3 years of articles published largely in our Forbes "Green Conversations" blog series with a few additional pieces from the on-line Eco News Network. While some of the data, circumstances and situations may have changed to varying degrees (for example, some 228,000 people have been added to the planet every single day since these essays were written, a continuing trend), the core spirit and essence of these diverse ecological, natural sciences, humanities and arts essays and discussions remain true to their original purpose.

Our hope is to intimate and spell out representative concepts and details that collectively enshrine the state of the world, primarily from an ecological set of perspectives. We hope to make clear how thrilling, remarkable and critical this generation is to the goal of stabilizing a planet that is, in far too many respects, under siege. Our goal is quite forthright: To underscore a very basic realization, namely, that the biological splendors of this Earth are precious, and have been, in many instances, ignored, misjudged, inappropriately exploited, or worse, for far too long.

"Sustainability" has become a universal appeal, from Wall Street to the Rio+20 United Nations Summit; from Ecuador to the United States; from across Asia and Africa to Europe; from Syria to New Zealand. Everywhere, the challenges of nurturing a healthy planet confront all of humanity, and hence, the enormous geographical breadth presented herein.

Moreover, the myriad of scientists, educators, key government and agency representatives and activists all speak to the great promise, but also the peril that now confronts the human species, and those tens of millions of other species with whom we co habit this miraculous planet. The science, ethics and artistic expressions of the urgency of our times could not be clearer. Every individual with whom we have had conversations, as re-published in this collection, speaks eloquently and passionately to many of the most pressing issues of our time, and we feel strongly that there is no better overview of this unanimous summons than the very basic statement, "Why Life Matters."

The Challenges to Our Humanity

Our very humanity is confronted by fundamental questions and necessities, as ecosystems increasingly reveal enormous gaps, and human-induced change. The moral compass every individual chooses to live by; our consumer habits, fertility trends, levels of tolerance in an age of great biocultural diversity all go to the Chinese aphorism suggesting that this is, indeed, an interesting time in which to live. Interesting, but challenging. The inequality gap is before us, with fewer than 90 individuals laying claim to some 50% of the global economy.

Part One of this book examines some of the most salient opportunities before the global commons in the form of human economics and how economics is, as California Governor Jerry Brown once made abundantly clear, a sub-set of the needs of nature, not the reverse. We examine bio-economics with the goal of suggesting how socially conscious investing, impact investing and the future of business ethics hinges upon firm incorporation into the crucial sub-stratum of natural capital; and why consideration of the ecological bottom-line in any corporate standard operating procedures is now fundamental to the sustainable auguries and durability of any business.

Part Two continues in the economic vein with an emphasis on climate change, energy use, and some of the mechanisms that might best enable one society after another to customize their cultural norms in ways that are less inflictive on the most vulnerable people and ecosystems. This is an interdependent world, and most pollutants do not recognize political borders any more than migratory birds or watersheds do. In the case of Ecuador, significant changes have occurred—from the time these essays and conversations were first published—that further challenge an ideal set forth by that country in an effort to reduce its exploitation of natural resources. But the future is yet to be written in terms of Ecuador's biologically stellar Yasuni National Park and the world's ongoing prayers for her unwavering stewardship.

Part Three considers human health, and the health of the environment as clear co-dependents. A healthy planet makes for a healthy person, and vice versa. With an emphasis on the food we eat and where that food comes from, Dr. Neal Barnard conveys a lucid and up-to-date account of some of the most pervasive issues in human consumption around the dinner table. Medical currents are also examined in terms of pharmaceutical companies and the latest challenges and successes within the realm of integrative oncology.

Part Four focuses explicitly on human demography and what the ongoing trends indicate from region to region. The unambiguous causes and effects of human population pressure on biodiversity are echoed from the U.S. to parts of Africa and Asia. Our unrelenting growth paradigm is examined with an eye towards its equally relentless pressure upon every single biome on the planet. Calls for human rights coincide with an emphasis on the pressing need to do away with the nutritional segregation that has meant the marginalizing of women and their children, particularly

young girls, in many parts of the world. Without equal rights and full access to contraceptive choices, the population explosion is likely to continue. While demographers debate the tipping and tapering points, there is no question that we remain "in the throes of" an unsustainable number of human consumers worldwide. Those interviewed in this section offer us a way out of what too easily resembles, at times, an intractable labyrinth.

Part Five is dedicated to individuals who are making profound differences for humans and other species, from Cambodia to India; from South Africa to nearly every country on Earth where the United Nations is engaged. We call such individuals "Ecological Heroes" because they really are. Against often unbelievable odds, their courage and tenacity should give each one of us not merely hope, but pragmatic options for the short- and long-term viability of a measurably higher quality of life for all sentient beings.

Part Six is representative of the complex challenges confronting such heroes, from China and Japan to England and all those countries where there are at-risk species. From England's National Trust, to the Alliance for Zero Extinctions, to China's new embrace of what its leadership has called "ecological civilization," the trends have been made manifest in country after country: we must embrace new paradigms that can better fashion a workable union between human cultures and all other life forms.

In **Part Seven** some of those "life forms" are analyzed in specific reference to what is generally thought of as the cause of *animal rights*. This phrase encompasses animal protection, animal welfare and animal liberation. It harkens back to many of the world's greatest spiritual traditions, and asks that we re-examine our often supremacist notions of a self-important human species and come to a much broader sensitivity with respect to other feeling, thinking, vulnerable beings whose lives are not merely biological, but also biographical.

Part Eight considers some of the critical solutions to ecological illiteracy, and to the melding of human culture with conservationist appeals. How does one create a national park in a country like Haiti, where human poverty, and corresponding deforestation, is rampant? How can we engender an emphasis on tolerance and compassion in our school curricula? What buy-ins by countless communities, often in economically marginalized parts of the world, can be facilitated in win/win conservation models? An in-depth discussion with one of the world's foremost primatologists, Dr. Russell Mittermeier, President of Conservation International, as well as with the former Executive Director of the United Nations Convention on Biological Diversity, Dr. Ahmed Djoghlaf, offer critical blueprints for what can be done, and what it will take to succeed in halting the loss of precious biodiversity.

Part Nine concludes with a diverse set of profiles of elegant personages and their examples of deep and personal commitment to nature. Through their philanthropy, their art, and their belief in ecological and social reform, these environmental luminaries demonstrate unconditional commitments to the natural world, and by their example proffer a love of nature that is truly inspirational and galvanizing.

The Sum of Its Parts

We recognize that no single anthology can do more than serve as a window on the expression of any number of ambassadors for an equal number of causes. What brings this collection of pieces into a singular focus is the lens of nature. We have found a clear unified vision shared by all those with whom we have had the good fortune to dialogue. Their own trials, tribulations and successes are indeed critical signposts along the way towards engendering a universal harmony that spells peace in every language.

We are grateful to everyone who so generously shared in the making of this modest collection of essays and conversations. Their time is precious, and we respect that far beyond the words and images on these pages. We also note that these essays obviously are mere "snippets" of vastly broader realms of knowledge, experience and expertise. But we hope that the sum of its parts, the quintessence of so many deep thinkers, great activists, generous souls and brilliant visionaries is lodged firmly in this book, and that its wonderful diversity will give readers everywhere a time-out in which to re-evaluate the possibilities before us in the twenty-first century as humble members of a vast biological collective.

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Part I
Nature and Human Economics

Chapter 1
Technology, Business and Nature: An Economic Primer on Winners and Losers

What is the true value to the world of a vulnerable cheetah? Nobody knows. Is there a way to determine it? What cost/benefits analysis could possibly be applied in order to discern so esoteric and critical a determination? This sums up the ecological crisis we're in. Is there a way out? (Fig. 1.1)

Last week, the Tesla stock hit 106.44 before dropping slightly, a record for what is surely among the most elegant environmental works of technology and art fused into one; while today's cover story of the Los Angeles Times by automotive and real estate editor Brian Thevenot features an overview of the new world of price competition between a variety of zero-emission vehicles, with "rock-bottom" leasing deals available.

There is a fascinating back-story to electric cars, supply-side economics, fair trade regarding eco-labels, carbon footprint calculators, eco-foot and eco-handprints, consumer willingness to pay factors (WTP), "integrated assessment tools" for determining levels of sustainability, and so forth.

For over a century these various indicators—from accounting to discounting—have been applied to both ecological ethics and economics, with a widely growing proliferation of science-driven variables upon which the fate of the world, as well as GNP, or Gross National Happiness, hangs, in addition to the sheer dispositions—however myriad—of consumers and collectives, whether in Los Angeles or in Bhutan.

Some of the very best peer-reviewed data can be gleaned from Ecological Economics: The Transdisciplinary Journal of the International Society for Ecological Economics (ISEE). In a critical essay published over 5 years ago, authors Stefanie Engel, Stefano Pagiola and Sven Wunder pointed out that there is no "silver bullet that can be used to address any environmental problem," especially when thinking about what consumers will actually pay for nature's often obfuscated services, or PES—"payments for environmental services" [1].

In fact, the fluctuations throughout the world are aggravated, in terms of any constancy, by the sheer proliferation of bio-cultural perceptions, "government-financed" subsidies versus payments into a pool or commune by economically marginalized farmers, the vast array of ecosystems involved, and who constitute true

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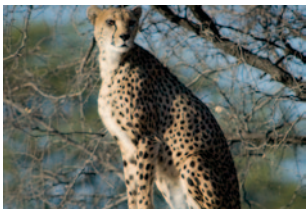

Fig. 1.1 Namibian Cheetah. (Photo Credit: © M. C. Tobias)

beneficiaries of both the payments and the services and types, or quality of services, rendered.

Are those services urban or rural? Connected to a grid, or off the grid? Directly, or indirectly correlated with an ecosystem—for example, a field of hemp, or a genetically differentiated field of medical marijuana? Which taxes are more likely to benefit the greater good? What comprises that "good"—organic or inorganic systems? People or other species? Who decides, and how fair is the influence or sets of influence (special stakeholders) that determine the markets, the outcomes, the suasion which dictates true bottom-line assessments? How do biological coefficients even get measured when alleged human need and/or superiority is the governing metaphor? These, and countless other questions are at the core—both ethically and metrically—of ecological economics. What is at stake affects every one of us; all sentient beings.

For 15 years, the so-called Environmental Kuznets Curves have applied a variety of income inequalities to policy formulations that, among other variables, include market forces which exploit relatively inexpensive rural labor whose fruits and benefits enter the urban market places where costs are higher, and the ratio of costs to benefits are widely different than those in the rural sector where products typically originate. This type of calculation adds human rights, social justice and environment equality, not to mention gender equality, to the mix.

The global catch-all phrase of "sustainable development" has been all but demolished in neo-tropical environments, and most fisheries where "no-kill" zones are outnumbered greatly by the expansion of polluted "death zones"; indeed, where the very concept (as first envisioned under the famed Brundtland Report—"Our Common Future") becomes ever more doubtful. At best, there are ecological compromises in the marine and riparian, fresh-water areas of the planet, as in the tropics, certainly the primary tropics. On marginal lands that have already been burnt or mowed over to varying degrees, eco-restoration at certain levels is the best that can be aspired to, particularly in habitats of huge vulnerability, meaning aggregates of at risk species, of whatever kind and proportion.

As early as June 2002, Stephen C. Farber, Robert Costanza (one of the world's longest-standing luminaries in the field of ecological economics) and Matthew A. Wilson, published their seminal "Economic and ecological concepts for valuing ecosystem services," and in their summary pointed out with devastating clarity that "While win-win opportunities for human activities within the environment may exist, they also appear to be increasingly scarce in a 'full' global ecological–economic system" [2].

In April 2010, Richard Noorgaard published a ground-breaking essay, "Ecosystem services: From eye-opening metaphor to complexity blinder." In it he analyzed the fact that, in so many words, there is not just one human nature; not one environment; not one correlation, but a dizzying proliferation of computational, or non-computational variations across the planet. He writes, "The metaphor of nature as a stock that provides a flow of services is insufficient for the difficulties we are in or the task ahead. Indeed, combined with the mistaken presumption that we can analyze a global problem within a partial equilibrium economic framework and reach a new economy project-by-project without major institutional change, the simplicity of the stock-flow framework blinds us to the complexity of the human predicament" [3].

These, and other issues of equal weight, relevancy and crucial significance to the fate of the Earth—who will win, who will lose; what ecosystems are more prone to be destroyed or saved; what is the value of a peanut, or organic avocado, versus the real cost to the world of such—will be examined in so many guises, at two upcoming global conferences this month. Next week at the University of Vermont in Burlington will see the convening of the Seventh Biennial Conference of the U.S. Society For Ecological Economics, and later in the month at the Flemish city of Lille, France, the European Society for Ecological Economics will hold an equally important gathering.

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Chapter 2
Women, Wall Street and Mitigating Climate Change: The Critical Importance of WOCAN

Michael Tobias (MT): Jeannette, the organization you founded, WOCAN—Women Organizing for Change in Agriculture & Natural Resource Management [1]—recently announced the "World's First Women's Carbon Standard" [2] which, according to your media release, " guides carbon project developers in identifying and measuring the social and economic benefits of building women's empowerment and gender equality into their projects." I assume this emphasis upon women in the crucial sectors of agriculture and natural resource management stems from the reality of a gender differentiation, wherein the critical role of women has been vastly underestimated and undervalued?

Jeannette Gurung (JG): Women and men have different roles and responsibilities, as well as social and political status in most developing (and even developed) countries. These differences have left women without the same levels of resources, be they economic, social or political.

MT: So, what leverage do these differences exert, potentially, in—for example—the area of climate change?

JG: What is so important in relation to climate change is that women are the primary producers of food and managers of the environment in many developing economies around the world. FAO states that "if women had the same access to productive resources as men, they could increase yields on their farms by 20–30%, which could reduce the number of hungry people in the world by 12–17% [3]. This simple fact is ignored and misunderstood by policy makers and planners, as well as the general public, who assume that the farmer and environmental manager is a man. Statistical evidence showing the contrary has been ignored for decades. Gender biases and a lack of political will have resulted in an unbalanced resource allocation.

MT: So how could a standard on emissions tailored to the work of women be of benefit to the planet?

JG: The Women's Carbon Standard attempts to address this gap and is a way to acknowledge women's contributions to climate change mitigation and thus recognize them not as vulnerable victims of climate change in pacts, but as managers, entrepreneurs and leaders [4].

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Fig. 2.1 Lao Woman using biogas. (Photo Credit: © Aiden Dockery)

MT: You see a set of circumstances, deriving from the Standard, whereby women could become a critical collective in reducing greenhouse gas emissions?

JG: If women were provided with adequate resources and empowered through the removal of barriers to their advancement, their contributions to GHG reduction would be vastly enhanced, and initiatives would be more effective and sustainable. Without such a standard, that specifically rewards and incentivizes investments in women, there is not a rigorous system that assures mitigation projects will invite women's engagement and assure they receive equitable benefits.

MT: But what about the carbon standards that are already in play? How does this amplify or compliment current standards, like the existing United Nations Clean Development Mechanism (CDM), or the Verified Carbon Standard (VCS)?

JG: Other standards, including the VCS [5], Gold Standard, CDM [6] etc. do not currently include a focus on women or gender in a way that is rigorous and focused. According to UNFCCC (United Nations Framework Convention on Climate Change) Executive Secretary, Christiana Figueres, though the CDM does have a principle that projects should have equitable benefits for women and assure their participation, in practice there is no way to know if this result is achieved. The VCS has approached WOCAN (at the Navigating the Carbon World in America Conference) to suggest that the WCS be tagged onto the VCS, much in the same way that the CCB (Climate, Community and Biodiversity Standards) has been tagged.

We are keenly interested in doing so, as this demonstrates clearly how the WCS complements an existing standard. Our interest is to find ways to keep monitoring and evaluation costs as minimal as possible, to assure that larger revenues are returned to the women's groups and their activities, so minimizing the steps required to validate and verify [7] the use of both standards makes good sense. As well, the WCS will gain greater market attention, through its link to the VCS (Fig. 2.1).

MT: Jeannette, what is your vision for WOCAN and how can impact investors on Wall Street and elsewhere get involved to help make a difference for women's and child rights, equal opportunity, and for climate change and moral change?

JG: Michael, as was presented and discussed in several recent sessions of the Carbon Expo conference in [8] Barcelona there is a strong interest now expressed by the private sector to link funding for climate change mitigation with co-benefits related to health, energy and livelihood provisions. The WCS is thus a timely mechanism by which corporate social responsibility investments for development goals

(outside of those related to carbon) can be governed by rigorous performance metrics that rely on a system of third party measurement and verification.

WOCAN recently elected to its board Mr. Lee West, bringing with him almost 30 years of financial services and investing background. Lee's goal is to introduce financial incentives that encourage institutional sponsors to invest directly into agricultural development and gender mainstreaming programs in developed and developing countries that directly impact women. Lee feels Wall Street's role in Carbon Finance and Development is driven by three primary factors.

MT: For example?

JG: First, public sources of project financing and international governments are increasingly directing project developers to incorporate standards of women's empowerment and/or equality into the project development cycle, as more evidence suggests that project outcomes improve in instances where gender is considered.

The second driver is that private sources of project financing in the global carbon markets are actively seeking out projects with gender inclusive standards. The WCS will provide benefits beyond emissions reductions, commonly referred to as "co-benefits," such as community development and biodiversity conservation.

MT: That's superb.

JG: Thirdly, there is an increasingly accepted belief that strengthening women's involvement in agriculture and forestry will provide social and economic benefits, primarily in developing countries. In agriculture, closing the gender gap would also provide women with more income, which has proven to improve health, nutrition, and education outcomes for children.

West believes Wall Street will value the WCS incorporation of women's empowerment as a separate co-benefit for an additional premium on each credit.

Similar to the "Fair Trade" label in other socially conscious consumer markets, the WCS tells a story that attracts investment. Like the "Fair Trade" label, higher standards could lead to more value in the overall market. Incorporating women's empowerment as a co-benefit aims to increase the overall value of a credit and help premium projects capture more market share. Lee's role will lead WCS's unique label in helping create the retail marketplace for investment funds that will increase margins associated with the WCS premium credit labeling for investors.

MT: Clearly, this is sorely needed, given that women have been left out of so many critical global ecological equations, a bias that has prevailed at far too many levels for far too long. It is hurting women, their families and the planet.

JG: Exactly. As most development initiatives throughout the globe have paid mere lip service to women's empowerment and gender equality, the WCS provides a unique way to assure that projects—both carbon and non-carbon—contribute to women's empowerment that is measurable [9] and real, avoiding 'gender washing' by projects that do not provide concrete benefits to women.

MT: So how does it work?

JG: The WCS provides a performance-based mechanism that values and compensates women for their contributions to GHG reductions by assuring that projects benefit women through provision of co-benefits and through the repatriation of a percentage of carbon credits [10] back to women's groups.

MT: It's pretty clear that this represents an ecological and gender justice win/win here.

JG: Precisely. WCS supports environmental enhancement and women's well-being at the same time. Carbon projects can thus be leveraged to support women's empowerment and climate mitigation, through investments in women.

MT: And in the short-term future, what do you envision?

JG: Through a widespread application of the use of the WCS, WOCAN will drive new investments to women and their groups, thus enabling them to benefit from climate mitigation activities that free up time, relieve them of time-consuming tasks, such as supplying their households with energy, and enabling their participation in education, entrepreneurial and leadership opportunities. Such programs would demonstrate the value in investing in women for development as well as entrepreneurial outcomes, for wide-reaching impacts.

MT: It's so amazing how a little common sense goes a long ways towards helping the planet, as in this instance. So what do you recommend for that growing body of impact investors throughout the public and private sectors?

JG: Impact investors and individuals can support women's empowerment and mitigate GHG emissions through investing in carbon and non-carbon projects that use the WCS.

MT: What about the acquisition of carbon credits, gender based, in this instance?

JG: Absolutely. Impact investors may purchase Women's Carbon Credits generated by such projects. Such credits will be sold by WOCAN or its affiliates, to assure maximum returns to women's groups themselves, after returning reasonable returns to investors.

MT: Tell me about some of the instances involving WOCAN presently around the world?

JG: As an organization built around a network of over 900 professionals comprising both women and men in environment sectors in 97 countries, with over two decades of experience in capacity building for gender equality and women's leadership, WOCAN is strengthening the capacities of women and men leaders to bring about gender-responsive change within agriculture and environment organizations in several countries of South and South East Asia and eastern and southern Africa. WOCAN is currently implementing an Asian Development Bank financed project, Harnessing Climate Mitigation Initiatives to Benefit Women in Cambodia, Lao

Fig. 2.2 Alternative Energy in Tanzania. (Photo Credit: © Ben Langdon)

PDR and Viet Nam, that will pilot the use of the WCS and bring women access to technologies of biogas, improved cook-stoves and waste management to reduce their labor and generate incomes (Fig. 2.2).

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Chapter 3
The New Business of Business: Evolution of Culture and The Survival of Humankind

Dr. Ervin László is Founder and President of The Club of Budapest, Chancellor of the Giordano Bruno University, Co-founder and Director of the Ervin László Center for Advanced Study, Member of the Hungarian Academy of Sciences, Fellow of the World Academy of Arts and Sciences, Member of the International Academy of Philosophy of Science, and the author or co-author of 54 books. He obtained his PhD from the Sorbonne, in addition to receiving four honorary PhDs. The recipient of numerous international awards, he has twice been nominated for the Nobel Peace Prize, in 2004 and 2005. He lives in a 400 year-old former chapel in the hills of Tuscany (Fig. 3.1).

Michael Tobias (MT): Dr. László, as you have written to me, "Many people say"—and I do so, repeatedly—"that only a thorough transformation of the way we manage ourselves and our environment can avert a major crisis and possibly breakdown." But why is that? Why now? Is this really the moment it could happen?

Ervin László (EL): When you deal with such complex systems as a living organism, and indeed the whole web of life, there are critical points where change is sudden and decisive. These come to the fore already when we simulate the dynamics of such systems: then we see that in place of the usual periodic and point attractors, so-called "chaotic" or "strange" attractors surface—practically out of the blue, as the systems analysts note.

The evidence for these "critical" or "chaos" points (also known as "systems bifurcations") is manifold and entirely convincing. Ecosystems reach what is known as a "climax"; species and populations reach crucial "tipping points," and individual organisms reach a life-or-death point where they can no longer maintain themselves in their environment. When these points are reached, change is sudden and deep-seated.

MT: Total disaster?

EL: Not necessarily. That depends on the kind of system we are dealing with. A system coded by one basic set of information cannot pull out of such states: it must go under. This is the case in regard to biological organisms such as ourselves.

MT: We are mortal.

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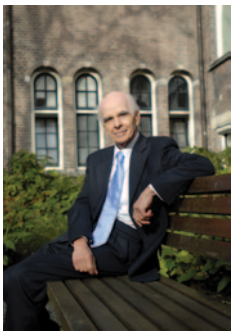

Fig. 3.1 Dr. Ervin László. (Photo Credit: Courtesy of Ervin László)

Fig. 3.2 A primate en route to extinction? (Photo Credit: © M. C. Tobias)

Avoiding "Catastrophic Bifurcation" (Fig. 3.2)

EL: Yes. We are irrevocably mortal: we reach such a "catastrophic bifurcation" sooner or later. But a system made up of different species and populations has the option of changing its basic structure. If it reaches a crisis point it can pull out by restructuring the relations between the species and populations that compose it.

MT: How can this distinction nurture a positive orientation in people?

EL: Michael, this is an important distinction. The world we have created on this planet entered a crisis stage not because of the genetic coding and epigenetic mechanisms of the organisms that compose it, but because of the unsustainable nature of the relations between its various species and population. In this situation, our species has become the critical factor.

MT: Evolution dictates biological sustainability, winners and losers. The implications are not hard to divine.

EL: Correct. We have become unsustainable because of the way we relate to the species, the processes and resources, that make up our life-supporting environment. The nature of this relation depends not on our genes but on our culture.

MT: OK. That is truly a major paradigm shift.

EL: I think so; the fact our relationship to the biosphere is not genetically but culturally coded.

MT: And what does that concept say to you? (Fig. 3.3)

Fig. 3.3 True companionship, Borneo. (Photo Credit: © J. G. Morrison)

EL: This gives us the answer we need: We must change our system of ecological relations on this planet. This is a manageable project. It calls for evolving the ensemble of our perceptions, values and aspirations that make up our culture.

MT: When must this "cultural evolution" come about? Is there a 'deadline' beyond which things will become more or less irreversible?

EL: Nobody can answer this question with precision. The contemporary world system is so complex that we cannot compute the exact time of its bifurcation points. What we do know is that a catastrophic bifurcation will come IF we do not transform our relations to nature. And the sooner we begin this culture-based human-nature transformation the greater the chance that we reach a new plateau of sustainability will become a reality.

There is real hope here, because cultural evolution, unlike genetic evolution, is both rapid and open to conscious guidance.

The Compelling Role of Consciousness

MT: Let us suppose you are correct; that our culture is the key to evening out the playing field between human civilization and the environment. But there is not one human civilization but hundreds if not thousands shared by the seven billion+ humans that live on the planet, and there is not one environment but thousands of biomes, ecosystems, and possibly as many as 100 million species still co-habiting this miraculous Earth with us. What is the ultimate role of business in embracing a vision for sustainability that is most likely to encompass all the variations in attitude, personality, vision, or lack of vision that now characterize *Homo sapiens*?

EL: If we are to answer this question in relevant detail, we need look at each case of unsustainability in turn. This can be done, and it is being done by scientists and forward-looking business people in many parts of the world. But there is something simple and basic that we can say that applies to all cases and forms of unsustainability. Why is any living system unsustainable? The answer is, because of the faulty way it is attempting to maintain itself in the living state.

MT: The specter of various laws of thermodynamics.

EL: Absolutely. Like Alice, we must keep running just to stay in the same place (and we must run even faster if we are to move forward). If we don't "run" we run

Fig. 3.4 Rapa Nui (Easter Island) civilization. (Photo Credit: © M. C. Tobias)

down: this is a law of nature, the second law of thermodynamics. Running for a living organism means constantly replenishing the energy, the matter, and the information it obtains from its environment. Living systems constantly use these resources every time they breathe, eat, move, even when they think. If they are not careful, they use them up. And then their viability is endangered.

MT: So how do you characterize our chances?

EL: Performing the feat of constant energy, information, and matter-replenishment is a stupendous job. It requires the fully coordinated collaboration of all the cells that make up the human body—and there are more cells in our body than stars in the galaxy. As long as we are alive and healthy, our cells collaborate in the shared task of maintaining us in the living state and then we can perform this feat. When we are sick, some of our cells fail to collaborate and if this is not rectified, we die.

MT: Historians like Arnold Toynbee applied this non-rectification pattern to some 22 past civilizations that have gone extinct.

EL: Precisely. The same applies to human societies and to the human family as a whole. They, too, need to maintain themselves in a dynamic state where they can make use of suitable energies and matter without exhausting these supplies and degenerating their surroundings. But they have more options for restructuring themselves: they can restructure the relations among the species and populations that compose them. This can be done consciously, purposefully (Fig. 3.4).

Purposeful Survival

MT: What are the conscious, purposeful options that we can look to reasonably, imaginatively, even quixotically?

EL: Human beings are the critical factors in this. We humans have the consciousness and thus could have the insight and the will to restructure the relations in the world system so that its various species and populations—including our own human species—could survive and thrive.

MT: Clearly this is the flash point, as I think of it.

EL: Yes. Here is where we come across the crux of the problem of our world's sustainability. Our world is a quasi-living globally extended complex system. Its resources are not managed effectively. As its dominant species, this is our responsibility. Our energy source is quasi-inexhaustible (the Sun), but only its source is that, and not the energy stored on the planet. If we use fossil energies, or other forms of energy stored by natural or artificial means, we live on our energy capital and not our energy income. As in the case of all finite capital, sooner or later it is used up.

MT: The physics is unassailable and, in our case, approaching global tragedy.

EL: Our use of matter is clearly unsustainable. The matter we have on board our spaceship is also finite, and we need to manage it carefully. If we use up more of it than we replenish or can access, we will have matter—(that is, material resource) shortages, which is what we have already, as the production of one resource after another peaks, while demand grows.

MT: Last month, in Bonn, scientists met to discuss "Water in the Anthropocene" [1] and highlighted an H20 tipping point that will affect everyone of us on Earth. The crisis is already affecting more than one billion of our kind. This is simply symptomatic of what our species is inflicting across every finite, life-sustaining component of the planet.

EL: Hence, the answer to your earlier question—how can we encompass all the variations in attitude, personality, vision, or lack of vision that most generally characterizes Homo sapiens is simple and basic. Each of us can give this answer in reference to a set of fundamental questions. Is the way we operate, as an individual, as a community, and as an enterprise, sustainable or unsustainable?

MT: Do we give or do we simply take?

EL: More specifically, do we degrade more energy than we access; do we deplete more material resources than we recycle and regenerate? And do we interfere with and possibly damage the natural reproduction and availability of these vital resources, poisoning and polluting our environment? Because we live and act sustainably only if we rely on flow energies and recycle the material resources we use—and if we safeguard the integrity of the rhythms and balances of nature.

MT: So what is your personal view of where our species, and this Earth stands at this point? Are you confident that we can make it?

Business People and the Chances of Human Survival

EL: There is a vast groundswell of public opinion—or should I rather say public feeling and consciousness—that indicates that we will make it. This groundswell is not fully rational, it is not motivated only, or even primarily, by reasoning. It is an expression of the deepest resource a species has when it is endangered. This is

what naturalists call the instinct for collective survival. Humanity's instinct for collective survival is now emerging with striking force and clarity. It comes to the fore in popular movements such as the environmental movement, the peace movement, the occupy movement, the intercultural and transgender solidarity movement, and movements for conciliation and empathy.

MT: And with regard to corporate culture and movements?

EL: There it surfaces as the recognition that spirituality has a role in business, and the insight that profit and power are not the end-all of a company. Ever more business leaders are embracing the view that profit and power are legitimate aspirations, but that they are not ends in themselves. They are means to a higher end: that of contributing to the survival of our species, and the flourishing of all life on the planet.

So to the extent that our instinct for collective survival finds concrete expression in business, I am optimistic.

MT: What, specifically, about business culture? Is the evolution of that culture a ground for optimism?

EL: It is. Because business moves faster than politics, and it is more immediately effective than any system of education and institution of culture. Because business people are rational people who can weigh the options available to them, but are also human beings, members of the human species, with a highly developed faculty for instinct and intuition. That could be our salvation. If that faculty further develops in the business world and reinforces and transcends the established forms of reasoning, then yes, I am optimistic. Then we shall make it.

MT: Many thanks to you, Ervin. This is a miraculous planet and I agree with you: we must, "we shall make it."

EL: My pleasure, Michael.

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Chapter 4
Wall Street After Rio: A Discussion with Calvert Investments' Senior Sustainability Research Analyst, Ms. Ellen Kennedy

Michael Tobias (MT): Ms. Kennedy, I want us to speak about the UN Rio+20 Summit, since it is so timely. But before we get to that, you, your work and that of Calvert. As one of Calvert Investments' senior Sustainability Research Analysts who manages environmental research and engagement, what are your key focus points and what kinds of critical ecological components do you examine when considering products and manufacturers for potential investors?

Ellen Kennedy (EK): I have been at Calvert twelve years now, and it's astonishing to see the changes that have occurred in the industry during that time, simply because of the Internet and mobile technology. We have so much more data readily available to us, and importantly, data from remote areas or developing countries that were something of a black hole before. But it's more than that, of course, as there's been an explosion of interest and activity in the area of corporate sustainability. There really was no such thing as a corporate responsibility report back in 2000, and now many companies offer multiple reports, provide information to third parties, and make public commitments the likes of which we could only have dreamed of back then. We also have good information from civil society and governments, so the challenge now is how to wade through all of that information and come to an analysis and investment decision on a company (Fig. 4.1).

MT: Confronted with reams of data, how do go about making your determinations?

EK: The first question to ask really is, "what is this company all about?" What are its key products and services, where does it operate or source raw materials? How big is the company relative to peers? That helps establish the company's footprint from the perspective of ecological and social risk. So a California-based software company would have a very low footprint compared to a global mining company, for example.

I also look at the company's overall performance relative to the policies and programs it has in place to offset risk. I will weigh whether or not the company has an environmental management system, a strong biodiversity policy, and the quality of reporting against any regulatory violations, lawsuits, and problems with local

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Fig. 4.1 Poster from the Rio+20 Conference. (Photo Credit: © M. C. Tobias)

Fig. 4.2 United Nations Secretary General Ban Ki-moon delivers opening remarks at the U.N. Conference on Sustainable Development. (Photo Credit: © M. C. Tobias)

communities the company may have. It's so important to stress that there are no perfect companies out there; not one is unblemished. But for those high-risk companies, we really need assurance that they are doing everything they can to avoid new problems and correct current ones. From an investor perspective, it's just an indicator of good management across the board. On a positive note, there are wonderful companies out there that are offering exciting solutions to global problems like the need for clean energy and water (Fig. 4.2).

MT: In the consumer staples sector I gather that you look at everything from obesity, animal welfare, Indigenous People's human rights, water scarcity, and toxicology to climate change. These areas represent an enormous swath of the human and natural landscapes. In working to create investor opportunities and long-term investment viability, how have Calvert Investment approaches been good for the natural world and good for portfolios?

EK: As you know, Michael, there are many other investment firms that use sustainability data as a tool for picking companies, but, in my opinion, few actually engage companies and try to improve their behavior. At Calvert, this engagement can take a number of forms. I may write a letter to a company, meet face-to-face, or file a shareholder resolution, which shareholders can vote on at the company's annual meeting using their proxy. As a great example, I have been working with other investors to encourage the consumer packaged goods companies to source palm oil sustainably through dialogue and shareholder resolutions. Grown primarily in Southeast Asia, some palm oil plantations operate on newly cleared rainforest or high conservation areas, threatening species such as the Orangutan or the Sumatran Tiger. This effort has been tremendously successful, as more and more

US and European companies—such as Colgate-Palmolive Kraft, General Mills and others—commit to sustainable palm oil. Due to these efforts in part, demand for sustainable palm oil has increased, which paves a market path for the producers who want to transform their plantations to certified operations.

MT: Does Calvert get involved at the level of certifications?

EK: Yes. I also work at the industry level to help design sustainability standards, best practices, or certifications. Lately I've been working with the Equitable Food Initiative [1] that is a certification scheme for fruits and vegetables in the US that is in the process of drafting standards for farm worker labor, pesticide use reduction, and food safety. This project is exciting because it really combines environmental and labor standards together at the farm level, which is so rarely done.

MT: What about animal protection?

EK: Well, I've done quite a bit in the past on animal welfare—filing resolutions to reduce animal testing for cosmetic purposes, and to improve farm animal welfare.

MT: Back to consumer packaged goods. You mentioned oil palm. What about, say, soy, sugar, and other commodity crops that have posed particularly challenging situations for ecologists. How do you and your colleagues go about examining the pros and cons of these products for investors?

EK: Calvert is not involved in commodity crop trades, and most agribusiness companies do not meet our sustainability criteria due to environmental or human rights problems. However, some of the companies we hold in the food, beverage, and apparel industries rely on these crops for raw materials. There are real differences between crops—for example, soy is typically grown on large plantations in South America and the US, while cocoa is usually grown by thousands of small holders in West Africa. The product is aggregated and sold on the spot market, so there is usually no traceability back to the farm. This lack of transparency and accountability can lead to all sorts of trouble—including clearing of high conservation value land, poor working conditions or even child or forced labor, overuse of pesticides, and contamination of local water. Most of the larger companies we invest in are aware of, and very concerned by, these problems (Fig. 4.3).

MT: Surely there some analytical and market-driven tools for improving the commodity crop commercial spheres?

EK: Absolutely. There are a few ways of improving the way commodity crops are grown. First, creating certified sustainable supply, such as through the Roundtable for Sustainable Palm Oil [2] or the Rainforest Alliance certification of crops like cocoa [3]. These all help to set good standards. But there is a downside to this approach.

MT: How so?

EK: It may be slow to catch on in the market without strong consumer or purchaser demand. Second, industry may decide to develop its own criteria that it requires of

Fig. 4.3 Poster Displayed at the Rio+20 United Nations Summit. (Photo Credit: © M. C. Tobias)

suppliers, with its own system of accountability. This method can lead to fast adoption by suppliers, but the standards are usually weaker than those established with the input of outside stakeholders.

MT: What about the actual role of Governments in redressing a weakening of standards that necessarily translate into ecological degradations? Surely that would be the ultimate and most transparent cause for generating remediation points?

EK: Yes. Governments can and sometimes will legislate and enforce rules against illegal forest clearing and other abuses. It varies, obviously, from nation to nation.

MT: What are your thoughts when it comes to economically factoring in biodiversity as a key indicator of whether a product or company or manufacturing trend is pernicious or propitious? This was a key area of interest for many of us at the Rio+20 Summit and while the Convention on Biological Diversity put out a summary Memo of interest, pointing to a successful outcome in terms of "The Future We Want" Rio document incorporating biodiversity as a crucial component of all economic drivers, it still seems like a slight reach to rejoice, as yet. Corporate policies seem often woefully out of touch with the biological bottom line, in my opinion.

EK: Biodiversity is one area where investors have been largely in the dark. There is currently a disclosure framework for greenhouse gas emissions, called the Carbon Disclosure Project (CDP), which also now gathers data from companies on water use and policies [4]. I'm excited that they are merging with the Forest Footprint Disclosure project to offer land use data to investors [5]. I do think that it is important to benchmark high-risk companies—like oil, gas, or mining companies—with regard to their approach to biodiversity, and their track record. But what we lack right now for most industries is contextual data. I know that a company's water use has decreased, but what does that mean to the local ecosystem? That decrease in water use may still be overtaxing an aquifer.

MT: And it's not just the aquifer. It could be the alteration of salinity, on top of, say, persistent drought that could potentially affect food supply for migrating birds. An allegation of this kind was filed in Texas regarding water removal from the Guadalupe and San Antonio Rivers and alleged impact on critically endangered

Whooping Cranes. But I'd like to move on to Rio. What is Calvert Investments' opinion on the outcomes of the Rio+20 Summit as they affect global human economics, and your investors' own portfolios?

EK: There's a lot of disappointment coming out of Rio—and well deserved.

MT: As one who was there, I have to say I was partly encouraged.

EK: Of course, there were definitely some high points. For investors, the promise of improved sustainability reporting and disclosure was probably the biggest win, made by the Corporate Sustainability Reporting Coalition, of which Calvert is a member [6]. This group of investors fought long and hard to include language in Rio's outcome document that encourages companies to integrate financial and sustainability reporting. The governments of Brazil, Denmark, France and South Africa announced they will help launch the effort globally. I was also personally very happy to see the Natural Capital Declaration (NCD) move forward—a project I've been collaborating on for the past year [7].

MT: Yes, indeed. I was there when some 39 CEOs signed on, along with dozens of nation states [8].

EK: Exactly. The NCD will provide a platform for investors to develop tools for understanding biodiversity and ecosystem risk in the companies they hold. That data will help us engage companies to reduce their biodiversity impacts. Down the road, it may be possible to quantify ecosystem services as an investment value, with an eye to providing conservation incentives. This type of work is promising, but extremely complex and distrusted by some civil society organizations. I thought it was important for Calvert to be involved in the early stages of this process, given our strong commitment to Indigenous Peoples' human rights and conservation, for which Rio+20 also produced some compelling outcomes [9].

MT: Finally, taking into account the many varied, often competing altruisms of animal protection, the safeguarding of biodiversity, and environmental ethics, how can investors actually accelerate sustainability both locally and worldwide, and do you see fair winds in that direction?

EK: We are all investors–not just firms like Calvert–but anyone who owns a retirement or college fund. Many of us may scour food labels and try to reduce our environmental impact, but might not consider how our personal investments may undermine our actual consumer intentions. So, I think all of us can contribute to a more sustainable future by examining the companies we hold and engaging with them. If the unexamined life is not worth living, then the unexamined company is certainly not worth holding!

MT: A good way to put Socrates' words to consumer and corporate use.

EK: For institutional investors, our most important charge is to continue to demonstrate the link between sustainability and financial performance. From that perspective, I am optimistic that investors can make a real difference. I mentioned the

amount of sustainability data available to investors now compared to the year 2000. Well, if you look at the number of reports and studies that show that a sustainably run business performs well on the stock market, there has been an equal flood of research showing just such a connection.

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Chapter 5
Investing in the End Game? An EarthDay Post-Mortem

Food, Sex and Water

The 31st EarthDay has come and gone but a few salient points are worth remembering. Environmental columnist Glen Asher recently pondered whether Thomas Malthus (best known for extracting dire mathematical revelations from a no-brainer equation combining endless human sex drive with our equally rapacious passion for food) may have gotten the Armageddon scenario exactly right [1]. Asher reviewed the latest United Nations Food and Agriculture Organization (FAO) survey of the main food commodity price hikes, its monthly Food Price Index (FFPI) in February of this year. He found an overall international increase of "2.2 percent in one month" the highest in the FFPI's 21 years of market surveillance.

Most food groups and indicators suggest higher, not lower pricing, as demand by 7, 8, inevitably 9 billion people (and tens-of-billions of other mammals already targeted for human consumption) figure into the global calculations. We can delude ourselves by putting up fences, inventing borders, and mouthing off regional immigration reform concepts, but they have no place in a world that is, in sum, one world in which we are all in it, so to speak, together. One Titanic. Not the upper deck and the lower decks. It's one ship. New arable land is fast shrinking worldwide; ground water is becoming scarce and polluted; glaciers are melting (3–6 m per year in the Himalayas) and aquifers, like North America's vast High Plains Ogallala [2] which supports nearly a third of all U.S. irrigation, is also showing a marked decline in recharge rates. Forests are disappearing, the climate is in freaky flux and researchers calculate [3] that of the 403 billion pounds of plastic now produced annually, "as many as 1 million plastic pieces" are showing up in every square kilometer (0.4 square miles) of the oceans, contaminating ever shrinking fisheries, marine mammal populations, seven species of sea turtles, a multitude of sea bird groups, indeed all the biological levels of the world's vast marine habitats.

All of these factors—human fertility, consumption, impact—translate into the much-scrutinized Sixth Extinction Spasm. Were current human fertility rates to actually continue as they are now, we could well reach 13 billion people and that is quite a thought.

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With so many consumers—whether 9 or 13 billion—that's (theoretically-speaking) great news for corporations that make things people want to buy; and terrific news for investors who see the supply/demand fluctuations providing moments of opportunity. None of this bodes well for the Earth, however, as measured biologically in terms of species diversity.

New Asset Classes

With diversity being key to healthy ecosystems, and all of the services humanity is focused upon (clean air, water, food, etc.) there has never been a more important time to think about "impact investments", the turnover of assets that correspond with social and environmental investor motivations. They are indeed on the rise. Both JP Morgan and the Rockefeller Institute have quantified [4] the annual value of such investments as an entirely new "asset class" that will be worth as much as a trillion dollars in coming years.

Some see that figure going much, much higher when the energy and agricultural sectors are combined with an eye towards innovation, efficiency, and a lessening of our per capita ecological footprints.

On the other hand, this Good Samaritan fiscal bonanza, as many might view it, actually lacks appropriate tools in some of the most critical sectors, particularly water. With demand for water estimated at increasing by 53 % as of 2030, according to Ben Levisohn and Jessica Silver-Greenberg writing in The Wall Street Journal [5] there is still no clear mechanism for actually investing in water futures. The most important life-sustaining "commodity" has no clear corollary on any stock exchange. Moreover, the vast majority of all human illness (80 % according to the World Health Organization, WHO) [6] results from water-related issues.

One of the best current case studies in water complexities—both from a utilitarian as well as investor standpoint—involves Australia's "2011 Biennial Assessment of the National Water Initiative." Dozens of Australian public submissions, including one by the World Wildlife Fund (WWF) make abundantly clear the policy gaps in formulating clear-headed strategies for sustaining and distributing clean water, even under the most fervently transparent, democratic processes, where competing altruisms invoke our inability to strike deals that are both clean and bilateral, meaning multi-stakeholders including biodiversity.

The Tragedy of the Commons

The complexity of this "multi-stakeholder" reality is the obvious challenge of any and all ecological reconciliation, restoration and policy. One of the most trenchant case studies concerning incremental harm to the environment that just sneaks up

Fig. 5.1 Indonesian children. (Photo Credit: © M. C. Tobias)

on you was analyzed by the late Professor Garrett Hardin in his famed essay for the magazine, Science, in 1968, "The Tragedy of the Commons [7]" But just as there is this "tragic sense of life," as Spain's great philosopher Miguel de Unamuno (1864–1936) put it, that confrontation with seemingly implacable odds, there is an even more compelling reason to be optimistic: the free market potential for liberating vast stores of wealth and targeting them at environmental solutions, which is precisely the point (one part idealism, two parts absolute necessity) in human evolution that we are at (Fig. 5.1).

By every indicator, the human population is continuing to grow. The demographic literature attending this Malthusian ripple effect is diffuse. Of the 223 countries ranked by the CIA (and countless other agencies and NGOs), more than half of those political entities are above fertility replacement levels, or 2.1, the ten highest being in Africa, nations all showing Total Fertility Rates above 5.68 children per couple. Niger yields the highest reproductive data at 7.6 children per woman, an estimated 3.643 % growth rate for 2011 and a doubling in numbers by 2025, from 14 million today. Yet, even now, an estimated 25 % of that populace faces "chronic food shortages". The African continent is projected [8] to exceed 2 billion by century's end. The majority of those individuals, whether in Africa or any of the other high-fertility regions will be members of the hugest baby boom in history, what demographers call a youth-bulge.

Does the 31st EarthDay, then, suggest only bad news on the horizon? Not necessarily. Looking at the entire global picture, some, like economist David Bloom at Harvard, have commented that such a youth bulge could be a boon to economies, producing what Charles Kenny calls a "growth dividend"; optimism further boosted by more women getting enrolled worldwide in universities and subsequently entering the workplace; declining fertility rates and the classic so-called demographic transition helping to engender democracies, or neo-democracies. These ups and downs are regional, environmentally-dependent, and the numbers mirror lag-times built into the population growth rates and age and gender differentiation, accounting for smaller family sizes and less infant mortality in the future.

But there will be winners and losers, population spikes, accompanied by intense supply and demand [9] fluctuations for everything humans consume.

Fig. 5.2 River in Suriname's pristine Guiana shield. (Photo Credit: © M. C. Tobias)

A Mouthful of Complexities

One of the staples of the current booming human growth rate is soya, a protein-rich legume [10] cultivated for millennia and containing eight amino acids whose combined nutrition has been much applauded of late.

Of the more than 8 billion bushels of soy beans annually produced, some 94 % is used in animal feeds, particularly pig and chicken, but also cattle. One of Brazil's biological hotspots, the Cerrado (bigger than all of Western Europe), has seen 80 % of its globally important ecosystems burnt, scraped, plowed and planted with soy (but also corn and coffee) to feed the relentless indulgence of meat eaters, a third of them living in Europe. This is one of the most apparent mismatches between human consumer growth and loss of biodiversity, prompting the World Wildlife Fund to appeal to Europeans [11] to curtail their taste for animals.

Unlike the situation with water, one can find over 22 million websites relating to the trade in soy futures, in sync—as is the case with every agricultural staple—with the weather. In the case of soy—whether genetically modified or organic—because it is coupled with the slaughter of animals and the direct destruction of indigenous biodiversity, but is also a mainstay of most vegetarian diets, there is moral tension exacerbating any easy summary of its future role in socially responsible investment portfolios, for those who even care. Soy literally connotes a mouthful of ecological complexities.

The upcoming June 12th "Rio Plus 20" conference to mark the 20th anniversary of the famous 1992 Rio Earth Summit, will, among other things provide Brazil's Environment Minister, Izabella Teixeira an opportunity to expound upon a new vision for Brazilian sustainability, particularly in the Cerrado, where representative species amounting to a whopping 5 % of the world's total cling to survival.

Such complex triage raises yet another crucial investor problem. Writes Ben Levisohn and Jessica Silver-Greenberg in their above-referenced "Scarcity Boom" essay on "natural-resource plays," "There are no publicly traded real-estate investment trusts dedicated to farmland."(Fig. 5.2)

Beautiful, But Sluggishly Green

While renewable energy sectors gain significant ground (just look at the "World Finance Carbon Market Awards 2011" [12] and as more and more eco-development projects are approved under the Voluntary Carbon Standard [13] to curtail GHG (greenhouse gas) emissions, the overall energy picture is full of hope and promise, but also sobering reality checks, not just in Fukushima and surrounding tsunami-afflicted regions. Since the time of the 1997 Kyoto Protocol, the trading of carbon emissions has seen a buoyant rise in activity: 8.7 billion metric ton equivalences traded in 2010 worth $ 144 billion, primarily under the European Union Allowance scheme, the biggest market for such trades to date.

In addition, a secondary carbon market, or CERs (Certified Emission Reductions) was valued at $ 17 billion in 2010.

The EU's Emissions Trading Schemes (ETS) currently place a value of roughly $ 23 for each ton of carbon and in the UK George Osborne, Chancellor of the Exchequer has announced [14] a Green Investment Bank to create a guaranteed floor for carbon sales and offsets, the goal being to ultimately replace all conventional, fossil fuel power stations. The ultimate cost of the bank, according to Greenpeace, will be about US$ 742 billion, which pales by comparison with the UK government estimates on the US$ 4 trillion annual market for low-carbon goods, as predicted by 2015. That's all good news. But as most pundits would agree, the transition is going to take time, and investors with long-term visions and high-risk aversions. Every day, scores of new engineering, electronic and biochemical "breakthroughs" in alternative energy seem to be announced, or forecast, a fact that clearly distinguishes this period in our history from any other, even while it smacks of the post-industrial revolution in late nineteenth century.

In the meantime, John Watson, CEO of America's second largest oil company, Chevron [15] in an Opinion column interview with Kimberley A. Strassel entitled "Oil Without Apologies," [16] recently pointed out that with regard to the case for biological energy alternatives to fossil fuels "we would need to consume land the size of states" if, according to Strassel, "U.S. ethanol targets were to be hit." Eighteen countries alone consume between 1 and 20 million barrels of oil every day, with the U.S. topping the list [17] at nearly 21 million barrels. Only a "tiny fraction" of that comes from alternatives "and even those 'are not affordable at scale,'" Strassel quotes Watson.

But with there being a global purchasing power parity of $ 74.4 trillion in 2010 [18] of which over $ 50 trillion exists in publicly traded shares, there is a strong underlying sector emergence—part wishful thinking, part true ingenuity and investor passion—that might be loosely described as a save the world fund, a concept that chimes with the Clinton Initiative, with billionaires pledging half their fortunes to charities, and with the essential spirit of an EarthDay that becomes a quality of mind and human behavior every day.

Biological Economics

The challenges will only get more difficult. Michael Elliott recently described the problem in terms of humanitarian triage in his Time article, "Whom to Protect, Whom to Abandon" [19] as an "applied selectively" syndrome, an inconsistency which, says Elliott is often critiqued as follows: "Just because you can't save everyone doesn't mean you shouldn't save someone."

While inconsistencies will always appear to undermine solutions, as 2001 Nobel Laureate in Economics, Michael Spence reminds us with regard to distributing the burden of carbon mitigation, a "fair solution" exists, whether in rich or poor countries [20].

EarthDay 2011 should remind us not only that there is still much work to be done, but that it can be done. Alfred Marshall (1842–1924), author of the classic textbook **Principles of Economics** (1890) is often considered the "father" of supply and demand, holding to the belief that consumers can adjust their habits, just as prices are elastic. If that is true, then we have much to look forward to. Such notions were in tune with an ethical disposition Marshall argued should underscore all economic thinking. He would have welcomed the tradition of EarthDay because it was he who said, in the Preface to his great, aforementioned treatise, "The Mecca of the economist lies in economic biology" [21].

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Chapter 6
Just When You Thought You Could Bank on it

I'm sitting with my friends William Shatner and his wife Liz having tea and discussing wildlife. Bill and I have been having an ongoing dialogue about the fate of the earth for over 20 years, a conversation that started in earnest beneath Mount Everest where he insisted on doing his own climbing stunts at about 19,000 ft for a television series we made together ("Voice of the Planet"). (Fig. 6.1)

"We need to get more wolves into the wild," he declares, mulling over the future for his kids and grandchildren.

Reintroduction of wolves, we both acknowledge, has been one of the most contentious of wildlife issues. But with over 2,000 Threatened and Endangered species (T&E's) [1] in North America wolves are iconic, just like the now extinct Passenger Pigeon was. We need to care about predators. They keep ecosystems healthy, without which, we're all dead.

The number of T&Es is growing rapidly and this trend threatens to defuse our sense of urgency about the value of biology in general [2].

When Extinction Starts to Draw a Yawn

We've read the "Be Warned" headlines too many times. We've set our sights on Labradoodles, not Antarctic sea-pigs, Egyptian vultures or Borneo leopards. But as oil prices soar, and revolutions come and go, the value of threatened wildlife takes on increasingly dire dimensions. The 193 delegates to the Nagoya Summit in October 2010 for the U.N. Convention on Biological Diversity journeyed to Japan in an effort to find ways to slow down the vast tragedy of extinctions occurring all around us [3] (Fig. 6.2).

Wish them luck. Polls among young people have shown they can recite hundreds of labels and brands—the latest cool gizmo—but know virtually nothing about other species. Kids need to get outdoors. They can't learn this stuff just sitting, yawning in a classroom or before a computer.

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Fig. 6.1 William Shatner and friend. (Photo Credit: © M. C. Tobias)

Fig. 6.2 Rare Egyptian vulture, Socotra/Yemen. (Photo Credit: © M. C. Tobias)

There may be as many as 100 million species out there and at current trends we're likely to lose as many as 50% of them by the end of this century. Not just species, whole populations—over 42,000 populations disappearing every day.

The Population Explosion

At current reproductive trends we nearly 7 billion human consumers could easily exceed the ten, even 11 billion benchmark by the twenty-second century. Most demographers look to population stabilization at about 9.5 billion but they're not the ones making most of the whoopee. Cutting off family planning assistance to the poor, which some politicians favor, would undermine a complex series of events in which demonstrative threats to the global environment are explicitly linked to consumer numbers [4] (Fig. 6.3).

Climate change and habitat loss are two of the most obvious symptoms of the human population explosion that, as with wildlife, diminishes the value of every individual.

Smaller families, higher per capita income, women in control of their personal destinies all translate into more healthy governance and fewer civil wars; a brighter future for all concerned. Greater wealth can also assist biodiversity. Nations like Brunei, Bhutan and Suriname, and now regional Quebec are all good examples of this ecological-economic marriage.

Fig. 6.3 Critically endangered Iberian wolf, Portugal. (Photo Credit: © M. C. Tobias)

Ecology and Economics

Ecosystem services have been valued at more than $ 33 trillion per year. A single tree in eastern Ecuador might well host as many as 60,000 different species of insects. This Bug Factor (often excluded from tropical eco-lodge brochures), in fact, maintains healthy rainforests, clean drinking water, effective pollinators, and exerts critical climate stabilization, among many other things.

Americans cannot afford a Marshall Plan for every threatened species and habitat around the world, although we should take pride in having created the world's first national park, Yellowstone, in 1872, which has since become a template for more than 120,000 other protected regions across the planet [5].

The Value of a Person

It's unlikely we'll ever fully value nature unless we value one another. If you perished in India's Bhopal disaster in 1984 [6] the courts would find your economic posterity hovering at a value fixed around $ 300.

In July 2008 the United States Environmental Protection Agency lowered its estimate of the value of a human being from just over $ 8 million to slightly more than $ 7 million, which is still more than double the average amount paid families of victims of 9/11 [7].

But They're Celebrating in Greenland

Shatner and I are wrapping up our conversation, and I'm thinking, "Damned if you do, damned if you don't." That's because even the famed Spotted Owl in Oregon—thought to have recovered—now appears to be in serious decline, 20 years after its forest habitat in the Northwest was closed off to chain-saws. The culprit is possibly another, larger migrant owl species, the Barred (or Hoot) Owl, who used to prefer North America's East Coast but is now showing up in the Northwest.

The environmental challenges—whether among wolves, people or owls—have gotten so complex that in Greenland, melting ice is a prelude to what some have been celebrating as the coming organic farming boom in a region that never imagined such a prospect, as Gerald Traufetter has discussed in Spiegel Online [8].

Fig. 6.4 Orangutan, Indonesian Borneo. (Photo Credit: © J. G. Morrison)

To anyone paying even mild attention, these complexities can lead to seasickness; the facts are both freaky and confusing and hint of Easter Island Syndrome, a human ailment that is taboo in most polite conversation. But the late historian Arnold Toynbee stayed home writing, not partying, and he pointed to 22 civilizations, not unlike the culture hundreds of years ago on Easter Island that rapaciously chopped down every tree, destroyed all native biodiversity, only to see its own human population self-destruct.

Happily, with help from the Chilean Forest Service, Easter Island is replanting native species and enjoying something of a renaissance.

I look at Bill who exhibits that "Boston Legal" final moment of reflection (the one typically accompanied by a cigar, but not today) and ask him if he thinks there's still time to fix the world?

"Absolutely," he says with an ambiguous smile (Fig. 6.4).

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Part II
The Carbon-Negative Ideal

Chapter 7
SuperGrid: A Discussion with Energy Expert Roy Morrison

Roy Morrison [1] is a writer and energy consultant with over 30 years experience. He is Director of the Office for Sustainability at Southern New Hampshire University, focused upon energy renewables and efficiency. He was the author of the first law in the nation (the US) for municipal aggregation for retail electric competition. His books include **Ecological Democracy: Markets, Democracy and Survival** [2] and **A Renewable Energy World: And other Adventures in Sustainability** [3] (Fig. 7.1).

Michael Tobias (MT): Roy, I've heard you speak of the creation of an "ecological civilization" within 20 years, almost by way of a smart business proposition that, among other things, involves preserving the environment, overhauling the tax code to reflect natural capital preservation, and the engendering of new "market rules and government leadership" as reflective of "what we do best, markets and democracy." You've even suggested that this "zero polluting and sustainable future—the high profit center for the 21st century" could happen nationally and globally in as rapid a period as two decades. How do we do it?

Roy Morrison (RM): First, build an efficient renewable energy system to replace all fossil fuels and nuclear energy. This efficient renewable energy supergrid will operate as a High Voltage Direct Current transmission (HVDC) network connecting not just large solar, wind, hydro, and biomass generation, but myriad distributed renewable generation resources. Networked renewable resources on a continental scale are substantially self-balancing as demonstrated in Europe by Gregor Czisch in **Scenarios for a Future Electricity Supply** [4].

MT: And this grid is essentially all-encompassing?

RM: Yes. Efficient renewable electricity will power our vehicles and factories, heat, cool and light our cities. It takes advantage of the second law of thermodynamics through split system heat pumps, cogeneration and district heating, high efficiency LED lighting, electric vehicles with V2G (Vehicle to Grid) and V2H (Vehicle to Home) capacity combined with a myriad of distributed renewable and storage devices.

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Fig. 7.1 Roy Morrison. (Photo Credit: Courtesy of Roy Morrison)

MT: On the global level?

RM: Globally, efficiency is supported by system benefit utility charges, widely used in the US, as an adder to utility rates to support efficiency installation. Efficiency Vermont [5] is a good example. The cost of saving a kilowatt hour is a small fraction of the cost of generating a kilowatt hour, giving a strong cost advantage to efficiency monetized as negawatts, pioneered by Amory Lovins [6] as long ago as 1989.

MT: In the Eurozone, Canada and most recently China, I gather that incentives for renewable energy have been helped along by what is termed "Feed-in-Tariffs" that provide 20 year contracts with a guaranteed price.

RM: Yes, it's a start but we can apply even better financial tools for nurturing market based financing of renewables with great rapidity.

MT: For example?

RM: What we call Renewable Energy Hedges and Advanced Energy Performance Contracting. Renewable hedges are agreements between energy developers and energy users that give developers reasonable long-term income streams to facilitate finance, and provide users reasonable long-term fixed energy prices. Renewable hedges require no capital upfront by customers. Combined with an efficiency and renewable resource bank, funded by public and private capital, renewable hedges can emerge as a major tool to facilitate efficiency and renewable development including transmission lines. Advanced Energy Performance Contracting (AEPC) combines the economic advantages of energy efficiency with the income generated by renewable power to facilitate the utility scale installation of a package of efficiency and renewables. In both China and the United States there is already a strong Energy Performance Contracting sector, typically focused on energy efficiency.

Fig. 7.2 Power lines in the Arabian Peninsula (Photo Credit: © M. C. Tobias)

MT: We're primarily accustomed to big utilities. How would this AEPC gain traction tomorrow in the US?

RM: By applying this method to utilities, AEPC will use a mixture of efficiency and renewables, starting with three parts efficiency and one part renewables, to supply prescribed amounts of load reduction and renewable supply in megawatts. Costs will be recovered from utility rates through the value of negawatts and kWh renewable sales. Competitive bidding and increasing scale will progressively reduce costs for energy efficiency, renewables and energy storage.

MT: Is there a good precedent for this? (Fig. 7.2)

RM: Absolutely. The concept of efficiency supplying utility capacity with costs collected from rates was pioneered in Guangdong province in China following plans developed by the Asian Development Bank [7]. It works. This approach could be applied, for example, in city-wide insulation based on thermal scans of an entire city used for creation of a 3-D map indicating areas for insulation and weatherization. This approach was successfully conducted by MIT for the City of Cambridge, Massachusetts. And the same method could be combined with appliance replacement, heat pump installation, solar PV and electric vehicle V2G and V2H charging stations.

MT: But how do you then equate a pretty enlightened town like Cambridge Mass with, say impoverished rural communities elsewhere in the world? How do we reach a state of even relative energy equilibrium?

RM: We need a global per capita sustainable energy budget and sustainable assessment methodology.

MT: Meaning what?

RM: We call it, SAVE, or, Sustainability Assessments to Value the Ecosphere.

MT: What is it?

RM: It will facilitate global ecological transformation by transfer of assets and technology from large energy users to small, and from rich to poor. The world cannot achieve sustainability if half continues mega-pollution, while the other half tries to exist on ecological islands in poisoned seas.

MT: In terms of actual mean per capita allowance, what are you saying?

RM: A per capita annual allowance of 70 GJ of primary energy (19,443 kWh) and 3 t of carbon dioxide emissions represents a global standard [8] making sustainable energy development possible for all. This is a matter of common global self-interest, equity and represents a fair process.

With SAVE, large energy users above the standard kWh and carbon dioxide output per person, both as individuals, and as nations, will be net payers, users below the standards will be net recipients of funds to be used for investment in efficient renewable energies.

MT: And the mechanisms of transparency?

RM: Well, the administration would be accomplished by the United Nations or other global development organizations, such as clean development banks.

MT: Where does the world's abundant coal come into play, or does it, in this plan?

RM: Coal must be converted to zero emissions or stay in the ground.

MT: That's challenging.

RM: Yes, but doable.

MT: You have spoken about sustainability signals in pricing systems. How does that work?

RM: Any pricing system can send tangible signals for sustainability through ecological consumption assessments which actually replace income taxation.

MT: Those assessments will have what kind of effects?

RM: Well, that which is sustainable must become less expensive, more profitable, and gain market share. What is polluting, depleting and ecologically damaging must become more expensive, less profitable and lose market share. The price system needs to send clear signals for sustainability to consumers, producers, bankers, investors, and government officials. This is not just for energy, but must apply to all goods and services.

MT: So, to conclude, how would you summarize the best way to overhaul our tax system based on an ecological model of sustainability?

RM: Michael, the best way to send price signals to producers and consumers is through ecological consumption assessments paid at the point of sale on all goods and services throughout the economy. Buy an item that's less polluting than an item of similar quality and you will pay less. By establishing comprehensive new market rules for sustainability through a system of ecological consumption assessments, a variation upon the Value Added Tax (VAT), to replace income taxation after the fact, can make the market an effective instrument for moving the myriad of production, consumption, and investment decisions along sustainable paths. As comprehensive ecological taxes are phased in, rating each good or service on a simple sustainability scale, income taxes are phased out. Such an ecological consumption assessment system is described in my book, **Markets, Democracy and Survival** [9].

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Chapter 8
Ecuador's Imperiled Paradise—One of the World's Most Important, If Least Known Battles: A Conversation with Dr. Ivonne Baki

In 2007, Ecuador's President Rafael Correa proposed protecting his country's biodiversity against huge oil revenue prospects [1]. This was the archetypal mother of all environmental contests, and remains so. The United Nations Development Program (UNDP) signed on to President Correa's proposal, and it was again discussed at the UN's most recent 66th General Assembly [2]. At that United Nations meeting, US$ 52.9 million of both public and private sector donations were committed to the proposal [3], as UN Secretary General Ban Ki-moon joined President Rafael Correa in a special meeting, along with Ecuador's indigenous Huaorani tribe. Two packed rooms at the U.N., and an overflow crowd of dignitaries there to listen indicates the excitement of the Yasuni-ITT Campaign. But will the rest of the world listen? (Fig. 8.1)

The stakes are high: oil revenues in Ecuador to the tune of billions of dollars, or nations coming to Ecuador's assistance to collectively help her leave that oil in the ground and thereby save some of the world's most precious wildlife?

I spoke with Dr. Ivonne Baki, Ecuador's Plenipotentiary Representative and head of the Yasuni-ITT Initiative about this unique opportunity—or crisis—in her country [4].

Michael Tobias (MT): Dr. Baki, Ecuador's Yasuní National Park, designated in 1979, is among the most biologically prolific areas on the planet and home to at least two indigenous non-contacted ethnic groups [5]. It also holds, apparently, vast amounts of heavy crude oil in the ground, the equivalent of an estimated 407 million tons of carbon… dioxide, carrying a US dollar value in excess of 7 billion. For nearly two decades there has been controversy, social, economic and scientific debate over how Yasuní's indigenous people, habitat and potential oil revenues for all of Ecuador might be reconciled? (Fig. 8.2).

Dr. Ivonne Baki (IB): Well, Michael, as chair of the Yasuní-ITT Commission, my views are pretty straightforward! As you note, on the one hand we've got this incredibly beautiful, biologically and culturally diverse National Park. On the other hand, a developing country with a third of its population in poverty [6] and massive oil reserves underground. How do you maintain a sustainable balance between biodiversity and oil extraction? I don't know if that is possible. Oil extraction by

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Fig. 8.1 Ecuador's President, Rafael Correa at Huaorani/Yasuni biodiversity. (Photo Credit: © M. C. Tobias)

Fig. 8.2 Ecuador's Secretary of State for the Yasuní-ITT Initiative, Dr. Ivonne Baki. (Photo Credit: © M. C. Tobias)

definition is not a sustainable endeavor. Yasuní biodiversity has been evolving for thousands of years—but damage from oil extraction could drive some of its unique species to extinction. That would represent massive long-term damage in the name of short-term profit. Moreover, looking at Ecuadorian history, oil revenues have not lead to investment in sustainable development. An entirely new energy matrix is needed—which is where the Yasuní funds will be invested.

MT: In what ways?

IB: We now hear a global call for clean, alternative energy sources and Ecuador has a huge unexplored potential to develop geothermal, solar, wind, and hydraulic energy. What we need to see are countries that will actually face the difficult decision of foregoing oil dependency to move towards a more sustainable, eco-friendly model of energy production.

MT: Is Ecuador up to it?

IB: Let me put it this way: if we continue to depend on oil to such a degree, IPCC studies demonstrate that there is no future for the planet and humanity [7]; we are reaching a tipping point of CO_2 emissions, the Earth's tipping point. The balance between nature and oil extraction is simply not sustainable.

MT: So what are you proposing?

IB: To reach the goal of conserving Yasuní's biodiversity, to protect the non-contacted indigenous people and the indigenous communities living in the Amazon and transit towards a clean energy model, the Yasuní-ITT Initiative is the one and only path to be taken. Yasuní is the ultimate precedent towards affecting such a paradigm shift.

MT: How much oil has already been extracted, what has the damage been, if any, and what, in your opinion, can be done as soon as possible to inhibit any further potential conflict (oil extraction versus in situ biodiversity) within Ecuador, and Yasuní specifically?

IB: Like many small developing countries around the world, throughout South America and in the Middle East for instance, oil has been the lifeline of our economy. Oil accounts for more than 50% of Ecuador's export revenue. But what is different about a place like Ecuador, and Yasuní in particular, is the sheer abundance and richness of life here. And then consider that Ecuador has already extracted more than half of its original oil reserves in the Amazon basin.

MT: With effects that have been documented—to varying degree—for years.

IB: Exactly. Consider the analysis by Bob Herbert of the New York Times, "Disaster in the Amazon" [7]. In the Yasuní National Park, oil activity has been limited, the oil, located in the ITT block, is considered to represent about 20% of the country's reserves.

MT: And those reserves have been left alone, to date?

IB: Yes, they are so far unexploited. But, to go back, the environmental impact of the more than 40 years of oil exploitation in Ecuador has been evaluated as severe, particularly regarding the impact of roads and infrastructure construction for this activity, related deforestation and oil spills. In Ecuador, we have already witnessed the tragic side effects of this oil drilling. International oil companies have dumped billions of gallons of toxic waste into our water supplies over the past few decades through illegal practices from which we are only now recovering. Biological studies have shown that many species have already disappeared throughout Ecuador.

MT: And the ITT initiative?

IB: The best strategy for Ecuador will be to concentrate on the oil extraction of its mature oil fields, what is called improved oil recovery, where the additional environmental impact is relatively low and profits can compete with those from new blocks that could thereby remain untouched, hence promoting the conservation of the most sensitive areas, such as the Yasuní National Park. The Initiative promotes the creation of new clean energy technologies which can create methods that work with nature instead of against it; in favor of our future as human beings without compromising environmental preservation, and the future of coming generations. The recognition of the importance of biodiversity has also to be internalized so that the thought of harming the environment in the name of energy seems counter-intuitive and even immoral.

MT: One journalist who visited Yasuní (Esme McAvoy) described the conflict as "Oil or life? Ecuador's stark choice" [8]. Ecuador's new Constitution, ratified in 2008, is one of the few documents in human history that enshrines "the rights of nature." How is this Constitutional declaration currently playing out in your country?

IB: Ecuador is indeed the first country in the world to recognize nature as a subject of rights, an example that should not only be praised but followed. The post-2008 situation is playing out gradually, as the country is starting a transition towards a model of development based on wellbeing and rights of nature, in which the Yasuní-ITT Initiative exerts a very important role in promoting this important transition.

The Proposal's objective can be qualified as both holistic and revolutionary because, in addition to addressing the root of global warming and biodiversity loss, it also aspires to fight poverty and inequality within Ecuador; to stop deforestation and promote reforestation, to protect the National Parks and invest in research and sustainable development. Given the fact that the Yasuní-ITT Initiative is a governmental project, it offers an opportunity for oil-producing developing countries, such as Ecuador, to end their dependence on an extractive economy and seek dignified development opportunities through the sustainable use of its natural resources.

MT: And in relation to the Kyoto Protocol?

IB: Considering the Kyoto Protocol's current limitations, Ecuador has put forward this innovative alternative, that even promotes a new climate change mitigation mechanism (Net Avoided Emissions) [9] to allow the active participation of developing countries in the mitigation of climate change, protecting biodiversity, the rights of indigenous peoples and promoting a new style of human development, that is equitable and sustainable.

MT: The Fund's administration?

IB: The Yasuní Fund, administered by UNDP [3], will collect the contributions during a 13-year period. Taking into account the positive international reception of the Initiative, we expect that the adverse effects of the recent economic crisis will be overcome in the future, and the need for effective solutions to climate change and biodiversity conservation will prevail.

What Ecuador is doing is to convey the importance of this Initiative by stressing the international community's shared responsibility and interest in its success. Yasuní is definitely a world ecological reserve that is worth much more than its oil underground. A new internationally binding agreement is necessary for climate change mitigation, and cannot be postponed indefinitely.

MT: How will the assets be targeted, the funds allocated?

IB: This fund will enable the State to earn interest in perpetuity, which will be invested in five areas: (1) Conservation and prevented deforestation in at least 19% of national territory, (2) Reforestation and afforestation of 1 million ha, (3) Efficiency improvements in national energy consumption, (4) Social development and sustainable production for the populations living in the areas, particularly in the Amazon region, and (5) Scientific and technological research in topics related to the Initiative.

Fig. 8.3 The Honorable Rafael Correa, President of Ecuador, addresses the U.N. Conference on Sustainable Development. (Photo Credit: © M. C. Tobias)

MT: And the precise financial goal?

IB: The goal of the Yasuní-ITT Initiative [3] is to raise $ 3.6 billion by 2024; half of what Ecuador could have expected to reap in profits from drilling for Yasuní-ITT's oil. The President's commitment to the Yasuní-ITT Initiative is firm and consistent with the environmental laws under the new Ecuadorian Constitution, comporting with the important rights of nature, as well as the National Development Plan policies. The commitment that nations and individuals need to exercise is not a mere cooperation but a necessity, in my opinion, in order for humanity's future to be sustained on this unique planet (Fig. 8.3).

MT: Ultimately, it really does come down to that very poignant statement by biologist E. O. Wilson, "The one process ongoing…that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats. This is the folly our descendants are least likely to forgive us" [10].

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Chapter 9
Native Americans Get Seat at Climate Table

Bill Gates and team may be the State of Washington's most celebrated entity to embrace the seemingly intractable crisis of climate change and greenhouse gas emissions mitigation, but there are others in that region making less news but taking equally important strides in the battle to tackle global warming. That would be the Confederated Tribes of the Colville Reservation in a northeastern portion of the state (Fig. 9.1).

In an effort to demonstrate effective greenhouse gas (GHG) mitigation strategies on tribal lands in the U.S., the Confederated Tribes [1] of the Colville Reservation headquartered in Coulee Dam, near Spokane, Washington, recently partnered with carbon finance advisory firm EcoAnalytics LLC of San Francisco, the Finite Carbon Corporation of Wayne Pennsylvania, and the Van Ness Feldman law firm which specializes in, among other things, environmental projects throughout the U.S. and has a unique tribal practice. With a $ 1.226 million Conservation Innovation Grant (CIG) award, and matching funds, the partnership hopes to show that previous barriers to entry in environmental markets encountered by the hundreds of Federally recognized tribes and bands in the U.S. can be surmounted.

If the new management systems in place prove effective, this landmark initiative could become a welcome template for countless other public-private partnerships aimed at lowering America's carbon footprint.

Native American tribal lands, to date, have not been included in the boom in new forest carbon offset endeavors for three primary reasons. First, at the state and federal levels, inconsistent climate change policies have emerged due to issues around sovereignty. Second, technical and legal issues exist in contracting a site-specific project on tribal lands. Third, there has been no clear route to various markets for tribal forest carbon projects and tribes have not been a part of stakeholder discussions.

With the help of this funding, "This project will demonstrate and adapt innovative GHG emission mitigation strategies and management systems to help create and monetize forest carbon offsets on tribal lands across the United States. This award is a milestone leading the way toward adapting approved and implemented forest carbon methodologies and protocols addressing issues involving tribal sovereignty," said Gene Nicholson, Chairman of the Board of The Colville Tribal

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Fig. 9.1 Steam emissions from power plant along the Pacific Rim. (Photo Credit © M. C. Tobias)

Enterprise Corp (CTEC), in a June 21st, 2011 press release from the four partners. California's Global Warming Solutions Act (AB-32) [2] the nation's most comprehensive greenhouse gas GHG cap-and-trade program at the state level, is scheduled to come into effect in 2013 after a 1-year delay, but this state program does not include the participation of tribes. The new Colville initiative hopes to change that, both in the state of Washington, and with any luck, throughout America.

Any project that can lead the way for similar involvement by the more than 4 million Native Americans would appear to be a brilliant stroke.

The Confederated Tribes of the Colville Reservation represent Native peoples and they offer an ideal test case to pilot a forest carbon offset project. The Colville Reservation has some of the highest contiguous forest cover of any U.S. tribe in the lower 48 States and has an established forest management plan that thus creates a clear baseline for managing forest carbon stocks that can be used for quantifying emissions in a scientifically defensible way.

In relating the Colville project to the new California legislation, Tiffany Potter of EcoAnalytics writes, "Market pundits feel that California's demand for all types of offsets will exceed supply. Opening up tribal lands to be able to participate in a cap-and-trade program especially through forestry could help supply meet demand, provide local jobs, and create sustainable, long term revenue for tribes across the country."

In addition, "by adapting approved forest carbon methodologies and protocols suitable for laws that support tribal sovereignty, we have the potential to create atmospheric and environmental benefits, while also generating a financial return for all tribes," said Ken Stanger, Chairman of Colville Tribal Federal Corporation (CTFC).

This project also importantly fills a critical gap. The U.S. Departments of Interior and Agriculture which are mandated to work responsibly and creatively with American Indians, Alaska Natives, and tribal resources, now have a newfound opportunity that can help facilitate consistent public and private market based incentives. Finite Carbon will provide data concerning carbon quantification and valuations of sequestered emissions, while Van Ness Feldman will lend its legal expertise to the whole process.

This project was funded by the USDA's Natural Resources Conservation Service (NRCS) that is focused upon funding "innovative, on-the-ground conservation technologies and approaches, with the eventual goal of wide-scale adoption to address water quality and quantity, air quality and energy conservation and environmental markets among other natural resource issues." Forty-three Conservation Innovation Grant proposals were received from 28 states. The Confederated Tribes of the Colville Tribal Enterprise Corporation Reservation initiative received one of the highest amounts awarded during this round of grant making.

If the dollar amount awarded seems somewhat shy of serious money, it's important to note that of the total dollar figures in the UN and World Bank-backed REDD + (Reducing Emissions from Deforestation and Forest Degradation), which has global agreements with nearly 30 countries, less than $ 150 million has been committed thus far (though less than $ 100 million disbursed), and over 80 % of that amount has come from one nation, Norway. But, as Mark Rowe describes in his piece "REDD + or dead?" [3] the Norwegian Government has also committed US$ 1 billion on the basis of a 2-year Indonesian moratorium on any for-profit timber extraction. The money to help save the planet is there. It's the mechanisms and agreements that have thus far proved frustratingly elusive.

Fast growing species like eucalyptus and Scottish pine—among many—are no substitute for primary canopy that guarantees a level of native biodiversity lacking from many current post-Kyoto Protocol schemes. Moreover, between 2000 and 2010, it is estimated that more than 52 million ha of forest were lost worldwide (ten Costa Ricas). It is also widely recognized that deforestation at all levels exerts one of the most serious and long-lasting impacts on climate change and the irretrievable loss of biodiversity.

By embracing North American tribal sovereignties in the process of reducing emissions, there is the inherent promise of traditional tribal conservation measures being implemented, as well. That would be good news for Americans, and for the planet.

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Chapter 10
Climate Shock: UC-Berkeley Scientist, Dr. John Harte, Puts the World on Notice

Dr. John Harte [1] is based at the University of California-Berkeley Department of Environmental Science, Policy & Management. With a PhD in physics, his research encompasses the most serious biochemical and climate-ecosystem feedback processes of global warming and theoretical ecology. He has been at the forefront, for decades, of some of the most important studies pertaining to the biological impacts—particularly in alpine environments—of climate change, as well as humanity's role in the disruption of critical ecosystems [2] (Fig. 10.1).

I have had the privilege of working twice with Dr. Harte during the last eight months: once for a day filming our three-hour Dancing Star Foundation TV series, "State of the Earth" [3] and then again this July at the Rocky Mountain Biological Laboratory [4] above Crested Butte, Colorado, where Dr. Harte and colleagues have been monitoring climate, soil and biological changes for nearly two decades. His profound, interdisciplinary understanding of the causes and consequences of climate change are urgent news, beyond anything you may yet have heard about. For that reason I urge you to read the following carefully—you will be tested (in some form or other).

A Feedback Fiasco

Michael Tobias (MT): John, let's cut to the chase here. While there are still some individuals in stubborn denial, even amongst those who do know how serious climate change is, there are many who still don't quite recognize just how rapidly the situation has escalated, for the worse. In your opinion, why is the global climate over the next century likely to be even hotter than what most climate scientists are currently predicting?

John Harte (JH): Climate science calculates what the future climate will look like using the basic laws of physics. The most trusted and largest group of climate scientists, the Intergovernmental Panel on Climate Change (IPCC) [5] summarizes the results of these calculations and concludes that under "business as usual" trends in

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Fig. 10.1 Dr. John Harte. (Photo Credit: © M. C. Tobias)

Fig. 10.2 Alaska. (Photo Credit: © M. C. Tobias)

fossil fuel consumption, by 2050 the planet will on average have warmed between 3 and 8 °F.

MT: And the key reasons?

JH: That warming is the result of both the direct heat-trapping effect [6] of greenhouse gases and certain feedback processes. The latter will increasingly occur in response to the direct warming, causing further warming.

MT: You're speaking of extremely critical global environmental security that far transcends, even, the tragic potential for the extinction of polar bears.

JH: As polar and glacial ice melts and snow cover decreases, temperatures will rise as less sunlight is reflected by our planet and more is absorbed by the remaining, darker surfaces (Fig. 10.2).

MT: And I know you've also studied other feedback dilemmas?

JH: Yes. There are many of us in the scientific community who believe that any number of important feedback processes are not being accounted for in the current IPCC projections. For example, from ice core data informing us about temperatures and atmospheric greenhouse gas levels over the past million years, we know that when the planet warms a little from any cause, it responds by releasing from the land and sea to the atmosphere huge amounts of carbon dioxide and methane. These greenhouse gases contribute to further warming. Because this process is not reflected in current climate projections, we can expect that there will be further emissions from our soils and our oceans. These will create additional warming beyond what IPCC currently projects.

MT: The evidence is solid?

Fig. 10.3 Japan. (Photo Credit: © M. C. Tobias)

JH: Yes. The evidence for these additional feedback effects is starting to pour in. Rising methane emissions from warming tundra soils and waters are being observed, and field research shows that warmed temperate ecosystems release additional carbon dioxide to the atmosphere.

MT: That's very alarming. What else?

JH: Forest damage from wildfires and bark beetle infestation, both of which are triggered by warming, will also result in the carbon stored in trees flowing to the atmosphere as carbon dioxide. By some estimates the additional warming could raise mid-century temperatures by as much as 11 °F.

MT: Not good.

JH: No. It means we're going to experience far more global warming than our current models predict.

A Guarantee of Future Shock?

MT: So even more than-

JH: Far more than mankind has ever experienced in our entire evolutionary existence, if we don't substantially cut emissions of heat-trapping gases. Our actions have already ensured further climate change, but the good news is that if we greatly reduced our use of fossil fuels now, we would prevent future catastrophic warming and we would rapidly see and feel the effects of declining levels of heat-trapping gases in the atmosphere (Fig. 10.3).

MT: Climate has varied throughout Earth's history as a result of natural processes—why should we be inordinately concerned about the current warming that our species is currently unleashing/triggering/producing?

JH: This enormous irony, if you will, apparently confuses many of those who deny the findings of climate science or, for other reasons, argue for complacency. First of all, some deniers ask "what's the big deal with 5 or 10° of warming? We see such changes daily."

MT: Right, floods in Manhattan, a drought across half the U.S. this Summer; temperatures in Texas exceeding three digits week after week after week. Some people are simply packing their bags and moving to Oregon, or wherever they are betting it's going to be cooler.

JH: Well, one way to think about that is to note that when earth's average temperature was just ten degrees cooler in the last ice age, a 300-ft thick ice sheet covered much of North America and Europe!

MT: OK? Go on?

JH: Other deniers argue that Earth has changed that much in the past and life survived. True, but previously, Earth warmed much more slowly than it is now, giving animals and plants many millennia to adapt or migrate through wilderness—wilderness undisturbed by exploding populations of people who now occupy much of the planet's former natural habitats.

The Statistics of Stress

MT: Right. Add 7 billion, soon to become 10 or 11 billion *Homo sapiens* [7].

JH: Exactly. The current global heating, which is proceeding at 10–100 times the rate of change of ancient climates, is outpacing the capacity of plants and animals to adapt. And during those aforementioned ancient climate transitions, there were not 7 billion human mouths to feed on Earth. The projected loss of irrigation water, increased frequencies of unusual storms and droughts, heat waves, and other climate anomalies are very likely to severely stress our capacity to feed ourselves.

MT: Yes, the United Nations Food and Agriculture statistics [8] of late on looming hunger crises, like that now spreading over much of East Africa, are not promising.

JH: Exactly. Moreover, these climatic stresses are coupled with increasing losses of fertile soil, increasing hazards from wildfire, and the increasing movement of exotic crop pest species around the planet.

MT: I'm thinking about such programs as the United States Department of Agriculture's Natural Resources Conservation Service [9]. But notwithstanding such efforts, you are obviously worried about bioinvasives? What some have labeled one of the most serious of all ecological problems.

Après moi, le déluge!

JH: Of course. But, going back a minute, fundamentally it is really hard for some people to grasp the scale of change that fossil fuel burning is causing. Consider the summertime melting of the Canadian Northwest passage. It has opened up a

connection [10] between the Pacific and Atlantic Oceans, a dramatic change that will have repercussions on a scale that Earth hasn't witnessed since the prehistoric separation of the oceans with the formation of the Isthmus of Panama. The resulting deluge of alien Pacific species into the Atlantic promises to create gargantuan problems for Atlantic marine ecosystems. It is frightening to think that just in my lifetime I have witnessed a planetary change, caused by human population growth and our fossil fuel consumption, on a scale that Earth has not experienced in several million years.

MT: John, you've argued that the barriers to preventing catastrophic global warming are political, not economic or technological?

JH: That politics is a barrier is evident; indeed, rhetorical denial of the findings of climate science has become a badge of loyalty in some political circles. Yet, we know how to make affordable, safe, energy efficient devices, including automobiles.

MT: Not to mention affordable renewable energy production systems.

JH: OF course, wind turbines, solar panels, and so forth. Your colleagues at Forbes write about it every day. So, the barriers are not economic or technological. What we lack is the political will to create incentives that will allow the U.S. to compete with other nations that are leading in those technologies. Responsible leadership here would greatly reduce the risk of catastrophic global warming, as well as create jobs, reduce smog levels in our cities, eliminate the risk of catastrophic oil spills, eliminate the need for mountaintop removal to obtain coal, reduce our vulnerability to rising oil prices, and reduce incentives to go to war to maintain shrinking oil supplies.

The Loss of Biodiversity

MT: Many of your colleagues have been writing about this for decades. I think immediately of your friend Dr. John Holdren (who taught for nearly two decades at UC-Berkeley), is President Obama's Director of the White House Office of Science and Technology Policy and Co-Chair of the President's Council of Advisors on Science and Technology [11]. And one of your own recent books that you wrote with your wife, the scientist Mary Ellen Harte, could not be clearer on the subject.

JH: In that free, down-loadable book, **Cool the Earth, Save The Economy** [12] we discuss the fact that the transition to clean energy is economically doable if we would only couple regulations with a shift of the Bush-era wealthy tax breaks and fossil fuel subsidies to tax breaks on the profits of those who sell clean renewable energy and energy efficiency products. This "reward the winners" strategy would fluently allow the market to pick the winners, and help make clean energy affordable. Fossil fuel lobbyists prevent our leaders from effecting these sensible policy changes.

MT: Obstructionists, who prefer the profit-conduits of the status quo, have proclaimed one annoying and actually catastrophically disingenuous mantra, namely: Why should humankind worry about the loss of ecosystems and wild species?

JH: It has been famously and correctly stated that the human economy is a wholly-owned subsidiary of nature. Healthy ecosystems maintain our soils, clean our air and water, and ameliorate the extremes of climate. That is, up to a point—for human activities can negate those ecosystem services.

MT: Our mutual friends Paul and Anne Ehrlich, and other great minds like E. O. Wilson, Gretchen C. Daily, Thomas Lovejoy, Russell Mittermeier, so many—have also pointed out the medical benefits of biodiversity [13].

JH: Of course. Our medicine cabinets are stocked with the direct or indirect products of nature, our foods all derive from wild species, and the search for future medicines and genes for crop improvement is carried out, in part, in wild ecosystems.

MT: Indeed, on that note, I urge readers to see an essay I wrote here in Forbes some months ago on biodiversity and cancer cures [14].

JH: Well, quite simply, we would not have the decent life we desire—possibly ANY life in absence of functioning ecosystems.

MT: Intact floral and faunal assemblages.

JH: Yes, with all, or certainly most of the wild species they contain. Stopping the cutting of old growth forests everywhere is critical because of the tremendous capacity of these awesome ecosystems to house biodiversity and store carbon, which converts to greenhouse gas when forests are cut.

Do the Math

MT: OK, then. Leaping to Ehrlich's and Holdren's IPAT [15] equation re: consumption, number of consumers (read population explosion) and the intensity of our myriad technology impacts and extractive obsessions, what do we do? I mean, short of dictatorial policies, can anything really be done to—in a nutshell—save the Giant Panda; to reduce the human population growth rate—not to ignore for one moment the fantastic efforts of the United Nations Population Fund and dozens of extraordinary population and family planning NGO's around the world (including the work of your own cohort there at UC-Berkeley, Dr. Malcolm Potts) [16]. Moreover, let me play my own devil's advocate for a moment: aren't growth rates rapidly declining around the world?

JH: A global review of the planetary resources shows that our global population is unsustainable. We are now permanently destroying renewable resources—cropland, clean water sources, genetic biodiversity—just to produce enough food and

resources for our current population, which continues rapidly to increase (over 225,000 people per day). So, even with declining growth rates, we still have way too many people on the planet. Now, don't get me wrong—I love people. But as the legendary ecological economist Herman Daly [17] observed, we don't need to have them all here at the same time! The more there are tomorrow, the fewer we can sustain the day after tomorrow.

MT: I think the late Chairman Mao himself once said that each baby is a miracle. But too many miracles can become an ecological disaster, or words to that effect. The late Prime Minister of India, Jawaharlal Nehru, said something like, 'we don't have a population problem, we have 300 million population problems.' He already grasped back in the 1950s the scientific rudiments of the IPAT equation dilemma, as well as the fickleness and fears of human nature.

Can We Stop It?

JH: The solution does not have to be dictatorial. In fact, it's very humane: give access to contraceptive information and materials to the 200 million women [18] around the globe who want that access.

MT: How can individuals do something to be part of that solution?

JH: Support organizations that help these women (and their partners) obtain the education, materials and reproductive liberties that they deserve. Encourage all nations, especially those in which consumption rates are so very high, to value small families (we know that most of those very same women desire small family sizes from U.N. data) and vote for leaders that promote humane approaches to family planning. A humane solution is in our own hands.

MT: Or else?

JH: The alternative to family planning and to transitioning to sustainable energy is to leave our future in the claw of famine, war, disease, and the extremes of climate.

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Part III
Human Health and a Living Earth

Chapter 11
Occupy Your Diet: A Discussion About Food, Health and Kindness with Dr. Neal Barnard

Neal D. Barnard, MD, is the president of the Physicians Committee for Responsible Medicine and an Adjunct Associate Professor of Medicine at the George Washington University School of Medicine in Washington, DC. His most recent book, **21-Day Weight Loss Kickstart**, is a road map to a healthier diet and was featured in a recent PBS program, "Kickstart Your Health" (Fig. 11.1; [1]).

I first met Dr. Barnard in a grocery store when filming a segment together for a feature documentary I was directing, "Mad Cowboy" (based upon the book by the same title by author Howard Lyman with Glen Merzer) [2]. I admired Neal for his outspoken, science-based quest to understand the critical intersections between a healthy diet, a healthy environment and animal protection. He was, and remains one of the most clear-thinking speakers on the subject anywhere in the world, and it was an honor to re-connect with Neal for this conversation for Forbes.

Michael Tobias (MT): Neal, what do you see as some of the most urgent medical issues facing Americans at this point in time?

Dr. Neal Barnard (NB): The biggest killers are still heart disease and cancer. But what has arrived like a tsunami is diabetes. Between 1980 and 2009, diabetes prevalence tripled in the U.S, from 5.6 to 19.7 million [3].

MT: The onset is occurring among more and more youth, as I understand it?

NB: Absolutely. It is striking at younger and younger ages. The forecast from the Centers for Disease Control and Prevention is frightening: one in three people born in 2000 will eventually develop the disease. This is completely uncharted territory.

MT: So what's the "plan?"

NB: The medical burden is bad enough—the average person with diabetes loses well over a decade of life. But the dollars and cents of it are terrible as well. Last year, Americans spent well over $ 100 billion on diabetes treatment [4], and that does not include all the indirect costs of time lost from work, lost income, lost taxes, and so on. When Congress debates how to manage its budget shortfall and when businesses agonize over the bottom line, medical costs are a massive part of the problem.

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Fig. 11.1 Dr. Neal Barnard. (© PCRM)

MT: What is causing this diabetes epidemic, in your opinion?

NB: It is obviously not just a genetic issue, since genes have not changed. Physical activity has changed a bit, but nowhere near enough to account for the sudden increase [5].

MT: So what is it?

NB: What has changed in a major way is our diet. Not that you would notice the changes from one year to the next, but if you stand back a bit, it's surprising to see what's happened.

MT: For example?

NB: Americans have never eaten especially healthfully—

MT: Wait a minute: in 1900 the average American life-expectancy was about 40 years. Today, for both men and women, well over 76. So what are you suggesting?

NB: Well, we've always been heavy on the meat and light on the vegetables, fruits, and grains, compared to much of the rest of the world. But over the last century, things have worsened considerably.

MT: Worsened? Even given the stats I just threw at you about life expectancy?

NB: In my opinion, yes. The advent of insulin injections and antibiotics has allowed people with diabetes to live much longer than they did in 1900. What we have done is to convert diabetes from a death sentence into a prolonged pharmaceutical sentence. But that does not mean we have less diabetes. Prevalence is exploding.

The USDA starting tracking American eating habits back in 1909, and, compared with those days, the average American is now eating 75 pounds more meat, 30 pounds more cheese, and 40 or 50 pounds more sugar—every person every year [6].

MT: I've heard that from countless sources, although they all differ somewhat. I suspect, and this is just my opinion, that this issue is heavily biased in terms of which side of the dietary bed you wake up on in the morning.

NB: The statistics I just cited are from the USDA, and they are as reliable as we have. Even so, people are free to disagree, if they can find a way to do it. But medi-

cal research shows that the fat we eat—beef fat, chicken fat, and even vegetable fats—is getting into our muscle and liver cells, making them resistant to the action of insulin [7]. And that load of grease is what is fueling the diabetes epidemic.

MT: There's no question that we need to eat more healthfully, so that we don't see epidemics of diabetes in youth, or significant levels of anorexia, obesity, and so on. And of course, as you know, I am coming from an ecological perspective and an animal protection perspective. So I'm all ears: if you could ban one food, what, in your opinion, would it be?

NB: Some would nominate processed meats, like hot dogs, bacon, and ham. The evidence linking them to cancer—especially colorectal cancer—is so strong that health authorities [8] are starting to say that we should never eat them at all, and never feed them to children.

MT: You're sure about that? I realize this is your opinion, but is there really scientific consensus on this matter?

NB: In 2007, the World Cancer Research Fund and American Institute for Cancer Research released the most comprehensive review on diet and cancer ever published, prepared by the world's leading experts, and it was quite damning about the link between processed meat and colorectal cancer. In early 2011, an update to the report encouraged people to avoid processed meats altogether.

MT: Dr. Barnard, if you were asked (as I am now re-asking) to place one food item at the top of the list which, in your opinion, you would recommend be banned as a massively-consumed food item, what might it be?

NB: I would perhaps put chicken at the top of the list. Americans now eat one million chickens per hour, around nine billion every year.

MT: Why so many chickens?

NB: Because we imagine it to be some kind of health food.

MT: Is it, in your opinion?

NB: Well, collectively we are in the worst physical shape we've ever been in.

MT: On what basis?

NB: Our obesity rates have never been higher, and cholesterol-lowering drugs have never been so popular. In a word, we are a mess.

MT: And you are suggesting, opining—that chicken is doing what?

NB: As a doctor I am not alone in being of the belief—call it opinion, if you care to—that the intake of chicken is one—among many—drivers of the continuing increase in meat intake, that, in turn, carries its load of fat and cholesterol. These do take their toll. The problem with chicken is that it is wrongly promoted as a healthful choice, so people now eat more of it than ever.

Fig. 11.2 Wild bovines on Easter Island (Rapa Nui), Chile. Photo Credit © M. C. Tobias

MT: You are from North Dakota, and you are no stranger to a meaty diet. I am assuming you grew up eating it, right? (Fig. 11.2)

NB: Every day of my life, it was roast beef, baked potatoes, and corn—except for special occasions, when we had roast beef, baked potatoes, and peas.

MT: Do you think it is realistic to ask people to make major changes in their eating habits?

NB: We have no choice. The previous generation tackled smoking. Now is the time to tackle our food issues [9]. In my opinion, our collective eating habits are terrible for health and for the environment—and the animals are not so keen on any of it either.

MT: Neal, how many members of your organization are there? My point being, are you and your colleagues realistic, and what about the majority of Americans who truly disagree with you, not to mention American farmers, by and large, and America's food economy, especially during these really hard economic times?

NB: First of all, my grandfather was a farmer, his father was a farmer, and his father was, too. They were good and decent people. But income in agricultural families is higher than for other American families, so there is certainly no reason for a man driving a forklift to pity a man driving a tractor. Second, just as the tobacco industry has had to accommodate to what research has shown us, the same has to be true of the meat industry. Ignoring medical reality is not an option.

MT: OK. You've made your point: you feel, from a medical perspective the changes you and many of your colleagues in this country and around the world are suggesting, are neither uneconomical, draconian, or unrealistic. But how, in your opinion, do you make it work? I avoid, to the extent possible, any and all exploitation of animals, though I believe absolute non-violence is an ideal, but not necessarily possible, or not every day. And tolerance is definitely a virtue. I come from untold generations of heavy fish and meat eaters. I am not about to point the finger at my family or close friends, relatives and colleagues. So what does one do?

NB: I firmly believe that the trick to changing food habits is simply to break the process into steps.

MT: OK, that's logical.

NB: For a person who'd like to break away from animal products, the first step is just to size up your options. What can I have for breakfast that is not bacon and eggs?

MT: OK?

NB: Try out blueberry pancakes and veggie sausage, or oatmeal with cinnamon and raisins. The idea is to simply try healthful foods to see what you like. Once you know what works for you, step two, if you will, is to do a "kickstart."

MT: That word is prominent in your new book, **21-Day Weight Loss Kickstart** [10].

NB: A three-week "test-drive" of a totally healthful diet, with no long-term commitment. Once you've tried a plant-based diet for three weeks and seen the pounds trim away and your energy come back, you find that your tastes just start to embrace a healthier way of eating. Breaking it into these steps makes it simple.

MT: I hear from numerous vegetarians that they put on weight, not lose it. What's going on?

NB: You're thinking of the cheesaholics who are taking in massive amounts of dairy calories. The truly healthful foods are plant-based. And let us not forget the example of President Clinton, who has been so vocal about the value of a plant-based diet, and he really wears it well, too, looking so trim and healthy [11].

MT: Speaking of President Clinton, what's the government's role in all of this? A few outspoken individuals have criticized the First Lady for taking a stance on diet.

NB: In my opinion the U.S. Government has long promoted the worst possible eating habits. By now, most Americans probably have heard that livestock feed grains are federally subsidized in this country [12]. And it goes much further.

MT: What do you mean?

NB: The government sticks taxpayers with the bill for the bail-out programs designed to counter falling meat and cheese prices, plus the cost of the clean-up programs that have to handle the environmental mess—again, this is my opinion, though one shared by many, that livestock operations cause.

MT: This is an opinion piece so, despite your extensive credentials as a scientist and an MD, I'm not here to debate it with you, because I believe there are always multiple realities, multiple perspectives and I wish to remind—and even warn readers—that these are opinions, in bold ink; Opinions. They may be based upon facts, but facts are biased to the degree that even scientists choose facts according to what suits their purpose, wouldn't you agree? Look at the heated debates, no pun intended, around climate change.

NB: You are being too modest. There is no longer any question that people who avoid animal products are, as a group, thinner, healthier, and longer-living, compared with their meat-eating friends. What is up for grabs is how far we should go in a plant-based direction, and my response is, how healthy do you want your kids to be?

Fig. 11.3 Vegetable market, vegetarian city of Pushkar, Rajsathan, India. (Photo Credit: © J. G. Morrison)

MT: Interesting response. OK, I want to ask you about Food Stamps.

NB: Ahh. The Food Stamp Program. As you may know, it's now called SNAP, or Supplemental Nutrition Assistance Program [13]. It started out as a smart and charitable idea of providing food for economically disadvantaged people.

MT: And—I should think—a good example of compassionate governance, what a Democracy is supposed to do, at the very least.

NB: Well, today it promotes the worst of health. The program, in my opinion, consists of what is essentially a credit card that puts sodas, candy, fatty cheese, steak, and junk food on exactly the same footing as healthful vegetables, fruits, grains, and beans. That is, everything that is free.

MT: How can that be?

NB: Because the program's staunchest defenders are not economically disadvantaged people. Rather, I am of the opinion that it is the food manufacturers who push hard for it, because SNAP dollars cannot be spent on gasoline, computers, or books. It is money in the bank for purveyors of cheese, meat, and junk food of all kinds.

MT: I'd ask all readers of this piece to do their own research on that and come up with their own opinions. Fair enough?

NB: At PCRM, we recently calculated that, if the government provided only what I would call "healthy basics," like vegetables, fruits, whole grains, and beans, the average taxpayer would save $ 176 per year. And SNAP recipients would have much more healthful foods than they have now. Food desserts would be gone, too, because grocers could only accept Food Stamps if they provided healthful foods (Fig. 11.3).

MT: But surely the U.S. Government, all that intelligence and experience over at the USDA, the NIH, the US Department of Health & Human Services, has come a long way, hasn't it?

NB: Yes. In contrast to the malignant effects of subsidies, the government's food guidance is better than ever. Not perfect by any means, but better.

MT: Man, you are tough.

NB: Look, we petitioned the USDA to replace the Pyramid with a plate design back in 2009, and although the government did not adopt PCRM's design quite the way

we submitted it, the resulting MyPlate [14] is still a real step forward. Plant-based foods predominate, and for the first time in nearly a century of diet guidance, there is no meat group.

MT: So what actually happened?

NB: Meat has been forced to share the "protein" group with beans and other healthier foods. And the dairy group is no longer just milk products; it includes soymilk, which is a good move [14].

MT: What about small businesses, big business, the whole U.S. economy as we approach a Presidential election?

NB: Many businesses are definitely tackling health issues responsibly, and that goes for the big guys, too. We have been working with GEICO to try out a program to help interested employees [15] shift to a vegan diet. An initial test at two sites was a big success, trimming waistlines, cutting cholesterol, and reducing absenteeism.

MT: Any future plans for that?

NB: Yes, we're now doing a bigger test, this one involving 10 of its 13 North American offices, and we are offering the same program [15] to other businesses.

MT: And Federal policies on food? Are you seeing an evolution in American government commensurate with all things Green?

NB: Unfortunately, federal policy is not yet where it needs to be. Not only is our government subsidizing the very foods that, in my opinion, fuel heart disease, cancer, and diabetes; it has no coordinated research attack on other basic health problems either.

MT: What's the answer, Neal?

NB: Michael, remember when President Kennedy set a goal of putting a man on the moon? He did not send out grants willy-nilly to anyone who had an idea about how to get there. He set in motion a coordinated effort that put Neil Armstrong's boots on the lunar surface within the decade. We need to tackle health problems in the same way. That means directly addressing their causes, the vast majority of which are in front of us when we sit down to eat.

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Chapter 12
Eating You Alive: Environmental Cancer

The Toxic Landscape

Most humans, and probably most vertebrates in general, have tumor cells in their bodies, if not now then at some point in their lives. Yet, according to the U.S. Department of Health and Human Services " in the U.S., only 41% (of the human population) ever get cancer." This from a highly readable and important publication from the NIH (National Institutes of Health), **Cancer And The Environment—What You Need to Know, What You Can Do** [1] (Fig. 12.1).

Throughout the massive literature on cancer there are countless theories, based on evidence or anecdote, why some people get cancer and others don't. Cancers are generally considered to arise as a result of many factors both internal, such as heritable mutation, hormones or epigenetic change, and external factors such as environmental risks. A 2009 report by the President's Cancer Panel warns of growing evidence linking environmental exposures to cancer, recognizing that these risks may be prevented.

There are more than 100,000 chemicals in commercial use (out of some 7 million known chemicals), including scores of pesticides. More data is emerging pointing to exposures in humans at younger ages than previously thought. Such chemicals may be passed through umbilical cord blood [2] and in the foods we consume. This latter point is highlighted in a study by HHS that cites two "linked" reasons why people may get cancer: "an increasingly toxic landscape in which we live, both indoors and outdoors, contaminated by potentially carcinogenic or endocrine-disrupting chemicals and the food we choose to eat." Indeed, not only our food but food packaging [3] plastic bottles and the lining of metal food containers may harbor such chemicals.

Food Uncertainties

In America food opinions are handicapped for purposes of journalism (at least in 13 U.S. states) under Food Disparagement or Libel Laws. However, if you are stricken with one of more than 100 known forms of cancer that may be eating you from

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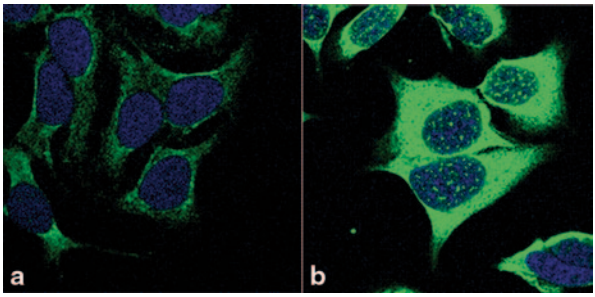

Fig. 12.1 Human breast tumor cells exposed to estrogen show a marked increase in activity of intracellular enzymes (termed 'mitogen-activated protein in kinases') that stimulate tumor progression. **a** resting state, **b** estrogen exposure to 10 min. Enzyme activity is exhibited by green dye. (Photo Credit: Courtesy of Dr. Richard Pietras)

within, you just want help, and fast, and that applies to more than "12 million new cases and 7.6 million deaths due to cancer throughout the world in 2009," according to the National Institutes of Health (NIH). While the NIH reports "modest declines" overall in the "incidence and mortality" of cancer, "about 25 %" of all known deaths in America remain "cancer-related."

That's when everything you eat and do becomes a matter of true urgency as well as controversy, from what you touch, inhale, or are exposed to in any form. But probably no other arena invokes such discussion and uncertainty as that of food.

I've Got Cancer: What Should I Eat?

Bananas, fruits, grains, vegetables… they are all good for you and they have been good for Homo sapiens for several millennia. Upon even a cursory sampling of all of the various literature sources and outspoken beliefs, one quickly discovers huge contradictions and divisions and news regarding "unapproved" [4] substances: food, or drugs or other concoctions for treating cancer. However, emerging evidence suggests that healthy diets rich in organic fruits, vegetables and grains and lifestyle choices that include active living and no tobacco exposure may well have beneficial effects on the progression of certain cancers and in cancer prevention [5].

A Day at UCLA Medical School

I am speaking with Dr. Richard Pietras, head of the Integrative Oncology Program at the UCLA-Jonsson Comprehensive Cancer Center at the UCLA Geffen School of Medicine in Los Angeles [6]. His scientific concerns and deep compassion for

Fig. 12.2 Dr. Richard Pietras, UCLA Medical School. (Photo Credit: © Dr. M.J.Gorrin-Rivas)

people as an "investigator in clinical trials" and research cover an enormous range (Fig. 12.2).

Such modern-day good Samaritans are many things to many people: shamans who wear the white robes of the priestly AMA but also court, to some extent, the I Ching. Dr. Pietras is committed to healing people, making them well. And wellness is the word that dates back to Hippocrates in the fifth century BCE, the man who kick-started modern medical ethics as well as herbal therapies. Even prior to the Hippocratic Oath, there was the Greek philosopher Pythagoras, who advocated vegetarianism and what some have likened to yoga, for staying healthy.

Dr. Pietras is also a real-time environmentalist. By that I mean, he is committed to the amelioration of suffering, both in humans and in other species, where some cancer therapies equally apply. And that's what makes this particular oncologist, and his remarkable team of colleagues at UCLA, so important.

The Terrible Toll

"More than 1,284,000 Americans will be diagnosed with cancer this year, and about 1500 of us die from cancer each day," Dr. Pietras reminds me. He also points out that some 80% of those people diagnosed with the bad news are likely to embrace "some form of complementary medical therapy," a "$ 30 billion" annual market in "alternative medical treatments."

It is this national compulsion that led the U.S. Congress to form what is known as the National Center for Complementary and Alternative Medicine (NCCAM) under the auspices of the National Institutes of Health (NIH) in 1992. Dr. Pietras and UCLA's Collaborative Centers for Integrative Medicine are an important part of that network. They look at conventional medicinal treatments and compare them with, for example, Chinese traditional approaches; "mind-body" approaches. They also look at the downside of alternative therapies (too much of one type of vitamin that might undermine chemotherapy or radiation treatment, for example). (Fig. 12.3).

Fig. 12.3 Northern-most, Unpopulated Amazon. (Photo Credit: © M. C. Tobias)

We're Losing Our Natural Drugstore

And they advocate intensely for biodiversity. A large number of anticancer agents come directly from plants, and Pietras acknowledges that "many patients use herbs, vitamins, minerals and antioxidant supplements for cancer remedies. In fact, more than 2/3rds of anticancer drugs in current use were originally derived from natural sources. Taxol, generically known as Paclitaxel, comes from the bark of the Yew tree. Most patients are unaware that botanicals are actually diluted natural drugs containing many different chemicals [7] a majority of which are undocumented." Dr. Pietras has numerous other suggestions [8].

Loss of our biodiversity can have a major adverse impact on discovery of new remedies for cancer. Take our natural food sources such as the banana [9], the wild pomegranate, and tens of thousands of other herbs, fruits, vegetables, bryophytes (like moss) and flowering plants—an alarming number of the projected 380,000 plant species that still remain in the wild. Between 20 and 25 % of them are likely threatened or endangered with extinction, primarily from habitat loss [10] caused by humans.

Numerous scientists collaborating with the International Union for the Conservation of Nature (the IUCN which generates its "Red List" for threatened and endangered species worldwide) evaluated just 11,000 of these multitudinous species and found nearly 8,000 of them were at some level of risk. Global estimates [11] from a variety of sources indicate as many as "one in four plant species (as) being under threat of extinction."

Many of those plants are found in poor or middle-income countries, the very sites, says the World Health Organization (WHO) where "more than 70 % of all deaths from cancer" occur.

Undocumented Workers

Undocumented field researchers, that is. This lack of knowledge about the biosphere is an open invitation to increased interest in, and funding for field biology and medical screening. The two go hand-in-hand. Because only a minute portion of the Earth's nearly 100 million potential species have been evaluated, cancer prevention and treatment are in dire need of that which we have all grown up with (but

Fig. 12.4 Singapore Tropics. (Photo Credit: © M. C. Tobias)

Fig. 12.5 Polish forest fungus on Belarus Border. Possible new species. (Photo Credit: © M. C. Tobias)

in some cases possibly took scant notice of) namely, those myriad plants in our backyards.

Nature was the backyard of the late Dr. Jonathan Hartwell who died nearly 20 years ago and developed, over a long and distinguished career, the "natural products" program at the National Cancer Institute. He researched thousands of years of literature, going back to Ancient Egypt, looking at Native American cultures, and came up with some 3,000 naturally occurring candidates for fighting cancer. His work underscores the incredible importance (at least to our species) of field research.

The Crux of the Matter

WHO [12] declares that "a third of cancers could be cured if detected early and treated adequately; that "all patients in need of pain relief could be helped if current knowledge about pain control and palliative care were applied." This strikes of an awesome imperative: pain relief may be the core of environmentalism. It is a maxim shared by every living being, let alone human cancer patients and their loved-ones. Ecology and medicine are virtually synonymous (Fig. 12.4).

The Natural Products Repository [13] of the NIH has sampled tens of thousands of organisms (not just plants) in over 25 mostly tropical and subtropical countries. It is a national clearinghouse [14] for anti-cancer drugs and biologicals.

In the meantime, understanding the mechanisms of cancer, early detection and appropriate, customized treatments (meaning the old-fashioned approach to patients: one individual at a time, with dignity, and the appropriate bedside manners exhibited by doctors) is being debated in the President's budget for Fiscal Year 2011 delivered to Congress (Fig. 12.5).

The "justification" from the NIH amounts to roughly $ 5.2 billion. In the scope of things it is a small sum, especially considering the continuing death toll. As Zachary Roth has written regarding the current budget, "$ 1.6 billion" in cuts has been targeted at NIH and "a healthy portion of those cuts seems headed for the National Cancer Institute (NCI)."

This seems hardly reasonable, considering it is the disease that "kills more Americans than any other." In the case of lung cancer which kills more Americans than any other malignancy, as Dr. Pietras points out, the statistics are looking worse, not better, especially for women [15].

And Dr. Pietras adds that the rates of cancers now common in western countries will likely rise if preventive measures are not widely applied. "There is a critical need to develop safer alternatives to many chemicals currently in use," he says with an air of profound alarm. "And," he sums up, "promote more public disclosure about environmental risks. Just as cancer prevention efforts have focused on reducing tobacco smoking to limit lung cancer, we require new efforts to change lifestyle behaviors and produce environmentally-safe 'green chemicals' to protect human health and Earth's precious biodiversity."

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Chapter 13
Food that Might Protect Your Brain and Save Your Life: A Discussion About the Ecology of Alzheimer's with Dr. Neal Barnard

Neal D. Barnard is an American physician, author, clinical researcher, and founding president of the Physicians Committee for Responsible Medicine (PCRM), [1] an international network of physicians, scientists, and laypeople who promote preventive medicine, conduct clinical research, and higher standards in research (Fig. 13.1).

Michael Tobias (MT): Dr. Barnard, in your soon-to-be-published new book, **Power Foods for The Brain** [2] you impart some very new insights and synthesis of biochemical data from research around the world pertaining to the impact of food on the mind. People, and government agencies, have long acknowledged the role of diet with respect to obesity, heart disease and diabetes. You take the correlations much deeper: into the secrets of the brain itself.

Neal Barnard (NB): The fact is, we can look into the brain in ways we were not able to before, and what we've learned is both hopeful and disconcerting at the same time. The disconcerting part is that threats to the brain are all around us, which is why Alzheimer's disease hits half of us by age 85. We can see the beginnings of Alzheimer's disease in individuals who, on the surface, seem fine. The hopeful side comes from careful studies of large populations showing that a particular pattern of dietary habits appears to protect the brain to a very substantial degree.

MT: One of the areas you discuss in your book that is particularly fascinating to me is what you refer to as the "Blue Zones." Talk about this.

NB: Yes, some years ago, Dan Buettner, working with National Geographic [3] began studying areas where people lived extraordinarily long lives: Okinawa, parts of Costa Rica, Sardinia, and Greece, as well as Loma Linda, California. Their name comes from the color researchers used to mark them on the map. So the question was, what do these long-lived people have in common? The first thing to leap off the page was that they all have largely plant-based diets. People in the Blue Zones also tend to avoid tobacco, are physically active, and put an emphasis on family and social engagement. I grew up in Fargo, North Dakota, where sausage and eggs were more our thing, and unfortunately Fargo is not a Blue Zone.

MT: But within these longevity zones?

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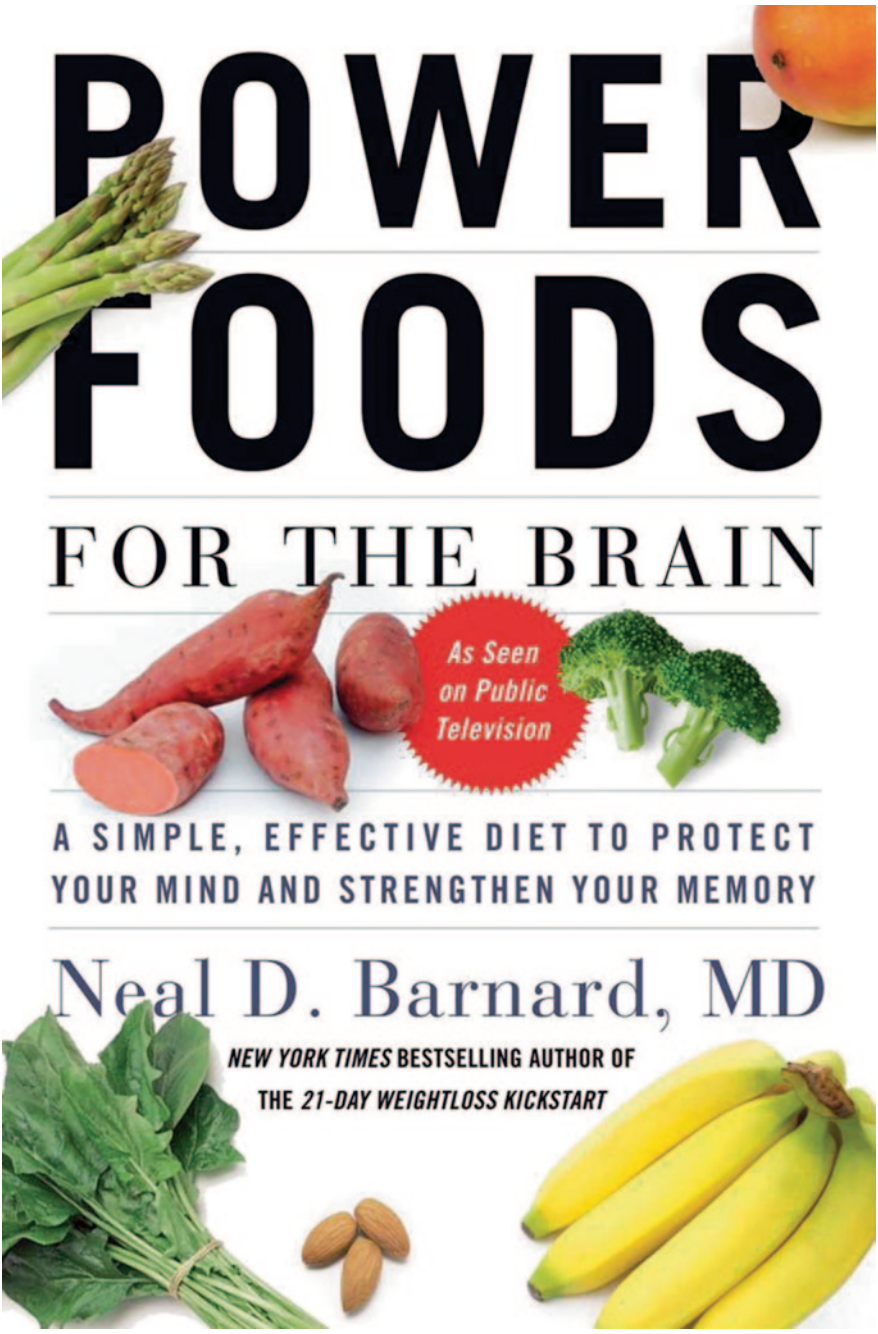

Fig. 13.1 Power Foods for the Brain by Neal D. Barnard, M.D. (Photo Credit: Published by Grand Central Life & Style)

NB: These areas are remarkable for more than longevity. They are marked by robust mental health, too. So I began to visit the Blue Zones myself. The dietary staple in Okinawa, surprisingly enough, is the sweet potato, and animal-based foods are few and far between. In Hojancha, Costa Rica, I was struck by the casado, a generous plate of black beans, rice, a vegetable, and sweet plantains, with meat strictly optional. The casado is the everyday plate in that part of Costa Rica. Its name refers to a man who, being happily married, stays in his casa, presumably eating healthful food and living a long, contented life. In Loma Linda…

MT: Near Los Angeles?

NB: Yes. There, I met a remarkable surgeon, Dr. Ellsworth Wareham, who continued his operating room career until age 95. He and his wife shared their healthy plant-based lunch with me. At nearly 100 years of age, he is as sharp as a tack.

The point is this: It's not genes that carry us into a healthy old age—or not genes alone. Lifestyle factors are very, very influential in determining who survives and who does not—as well as in determining who can think clearly decade after decade and who succumbs to the tragedy of dementia.

MT: The ecology of Alzheimer's, and of dementia in general, suggests a strong correlation between a vast disease arena afflicting people (and possibly other species, like canines) throughout the world, and the environment. The intersection, as you describe it, might well be our diet. Given the alarming prevalence of Alzheimer's and dementia, in your opinion what do you think is going on, in terms of the fundamental diets that may be contributing to the breakdown of mental faculties, and—in so many instances—widespread mortality?

NB: Within the brain of an Alzheimer's patient, strands of beta-amyloid protein ooze out of the brain cells. It is a bit like sausage coming out of a sausage-maker, and these protein strands collect between the brain cells in microscopic clumps called amyloid plaques. This process appears to be fueled, at least in part, by fatty, cholesterol-laden foods [4].

The more these foods are on your plate and the higher your cholesterol level rises, the more plaques accumulate. And also hiding in those plaques are tiny traces of metals—iron, copper, and aluminum—and these appear to be potentially neurotoxic [5].

MT: What about natural foods that combat these alleged toxins?

NB: Yes. Apart from these threats, we also have our defenders. The vitamin E in nuts and seeds, the anthocyanins that give grapes [6] and berries [7] their color, and the omega-3 traces in green vegetables all play protective roles. They can add up to a big drop in the risk of cognitive problems.

MT: One of the sub-headings in your book is entitled "Bad for the Heart, Bad for the Brain." What are some of the explicit links researchers like yourself are starting to uncover?

NB: The first was the cholesterol link that I hinted at just now. A high cholesterol level is bad for the heart, of course, and it is clearly linked to Alzheimer's risk, too. Taking a step further, it turns out that the most notorious gene linked to Alzheimer's risk—called the APOE epsilon4 allele [8]—actually has the job of transporting cholesterol particles in the blood and the brain. Here's what I believe is going on: For many years, people have lamented that this gene condemns people to Alzheimer's disease. However—and this is one enormous however—if we skip the foods that cause our bodies to make extra cholesterol, it may be that we can leave that gene with nothing to do—that is, with not much cholesterol to transport. So you may still have the gene, but your food choices protect your heart and brain at the same time.

MT: And saturated fats?

NB: Precisely. There is more to the heart-brain link. As you know, scientists observed long ago that saturated fat—the kind that makes bacon grease solid at room temperature, as opposed to olive oil, for example—is strongly linked to heart disease. Well, researchers at the Chicago Health and Aging Project [9] began observing thousands of healthy individuals, starting in 1993, to try to sort out who stays healthy and who does not.

MT: The results?

NB: Ten years later, it became clear that those who got the most saturated fat [10] in their foods had a much higher risk—not just of heart problems—but of brain problems, too. Their Alzheimer's risk was more than three-fold higher, compared with those who generally avoided "bad fats." And then, looking at trans-fat, that oft' maligned grease in donuts and snack foods, they found the same thing. A snack-food junky mainlining plenty of trans-fats could end up with five times the risk of Alzheimer's, compared with a person who skipped these foods.

MT: And the ascribed-to suite of cholesterol-lowering drugs, in your opinion?

NB: That is the logic. If high cholesterol is bad, cholesterol-lowering drugs must be good, right? Well….not necessarily. Statin drugs [11] can sometimes be a double-edged sword. They definitely lower cholesterol and do seem to reduce the risk of dementia. But they can actually cause quite serious memory problems in rare cases. And that really makes the case for dietary changes as our first line of defense.

Exercise plays a huge role, too. It protects the heart and brain, and even reverses age-related brain shrinkage.

MT: You've looked at healthy diets from countless studies and one of the most stunning comparisons was that of broccoli versus cheese. The inherently different properties and pathways through our bodies of these two food types would suggest a veritable poster child for your message. Could you clarify?

NB: Dairy products and green leafy vegetables are both calcium-rich. So, yes, broccoli and cheese both bring you calcium. But that is where the similarity ends. A cup of broccoli has essentially no saturated fat, while a one-ounce slice of ched-

dar cheese has 6 grams of it. The tiny fat traces in broccoli are heavily balanced in favor of "good" omega-3 fats, unlike cheese, which mainly delivers "bad" fats. Broccoli has no cholesterol—ditto for all vegetables while, ounce-for-ounce, cheese has about the same cholesterol as a steak. And green vegetables also deliver vitamin E, folate, and iron.

MT: Folate—the water-soluble B vitamin?

NB: Yes. And by the way, I have a tip for any broccoli haters out there: Add a little spritz of lemon juice. Somehow the sourness of the lemon juice combines with the bitterness of broccoli to make an almost sweet taste that even a broccoli-avoiding president would have loved.

What counts here is that, when we are looking for nutritious foods, we need to look at the whole package. Not just, "will it give me calcium," or "is this a source of iron." Rather, we need to look at the range of nutrients packed into a food to see if it helps us or harms us overall. And basically, your brain is happiest at the produce counter.

MT: While many specialists have looked at meat and dairy products, and their impacts on human health, you have also brought forward some compelling new data—albeit, as yet apparently inconclusive—with respect to fish and saturated fat. Could you elaborate and describe some of the studies you've examined, both the positive and negative correlations in terms of what may be happening, in your opinion, in terms of human consumption of fish?

NB: As you know, there has been a lot of enthusiasm for fish in some circles, and fish do contain omega-3s. However, studies show that people who eat fish tend to have more weight problems and a higher risk of diabetes [12] compared to people who skip animal products altogether.

MT: And studies regarding the impact of human consumption of fish on the human brain? Because this is pretty big news.

NB: When it comes to the brain, fish get a mixed verdict [13]. Some studies show benefits, but others do not. There certainly are omega-3s in fish. But if you were to send a vial of fish fat to a lab, you would find that 70–85 % of the fat in fish is not omega-3s. Just like chicken fat and beef fat, fish fats are mixtures, including substantial amounts of saturated fat. And studies of fish-oil supplements for heart or brain health are really running aground—showing no benefit at all.

MT: A lot of fish eat other fish.

NB: Exactly. It is important to remember that fish are carnivores, which sets them apart from many other animals people eat. That means they are part of a long food chain, and they accumulate whatever toxins their prey have swallowed. They live in the oceans and waterways that have effectively become the human sewer, so they are an abundant source of toxins we want to avoid.

MT: You speak at length about toxic metals in our body, like copper, iron and aluminum. What are we consuming and surrounding ourselves with that we might want to think twice about, in terms of such metals and complex metallic alloys?

NB: We need traces of iron to make the hemoglobin our blood cells use to carry oxygen. And we need traces of copper to make several key enzymes. But iron rusts. Copper corrodes, too, which is why a penny does not stay shiny forever. This is oxidation. And it doesn't just happen in a frying pan you accidentally left on your backyard picnic table for a few days. It also happens to the iron and copper within your body. As these metals oxidize, they produce free radicals, which are like little sparks damaging your brain cells and every other part of you.

MT: OK, we're living in a world of sparks and free radicals, toxins and a mishmash of threats. What do we do?

NB: plaques [5] in the brains of Alzheimer's patients. Where do they come from? Many municipal water treatment plants add aluminum to drinking water to precipitate out solids (so bottled water or reverse-osmosis filtered water is a better choice for drinking). Aluminum or cast-iron cookware and copper pipes will leach metals into whatever they come into contact with. Meats are loaded with iron—which, of course, we had thought was an advantage until we realized that most of us get too much iron.

MT: But what about the supposedly good iron derived from vegetables?

NB: The iron in green vegetables and beans is easier for the body to keep out when the body already has enough. Multiple vitamins often have added iron and copper, so it pays to read labels and select brands without these metals. Aluminum also turns up in some antacids, in baking powder, and as an additive in a number of foods; aluminum-free brands are right next to them on the store shelf.

MT: Ultimately, are you and your scientific peers beginning to sense a kind of diet that could truly liberate us from the debilitating, tragic and life-altering demographic avalanche of Alzheimer's and/or dementia, and how does that fit in to your own life story?

NB: When my father succumbed to dementia, I realized that he was walking down the same dismal pathway that had consumed his parents, as well. And there is nothing more tragic than seeing your loved ones drift further and further away with each passing day. The financial cost is back-breaking, but the personal cost is far worse.

We need a take-no-prisoners assault on this disease. And I believe we can do it, if we take advantage of what science has shown us and set aside some of the habits we grew up with. The previous generation dealt with smoking. The current generation is in an identical battle with unhealthy foods. But just as the war on tobacco was much slower than it should have been, we are taking our sweet time in getting the courage to do something about the garbage on our plates, and we are putting our children at risk, too. But we know what we have to do, and it's time to get started.

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Chapter 14
Biological Shock Treatment: A Discussion with 'Deadly Monopolies' Author Harriet A. Washington

Harriet A. Washington, author of such works as **Medical Apartheid** (a winner of the National Book Critics Circle Award for Nonfiction) recently published a book whose title nearly says it all, **Deadly Monopolies: The Shocking Corporate Takeover Of Life Itself—And The Consequences For Your Health And Our Medical Future** (Doubleday, 2011). Washington has been, among other things, a Research Fellow in Medical Ethics at Harvard Medical School and a journalism fellow at Stanford University. Her peer-reviewed published papers have made noteworthy scientific contributions to bioethics. In this latest book, she examines a complex biological paradox with instantly global ecological ramifications. Consider what it means to make life itself a commodity.

Since the time of the Bayh-Dole Act of 1980 [1] the U.S. Patent and Trade Office (USPTO) has granted more than 40,000 patents on genes, with more pending. In addition, the 5-4 Supreme Court decision in June, 1980, pertaining to Chakrabarty v. Diamond [2] enabled the "paradigm-shattering" [3] ability of researchers to successfully apply or sue for patents on life forms from oil-consuming bacteria (in the case of Ananda Chakrabarty) to Harvard University's multi-million dollar goldmine: the "cancer-prone 'oncomouse'" [4]. Indeed, while the USPTO "in 1987 offered reassurances that it would not allow the patenting of human beings" Washington's book suggests that that line has become not narrowly defined, but blurred in an aggressive modern tradition.

The many issues Washington raises in her new book evoke terrible dilemmas for all of us: balancing economic ambitions against human medical needs, the commodification of the body and of life itself, notably the flora and fauna of the developing world, poverty alleviation, the minimizing of suffering from human medical ailments that can or could be treated, faith in science and, at the same time, an addiction to manifest destiny, which is, as she writes "still invoked in the medical arena to justify the literal appropriation of the bodies and tissues of the poor, the marginal, the weak, the subjugated, and the genetically distinct for the Western medical marketplace—and for the plants and animals under their dominion as well". This final subset is huge: it intimates unchecked, morally-bankrupt exploitation of all animals and plants and their habitat.

M. C. Tobias, J. G. Morrison, *Why Life Matters,*
DOI 10.1007/978-3-319-07860-1_14, © The Author(s) 2014

Fig. 14.1 Brazilian Amazon. (Photo Credit: © M. C. Tobias)

Michael Tobias (MT): Harriet, it's telling that you open your final chapter in **Deadly Monopolies**, entitled "The Laboratory Of The West—Pharmaceutical Corporations, Human-Subjects Research, and the Developing World" with a quote from Thomas Browne's **Religio Medici** (1643): "No one should approach the temple of science with the soul of a money changer" [5]. Browne, after all, loved the natural world and was deeply influenced by one of the great scientists of his time, albeit a conflicted one, Francis Bacon [6] who, not unsurprisingly in this context, was also a Lord Chancellor of England, a man concerned as much with nature as with economics. The minute those two arenas are mated, we've seen a rash of policies you and others have named "biopiracy" [7] and "biocolonialism" [8].

Explain what that could mean for Brazil, a country which hosts some of the oldest living biocultural traditions, and much of the world's biodiversity [9]?

Harriet Washington (HW): Michael, researchers and pharmaceutical companies have designs on the diverse biological riches of poor countries because much of the biodiversity of the West has vanished, having fallen victim to the shortsighted agricultural behavior of industrialized nations. We've seen the United States and much of Europe breed crops by selecting for traits that will maximize market performance such as hardiness, disease resistance, long shelf life, and even for easily stacked shapes such as square tomatoes and watermelons. As huge farms crowd small ones out of business and giant supermarket firms dominate the market, botanical conformity sells.

MT: Monoculture. Vastly attenuated breeds and cultivars.

HW: Yes, leaving little room for more exotic varieties of fruits and vegetables that are harder to stock and store. Reliance upon a relatively few strains of each agricultural product has sapped Western genetic diversity. Ninety percent of all the vegetable varieties ever distributed by U.S. seed houses during the twentieth century are now extinct, and fully half of Europe's domestic animal species have become extinct over the past century as well. For diversity, scientists must look to the developing world.

Brazil is the world's most biodiverse country, home to one of every five animals, plants, and microorganisms on earth and to one of the highest densities of indigenous human communities as well (Fig. 14.1).

Many familiar medications are derived from plants that were first studied or cultivated by people in the developing world or in marginalized, genetically distinct enclaves of Western nations. Aspirin was distilled from willow bark and meadowsweet, and it was used widely for pain relief by ancient peoples. In 1853, chemist Charles Gerhardt distilled acetylsalicylic acid from it, which the German drug firm Bayer tested and marketed as a less-irritating replacement for standard common painkillers in 1897.

But for all its biodiversity, Brazil has never patented a plant or a pill. Like much of the developing world its indigenous cultures do not encompass the concept of exclusive ownership of plants, animals, other biological diversity, and certainly not of human tissues. Neither do the laws and technological capabilities of most developing nations allow them to produce patented versions of their biological resources. This technological vulnerability is exploited by Western corporations and scientific entrepreneurs who travel to Brazil, the Amazon, sub-Saharan Africa and India in search of biological treasures to appropriate, analyze, patent and profit from. Valuable patents have been granted for living organisms, genes, biological processes, medically important animals, and even for human embryos in developing nations like Brazil, which are storehouses of diversity that for-profit companies appropriate and market but do not share with the aboriginal peoples who have long cultivated and researched them.

US patent law [10] does not adequately recognize the lengthy cultivation abroad nor the cultural objections of the affected peoples. Thus the countries of the developing world remain particularly vulnerable to neocolonial exploitation.

The list of appropriated and patented biological treasures includes neem which has been used in the developing world to treat scores of diseases for centuries; The rosy periwinkle (Catharanthus roseus) originated in Madagascar and has long been used in Togo, Botswana, Uganda, and other parts of Africa as a diabetic medication that lowers blood sugar and that also treats malaria, dengue fever, dysentery, diarrhea, and cancer.

Today, the medicinal alkaloids vincristine and vinblastine have been extracted from it and are in wide use as a cancer therapy as well as in a myriad of Western prescription medicines for neurological disorders.

MT: Your account of cotton farming in parts of India is nothing short of devastating, particularly given the suicide statistics you report, resulting, allegedly, from the commercial designs by multinationals that would all but force growers to adopt patented seed types, such that poverty, ecological destruction and despair are the apparent end-results. If that is the case, where are the profits to perpetuate this unbelievably pernicious vicious cycle, and why have Indian courts not balked at this level of biocultural intrusion by foreign-based corporations. After all, some of the most internationally prominent Indian environmentalists—like Dr. Vandana Shiva—have been waging the battle to illuminate this disastrous situation for many years; while hundreds of thousands of Indian farmers, like their Haitian agricultural comrades—have also raised the banner of outraged resistance.

HW: It's my opinion that activists such as Dr. Vandava Shiva have denounced the widespread crop failures, bankruptcies, suicides and other devastation in the wake of the Western imposition of profitable terminator-seed technology. I believe that this and other aggressively marketed agrarian technologies are inappropriate for Indian subsistence agriculture as well as that in Haiti and much of the rest of the developing world.

But Dr. Shiva charges that the Indian government has largely failed its farmers by providing too few government agents to offer technical advice to counter-balance the sales messages of major multinationals and their patented seed-types, some of which require large amounts of water and the dousing of fields with very toxic pesticides [11].

As a result of these and other unexpected expenses and issues, failed crops have driven famers to village moneylenders who will give them loans when the bank refuses, but only in exchange for the deeds to their ancestral farms. When the farmers cannot repay, they face starvation, eviction and despair.

As a result, suicide—often accomplished with the very pesticides whose use helped drive the farmer to ruin—has become an occupational hazard for Indian farmers. The suicides are overwhelmingly triggered by debt, sometimes less than $ 214. In the decade between 1993 and 2003, 1,000,248 Indians committed suicide.

MT: From Tristan da Cunha to Easter Island; from the Grand Canyon and Hawaii to Iceland, scientists have sought out isolated human populations in order to study complete population genomes in hopes of—purportedly—streamlining cures for medical ailments, from asthma to schizophrenia. How has reduced genetic diversity, as witnessed frequently amongst the last remaining indigenous peoples of remote areas, translated into dollars for corporations?

HW: Isolation has transformed the genomes of people in targeted areas in very specific ways that make them attractive to naturalists and scientists engaged in a frenzied patent gold rush: the treasure is biological, not mineral.

Take Tristan da Cunha which lies 1750 miles from South Africa and 2090 miles from South America. It is the most remote inhabited location on earth and centuries of isolation among these descendants of the earliest sailors to the island have yielded a genetically distinct population with medical peculiarities.

In our age of ubiquitous air travel, transcontinental commerce, and trans-ethnic marriage, such strict genetic segregation is no longer easy to find. Isolated communities are more likely to contain the rare "disease genes" [12] that the pharmaceutical companies seek. Corporations hope to capitalize on them by taking out patents and then devising profitable diagnostic tests and therapies based upon them.

Scientists seek to interest corporations with deep pockets to fund the research, development, and marketing in places like Tristan da Cunha that will transform its samples into the next blockbuster genetic product, such as the much touted asthma gene [13].

MT: An earlier portion of your book focuses on how the primacy of commercial interests stymie or block medical access to needed medications.

HW: Drug companies buy or license the patents of medically important entities that were developed in universities with our tax dollars, then they charge enormous prices that in the US are unfettered by government price controls. It's my opinion that some corporations halt the testing of medications that they fear will not be profitable blockbusters earning at least $ 1 billion a year, as PolPharma did with the promising liver cancer drug PI-88 [14] or some companies repurpose drugs for more profitability, if more trivial uses, as when the sleeping sickness drug eflornithine [15]—which few of the afflicted Africans could afford—was pressed into service as a facial depilatory [16] for women at $ 50 a month.

Companies also ignore or under-develop drugs for scourges of poor people in the developing world such as cholera, malaria, tuberculosis and sleeping sickness even as they pursue profitable drugs for common but relatively trivial disorders such as erectile dysfunction and gastric distress.

MT: In your work you've referenced a huge discrepancy between pharmaceutical investments in critical versus non-critical drugs, and the line tends to divide straight down the middle of the developed versus developing world.

HW: Harvard economist Michael Kremer [17] tells us that of the 1,233 medications developed by the pharmaceutical industries between 1975 and 1997, only 4 targeted the diseases that strike people in the developing world. We've had 14 drugs for erectile dysfunction since 1996, although it kills no one. The one new drug for fatal sleeping sickness [18] which threatens 60 million Africans, was withdrawn after 5 years in which its patent-holder could make no profit.

High prices separate people from the drugs they need as well and in **Deadly Monopolies** I detail how the industry's claim that such high prices are necessitated by billions in research and development costs for each new drug is simply untrue. In the West, expensive drugs bankrupt patients: in the developing world, the untreated patients simply die. New cures are often generated from biologicals found among poor native peoples and are often tested in Third World clinics. But once perfected, these medications tend to be priced out of the reach of the communities that made them possible.

MT: You've pointed out that NGOs representing indigenous peoples, like those throughout the Amazon, have traditionally had no terms like those imposed upon them by colonists—terms like "intellectual property and biodiversity." What kinds of legal recourse have emerged in the wake of so much intellectual trespass and biocolonization?

HW: Some NGOs based in the developed world have represented the interest of indigenous peoples when Westerners obtain patents on medicinal plant extracts that others, such as Pacific Islanders, have discovered, processed, and used for millennia. Some of these plants include kava, taro root, and the canarium nut.

Such bio-prospecting has shown disregard for the cultural significance of living things in marginalized countries. Dr. A. H. Zakri, [19] director of the United Na-

tions University's Institute of Advanced Studies has stated, "In South Pacific cultures a plant is a living ancestor—and even a drop of human blood retains its life spirit after it has been collected for medical research or synthesized and specific DNA qualities isolated." "Plants and animals are not seen as mere physical or biological entities but also as embodiments of ancestral spirits," added Steven Ratuva of Fiji, [20] a senior fellow at the University of the South Pacific.

But indigenous organizations can articulate their own positions quite well and should be listened to. The Maori voiced their objection to the melding of bovine-human cell lines quite eloquently, but researchers have not listened.

Ugandan medical ethicists voiced their objections and pointed to their own policies governing human medical research, but US researchers conducting HIV investigations did not always conform to them.

Tanzania has been very successful in going beyond talk to protect their nation's resources, and its national institutions are involved in carefully monitored research management with other countries. Tanzania's estimated ten thousand plant species, for example, are protected by a facility that "can collaborate with a technologically developed institution or country through mutual research agreement in short-and long-term programs." Tanzanian scientists collect and export the materials for testing by the Western collaborator, but only after a research agreement spells out the terms under which any discovery's benefits are to be shared by Tanzania and its guests [21].

MT: You have written about certain salient examples of what you term a new "Global Pharmaceutical Vision" and those medical-research groups, in the tradition of Jonas Salk, who "dispense with patent protections altogether." Clearly, such ethical altruism is the future we should all be looking towards?

HW: Some visionaries have embraced new marketing models that use patent monopolies in a symbiotic manner to meet the needs of both patients and pharmaceutical firms. For example, Aidan Hollis, a professor of economics at the University of Calgary, and Thomas Pogge, a professor of international affairs at Yale, have developed an alternative model, The Health Impact Fund, in which pharmaceutical companies continue to obtain patents on their products and are paid for the use of those patents and products. However, the size of the payments will directly reflect the extent to which their new drugs reduce the global burden of disease.

Pogge and Hollis suggest that all governments contribute to a Health Impact Fund that would compensate companies in proportion to their products' effect in ameliorating pressing health concerns and reducing disease. In their scheme, the pharmaceutical company (or other patent holder) must agree to supply its medications at cost around the world and to aid in the measurement of its medicines' health impact, which would typically be a direct assessment of how much the new drugs reduced deaths and disability every year, followed by an annual payout. Thus, instead of profiting from a patent whose exclusivity allows it to set high prices that can be met by a relative few, the company would charge low prices for the drug and receive a share of the fund for a decade as it distributes its drug much more widely than current high prices would allow.

This system would provide an incentive to address the biggest killers worldwide, such as malaria and tuberculosis, rather than minor lifestyle ailments that only relatively affluent Westerners can afford to medicate.

MT: The Pogge-Hollis model would clearly establish a precedent towards the achievement of global medical equity, no?

HW: Definitely, in that every life will have an equal value. That way, a company would receive the same financial reward for saving the lives of poor Indians and Africans as it does for saving Europeans and Americans.

The Gates Foundation [22] has already met with success in developing and distributing medications through the advance market commitment, or AMC, which is a contract, typically offered by a government, that is used to guarantee drug makers a viable market if a medicine is successfully developed.

MT: Harriet, your **Deadly Monopolies** is a brilliant book and we really appreciate your taking the time for this discussion.

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Chapter 15
Bioeconomics: A New National Blueprint

The Obama Administration has unveiled its National Bioeconomy Blueprint, which places last week's EarthDay into startling perspective by coining an initiative that is largely predicated upon hope and the unknown [1]. Unknown, because our species—though composed primarily of micro-organisms—understands very little when it comes to the eco-dynamics and ecological landscapes of microbial organisms, their civilization(s), their symbiotic importance to our own lives and that of every other living vertebrate and invertebrate (Fig. 15.1).

Cites Carl Zimmer, a brilliant student (and author) of all things microbial, "There's this whole ecosystem of interactions going on inside our own bodies that we do not understand—barely at all," he says. "Scientists are just starting to figure it out with very big projects where they're sequencing all the genes these microbes have. But they're just at the beginning of understanding it" [2].

If you have the slightest doubt as to the importance of a bioeconomy, just think of living cells, bacteria and viruses, as dollar signs—an ethically imperialist but far from bankrupt notion that is precisely what biotech firms are engaging. They are considering with some zeal the numbers involved, however vaguely and imperfectly grasped; a seemingly infinite sea of life forms about which we know very little. Aside from some usual bacterial and viral suspects studied by scientists, humanity is all but uninvolved in the vast quanta of life of which, ironically, it is comprised; namely, as many as 180 trillion beings at any given moment in each human body, accounting for 44 different bacterial species on a single human forearm; 600 species of bacteria in the mouth, more still in a human colon; 10 trillion cells (others suggest 100 trillion) per person, whether Democrat or Republican; 7 million follicle mites in our eyelashes, dominated by two Demodex species, the smallest known arthropods—invertebrates with jointed limbs and segmented bodies which include among their rank, crustaceans, insects, spiders and centipedes.

A team of scientists at the University of Georgia led by microbiologist William Whitman estimated in 1998 that the total number of bacteria in the world number "5 million trillion trillion, (a five with 30 zeroes after it.") This was the first ever estimate of the total bacteria on earth [3]. But it is just an estimate.

If bacteria like the extraordinarily symbiotic, helpful, even loving *E. coli*, in the lower intestines of most mammals (the life-form most intensively persecuted for

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Fig. 15.1 Northern Borneo—Remote Brunei Tropical Paradise—The majority of its biological organisms, invisible to the naked eye. (Photo Credit: © J. G. Morrison)

purposes of research), are multitudinous, and critical to our survival, the viral universe is even more numerically outrageous. Viruses outnumber bacteria, with some "10 million virus particles" in every drop of seawater, "100 million" per "pinch of soil" and a world total of something like "one with 31 zeroes behind it" [4].

Hence, the largely unheralded revolution the new Obama Administration National Bioeconomy Blueprint represents. What will be particularly critical is not just the expediting of marketable products that can help in efforts to increase human health and happiness and a sustainable future on Earth, but a greater appreciation for that which is unseen and unknown in nature. All of the mysteries need not be solved, denuded, exploited. Bioeconomics is more theory than reality, aside from the millions of tormented vertebrates, mostly mammals and avians, who are tested needlessly, in my opinion, in most biomedical settings.

Where a bioeconomic blueprint has the hope of real traction is in the realm of non-invasive medicinal and agricultural derivatives that might just represent a turning point for indigenous communities dependent upon nature's cornucopia, whether in coastal, desert, neo-tropical or boreal biomes, among many others, that will prove what ecologists have been saying for millennia, in one form or another; namely, that a living creature is certainly worth much more alive, than dead.

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Part IV
Ecology and the Human Population Explosion

Chapter 16
Six Billion, or Fifteen Billion People? A Discussion with Environmental Scientist Leon Kolankiewicz

Leon Kolankiewicz is an environmental scientist, wildlife ecologist, and natural resources planner whose career spans almost 30 years, multiple states, and three countries, having worked with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Alaska Department of Environmental Conservation, the Universities of Washington and New Mexico, among others. He has been the Vice President of the Washington, D.C.-based Carrying Capacity Network and, as a Peace Corps Volunteer in Honduras, promoted the conservation of tropical rainforests and wildlife. He serves as a Senior Writing Fellow and Member of the Board of Advisors of Californians for Population Stabilization, has authored two books, scores of articles, and managed and edited a number of environmental impact statements for federal agencies and dozens of management plans for national wildlife refuges on behalf of the U.S. Fish and Wildlife Service (Fig. 16.1).

A Demographic Mount Everest

Michael Tobias (MT): With a global total fertility rate [1] average of 2.4 children per couple, as highlighted in last year's "2012 World Population Data Sheet" of the Population Reference Bureau a range of assumptions and projections can be ascertained. These figures—known and, as yet, unknown—are likely to impact nearly every aspect of life for humans, as well as most animals and plants across every global biome. In the area of sheer quantifiable numbers of humans what specific trends give you some measure of confidence that global population is stabilizing; what data sounds an alarm and inflicts serious speculative pause?

Leon Kolankiewicz (LK): What gives me some measure of confidence that the global population may be on its way to stabilization is that worldwide Total Fertility Rates have dropped by about half in the last half-century or so. In countries as diverse as Iran and Brazil, populations are now virtually at or even below "replacement level fertility," that is, about 2.1 live births per female. Moreover, women the world over, when and if provided with educational and economic opportunities, and

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Fig. 16.1 Leon Kolankiewicz at New Mexico's Rio Grande Bosque. (Photo Credit: © Kathy Kolankiewicz)

when given a real choice in their reproductive decisions, tend to choose quality over quantity (Fig. 16.2).

MT: But population growth continues? This is the ineluctable promise of a built-in momentum of couples at their reproductive heights, the somewhat baffling reality of what I have elsewhere termed, "a demographic Mount Everest" in my book, **World War III: Population & The Biosphere at the End of the Millennium.**

LK: Yes. But while still rapid and unsustainable, it is no longer exponential, because the annual percentage rate of increase is decreasing ever so slowly, having peaked, of course, at about 2 % several decades ago. It's been gradually dropping since.

MT: A rationale for demographic complacency?

LK: Definitely not. The rate of decline is too slow. In 2004, the respected Population Reference Bureau (PRB) estimated the annual growth rate at 1.3 %; eight years later, in 2012, PRB estimated the rate at 1.2 %, a mere 0.1 % decrease.

And because this smaller rate is applied to a larger population base, the annual increment of population increase has not really declined at all. Indeed, PRB has estimated that in 2004 global population grew by about 83 million, while in 2012 it grew by about 84 million.

Moreover, there has been an emerging backlash in the more developed countries among many economists, politicians, pundits and business advocates to the decades-long prevalence of lower birth rates. This manifests itself with cries of alarm over an alleged "birth dearth" or "baby bust," coupled with at least partially legitimate concern about a growing dependency ratio with the retirement en masse of the baby boomers (and not enough workers from subsequent generations to support them). Of course, since people are living longer, the dependency ratio issue could be dealt with by people having to work a bit longer. But these fears lead to calls for a number of measures to increase fertility by improving the "family friendliness" of society. The record of these measures in achieving their aim tends to be marginal at best, if Europe is any guide. It remains to be seen whether the call of Iranian President Ahmadinejad for Persian women to get back to the bedroom and fulfill their patriotic duty to produce more Iranians will be heeded.

MT: What a notion! So, in sum, taking into account all the positive and negative trends, by the year 2100, what do you see? (Fig. 16.3)

Fig. 16.2 Young couple in Mexico. (Photo Credit © M. C. Tobias)

Fig. 16.3 Bifurcated Rio. (Photo Credit: © M. C. Tobias)

LK: Michael, with relatively modest changes in year to year demographic factors (birth and death rates, longevity, etc.) the Earth could well see a global human population ranging from a low of about 6 billion or less to a high of 15 billion or more.

MT: Six billion versus 15 billion. That's a world of difference. At more than double the current human population, the 15 billion, I have serious concerns about the world's biological well-being, not to mention that of Homo sapiens.

LK: Absolutely. The quality of life for 15 billion is entirely uncertain and there are likely to be huge and socially unstable variations among regions, countries, and individuals.

The Biological Bottom-Line

MT: The biological bottom-line; the entire biosphere.

LK: Precisely. The life support system for this global human enterprise—the potential for 15 billion—is, tragically, likely to be even more compromised than at present, though this is not a given. It is also not a given what will be the decisive factor in ultimately stopping human population growth: rising death rates, or preferably, declining birth rates where they continue well above the replacement rate.

We are approaching an extraordinary moment in the history of life on Earth—the peaking of the population of the dominant vertebrate, after millennia of steady growth and two centuries of a population irruption with unparalleled impacts on the biosphere. Hopefully—but with no guarantees—the end of this phase is swiftly approaching.

MT: We've heard much about planetary "ecological wounds" [2] and the consequential intersections for both human and habitat health resulting from so many demographic moving parts. If we extrapolate to 2050 and beyond we verge upon cognitive dissonance and data laced with varying conceptual, cultural and methodological biases. But in this foreseeable decade, throughout this hands-on generation, what are the population flash points that most concern you?

LK: As a wildlife biologist and lover of wilderness and biodiversity, I am deeply disturbed by the unfolding biodiversity and extinction crises, threats more severe than any faced since the end of the Cretaceous, 65 million years ago. Seven billion humans are imperiling wild flora and fauna in any number of ways, from habitat destruction, fragmentation and degradation, to poaching, overhunting, overharvest, toxic contamination, and the deliberate or unwitting introduction of invasive species.

A Planet of Consumers

MT: And the differentiation between rich and poor impacts upon the Earth?

LK: All in all, richer people tend to have a greater per capita environmental impact than poorer people, due to their greater resource consumption and waste generation. But economically marginalized people can have a disproportionately negative impact on wildlife because of the fact they are often forced to move into and exploit frontier and marginal sites (like steep mountainsides, floodplains, or malaria-infested rainforests), often among those very inhospitable places within which remaining wildlife perilously clings to survival. Wildlife is hunted without any controls or management so as to put cheap food on the plate; or is displaced by livestock. Unfortunately, many of the world's so-called biodiversity hotspots—where the greatest numbers of species are found in relatively small areas—are in places being subjected to stresses from inordinate human population growth.

MT: So we are in an ecological double-bind? (Fig. 16.4)

LK: Yes, a sort of a "damned if we do, damned if we don't" dilemma. The ever-increasing burden on environmental resources posed by traditional economic growth needed to keep unemployment low and meet rising material aspirations for a growing population is absolutely unsustainable. Yet, without such prosperity, and the social order it engenders, desperate people will destroy wildlife and wild places in order to survive. In Africa elephants are being slaughtered for their tusks and rhinos for their horns. When I was a Peace Corps Volunteer in war-torn Central America in the late eighties, I saw firsthand the wanton killing of monkeys and other wildlife by trigger-happy, bored, uneducated young soldiers with M-16s provided by U.S. taxpayers. The social instability and widespread poverty one sees in the growing number of failed states is an unmitigated disaster for wildlife.

For the time being, we are able to persist in this inherently unsustainable condition only by drawing down natural capital such as fertile soils, productive forests, and

Fig. 16.4 Endangered orangutans, Borneo. (Photo Credit: © J. G. Morrison)

Fig. 16.5 Photo Credit: © Dancing Star Foundation

concentrated mineral resources and fossil fuels, while overloading environmental "sinks" such as the atmosphere and oceans. This game can't go on forever, and will end badly unless we start to get our act together far more than we have to date.

MT: Examining the most recent U. S. Census Bureau [3] summaries makes for enlightening reading. Some will argue it is bedtime reading, others pre-dawn wake-up calls. What are the most salient Census Bureau findings Americans should be most concerned about, good and bad.

LK: Even without substantially higher immigration rates—which are a distinct possibility given some of the proposals for amnesty and higher legal immigration levels being pushed by the Obama administration and certain members of Congress—our population is still projected to grow by over 100 million in the coming half century, and still be growing rapidly with no end in sight. The Census projects that the U.S. population will grow from about 315 million at present to 420 million in 2060.

MT: And if it should so happen?

LK: Such growth will thwart the pursuit of environmental sustainability in the United States. It will also degrade the environment, hasten the depletion of non-renewable resources, contribute to the overuse of renewable natural resources, accelerate the loss of wildlife habitat, and last but not least, worsen our quality of life by exacerbating everything from traffic congestion to overcrowded, overused parks (Fig. 16.5).

Immigration and Abortion

MT: Two areas of heated debate have long dominated most American deliberations regarding population: abortion and immigration. What are some key personal, community and ecological outcomes that you envision might well materialize should this nation fail to reach some tenable consensus on these divisive population concerns?

LK: These issues are both profoundly related to the population question, in that they touch upon exactly who and how many will be added to our ranks, to the American community. While abortion and immigration are both intensely personal matters, they also present serious ramifications for the public.

Unfortunately, the very contentiousness of these issues, and the political paralysis and polarization that characterizes them, has been a serious obstacle to rational consideration of a sustainable population policy for the United States. Many people, environmentalists and environmental groups foremost among them, avoid the population issue altogether to avoid being attacked for whatever position they take, or alienating some of their membership base. It is more expedient, and often more productive, to publicly oppose a new road or road expansion, or a new power plant or power line, or a new mine, or a new dam, or a new subdivision, than to oppose the underlying population growth that necessitates these projects.

The Population and Consumption Task Force of President Bill Clinton's Council on Sustainable Development wrote in 1996 that: "This is a sensitive issue, but reducing immigration levels is a necessary part of population stabilization and the drive toward sustainability." Environmental leaders and groups all but ignored this finding. And today there are about 45 million more Americans than in 1996, most of them directly and indirectly a result of immigration that the environmental establishment avoids addressing so as to skirt the controversies attending immigration.

MT: Given the political stalemate on immigration, what are the current numbers?

LK: Well, for starters, more than a million immigrants settle in our country every year, most of them admitted legally. This will continue indefinitely, unless Americans decide to muster far more resolve to reduce immigration rates than they have shown to date, in recognition of immigration's adverse impact on population growth and the environment, and decidedly not out of any enmity towards immigrants as individuals.

MT: And our deep-seated "nation of immigrants" concept?

LK: I am of the opinion that many Americans seem incapable of grasping the simple notion that there can simply be too much of a good thing. It is certainly possible to honor our immigrant past and accept some role for immigration now and in the future, without falling for the fallacy that this means we can continue to accept immigration levels in excess of a million a year forever.

In the recent book, **Life on the Brink: Environmentalists Confront Overpopulation** (University of Georgia Press), former Colorado Governor Richard D. Lamm has an essay entitled "Confronting Finitude." Lamm writes: "Americans now live

in a cash-wage industrial society with no more virgin land," and he adds that this new reality compels us to "no longer blindly assume that all immigrants benefit America." More generally, he urges Americans to reconsider their public policies, which mistakenly assume infinite resources in a finite world.

MT: And what about abortion, in this context?

LK: I'm not hopeful about any national resolution or consensus on the abortion issue within my lifetime. I do think it unlikely that Roe v. Wade (1973) will be overturned anytime soon, and I hope never.

MT: In his recent address to Planned Parenthood, President Obama made clear that that organization can be assured it is here to say.

LK: Yes, but for the foreseeable future, greater and greater restrictions will be placed on access to abortion at the state and local levels, especially in more conservative parts of the country. Of far greater potential demographic-related import are possible restrictions on access to family planning, which some of the same anti-abortion groups also support. This needs to be opposed vigorously.

Our Individual Choices

MT: What can individuals do? What are the most important steps individuals can take to make a tangible difference towards engendering more environmental stability at home, as well as globally?

LK: Individuals can make a difference in several ways, both in terms of the personal choices we make as parents and consumers and in how we affect broader political and economic policies.

First, we can choose to "walk the talk" and limit the size of our own families to one or two children at most. Better yet, go childless.

Second, we can be advocates and educators on behalf of U.S. and global population stabilization. Our personal decisions to limit our own demographic impact by having fewer or no children will make no difference at all unless large enough numbers of people think it is important enough to behave similarly. I would recommend that individuals support advocacy non-profit groups such as the Population Media Center and the Population Institute, which focus on international population issues, and NumbersUSA and Californians for Population Stabilization, which focus on slowing and stopping U.S. population growth.

Third, we can conserve energy and resources in our own personal consumption choices and actions. Drive less. Ride bicycles, take public transit, and walk more. Drive smaller, more fuel efficient cars. Recycle. Reuse. Replace incandescent lights with compact fluorescents. Purchase energy star appliances. Eat less meat or none at all. (It takes 5–10 times the amount of water, energy, and land to produce the same number of calories or protein in meat as in plants and vegetables.) Turn the

thermostat lower in winter and higher in summer. Many of these tips save money as well as helping save the Earth.

Fourth, at a political level, we can support more rational, enlightened environmental policies and better stewardship of natural resources. From my perspective as one who believes we need to learn to live within limits, Democratic politicians tend to be better in their support for the environment, family planning, and global population, and lousy on U.S. population stabilization and immigration. Republicans are pretty much the reverse. Most Americans support population stabilization nationally and globally, and they support environmental sustainability, at least in theory. But we are overwhelmed by the power of vested interests who dominate American politics and politicians.

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Chapter 17
A 'King's Speech' that Could Help Save the World: A Discussion with UC-Berkeley's Dr. Malcolm Potts

In South Africa on this very day, Dr. Malcolm Potts [1] Bixby Professor in the School of Public Health at UC-Berkeley has just delivered a bombshell of a speech to a packed crowd of distinguished health professionals representing more than half of the world's population. Prior to its delivery, Dr. Potts and I spoke about some of the most salient implications and data in his talk, intimations of which he had imparted several years before in our public broadcasting feature film documentary "No Vacancy" [2]. The timing for Dr. Potts' speech today could not be more eerie. Just yesterday, October 31st, the United Nations officially declared that the human population had hit 7 billion [3] (Fig. 17.1).

That definitely puts a new face on the Halloween mask of human nature.

Michael Tobias (MT): Malcolm, you and your wife, as I understand it, enjoyed the birth of your sixth grandchild recently. As an MD who has dedicated his life to mitigating the environmental and human rights-related fall-out from the population explosion, it would seem that even those who know only too well for whom the bell tolls, are inextricably part of the problem.

Dr. Malcolm Potts (MP): Well, yes, in truth, we are talking about an issue that directly involves each one of us personally. And it's true that last month my wife and I had our sixth grandchild, Charles. There is every reason to think that baby Charles could live into the twenty-second century. But Charles will grow up in an increasingly bipolar world—manic levels of consumption in the North and depressing levels of poverty, illiteracy and violence in the South.

MT: The world has tripled in human numbers since you and I were born. In the most economically marginalized of nations, particularly parts of Africa, life expectancy has increased by some 20 years. That's all medically well and good. But what about the fact so many billions of our kind are perpetuating, in effect, misery, not only for themselves, but for the environment as a whole?

MP: Michael, our medical successes have a cost. For the first time in literally billions of years of the Earth's history the activity of one species—our own—has come to dominate the complex biological systems on which all life depends. Indeed, we may have reached already a point where the world's use of resources and concur-

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Fig. 17.1 Dr. Malcolm Potts. (Photo Credit: © Peg Skorpinski)

rent production of pollutants is jeopardizing the welfare of all our children and grandchildren.

MT: The Sixth Extinction Spasm we have unleashed.

MP: Yes. As a medical student at Cambridge I also studied zoology—now half a century later, one in four of the mammalian species I studied is threatened with extinction. The world as a whole is 50 times as rich as it was when my grandparents were born. Yet, over 1 billion people continue to live on US$ 1.25 per day, or less [4].

Unbridled consumption in developed nations, along with continued rapid population growth in the least developed parts of the world, will set off a vicious spiral of ecological destruction and conflict over diminishing resources, bringing misery on a scale never before seen.

MT: United Nations demographic spreadsheets strike of a certain chaos. What are we to make of the vast gulf between the high versus low projections for future human populations [5]?

MP: Prudent decisions about consumption in the North, combined with slowing rapid population growth through voluntary family planning and investing in the education of girls and young women, in the South could open the door to a biologically sustainable, more prosperous and peaceful planet with spectacular increases in human well-being. Instead of a world approaching 16 billion—the upper UN estimate for 2100—we could have a world of just over 6 billion, the low UN estimate (Fig. 17.2).

MT: What is the key to unlocking this draconian puzzle?

MP: Surveys demonstrate that meeting the unmet need for family planning and preventing unintended pregnancies among the rich, while improving access to family planning in the South and slowing population growth lays a foundation for building needed adaptive strategies to cope with global warming.

MT: Unintended pregnancies translate into per capita carbon emissions. That's clearly one instance where family planning lowers the temperature, literally.

Fig. 17.2 New Delhi, India. (Photo Credit: © M. C. Tobias)

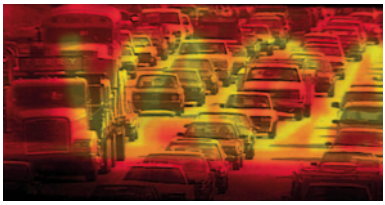

Fig. 17.3 U.S. traffic. (Photo Credit: © M. C. Tobias)

MP: Well, if you consider that there are 3.1 million unintended pregnancies in the US annually and American carbon emissions average 20 tons a year per person, where life expectancy is 78 years, then an individual's lifetime emissions add up to a staggering 1569 tons. A careful evaluation of a federally funded program to subsidize the high cost of family planning in California has shown that averting 100,000 births through voluntary family planning saves 156 million tons of carbon emissions, worth US$ 3.12 billion on today's carbon trading market [6].

MT: What about in the South?

MP: It is estimated that perhaps one quarter of the 1.2 billion pregnancies that occurred in the South between 1990 and 2000 were unintended. If we start, as we must, with the right of a woman to manage her family size, then even in developing countries, the volume of carbon abatement from averting unintended pregnancies becomes significant. In India where there are an estimated 3.5 million unintended births annually, meeting the unmet need for family planning would avert 195 million tons of carbon [7] (Fig. 17.3).

MT: And in Africa?

MP: In the Sahara desert, rapid population growth and global warming are on an especially dramatic collision course. Rapid population growth, global warming, poor governance, and a low status of women and lack of access to family planning are combining in a perfect storm that could lead to unprecedented levels of starvation, escalating conflict and massive waves of migration.

Fig. 17.4 Sahel. (Photo Credit: © M. C. Tobias)

MT: According to data from the Climate Institute, the number of environmental refugees is projected to swell to nearly 200 million by mid-century [7].

MP: In the Sahel, 60 million of the world's most forgotten people doggedly attempt to scratch a living from a hostile environment. Unless family size falls in that region, there could be 200 million people by 2050. Today, 46 % [8] of children in Niger are growth retarded. The stunted growth of a child carries a life-long penalty in brain development. I see a mega-catastrophe unfolding in the Sahel. The evidence is simple and obvious. The population of much of the region is growing more rapidly than the food supply [9] and in many cases more rapidly than the economy (Fig. 17.4).

MT: And the actual global warming estimates for the region?

MP: One estimate for global warming is that today's maximum temperatures in the Sahel will become the average by 2050—and today's extreme temperatures can exceed 115 °F. The crops will wither and the cattle die. The worst drought in 60 years is hitting the Horn of Africa, 12 million people are already hungry. The Dadaab camp in Kenya was built for 90,000 houses and 400,000 refugees. 1500 additional women and children arrive every day. The misery of subsistence in a refugee camp will be multiplied many times as millions of people migrate to survive. It is always the children and women who suffer most.

MT: The Darfurs of the world.

MP: Yes. There will be more Darfurs in coming decades.

MT: So what's the answer?

MP: A new vision based on scientific evidence, even if some of the conclusions are uncomfortable.

MT: Uncomfortable, "inconvenient," and frightening.

MP: Yes, but it is essential to enable individuals and couples to make voluntary decisions on whether and when to have a child. We need to meet the proven, and in some places growing, unmet need for family planning. We must set about dismantling the many tangible and intangible barriers that all too often confront women who wish to delay the next pregnancy, curtail childbearing altogether, or terminate an unintended pregnancy.

MT: I recall that in the mid-1990s when I was doing research in parts of East and West Africa, modern forms of contraceptives were either inaccessible or unaffordable. How difficult is it across Africa for women to obtain contraceptives in 2011?

MP: In Africa only 3% [10] of women can afford the full cost of modern contraception. In Europe and America there are commercial but no scientific reasons for keeping oral contraceptives on prescription. In Madagascar oral contraceptives are refused to women who do not have one child, while in Tanzania those with five children are told not to take them—there is no science behind either rule.

MT: That suggests to me of demonstrably little compassion. And then there is the continuing problem of child marriage?

MP: Absolutely. There must be comprehensive policy imperatives to end child marriage. Demographers calculate that increasing the age of marriage by five years reduces population growth by 15–20% [11].

In Niger, where the average age of marriage is under 16, one in five women have ten or more children. Globally, 25,000 under-age girls are married every day.

MT: That's a mind-boggling number, and the data, as I understand it, also segues tragically into educational gaps, deficits, as well as spousal abuse.

MP: Yes, and most child brides either never go to school, or drop out when they marry. Compared with mature women, these girls are twice as likely to be beaten by their husbands and five times as likely to die in childbirth.

MT: You're meeting with dignitaries throughout Africa. What progress are you seeing?

MP: Fortunately, even seemingly conservative societies may be near a cultural tipping point. The Bixby Center for Population, Health and Sustainability at Berkeley has an NIH supported project in Northern Nigeria close to the border with Niger and subject to the ecology of the Sahel. It is a Hausa-speaking, polygamous society, and in the project area the average age of marriage is 14.5 years. With Nigerian colleagues we are supporting girls and providing a modest cash payment to keep them in secondary school.

MT: How do those girls' parents feel about it?

MP: The parents decided they wanted the money to go directly to the school, even though keeping their daughters in school is a drain on their limited disposable income. For just over $ 30 a year between 82 and 92% of girls are remaining in school. We calculate that the total cost of reaching 50% of the adolescent girls in Niger would cost $ 15 million. This would be a genuine revolution—and it is achievable and affordable.

MT: OK. Let's assume that there is a fast learning curve and unmet needs for family planning are served. What about the allegedly unmet needs of consumption?

MP: Exactly. While there is a large unmet need [12] for family planning, there seems to be no significant unmet need for consuming less. However, changes in economic policy are inescapable if our children are to inherit a stable, sustainable world.

MT: The question remains: How do we accomplish that?

MP: We must cap and then slowly reduce those types of consumption that deplete non-renewable resources, destroy biodiversity and increase greenhouse gases. We can still value and continue to grow the types of consumption that enable everyone to flourish. We must find better ways to measure wealth than the misleading GDP metric.

MT: So, in the end, we're speaking both fertility and economics which, in one combination or another either spell doom, or hope for the global environment, right?

MP: Definitely. And when it comes to both the economic and demographic decisions that will determine the fate of the world at the end of this century, time is of the essence. The policies that nations and the international community need to begin negotiating should enhance equity and individual autonomy and well-being, and they must be based on justice for the contemporary world and for future generations.

MT: Quixotic thinking?

MP: This is no mission impossible. For example, we must explore using carbon credits to fund family planning. Family planning has too much political baggage for such an idea to fly in the North, but it might be worth exploring in the South—and the reward could be hundreds of millions of dollars—perhaps billions—to help some of the poorest and most vulnerable groups of women and their families in the world.

MT: A "carbon for condoms" plan, like your colleague Professor John Harte has suggested—whereby developing nations work with wealthier countries to provide funding for contraception, while reducing financial support or incentives for carbon emissions.

MP: Carbon for Condoms. It has a nice ring to it. I hope people will explore all these options, because unless access to family planning is improved, age of the first birth raised and rapid population growth slowed, then the future for the babies born today in much of the Sahel is starvation, feeding by the international community in refugee camps, living in slums, or walking south to other countries, where they may not always be welcome. If we can contribute to solving the first two of these huge problems we will also help ameliorate the third and fourth—the risk of escalating conflict, possibly permanent escalation, if one even ventures to imagine the ecological calamity that nuclear war would unleash.

MT: And you seem to be convinced that family planning is a key to preventing such calamity? (Fig. 17.5)

Fig. 17.5 Sex education class for high school students, Mexico. (Photo Credit: © M. C. Tobias)

MP: Look, Michael, as you well know there is an increasing body of evidence that family size falls when the numerous barriers to contraception and safe abortion are removed, even in poor and illiterate societies [13].

Policy makers need to understand that birth rates can and should be slowed by improving access to voluntary family planning. The international community also needs to understand that in any of the countries with a low age of marriage it is imperative to invest in girls and raise the age of the first birth.

MT: We don't hear our political candidates talking about these things, why not?

MP: All I can tell you is this: policy makers need to understand that when the right of parents to decide the number of their children is respected, then a welcome side effect of preventing unintended pregnancies will be a modest but useful contribution to slowing global warming in lesser developed regions of the world and a significant impact in the North, especially in the USA. While investing in family planning and in girls and young women will not by itself bring peace or development to the high fertility countries, not investing in family planning and in girls and young women makes survival and peace impossible.

MT: That's a message I hope will resonate with everyone. Thanks, Malcolm.

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Chapter 18
Planet Under Siege: Family Planning Critics Soon to See Global Population Reach 7,000,000,000

On August 18th, 1920 [1] the 19th Amendment to the U.S. Constitution was ratified as Tennessee clinched a necessary vote to become the 36th state to duly sign on to the groundbreaking legislation—thus ensuring a woman's right to vote throughout America. The 19th Amendment [2] forbids discrimination against any voter on the basis of sex. The suffragettes [3] had struggled for years to see this long-overdue basic human right materialize (Fig. 18.1).

Now, 91 years later some Tennessee lawmakers [4] as well as legislators in several other states [5] including Indiana, Montana, South Dakota, North Dakota, Ohio, Texas, North Carolina, New Hampshire, Minnesota, and Wisconsin, have been legally inching their way toward abolishing taxpayer funding for Planned Parenthood and/or Title X family planning funds, specifically abortion [read: a woman's right to choose by singularly targeting Planned Parenthood [6]. These glaring challenges threaten not only the integrity, human rights, privacy and sovereignty of women, but are an assault on the prospects of an ecological future for the very children those who have attacked women pretend to care about.

A recent Guttmacher Institute study reveals that the rate of "unintended pregnancies in the United States ranks among the highest among the world's most developed countries" and costs American taxpayers at least $ 11 billion per year. In addition, "for every dollar spent on contraception for low-income women, the government saves four dollars in medical costs within the next year by averting unwanted pregnancies," according to Susan Cohen [7] director of government affairs for the aforementioned Guttmacher Institute [8].

From a global, biological perspective this in-fighting over alleged medical and religious ethics is in fact nothing less than an all out affront to environmental sustainability. Consider just a few of the noteworthy highlights of the human ecological footprint [9]. These pertain to each infant, along with his/her consumptive lineage, all those successor genetic generations which Paul Murtaugh and Michael Schlax have discussed in their Global Environmental Change article, "Reproduction and the carbon legacies of individuals." (GEC 19, 2009).

According to an illuminating piece by Kiera Butler and Dave Gilson in Mother Jones Magazine "What's Your Baby's Carbon Footprint?" [10] each American baby will consume in his/her lifetime at least "3.1 million pounds of CO_2,

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Fig. 18.1 Plastic doll market, downtown Mexico City. (Photo Credit: © M. C. Tobias)

Fig. 18.2 Large Scale Bovine Stockyards, California. (Photo Credit: © M. C. Tobias)

22,828,508 pounds of water waste, 16,372 pounds of yard waste… 7,249 pounds of food waste…s/he will eat 1,654 chickens, 74 turkeys, 25 pigs, 11 cows, 2 sheep…" and consume "1,870 barrels of petroleum…" as well as going through "3,800 disposable diapers" (this latter figure occurring during the first 30 months of life).

In 2009 the world's human population consumed over 56 million tons of beef and veal, over 100 million t of pork and 71 million tons of so-called broiler chickens (according to the most recent U.S. Dept. of Agriculture, **Foreign Agriculture Service Livestock and Poultry: World Markets and Trade annual**). That translates into well over 10 billion land animals; not to mention loss of heretofore pristine habitat, rain, temperate and boreal forests, coral reefs and most prime biomes in general (Fig. 18.2).

In addition, our species caught, killed and ate between "0.97–2.7 trillion wild fish" (as tabulated by fishcount.org.uk [11] with virtually no "humane" considerations afforded them.

With the U.N. Food and Agriculture Organization (FAO) reporting last December that—according to Earth Policy Institute [12] head, Lester Brown—"its Food Price Index had reached an all-time high," [13] and with famines erupting like wildfires (witness the current [largely ignored] food crises across much of East Africa) and the wild gyrations of food futures on Wall Street, an unprecedented raft of species extinctions exceeding anything even imagined just a few years ago by the world's leading scientists (possibly hundreds of species going extinct every day),

it is overwhelmingly clear that Americans need a population policy. Moreover, we urgently require a population stabilization campaign (note the more than four decades of great work by Bob Gillespie, President of Population Communication in Pasadena, California as well as such organizations as Santa Barbara-based CAPS) [14] incentives for those couples who choose NOT to have children, and an honest reappraisal of the blinders that continue to encourage child-bearing at a time when, as Jeremy Grantham puts it, we are witnessing the tragic fall-out from what is, economically speaking, the equivalent of a global "Ponzi scheme" [15].

A scheme predicated on the most, not the least number of mindless consumers.

The end-losers in this vicious (but needless) cycle are women and their children, as well as all other species whose primeval territories we usurp, whose lives many of us consume—the primary targets of abuse, abnegation and outright cruelty. The moral compass that would otherwise support a pain-free demographic transition and accompanying ecological renaissance appears all but non-existent, even amid the greenest of conversations and investor appetites. Is it apathy? Ignorance? Or sheer narcissism that perpetuates the population crisis? Your call!

Grantham cites our keen abilities at negotiating rush hour traffic, but our supposed math skills are something else altogether. Apparently, we simply refuse to see what's coming, as nearly 80 million newborns are annually added to humanity's collective toll on a hemorrhaging planet. At current rates, we will number 11 billion by 2050 [16].

What's more, declining mortality rates throughout the world equate with a stark and sinister ambiguity: most kids born today will live long enough to have yet more babies.

Sometime in October 2011, child #7 billion [17] will be born. That is serious cause for totally re-focusing domestic and international policy (particularly security) issues, philanthropy, medical ethics, educational reform and for re-framing all conservation-related priorities.

If we do not address what has famously been labeled the "population bomb" and "population explosion" [18]—the titles of two books by Dr. Paul Ehrlich—[19] then we are surely going to lose it, becoming the shortest-lived mammalian species in known evolutionary history.

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Chapter 19
China's Demographic and Ecological Conundrum

On a Wintry Morning in Beijing [1]

Just over a week ago, China's President announced a phasing out of the famed and controversial "one-child policy" across China, a strict regulation set in motion in 1979. Back then, the preferred family sizes throughout much of the country were three or four children but the Chinese government recognized that in order to avoid utter demographic and economic anarchy, even a two-child family would never equate with fiscal sustainability.

Then came the bombshell, in 1981, when China became the first nation in human history to exceed one billion people, a marked increase from the time of her first census in 1953, when China numbered 583 million. The 1981 data sent shivers through China's economic number crunchers. The implications were staggering because, in fact, it had been assumed that the country's population was 900 million, not 1 billion. The corrected statistic instantly decreased GDP by 10 %, overnight. Moreover, the future looked grim in terms of agriculture and environmental predictions (Fig. 19.1).

By 1993, with the population continuing to increase, despite the one-child policy (notwithstanding 11 exemptions from the rule), Chinese Communism officially endorsed the concept of "profit," or—perceived in another guise, capitalism. There was ample reason in that year to be more optimistic about the country's future, than back in 1981. By 1993 China's Total Fertility Rate had dropped from a whopping 6.0 in 1960 to 2.5 children, on average, per couple. Some have recently argued that China's population would have come down regardless of a one-child policy.

Nonetheless, for all the controversy enshrouding the one-child policy, with its forced sterilizations, increasing gender disparities in favor of males, huge numbers of rural farmers migrating to cities in search of jobs, and escalating ecological debacles—China's built-in demographic momentum was continuing to push her human numbers higher and higher. 1993—the year of China's transition to capitalism—witnessed a population of 1,165,800,000, or 22 % of earth's human inhabitants.

It was in that year that we (Jane and I) set out to see if we could track down the actual architect of the one-child policy and gain some personal insights, noting that

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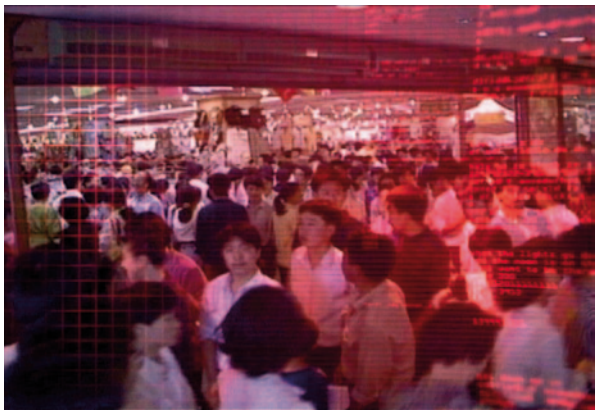

Fig. 19.1 Shoppers in Shanghai, China. (Photo Credit: © M. C. Tobias)

this policy had, by then, prevented some quarter-of-a-billion people from being born (a figure some continue to contest). As ecologists we tended to view such numbers as critical; indeed, an unprecedented humanitarian and ecological achievement.

One cold February morning, back in the mid-1990s, in a near frozen lake garden palace, seated beneath a large Ming Dynasty landscape painting, we sat with Dr. Qian Xinzhong (pronounced Dr. Chen) and discussed his remarkable career, the man upon whom the United National Population Programme had bestowed its first award for "his outstanding contribution to the awareness of population questions and to their solutions." For its praise of this gentle mastermind of the one-child policy, the UNFPA (United Nations Population Fund) would be excoriated by the Reagan Administration which proceeded to derail any and all American support for the UNFPA for allegedly ignoring Chinese human rights abuses as China continued to vigorously pursue a desperately needed lowering of its domestic fertility rates. China, by trying to do what few countries had ever attempted—facing up to their ecological peril by confronting the population explosion head on—provided fuel for anti-abortionists throughout the United States.

Dr. Qian was modestly but elegantly dressed, his white hair cropped handsomely, his forehead gleaming. With some trepidation, he acknowledged, in so many words, that China was headed towards human and biological disaster if her population could not be checked. Indeed, he emanated an air of desperation, as if the very worst fears of Thomas Malthus were about to be realized.

There were ample precedents within Chinese history for such anxiety. An estimated 70 million Chinese had died from famine and civil war between 1850 and 1880, but that was nothing compared with what might happen if China were to hit 2 billion people, a very real possibility, according to the State Family Planning Commission at that time, were current TFR rates to continue unchecked.

In our book, **World War III: Population & The Biosphere at the End of the Millennium** [2] we wrote, following our meeting with Dr. Qian, that he embodied "the full paradox of compassion tempered by unflinching realism." The venerable Qian died December 31st, 2009. He was almost 99 years old.

During his many decades of selfless service to his country, he had helped engender the single largest decline in total fertility rates of any nation in human history, thereby preventing much suffering, among humans, and other species.

The Phasing out of the One-Child Policy

The People's Republic of China currently has 1.35 billion residents, the largest number of any nation in human history, and a Total Fertility Rate ("TFR," the number of children per couple, on average) of 1.5 [3] versus a world average of 2.4 (as of mid-2012). Projections for China have alternated from a conservative 1.45 billion at century's end to the aforereferenced draconian prospect of nearly 2 billion in 2100. Whether 1.45 or 2 billion, China's recent ambitions to create an ecological civilization within her political boundaries, as outlined by President Xi Jinping [4] strikes of a laudatory if challenging ideal. Some might argue, a Quixotic ideal in light of last week's news regarding the relaxation of the one-child policy. "In future, families will be allowed two children if one parent is an only child, the Xinhua news agency said" [5]. The political shift is a victory for human rights, and is proving immensely popular throughout China by all accounts. But the reform is based upon the alleged need for a more robust economic future, predicated on fears that—like several countries in the world with aging populations and declining work-and taxpayer sectors—China's human geography is likely to find itself in a few decades without assured income generation at the base of her enormous economic pyramid.

With some 63% of China's population having been—until now—greatly affected by the one-child regulatory structure, the estimated 400 million unborn Chinese, with all of their averted carbon and consumption footprints, pose a startling question: Would 400 million more consumers have been a positive, or a negative factor in computing the options for Chinese business and its ecological trickle down potentials? The nuances of this paradox appear to be key to the logic driving the Chinese Government's fundamental shift in fertility-related thinking.

China's Ecological Challenges

Now add the following data to the equation: The People's Republic has as much or more to lose in terms of biodiversity and remaining wilderness than any country in history. Consider some of the nation's "basal ecological metabolism": nearly 18% of the country remains clad in forest, or 175 million hectares (420 million acres or nearly 700,000 square miles). Within that vast and scattered canopy exist at least 6,347 vertebrate species including 581 mammals, 1,244 bird species, 284 species of amphibian, 376 species of reptile and at least 20,000 marine species. In addition, nearly 8% of the Earth's plant species are represented in China, or some 30,000, a

Fig. 19.2 A Giant Panda, Xicheng District, Beijing Zoo. (Photo Credit: © M. C. Tobias)

third of which are endemic (i.e. found nowhere else). From the summit of Everest to the Turfan Depression, 154 m below sea level, China's altitudinal variations are the largest in the world, ensuring an astonishing turnover rate of species diversity across the vast arrays of China's numerous mountain ranges, deserts, tropical, temperate and marine biota.

This grand sweep of flora and fauna is seriously imperiled. Among the country's most critically endangered iconic species are not only the highly threatened Giant Panda, but lesser known creatures, not least of which, the world's "greatest concentrations of endangered primate species," including the sub-nosed monkeys and the Hainan gibbon. Others include Yangtze river dolphins and Père David's deer, snow leopards, the Chinese alligator, and the world's largest number of endemic pheasants, not to mention a quarter of the world's unique Rhododendron species, according to a myriad of scientists with Conservation International and other NGOs.

With the continuing rage for economic progress, multiplied by so vast a consumer base, time is running out for Chinese ecological stabilization.

In 2008, the Yale Environmental Performance Index showed China as ranking 105 out of 149 nations that had been assessed. China fell behind Myanmar and was just barely ahead of Uzbekistan. But last year, China fell again to 116th out of 132 nations sampled. Much of this can be attributable to China's air and water pollution issues, but also to biodiversity loss. Recognizing the gap between ecological costs and benefits, assessment and appraisal, China's recent Twelfth Five Year Plan for National Economic and Social Development (2011–2015) yields an aggressive portfolio determined to embrace cleaner and alternative energy technologies, and far more strict emissions standards than ever before.

In a provocative Washington Post editorial [6] in March 2011, Lester Brown asked, "Can the United States feed China?" in which he pointed out that "China requires 80 million tons of grain each year to meet just one-fifth of its needs" 310 million American consumers could find themselves competing against 1.4 billion Chinese consumers (Fig. 19.2).

Add to this scenario exhausted Chinese soils and watersheds, and shrinking aquifers, and the fact that already, according to the International Union for Conservation of Nature ("IUCN") over 27% of all species throughout the country are deemed to be threatened, and a series of dire futurist scenarios necessarily emerge for China.

Then there are the animal rights considerations. By 1990, China actually surpassed the U.S. as the largest "meat producer" in history. The animal rights situation across China is disastrous. As described in our Forbes conversation with Dr. Peter J. Li [7], Associate Professor of East Asian Politics at the University of Houston-Downtown, says Li, the country has "lagged behind the industrialized nations in animal protection law-making for more than 180 years….[and] Never in its 5,000 year history did China ever raise and keep hundreds of millions of wildlife species in captivity as it is today." Such transgressions against traditional Chinese ethics are strictly driven by demographics: the vast number of consumers competing for an ever shrinking resource base.

All of the biological indicators suggest a ruinous link between demographic pressure and Chinese biodiversity loss. Among those nations with the largest number of threatened and endangered plant and animal species, China is one of the worst, ranking 14th and 7th from the bottom, respectively. And while the country has focused considerable attention on the prospects of ecotourism, it has done so without any overall sustainability plan.

An Ecological End-Game

According to the World Bank [8] China's per capita income as of 2012 was US$ 6,091, ranked 90th in the world. That economic growth, from rags towards riches (a current GDP of well over US$ 7 trillion) coincided (perhaps a mere coincidence, though we think it no coincidence) with the enactment of the one-child policy.

Now, as a new and welcome mindset is celebrated in a nation gearing up for more babies (how many more is unclear), the International Monetary Fund has warned of a looming "economic crisis in China;" that it may "fall off the rails and take years to recover," according to Tom Holland, writing for Monitor, and published in the South China Morning Post Business section. "Even IMF staffers are warning of an economic crisis in China" [9].

Hence, the end-game: What continues to trouble a hazy economic and demographic future in China is the haunting memory of Dr. Qian's stark ecological premonitions. Once a species goes extinct, it is forever. There is no escaping the ineluctable correlations between population growth and its human consumptive footprints, and widespread biological Apocalypse.

How China can commandeer a most fragile balancing act of more people, more economic gain, and more environmental protection will serve as the ultimate proving ground for whether our species can finally come to terms with the reality of our ecologically-pernicious omnipresence and what we are truly prepared to do about it.

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Part V
Ecological Heroes

Chapter 20
One Woman's Remarkable Quest to Save Africa's White Lion

Her name is Linda Tucker and, prior to attending the University of Cape Town, and then Cambridge (UK), she grew up during the tumult and agonies of South African Apartheid. In 1991, at the height of a fashion and marketing career, something happened to her in the presence of lions, an epiphany that turned her world upside down: she became a conservationist (Fig. 20.1).

By 2002, she had founded the Global White Lion Protection Trust (WLT) [1], a community-based conservation organization whose objective is the protection of the unique White Lions, and the preservation of the magnificent cultures of the indigenous Tsonga and Sepedi communities, which celebrate these legendary animals as a cultural and conservation legacy.

The WLT has an advisory council comprising traditional leaders from around the globe, and experts from financial, scientific, accounting, political and legal backgrounds. Linda's charity has secured large tracks of ancestral pride-lands as a protected area for the White Lions, and has successfully reintroduced 3 prides back into the wild in a carefully monitored scientific reintroduction program which is restoring their gene pool to the region of their origin.

In the Heart of Africa

This protected area is situated along the Klaserie River and consists of approximately 5000 acres. The Trust's CEO hopes to secure far more of the ancestral White Lion territory with donations from throughout the world. What is needed is protection in perpetuity of the entire Klaserie riparian corridor that gives life to the entire biome. At the same time, there is every reason to be hopeful that the White Lion Heartlands can gain both National Heritage and World Heritage status.

Linda's new book, **Saving the White Lions: One Woman's Battle for Africa's Most Sacred Animal** [2] conveys an astounding odyssey that restores faith in humanity's capacity to see, feel and put the pieces together to ensure a compassionate future for all biodiversity, including ourselves.

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Fig. 20.1 Linda Tucker with baby Marah. (Photo Credit: © 2013 by Linda Tucker. Reprinted by permission of publisher)

Fig. 20.2 White Lion—King of Kings. (Photo Credit: © 2013 by Linda Tucker. Reprinted by permission of publisher)

Michael Tobias (MT): Linda, as I understand it, these amazing big cats with huge personalities are not albinos, correct? (Fig. 20.2)

Linda Tucker (LT): Absolutely. They are a genetic rarity unique to one endemic area on earth: the Timbavati region of South Africa, in the heart of a wilderness area declared by the UN to be the third largest "Biosphere" on earth.

MT: Of course, the whole issue of speciation remains a hot scientific topic today.

LT: Yes. Some might argue that these amazing White Lions have no so-called "conservation value" and can't survive in the wild, but recent scientific papers prove the opposite. Indeed, for nearly a decade, scientists from the Global White Lion Protection Trust (WLT) have led an international collaborative study involving six countries and research on Snow Leopards, Tigers and White Lions. Recently, these

collective efforts resulted in a genetic breakthrough: the confirmation of a "genetic marker" for the White Lions.

MT: That's huge.

LT: Indeed, it is. This unique genetic code (carried by certain of the "Golden Lions" in this specific region) will—among other things—enable the WLT to head the campaign to have the White Lions declared a protected sub-species or critically endangered sub-population according to international legislation, listing by CITES and the IUCN Red Data Book.

MT: Bio-legislation can be sluggish. In the meantime, there is, as I have come to understand, a severe crisis afflicting the White Lion.

The Crisis

LT: Definitely. The White Lions were born naturally in one locale on earth, a wildlife area neighboring South Africa's Kruger National Park, called Timbavati—which means in the ancient Tsonga language: "The place where the Star Lions came down." It was declared a 'sacred site' by African kings hundreds of years before the Kruger was declared a national park. Today, this reserve is made up of as many as 69 private landowners with a constitution that follows the national park's management policy, but unfortunately not it's non-trophy hunting prohibitions—despite there being no fences between the private land owners and the national park. Species cannot delineate human boundaries, as a rule, though elephants have shown amazing capacities, in this regard.

MT: But the "Big Five" continue to be killed?

LT: Yes. Commercial hunting of elephant, rhino, buffalo, leopard and lion ('national game') continues, because many migrate from the national park as there are no fences. And for the past five decades, white lions have been artificially removed from their natural system.

MT: By that you mean through hunting, obviously.

LT: Yes. The current status is that the critically endangered White Lion is afforded no protection in legislation, and may be legally hunted in the wilds of its endemic homeland, as well as in captivity, where tamed lions are being shot in enclosures (a malpractice now known as "Canned Lion Hunting"). While the indigenous elders revere the White Lions as the most sacred animals in Africa, the international trophy hunting cartels exploit them as the highest income-earning trophy.

The Complexity of the Crisis

MT: What attrition rates have you identified for the big cats?

LT: According to a recent census, in the last 30 years, Africa has seen a decline in lion numbers of over 50%, with over half the lion trophies coming out of the continent attributed to American trophy hunters. In South Africa today, there are more lions in cages than in the wild.

MT: And in reality, we're talking about a very small number of people who are hunting these animals to potential extinction, correct?

LT: Yes. Which means, in terms of seeking a solution to this crisis, we have to remember that the short-term material gain of a few exploitative individuals does not justify the longer-term economic and ecological catastrophe of destroying a living heritage for future generations.

MT: Not to mention destruction both cruel and insane.

LT: And let's also remember that in ecological terms this same Lion is the apex predator, key to the survival of the entire ecosystem. In economic terms: the Lion is equated by indigenous cultures with Gold, the "Lion of Metals." In cultural terms, the Lion is the King of Animals, equated with leadership and good governance of the earth's resources. And in spiritual terms, the White Lion is believed by indigenous leaders to be "King of Kings"; a salutary reminder that God still exists in creation, and we humans are accountable for the sustainability and stewardship of our earth.

Solutions

MT: Clearly, as with almost any conservationist challenge anywhere in the world, community buy-in is important. In your case, these are your dear friends we're talking about: communities you have come to love and be a part of. They are people who worship the White Lion, who identify with its being. So we're not just speaking about impersonal "constituencies".

LT: Yes. The win/win solution has to be community-based conservation—with a long-term strategy that is instilling grass-roots stewardship in communities neighboring sensitive wildlife areas.

MT: So, in promulgating the key mission statements that can serve to accelerate both the legislative protections for the White Lion and engender a love affair with Africa's biological poster-child, what are some key lessons to be gleaned here?

LT: Our aim is to ensure that governments and trading partners respect the White Lions' conservation importance and help us protect this apex predator as the

Fig. 20.3 Linda Tucker and Jason Turner carry tranquilized cub to freedom. (Photo Credit: © 2013 by Linda Tucker. Reprinted by permission of publisher)

"capstone species" in the epicenter of the Kruger-to-Canyons Biosphere, and the key to preserving this seminal eco-system, and its globally unique biodiversity (Fig. 20.3).

MT: And culturally, in terms of the communities living with the lions?

LT: Protecting the White Lions as an iconic cultural symbol is also the key to preserving and reviving the culture of neighboring indigenous communities—and thereby providing them with previously denied opportunities of cultural tourism, social upliftment, and poverty relief.

Wall Street's Role in Protecting Africa's Biodiversity

MT: What about the exacting economic models for nurturing success in protecting the White (and Golden) Lions and their ecological niches, along with the human communities who share those niches?

LT: Michael, the immediate and longer term strategy of protecting White Lions as a conservation and cultural heritage is the key to generating and supporting the emerging socio-economic development in this low income region, which will continue to celebrate this rare animal as a proud living heritage for future generations. Our "Eco-Cubs" educational programs instill pride and purpose in a critical poverty node region, where more than half the children are orphans in the schools with which we work, and our White Lion Leadership Academy has been established for school leaders, to provide a goal-driven model for sustainable living in wildlife areas.

MT: What can those on Wall Street, and across the banking capitals of Europe, Asia and Africa do to help, along with the major NGOs?

LT: Look, NGO's such as the WLT are very clear regarding all of the key steps in our strategic action plans for transformation, both in the short and longer terms. But, it is also the shared, global responsibility of those with financial means and in positions of influence to help govern the earth and her natural resources as a legacy for future generations.

MT: The burden, in other words, is on all of us. That is the great, if troubling revelation of the twenty-first century.

LT: Definitely. The solutions to today's unprecedented crises of species eradication and eco-system degradation lies with all of us, but particularly with those individuals who are in positions of leadership. Inspired stewardship is demanded of all of us, as you say.

MT: In terms of your organization's programmatic steps to secure the White Lion's future, what are they?

LT: In the case of our community-based conservation program, two joint strategies need support in order to ensure the survival of the White Lion and its associated eco-system:

Firstly, acquisition of more ancestral pridelands, thereby extending the protected area along the arterial watercourse that supports the biodiversity of the entire biosphere.

Secondly, we are seeking funding for a Cultural Renaissance Program, based on an intimate partnership with the region's two tribal authorities, which includes the establishment of a White Lion Heritage Centre; the opening up of a cultural visitor route; a White Lion craft development program with skills transfer to highly talented but previously marginalized groups (particularly single mothers); a training center in sustainable living principles; and the building up of an already successful "Eco-Cubs" educational program and world-class theatre in the wild, which is attracting high-end eco- and cultural-tourism previously denied to these low income rural communities.

Therefore, in addressing the inevitable challenges and opportunities provided by a community-based natural heritage, the WLT identifies that wildlife conservation goes hand-in-hand with enriching community participation.

Support for the "Eco-cubs" educational program, and sponsorship of key individuals identified in partnership with the community as eco-leaders, so they can attend the White Lion Leadership Academy, will assist the socio-economic revival that is already emerging in celebration of the White Lions as a living heritage in this region.

MT: Linda, I was amazed when you told me about a tribal shaman who indicated that the White Lion was something like a veritable icon of climate change: white. And, that your conversations with an Inuit Elder suggested that a black polar bear—also as a psychic or spiritual harbinger of climate change, had been identified in the biological landscape.

LT: Yes. There is so much science fails to recognize. But these peoples of the land know it. They feel it. They have lived it for tens-of-thousands of years (Fig. 20.4).

Fig. 20.4 "Saving the White Lions: One Woman's Battle for Africa's Most Sacred Animal" by Linda Tucker, published by North Atlantic Books. (Photo Credit: © Global White Lions Protection Trust, book cover, design by Jasmine Hromjak and Suzanne Albertson and image, still from video clip by Rijk Keyser from Saving the White Lions: One Woman's Battle for Africa's Most Sacred Animal by Linda Tucker, published by North Atlantic Books, copyright © 2013 by Linda Tucker. Reprinted by permission of publisher)

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Chapter 21
The Heroism of Everyday: A Discussion with UNOPS Luminary, Ms. Maria-Noel Vaeza

Not infrequently, I meet remarkable people who are, for all of their dedicated public service, huge hearts, brilliant convictions, and unwavering commitment to Mother Earth, unheralded. In a world accustomed to cynicism, if not hopelessness, where such people, who work every day in the wearying trenches, get written and yawned off, along with bureaucracy and politics in general, there is an entirely different narrative of human affairs that must be recognized and celebrated. It involves words and phrases like "management," "strategic partnership" and "diplomat." But there is nothing routine or bland about such individuals' engagement with the world. Rather, they grapple on the trying edge of nuts and bolts, heartbreaking challenges, and carry through remarkable achievements; the true torchbearers of a better livelihood for women, children and whole communities that are often hard to find on a map. Where situations are often so culturally complex, and the very life-support systems so compromised, that most people in the world would prefer to turn away (Fig. 21.1).

A native Uruguayan, Ms. Maria-Noel Vaeza [1] oversees approximately US$ 400 million in annual expenditures as Regional Director of the United Nations Office for Project Services (UNOPS) for all of Latin America and the Caribbean. With its global base in Copenhagen, Denmark, UNOPS [2] works in 126 countries+ and is the United Nations agency charged with the management of U.N. projects, procurement, HR, and financial management. Ms. Vaeza is based in Panama City, one of five UNOPS regional offices. Hers is a daunting venue but what is especially compelling is Ms. Vaeza's optimism, which was instantly apparent to me when I first met her at the near conclusion of the Rio+20 Summit. It was the middle of the night in Rio, at the airport and without missing a beat she began describing how amazing she felt the Summit had been, and how different it was from the first Rio Summit.

Michael Tobias (MT): Maria-Noel, 20 years ago you were here at Rio. Was it really so different? The sense of impending problems, of possibilities?

M. C. Tobias, J. G. Morrison, *Why Life Matters,*
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Fig. 21.1 UNOPS Regional Director for Latin America and the Caribbean, Maria-Noel Vaeza. (Photo Credit: © M. C. Tobias)

Maria-Noel Vaeza (MNV): Michael, I feel that the world has changed dramatically in those 20 years. As a woman I was amazed to see that for the first time ever, a woman—the 36th President of Brazil, Dilma Vana Rousseff—was chairing the most important United Nations conference of this century. Twenty years ago, the first Earth Summit that took place at the same premises in Rio, was governed by men in suits, very elegant, but mainly white skin and clear eyes. At Rio 2012, we could see the real multiculturalism of the world deciding about the future of Mother Earth; a genuine variety of cultures, races, gender, religions, diplomatic and not-so-diplomatic spokespersons and activists coming from every corner and sector of the world, wearing at ease their own national way of expressing their respective cultures with pride.

MT: And when you reference the planet's future, what I also took away from this Summit was the utter intensity and seriousness of the stakes involved.

MNV: Absolutely. The President of Brazil reminded all of us in her speech what was at stake in Rio—a new development model that has three dimensions, the very components I am focused upon at UNOPS, namely, economic, social and environmental. Development from now on will always be associated with the term "sustainable."

MT: Certainly not a new word (Fig. 21.2).

MNV: No, but now one can rightly say that a whole new equation of sustainable development goals has been born at the Rio+20 Summit to truly target the fight against poverty and inequality, as well as environmental sustainability. From now on the world economies should grow, but all such growth must also protect and conserve. I was proud to see that a woman was leading by example, as Brazil has done more than any other countries, to reduce GHG (greenhouse gas) emissions. I was also proud to see that another woman, Connie Hedeggard, the European Union Commissioner for Climate Action and former Minister of Environment of Denmark, was pushing to measure economic growth beyond GDP, in order to capture the natural wealth of a country, of a clean environment. A sustainable growth to guarantee our children a decent life. And I was thrilled, as well, to see another woman, Karen Christiana Figueres Olsen, the Executive Secretary of the United Nations Convention on Climate Change, emphasizing the importance for the universal participation in legally grounded mitigation targets, a clear policy framework so business can invest with confidence in renewable energy.

Fig. 21.2 Rio Coco Verde.
(Photo Credit: © UNOPS)

MT: As head of the Region for Latin America and the Caribbean for UNOPS, tell me about your ecological portfolio, emphasizing the endeavors dearest to your heart?

MNV: UNOPS provides specialized services to ensure the successful implementation of projects, translating environmental policies into actions. Environmental sustainability is mainstreamed into all UNOPS operations. This work is done in partnership with other members of the UN family, multilateral and bilateral agencies, national governments, non-governmental organizations, and community-based organizations.

MT: How many countries do you work in?

MNV: Large scale and small grants projects are executed in over 120 countries worldwide. In support of its partners, UNOPS helps address environmental concerns by focusing on building national capacities for environmental management and raising local, regional and global awareness.

MT: Some timely examples?

MNV: UNOPS' environment portfolio includes projects addressing biodiversity conservation, climate change adaptation and mitigation, land degradation, international waters, ozone depletion, chemical pollution, environmental risk management and post-conflict and natural disaster management, as related to the environment.

One of the initiatives dear to my heart is a trans-boundary river basin project between Nicaragua and Honduras, funded by the European Union in collaboration with the United Nations Environment Programme (UNEP) and local authorities. Although Latin America has an abundance of rivers, there is an uneven distribution of water in the region, and also there is increased contamination of rivers as a result of unsustainable socio-economic development. The Coco River is a very important natural resource in one of the poorest areas of Latin America and where the water is quite scarce. The UNOPS project there has improved the conservation of water resources for more than 170,000 people, by bringing together partners and stakeholders, gathering lessons learned and best practices of both countries on how to cultivate and manage the Coco River Basin in a sustainable manner. This is an important instance where the bilateral watershed management plans actually improved the political relations between two countries that in the past have been at war, whilst delivering technical studies and surveys. This project has used the learning-by-doing approach while strengthening the technical capacities of local

Fig. 21.3 Rio Coco project. (Photo Credit: © UNOPS)

communities and authorities in water resource management and also raising awareness on the effects of climate change (Fig. 21.3).

The trans-boundary aspect of this undertaking is extremely important. It underscores the potential elsewhere for collectively embracing ecological issues that, in turn, serves as a basis for political conflict prevention between nations. It likewise prevents the exacerbation of further water scarcity as a consequence of climate change impacting countries with shared watersheds and rivers.

MT: I see from the UNOPS literature that you have a significant program in Peru?

MNV: Yes. In Peru, on behalf of USAID (United States Agency for International Development) and UNODC (United Nations Office on Drugs and Crime), we are focusing on the expansion of agriculture alternatives to coca production, in an effort to promote the fight against illegal drugs, and at the same time improve the care and maintenance of cultivated lands. With this program UNOPS promotes alternative agricultural activities with greater economic potential, such as the recovery of degraded lands, and reforestation. At the same time, we're trying to better ensure environment and economic sustainability for producers.

MT: You mentioned you were working in Haiti? I can scarcely imagine the scope of UNOPS' involvement there.

MNV: Indeed. What we are doing in Haiti is deeply gratifying to me, particularly following the earthquake. We are supporting the government together with UNEP and the government of Norway, to develop a rural sustainable development initiative in the south of the country, covering an area with a population of 200,000 Haitians. The technical aspects are natural resource management, economic, infrastructure and also social development.

MT: Translate that?

MNV: Rural development, erosion control, reforestation, flood risk and land use management. We can see results already (Fig. 21.4).

Fig. 21.4 UNOPS Regional Director for Latin America and the Caribbean, Maria-Noel Vaeza, with Haitian President Michel Martelly. (Photo Credit: © UNOPS)

MT: How does the private sector\(Wall Street) come into play within the UNOPS universe?

MNV: The private sector is fundamental to achieving sustainable development. A green economy is one whose growth of income and jobs is driven by investments that reduce carbon emissions and pollution, enhance efficiency and sustain biodiversity and ecosystem services. A green economy is the economic vehicle for sustainable development and is an economic paradigm that will drive growth without creating environmental risks. As the UNEP report "Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication" [3] states, investing 2% of the world's GDP (US$ 1.3 trillion) per year in 10 key sectors, could—with the right enabling policies—kick-start a transition to a low-carbon, resource efficient and employment generating economy.

The private-public partnership needs to focus upon alliances to adopt policies that help reduce harmful CO_2 emissions and increase investments in natural capital and energy efficiency.

MT: And did you see evidence of nations moving in this critical direction at the Rio Summit?

MNV: Yes. What impressed me most at Rio was hearing the IMF deputy manager and a group of ministers of finance (Brazil, Mexico, South Africa, Nigeria) seriously engage in discussions pertaining to subsidies for oil imports which represent more than US$ 400 billion a year. Private-public partnerships must find ways to move away from these subsidies towards smart sustainable investments. Money is not the issue, even in a financial crisis. The issue at stake is how we better invest the national budgets by moving away from oil import subsidies.

MT: Of course, there are other harmful subsidies, particularly with respect to impacts upon global biodiversity.

MNV: Definitely. Fisheries subsidies are estimated at US$ 27 billion per year; money that is simply depleting fish stocks as well as the marine areas so important to preserve. The private sector should be smart and quick and dive into environmentally friendly investments in energy or biodiversity conservation, which are also

Fig. 21.5 Haiti. (Photo Credit: © UNOPS/Marc Lee Steed)

inclusive and respectful of multiculturalism. UNOPS is ready to support these alliances by translating them into action in the field—this is what we are very good at!

A fantastic private-public alliance emerging is Yasuní. As you know, the President of Ecuador announced at the UN General Assembly, the country's commitment to maintain indefinitely unexploited reserves of 900 million barrels of oil or the equivalent of 20% of the country's reserves, located in Yasuní National Park inside the Ecuadorian Amazon. This is a concrete example of how multiple sectors can solidly collaborate to help a country that is committed to preserving for future generations the most important biodiversity of the world.

MT: As an official with the United Nations host agency for the entire Conference, as a woman; as an environmental citizen and as a national from Uruguay with a family; a parent who hopes that there is a world of biological integrity for coming generations to enjoy and be part of, what is the source of your optimism, following the Rio Summit? (Fig. 21.5)

MNV: As a mother—my most important role in life—I was in high spirits coming out of Rio as I thought to myself, there is hope after all! The agreement reached represents a framework to enable all stakeholders—governments, private sector, civil society, and critically, the younger generations—to push for sustainable development now more than ever. The agreement that came out of the conference was chaired by a powerful woman, the President of Brazil, who—as I mentioned—led by example by tasking her country to adopt tougher measures to reduce GHG. Smaller countries like Denmark and Korea had the chance to show to the world how things should be done to grow in a sustainable manner. These countries demonstrated how to reach a political consensus when approving their respective energy

Fig. 21.6 Project debris. (Photo Credit: © UNOPS/ Marc Lee Steed)

policy frameworks. Those frameworks had been adopted in Denmark and Korea within the normally hotly-contested political arenas. In other words, sustainable development can, indeed, be engendered, even enshrined by politics (Fig. 21.6).

As a Uruguayan, I am very proud of the intervention of our President José Mujica Cordano during the conference. He mentioned that the single most important thing in life is to be happy, and that the very search for happiness is to live in harmony with nature. He challenged all those at the UN Summit by reminding everybody that politics matter and that civilization needs to change from a culture of consumption to a culture of respect for the planet. Poor is the one who has it all yet continues to desire more. The model of consumption, if it is not changed, will continue to deplete this precious Earth. So I agree with President Mujica that the search for happiness and harmony with the environment will, indeed, it must, bring sustainable development for all.

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Chapter 22
Down To Earth: The World According to Ted Turner

MT: Ted, first of all congratulations on the terrific new book about you by Todd Wilkinson, **Last Stand**: **Ted Turner's Quest To Save A Troubled Planet** [1]. In your own Foreword to the book, you point out that tree-hugging and being in Forbes are by no means incompatible. Taken to its logical conclusion, what are you really intimating by that in terms of corporate responsibility and stewardship, and possibilities for each [2] (Fig. 22.1).

Ted: Michael, several years ago as I was reading the Forbes 400 "Rich List" it occurred to me that if there is a list recognizing those who've made a lot of money, there should be recognition for those who've chosen to give back.

MT: You've certainly done so. Not just the huge number of recipients in a broad sweep of environmental sectors, but your $ 1 billion gift to the United Nations Foundation [3].

Ted: Well, I've always encouraged my wealthy friends to give, not only because it's the right thing to do, but also because contributing to the improvement of the human condition and to the betterment of our environment is a wise investment.

MT: Of course, outstanding families like those of the Gates and Buffetts come to mind.

Ted: I was very encouraged when Bill Gates and Warren Buffett created The Giving Pledge [4] and I'm pleased that there are several "Lists" out there today acknowledging generous philanthropists as well as companies that have made philanthropy a top priority (Fig. 22.2).

MT: You and Senator Sam Nunn have spoken about how civilization has long been "dodging bullets on nuclear security." Right now the Bulletin of the Atomic Scientists Doomsday Clock [5] reveals that we are 5 min to midnight and I would urge readers of Forbes, if they are not familiar with that particular timeline, to become better informed. But tell me about some of your most critical efforts at this time to help us stave off nuclear war? It is certainly the worst ecological disaster I can think of. But, there are those who might argue, is it really something we should all actually be worried about?

M. C. Tobias, J. G. Morrison, *Why Life Matters,*
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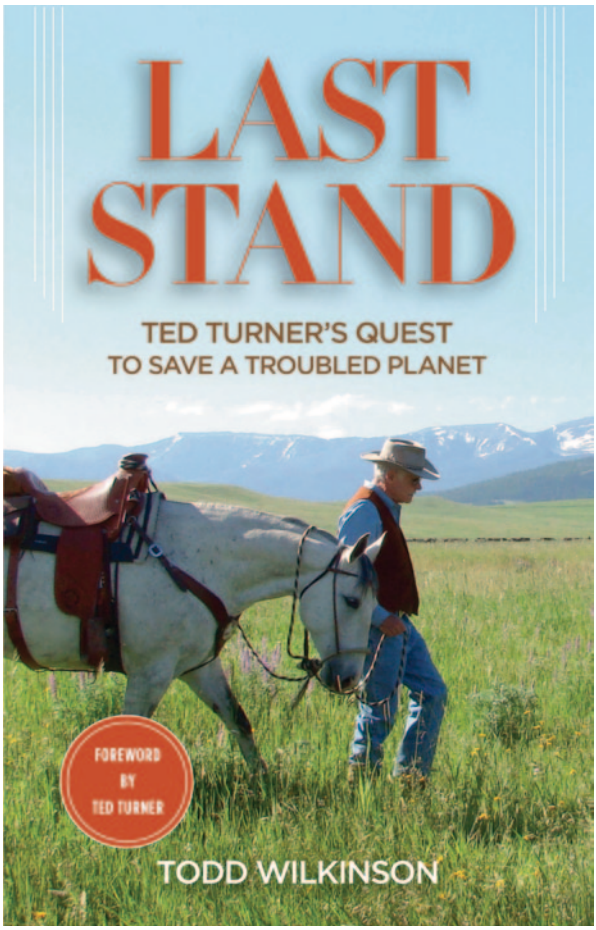

Fig. 22.1 Cover photo of the book by Todd Wilkinson, The Last Stand. (Photo Credit: © Elena Cizmaric)

Fig. 22.2 Warren Buffet giving Ted Turner his wallet. (Photo Credit: © Shearon Glover)

Fig. 22.3 Ted Turner and Senator Sam Nunn, nuclear threat initiative. (Photo Credit: © Turner Enterprises, Inc.)

Ted: Nuclear security is absolutely something we should all be concerned about. The threat is still very real, and I look at it as two-pronged. There's the ongoing issue of the US and Russia maintaining large arsenals sitting on hair-trigger alert, and emerging superpowers like China amassing arsenals.

MT: Not to mention—

Ted: There are dangers looming large from isolated countries like North Korea that just recently threatened to strike at the US.

MT: Exactly. Pretty frightening to be thinking of it in the allegedly sophisticated, chastened twenty-first century.

Ted: And then there is the potential of terrorists either stealing a bomb or getting their hands on nuclear, biological or chemical materials to put together a weapon of mass destruction.

MT: The consequences of which—

Ted: Michael, the consequences of an accidental launch, either from computer malfunction or human error, would be catastrophic. The stark reality is that once a nuclear disaster occurs it's too late.

MT: In a concerted and smart effort to prevent such a disaster I know that you and colleagues have been working on what you term the Nuclear Threat Initiative [6]. Tell me a little about it? (Fig. 22.3)

Ted: Senator Sam Nunn [7] who co-founded the Nuclear Threat Initiative with me and who was chairman of the Senate Armed Services Committee, has done an outstanding job elevating the profile of those nuclear challenges on both fronts. NTI has cultivated an incredible group of allies from both sides of the political aisle to address these issues and move us closer to the ultimate goal—complete eradication of nuclear weapons worldwide.

MT: I'd like to change topics and raise another subject that I know is extremely important to you, namely, land stewardship. You are this nation's second largest private landowner (until recently, the first largest). It's an awesome concept, let alone responsibility. And, knowing you somewhat, I am not surprised by the enormous range of your endangered species and re-wilding endeavors and remarkable largess. Your widespread philanthropic and scientific efforts have made it crystal clear that you really care about the land in a deep ecological sense (Fig. 22.4).

Fig. 22.4 Black-Footed Ferret. (Photo Credit: © Turner Enterprises, Inc.)

Fig. 22.5 Flying D. (Photo Credit: © Turner Enterprises, Inc.)

Moreover, you have set something of a new gold standard for what private citizens can do in the conservation arena. That's truly important for building role models that young people and colleagues alike can look to; and for reminding all of us what is truly important, yet so fragile, in the world.

Clearly, the teamwork you have assembled has been critical to successful collaborations on key environmental restoration efforts on your properties in the US and elsewhere in the world. Conservation is all about teamwork and your Turner Endangered Species Fund [8] has systematically bolstered effective public/private partnerships. What I find so refreshing is that you appear to have accomplished all this without fanfare or to-dos, but—as I would perceive it—entirely from the heart, and in systematic reliance on the best biological science (Fig. 22.5).

I found the last two chapters of Todd Wilkinson's book about you especially compelling. He refers to "underdogs" and "bloodlines" with respect to how you have gone about prioritizing; choosing flagships and keystones from amid a welter of appeals and imperatives. Tell me some of the most meaningful, and perhaps symbolic moments in your experience, when it comes to saving species?

Ted: I learned early on that landowners both large and small are able to greatly influence the environment as a whole by managing property in ways that are conducive to wildlife, to biodiversity, and to cleaner, sustainable living. I have been very fortunate to acquire large amounts of land over the years, and this has enabled me to help a wide range of species, including those that require a substantial amount of land to survive.

Fig. 22.6 Bison. (Photo Credit: © Elena Cizmaric)

MT: I know it's not academic for you. That you clearly have strong and powerfully emotional bonds to the planet, and to wildlife. More than most people I've ever met (Fig. 22.6).

Ted: It is one of my life's greatest pleasures to observe wildlife, especially those species that are or have been imperiled, roaming wild on our properties.

MT: I gather you have a thing for wolves?

Ted: I had often dreamed of having a wild wolf pack on one of our western ranches, and today the Beartrap Pack lives in the middle of the Flying D Ranch in Montana. We also nurture prairie dog colonies on our plains ranches alongside the bison herds, because the presence of prairie dogs is important to the health of dozens of other species.

The great work of our Turner Endangered Species Fund staff biologists and our wildlife veterinarians measures the impact of one species on another; how the wolf packs are affecting the bison herds and other wildlife populations such as elk and deer and pronghorn and moose, and how the prairie dog population affects one of the most endangered land mammals in the world, the black footed ferret.

MT: Many people are probably not familiar with your list of "Eleven Voluntary Initiatives by Ted Turner."

Ted: I carry a copy of the Eleven Voluntary Initiatives in my wallet and look at it often. They serve as a reminder of the good we can do if we think and act as global citizens. They are all equal in importance and meaning.

Eleven Voluntary Initiatives by Ted Turner, © Ted Turner:

> I promise to care for planet earth and all living things thereon, especially my fellow human beings.
> I promise to treat all persons everywhere with dignity, respect, and friendliness.
> I promise to have no more than one or two children.
> I promise to use my best efforts to help save what is left of our natural world in its undisturbed state and to restore degraded areas.
> I promise to use as little of our non-renewable resources as possible.
> I promise to minimize my use of toxic chemicals, pesticides and other poisons and to encourage others to do the same.

Fig. 22.7 Turner family (L-R Jennie Turner Garlington, Teddy Turner, Ted Turner, Laura Turner Seydel, Beau Turner, Rhett Turner). (Photo Credit: © Turner Enterprises, Inc.)

> I promise to contribute to those less fortunate, to help them become self-sufficient and enjoy the benefits of a decent life including clean air and water, adequate food, health care, housing, education and individual rights.
> I reject the use of force, in particular military force, and I support United Nations arbitration of international disputes.
> I support doing everything we can to reduce the dangers from nuclear, biological or chemical weapons and ultimately the elimination of all weapons of mass destruction.
> I support the United Nations and its efforts to improve the conditions of the planet.
> I support clean renewable energy and a rapid move to eliminate carbon emissions [9].

MT: That's an Earth Charter of clear and compelling logic that pretty much covers it. But how do we engage youth to become conservation stewards and philanthropists like yourself and your own children, so that future generations will take to heart such a charter?

Ted: My son Beau founded a youth conservation center near his home in north Florida. It gives kids of all ages, ethnicities, and income levels, from urban and rural communities, a place to enjoy the outdoors and learn about nature.

MT: So many young people are virtually held captive by urban environment; concrete, steel, highways, computers, television and with it advertising. How do we provide outdoor opportunities for them?

Ted: Michael, it is so important to cultivate our next generation of conservationists by making sure they have access to outdoor spaces and encouraging them to put down their computer games and remote controls and play outside. I shared my love for the outdoors with my children, and they are doing the same with theirs. If we lead by example, we'll ensure that our kids develop their own personal relationship with nature and learn the value of land stewardship (Fig. 22.7).

Fig. 22.8 Ted Turner on Horseback. (Photo Credit: © Elena Cizmaric)

MT: So what keeps you up at night, Ted, as you contemplate where humanity may be headed?

Ted: I worry about the big problems facing humanity like the nuclear threat, rising human population, an unsustainable consumption of resources, climate change, and increased pressure on wildlife. I worry about the future for my grandkids and great grandkids and fear we are in danger of leaving them more problems than solutions. They deserve to inherit a healthy, prosperous planet. That's why I work so hard, and fight so hard to address these issues.

MT: OK, then what gives you a good night's sleep?

Ted: When I think about the inherent goodness of humankind, and the progress we have already made. We're on the cusp of eradicating polio, and recovering iconic species like whales, grizzly bears and wolves. We're confronting environmental health in urban areas, and we're having a more civil and sensible dialogue about the nuclear threat than a generation earlier.

MT: And people with wealth—the 1 or 2%?

Ted: More people of means are getting involved to tackle problems and I've witnessed firsthand that nature has an enormous capacity to heal and regain its richness if given a chance. I'm satisfied that I've done my best to help with the important challenges we face, and even though I wish I could do a lot more, I'm pleased to see more and more of the world's citizens picking up the call to action (Fig. 22.8).

Michael: Thank you, Ted!

Ted: My pleasure, Michael.

A Special Thanks to Laura Turner Seydel; and to Phillip Evans.

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Chapter 23
How the Life of a Chipmunk in Michigan Came to Save Elephants and a Million Acres in Cambodia

Cambodia's Paradise (Fig. 23.1)

Cambodia, the first Asian nation to join the IUCN in 1958 [1] is also a significant signatory to the United Nations global Convention on Biological Diversity mandating that member nations draw up sustainable Biodiversity Action Plans. Cambodia's recent 2010 plan, by any standards, represents a remarkable aspiration towards nation-wide ecological sustainability, indigenous human rights and biodiversity conservation.

Cambodia's prospects for sustainable agriculture and for enlarging her protected area network, ensuring the sanctity of more and more precious habitat, encouraging eco-tourism and training the next generation of young ecologists are extremely promising. Currently, "Cambodia's protected areas system [2] includes 7 national parks (742,250 ha), 10 wildlife sanctuaries (2,030,000 ha), 3 protected landscapes (9,700 ha), 3 multiple use areas (403,950 ha), 6 protection forests (1,350,000 ha), and 8 fish sanctuaries (23,544 ha)."

Cambodia's protective umbrella accounts for some 18 % of the country—a third higher, by percentage than the world average [3] for national protected areas.

It is estimated that while 2,308 plant species are known to exist in Cambodia, another 5,900 or so are thought to be present, and as many as 10 % of all plants in Cambodia are believed to be endemic (found nowhere else on earth). Other biological superlatives cascade throughout the country: at least 2,000 other documented species, including a remarkable 490 fresh water taxa from nearly 70 genera. There are as many as 600 bird species and/or sub-species; hard and soft coral, an abundance of unique reptile and mammalian species, as well as distinctive sea grass varieties.

Collectively, Cambodian wildlife comprises a unique window on Asia's primordial, living paradise. Considering the twentieth century trauma the country suffered under the genocidal Pol Pot regime (1976–1979) responsible for the deaths of as many as 3 million Cambodians, or more than 30 % of the entire nation's population, this sanguine environmental legacy is good news, to be sure.

But the environmental challenges of species protection and human poverty amelioration are only too real, with deforestation occurring at a rate of some 2 % per

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Fig. 23.1 Our first bull at Cambodia Wildlife Sanctuary (CWS). (Photo Credit: © David Casselman)

year, at least between 2002 and 2005, according to the United Nations Food and Agriculture Organization. One penultimate index of health, or lack thereof, is the IUCN Red List, which elucidates those many species that are vulnerable, rare and endangered throughout the world. Across Cambodia, at least 138 plants and animals are suffering significant decline [4].

One of the aforementioned 10 wildlife sanctuaries is known as Kulen Promtep, Cambodia Wildlife Sanctuary. Located approximately one hour north of Siem Reap, it had been a kind of Sherwood Forest, used by Pol Pot who logically placed no land mines there, during the Khmer Rouge Genocide.

The Story of a Lifetime

Over superb vegan cuisine at his El Patron Restaurant in Tarzana, California, a nationally recognized trial lawyer and powerful elephant advocate, David Casselman, described how one day, a decade ago, he and a business partner from Phnom Penh, a Mr. Sok Hong, had unexpectedly engaged in a cross cultural dialogue about conservation and the demise of Cambodian wildlife.

They had stopped along a Cambodian roadside because Sok Hong decided to donate money to a poor elderly woman at a small roadside temple. Casselman opted to wander off into a roadside glade with lush green grass and trees. His friend frowned at the idea, with only a single word explanation: “Tigers.” Casselman was skeptical, having learned there were few if any tigers left in the wild in Cambodia. Hong admitted never having actually seen one, but knew some remained because he was familiar with “tiger cub barbecues” arranged for wealthy visitors from other Asian countries.

This concept turned Casselman’s moral universe upside down and the subsequent dialogue spawned what Casselman describes as a “ten year dialogue and odyssey ” beginning with the plea that his friend promise never again to abet or participate in

Fig. 23.2 Navann's Mother watching closely. (Photo Credit: © David Casselman)

such a practice. The conversation grew in scope, starting with the demise of world habitats and animal species, evolving into a graphic discussion about the desperate state of the native Cambodian species and their remaining habitat (Fig. 23.2).

In terms of Cambodian tigers, as with neighboring Vietnam and Laos, there are estimated to be no more than 30 individuals remaining in the wild [5] Within another decade, many scientists believe—at current rates of poaching and habitat loss, there will be no more wild tigers (Fig. 23.3).

Casselman, who had come to love Cambodia and her gentle people, asked his friend to join with him to do something extraordinary. His friend did just that, arranging a dinner that very night with his friend and mentor, the nation's Minister of the Environment, Dr. Mok Mareth. For all of its nearly 70,000 square miles and 15 million people, approximately, Cambodia proved to be a small world. The stars were lining up.

During that dinner, Casselman learned that there existed only one forest, roughly 1 million acres (1,562.5 square miles) of un-mined deep jungle, but it was under attack by illegal logging interests, while also providing a subsistence diet for unemployed villagers living nearby.

Michael Tobias (MT): David, I've seen images of you on national television in the Kingdom of Cambodia committing to permanently protect that venerable Buddhist country's largest, un-mined wilderness area.

That's rather amazing. How does a man who played competitive college golf for the University of Michigan, who spent 34 years developing a national reputation as

Fig. 23.3 In Southeast Asia. (Photo Credit: © M. C. Tobias)

Fig. 23.4 Buddhist Prayer. (Photo Credit: © M. C. Tobias)

a civil trial lawyer, find himself dedicated to the permanent protection of a million acres wildlife sanctuary in Cambodia? What triggered this ambitious global altruism in you?

David Casselman (DC): It just seemed like the right thing to do. It was a once-in-a-lifetime opportunity to make a difference. Sometimes, life takes unexpected turns and we never know what memory or deep unrecognized influences will motivate us. As a young boy, I lived in Michigan, a hunting state. I shot birds, squirrels and targets. They were all the same to me. Then one day, I threw a rock and killed a Chipmunk. It was probably the most beautiful Chipmunk that ever lived. I hit it from 75 feet away and thought, "What a shot!" until I stood over my prize and saw this tiny, perfectly painted, incredibly beautiful creature, dead, with a single ball of blood on his ear.

MT: Then what?

DC: Something inside of me shattered. It was an epiphany I will never forget. I knew deep inside that senseless killing like that was wrong. I didn't even know why. It wasn't an intellectual realization. It was much deeper. I felt it. I did not understand it. Only years later did I even begin to understand what my grandfather had told me around that time in my early childhood when he said that "All living things are connected. We are all part of a universal creative intelligence." From the time I began to understand that connection, I felt a common link to trees, animals and people, essentially at the same level. All living things want and deserve the chance to live in peace. As a litigator, I know only too well that peace among humans is hard to achieve. I will just say that if I, a childhood hunter of defenseless animals, was able to achieve some modicum of enlightenment, anyone can.

The Logic and Urgency of World Conservation (Fig. 23.4)

David spoke to me about Cambodia as he has experienced it with Hong and had grown to love it. How "once exposed to the logic and urgency of world conservation," his Cambodian friend, Hong, was equally transformed.

Fig. 23.5 Lek and Navann are clearly bonded. (Photo Credit: © David Casselman)

Throwing his incredible will and energy behind the Sanctuary, he too became a strong environmental advocate for his country.

Negotiations moved forward with the government over a period of many months, ultimately leading to an agreement signed on national television.

Says Casselman, "That was almost a decade ago and much has happened since then. But, our original Project Agreement with the Kingdom of Cambodia is still available for online viewing" [6].

Casselman and Hong worked for years, essentially financing their efforts alone, until Casselman met and asked a new partner to join with them in their endeavor (Fig. 23.5).

Her name is Lek Chaillert [7] She is from a Thai Hill tribe [8]. Selected as a Time Magazine Asian Hero of the Year and honored by the Thai Parliament for her conservation work, she is famous for her life-long dedication to the protection and preservation of the endangered Asian elephant. Casselman describes her like this: "Her humility is only exceeded by her love for all living things. What she brings to the world is an authenticity, a purity, so rare that you expect butterflies to land on her for safety. She is Mother Teresa and Dr. Dolittle rolled into one…."

With her Canadian-born husband Darrick, Lek developed the increasingly famous 225 acre Elephant Nature Park near Chiang Mai, in Thailand [9].

It has 34 rescued elephants living in peace; elephants that had previously endured countless years of horrific suffering. Casselman had initially reached out to Lek by phone for a few minutes and in a matter of days he found himself in Chiang Mai to meet her. Together, Lek, Darrick and Casselman went down to Siem Reap and walked the frontage of one small part of the Cambodia Wildlife Sanctuary.

Says Casselman, "It was quite a special day. Without ever lecturing me at all, Lek began to teach me so much about animals, life and how to love in a spiritual way that does not discriminate. Without preaching, her simple approach to every day life is the same as her approach to the ever-present ecological crisis. Whether it is involving animals or people, she is always calm, thoughtful and her actions are always informed by her appreciation for the long term."

Casselman describes how Lek, Darrick and Dino, a Thai employee of their Park, traveled back and forth to Cambodia, creating a volunteer center, an office, solar water heating, bathrooms and a tree nursery that, thus far, has grown some half-million native trees from seeds; seedlings being replanted in logged areas by indigenous women in need of jobs. Each seed represents another step forward as their collective dream of a "world class eco-tourism sanctuary" takes root.

But, elephants have remained an important part of their dream.

The prospect of bringing rescued Asian elephants to the Cambodia Wildlife Sanctuary was especially critical, given that species' rapidly declining status. *Elephas maximus* (smaller and more vulnerable, even, than the African elephant) [10] is listed on CITES Appendix I [11] and has been classified Endangered for many decades. At a meeting in June, 2012, scientists determined that this past decade has seen the worst surge in poaching of Asian elephants, ever [12].

With increasingly fragmented distribution of populations [13], the fate of this species rests in the hands of enlightened advocates like Casselman, Lek and those like them. It is estimated by Lek that fewer than 30,000 Asian elephants remain [14] in the wild. A million acre Sanctuary in Cambodia—with ample protections on the ground and the pragmatic, ecologically inspired buy-in of the more than 20,000 indigenous Cambodians living in and around the Sanctuary—represents the last best hope for this great terrestrial mammal, the largest of animals in Asia.

Upon seeing the Sanctuary land, Lek nodded in agreement, her tears confirming Casselman's assessment of its beauty and potential.

She now shares his enthusiasm with everyone else who has seen this "promised land".

Of Starfish and Elephants

DC: I was called on to litigate pro bono regarding the fate of elephants in the Los Angeles Zoo. After 5 years of study in that case, I gained invaluable information from world class experts, like Dr. Joyce Poole from Norway (the foremost elephant researcher in the world), Dr. Phil Ensley, a top veterinarian with specialized training regarding elephants, Dr. Jenny Conrad, a groundbreaking wildlife veterinarian, Mr. Will Travers, CEO of the Born Free Foundation in London, an extremely knowledgeable conservationist, and Pat Derby and Ed Stewart, founders of the PAWS Sanctuary in Northern California. With their insights, I came to a greater understanding of the world threat to elephants, in both Africa and Asia… and most certainly in Cambodia.

The combination of shrinking habitat and human/elephant conflict is a nightmare I could not ignore. It comes in at least two forms. First, the intentional, senseless slaughter of elephants for ivory and to steal babies to sell to zoos. Second, the unintentional destruction of their habitat as farms and villages encroach deeper and deeper into the last remaining wild acres.

Both represent the future, and without massive help, elephants will soon be remembered like the Dodo bird, another truly remarkable species that we can only say once lived on this earth.

Casselman says he tries not to dwell on the sadness and waking nightmares.

He is, instead, motivated by the heartening "Starfish Story" his incredibly supportive wife, Pam, told him years ago. Together, they rescue animals of all kinds.

Fig. 23.6 One Logged out Area in Cambodia. (Photo Credit: © David Casselman)

Their passion is rooted in this story about a small boy on a rocky east coast beach. As he was throwing stranded Starfish back into the water at low tide, an elderly gentleman asked him what he was doing. "Saving Starfish," said the boy. The man said, "But, look down the shore-line, there are millions of them. You can't make a difference." Ignoring him, the little boy bent over, tossed another one in the life-giving water and said with a smile, "Made a difference to that one."

Casselman said "I have tried to live up to that standard every day since I heard that story. Sometimes you can only save one…and sometimes you are given greater opportunities. But we try our best to seize them all."

The Future: A Race Against Time (Fig. 23.6)

MT: David, what are your needs for the short-term to make the Cambodia Wildlife Sanctuary [15] a future success?

DC: Well, like most human endeavors, we need support of many kinds. We are so fortunate to have the support of the government and we are truly blessed to have the irreplaceable energy and inspiration that Hong, Lek, Darrick, Dino and the Elephant Nature Park provide. With their amazing assistance, we were able recently to free some elephants [16] from a life of brutal bondage in a logging camp in Cambodia.

When word of their release into the Sanctuary started to spread, we immediately began receiving emails from around the world, asking if we would accept Asian elephants rescued from zoos in Argentina, Korea and Romania. At least one airline has apparently agreed to partner with local, passionate animal advocates who have struggled for years to return these gentle giants to their native land. It is really exciting to be a part of something so emotionally fulfilling.

With proper infrastructure, we hope to offer many, many Asian elephants the largest natural Sanctuary environment in this part of the world. But, to do that, the single biggest thing we need is to move faster.

We need to get the infrastructure in place before more illegal logging and poaching takes place, and more species become extinct. To do that, we need financial support. Spending my own funds, together with Hong and now Lek, Darrick and The Elephant Nature Park, we have come a long way. But, we need to buy backhoes,

fencing and build the remaining infra-structure required to permanently protect the land and create a viable eco-tourism facility.

This land is within an hour of the Angkor Temples, perhaps the largest tourist attraction in Asia. Once we are able to "open our doors" we will have massive land quadrants for the animals to reside within, with special unobtrusive viewing areas for people. Since day one, I have been dreaming of the day when visitors can stand in a cool underground grotto and watch underwater through a viewing window and see elephants and tigers swimming in peace in their respective ponds. Where else can you see that? I am very confident that when are are up and running the Sanctuary will pay its own way.

MT: What about continued illegal logging and land encroachment one hears of throughout Cambodia?

DC: Truly, it is a race against time. We changed the law of Cambodia to make it illegal to log or poach on Sanctuary land. But, even so, logging interests are constantly eroding the existing forests. With world demand for mahogany, teak and rubber trees, we will need to literally defend the forests until our infrastructure is in place. And even then, constant vigilance will be required. It is heartbreaking to see the huge trees cut down. But, we have no time to mourn.

With only modest financial support from individuals or institutions, we can do so much more to stop the logging and poaching that still haunts us day and night. The smell of burning wood across Cambodia represents a clear and present danger…. Proof that not everyone shares our dream. This threatens destruction of almost all of the natural habitat in this area. It is a race and we need to move faster to have any chance of winning.

MT: What about genetic corridors to protect indigenous primates, big cats and elephants, among others? What is necessary, what are you calling for, and how can readers of Forbes help this vitally important effort?

DC: We invite and welcome everyone and anyone who shares our vision. We know that we did not invent anything in Cambodia. What we are hoping to do there is to create a model for exemplary public/private partnerships. They work elsewhere in the world. What country could not benefit from working to support conservation and eco-tourism?

In Cambodia, the Minister has assured me that if we are successful, he will work with us to create land corridors to other areas in need of protection. We hope to take him up on that. But, we will need as much support as we can get if collectively we are to leave Kulen Promtep for Cambodia's children and their children.

Millions of people are already committed to saving our planet. But, just a few can destroy so much more than many can save. We need a lot of help. If your readers are talking about possibly doing something, I would urge them to just do what they can, now. Don't wait. I would encourage everyone to find and save the "Starfish" that cross their paths (Fig. 23.7).

You only get one opportunity, and then it is too late.

Fig. 23.7 Lek and Navann at ENP. (Photo Credit: © David Casselman)

Each of us should hope someday to achieve that evolved state of peace and harmony that animals have been demonstrating for us since the beginning of our time. Why is that so hard for people?

The Big Question

That is the question for the twenty-first century to answer, I suggest. I pose to Casselman, "And in the meantime?"

He smiles: "Well, we fight the good fight." And, he adds, "Life is good."

"You've been blessed," I remind him. He agrees: "Absolutely. And I hope others who have been blessed will join me in trying to give a little back. Let's leave this place better than it would have been without us, shall we? What a concept?"

In a very real way, one Chipmunk in Michigan gave his life to save the elephants and a million acres in Cambodia (Fig. 23.8).

Coda

What a concept, indeed. And for those interested in visiting this highly accessible million acre Cambodian Wildlife Sanctuary, here are but a few of the rare species thought to still exist within Kulen Promtep: They include the Siamese Crocodile,

Fig. 23.8 Navann his mama and his nanny. (Photo Credit: © David Casselman)

the Giant, as well as White-shouldered Ibis, Wroughton's Bat, two rare vultures, the Asiatic Wild Dog, or dhole Cuon alpinus, the Elongated Tortoise, the Yellow-headed Temple Turtle as well as the Giant Asian Pond Turtle, the Particolored Flying Squirrel, the Tiger, Sarus Crane, Golden, Marbled, and Fishing Cat, the Clouded Leopard, Greater Spotted Eagle, Pileated Gibbon, Green Peafowl, and—thanks to a kid from the mid-west turned LA lawyer, his friends and colleagues—the magnificent, gentle long-lived Asian elephant.

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Chapter 24
Helen Clark: UNDP's Pragmatic Visionary

The Right Honourable Helen Clark is the Administrator of the United Nations Development Programme and was the 37th Prime Minister of New Zealand, serving with distinction for three consecutive terms, from 1999 to 2008. In 2006 Forbes ranked her the 20th most powerful woman in the world. That was 2 years before Ms. Clark was chosen to lead the UNDP, with a startling array of humanitarian, ecological and innovative projects (Fig. 24.1).

Michael Tobias (MT): UNDP [1] is assisting nations in a remarkable range of biodiversity conservation and management, a cumulative "surface area greater than that of India." I know that environmental protection has been your special calling for many years. With this enormously expanded purview, what are the signs of positive change you are seeing and overseeing at a time when so many people are deeply worried, bewildered and exhausted by so much ecological bad news?

Helen Clark (HC): It is true that we face massive and daunting challenges—as we continue to lose the biodiversity and ecosystem services that underpin sustainable development. UNDP has tackled these challenges head-on, with a 40-year record of investment in helping to slow the rate of loss. On the one hand this has been achieved by supporting national governments in building institutional capacity—for example, we worked with the government of India and the UN Food and Agricultural Organization to set up the Wildlife Institute of India, now a global leader in biodiversity management.

On the other hand we have helped raise finance to make possible a large portfolio of work in biodiversity and ecosystems management in 140 countries. Following the Rio Earth Summit 20 years ago, UNDP was a launch partner of the Global Environment Facility (GEF) [2]. With a current project portfolio worth US$ 990 million in grants from the GEF and other donors, UNDP continues to play a major role in this critical field.

MT: What about UNDP's efforts to halt biodiversity loss?

HC: Although biodiversity loss continues globally, many countries are significantly slowing the rate of loss by shoring up protected natural areas and the services

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Fig. 24.1 UNDP Administrator, The Right Honourable Helen Clark. (Photo Credit: © UNDP)

Fig. 24.2 The southwestern Tillabéry region of Niger benefits from local UNDP projects that promote food security and tackle nutrition. (Photo Credit: © UNDP)

they provide, and in expanding national park systems with tighter management and more secure funding.

MT: I know there have been significant UNDP conservation successes that many people are unaware of.

HC: Over the past few years UNDP, supported by GEF funding, has helped governments and communities establish 67 new Protected Areas, covering over 8.8 million ha (roughly the size of Austria), with 163 more covering over 28 million ha (an area larger than the UK) in the pipeline for protection.

MT: And, as I understand it, some very down-to-earth approaches? (Fig. 24.2)

HC: There is also a marked global trend towards sustainable agriculture, building on traditional methods which use fewer chemical inputs, carefully manage soil and water resources, and work hand-in-hand with nature. UNDP has a 7-year programme funded through GEF to help the Rainforest Alliance [3] to meet the ambitious goal of certifying 10% of the world's coffee supply as sustainably produced. A concerted marketing effort is already paying off, and work on the ground is providing Latin American farmers with the information and tools they need to farm sustainably.

MT: I gather the UNDP has assisted over 130 nations in their efforts to realize true and transparent democratic governance, supporting over two-dozen free elections annually. Can you share with me some of the more striking examples of how democracy is good for the environment?

HC: In Southern Sudan, UNDP supported the January 2011 referendum that brought to an end to two decades of civil war in Sudan and resulted in an overwhelming vote for South Sudan's independence.

MT: In South Sudan, have there been any demonstrable conservation gains?

HC: The newly established government has already shown a commitment to protecting wildlife areas, and expanding tourism as a source of revenue and foreign exchange. With GEF funding [2] UNDP is working with the Ministry of Wildlife, Conservation, and Tourism to expand Boma Park from 20,000 to 68,000 km^2 (the size of the nation of Georgia), bringing the whole area under effective management and securing long-term financing. The park project will bring much needed infrastructural development, capacity development, and the creation of ranger jobs for demobilized soldiers.

MT: Tell me about some of the UNDP efforts in the nation of Georgia?

HC: In Georgia, UNDP continues to support the development of democratic institutions. Georgia is part of the global biodiversity hotspot of the Caucasus Ecoregion, with a network of Protected Areas covering 7% of the country. With GEF funding UNDP has helped to find new ways to fund these parks and reserves, develop managers' capacity, and establish a major new Conservation Trust Fund. Within 5–7 years, a designated fund should enable 100% coverage of basic operating and investment needs.

MT: The Caucasus Ecoregion is little known to most people worldwide. What sorts of noteworthy endeavors are being launched there?

HC: The Government of Georgia has recently completed a project supported by UNDP to conserve genetic diversity of key crops and their wild relatives in Georgia, tackling the legacy of a farming system during the former Soviet Union era which favoured extensive production of introduced varieties. Seed and plant material were successfully recovered and distributed to farmers, stimulating the development of organic farmers' markets and agri-tourism projects.

MT: Having led a country (New Zealand) with one of the most expansive Exclusive Economic Zones among nations, you obviously have had to grapple with competing altruisms and constituencies. Goat Island [4] became one of the great No Kill marine zones in the world in New Zealand waters over a quarter century ago. However, in the meantime most of the world's major fisheries are vulnerable, if not in outright decline, with little more than 1% of the world's oceans enjoying any level of protection. How is the UNDP working in this complex realm that—in fact—encompasses over 70% of the planet?

Fig. 24.3 Local Turkish community leaders in Bokurdak villiage convene in a traditional yurta to learn more about a UNDP project to combat desertification. (Photo Credit: © UNDP)

HC: Marine protected areas, and particularly no-take zones, are very effective in allowing regeneration of fish stocks.

MT: How so? What is the data looking like?

HC: The global biodiversity targets set in Nagoya in 2010 [5] aim to have 10% of the planet's marine and coastal areas under some kind of protection by 2020, a massive step up from the 1.17% of the oceans currently protected. UNDP is working hard to promote solutions which protect fisheries while supporting alternative livelihoods for communities traditionally dependent on fishing.

MT: I understand that UNDP is involved in some significant Indian Ocean conservation efforts?

HC: A UNDP-managed GEF project in Baa Atoll in the Maldives [6] has recently helped get concerns about overfishing into national development plans, establishing six new Marine Protected Areas covering 3,700 ha. The project played an important role in banning shark fishing nationally, and helped fishermen, who had lost livelihoods as a result, successfully generate new income through vegetable farming, pearl culture, and handicraft production. Another project in the Sabana Camaguey in Cuba [7] successfully banned unsustainable fishing practices, putting in place new regulatory frameworks to prohibit and control the use of bottom trawling. Large fishing areas—totaling over 333,000 ha (an area equivalent to Moldova)—were converted into special zones of use and protection.

MT: Newly-protected areas in Turkey seem to be setting some critical gold-standards? (Fig. 24.3)

HC: The government of Turkey is working through UNDP with GEF resources on a flagship project on the expansion and management of marine and coastal protected areas in the Mediterranean region. It has reached a significant milestone with the declaration of the Gulf of Saros as a protected area and the extension of Gökovaas Special Environmental Protection Areas (SEPA) [8] covering over extra 100,000 ha in total. A special agency in these landscapes is responsible for the integration of city

Fig. 24.4 UNPD programmes enable women-owned enterprises like this mango farm. (Photo Credit: © UNDP)

planning, nature protection, promotion of a green economy, and pollution control work. The model is being extended through partnerships leveraged with regional and national agencies across the Mediterranean.

MT: Might there be a fortuitous timing opportunity with the Rio Summit nearly upon us?

HC: With the approaching Rio+20 summit [9] we believe the SEPA concept could provide a practical example of a sustainable development pathway for countries with large marine and coastal zones.

MT: UNDP's commitment to REDD, [10] the GEF, and the securing of ecosystem services is so crucial to all people. What will you be hoping to accomplish in these arenas at the upcoming Rio+20 Earth Summit in June?

HC: Since the first Rio Summit 20 years ago, much progress has been made in securing national governments' commitment to the environment—particularly through the major conventions on biodiversity, desertification and climate change. 2010 saw the Convention on Biological Diversity achieve a significant milestone with the agreement on the "Aichi" [11] global targets for biodiversity conservation and sustainable use, as well as access to and benefit sharing of genetic resources.

MT: What other actionable goals are you looking to accomplish by the conclusion of Rio+20?

HC: At Rio+20 we will continue to make the links between sustainable development and the biodiversity and ecosystem services which underpin it, focusing on the additional issues now being addressed, such as the health of oceans and food security. Reducing deforestation and forest degradation is also critical. We have forged a partnership with UNEP and FAO [12] in the UN-REDD Programme, and are assisting countries with "readiness"—developing policies, institutions, monitoring tools, and mechanisms to share benefits with communities. This is a complex and long-term undertaking, but is critical to the future of our planet (Fig. 24.4).

Fig. 24.5 UNDP Administrator Helen Clark visits beneficiaries of the National Rural Employment Guarantee Programme in India. (Photo Credit: © UNDP)

MT: Gender equality is clearly critical for poverty alleviation, human rights that devolve directly through the world's umbilical cord, if you will, to all future generations. What are your primary concerns, initiatives and goals in this arena?

HC: Achieving gender equality is essential in human rights terms, and because the empowerment of women also makes economic sense, strengthens democracy, and enables long-term sustainable progress. Any serious shift towards more sustainable societies has to include gender equality (Fig. 24.5).

MT: So how are women to be fully engaged, not only pragmatically included in sustainable initiatives, but demonstrably championed?

HC: Investing in gender equality is catalytic for development. The education of girls, for instance, yields some of the highest returns of all development investments. Providing a woman with just one extra year of schooling means that her children will be less likely to die in infancy or suffer from illness or hunger. The inter-generational benefits go further still as a mother's education significantly affects her children's education attainment and opportunities. The flow on effects will also include reduction of child and maternal mortality, better child nutrition, a boost to economies, and greater ability to protect women and girls from HIV/AIDS, abuse, and exploitation.

MT: Clearly, the persistence of poverty remains a sobering challenge to the global work of UNDP? (Fig. 24.6)

HC: Gender equality is central to UNDP's work in poverty reduction. We focus on three core dimensions of women's economic empowerment—economic opportunity, legal status and rights, and voice, inclusion, and participation in decision-making. Where women and men have equal opportunities and rights, economic growth accelerates and poverty rates drop more rapidly for everyone. In addition to addressing existing structural barriers to women's advancement, UNDP facilitates equal opportunities for women's entrepreneurship and participation in the green economy.

Fig. 24.6 The UNDP's National Rural Employment Guarantee Programme empowers women to engage in gainful employment as it enhances their social and economic freedom and security. (Photo Credit: © UNDP)

Fig. 24.7 A baby girl is vaccinated at a rural health clinic that uses solar panels to provide back-up electricity in emergencies. This UNDP project forms part of a pilot programme to provide efficient and renewable energy in Uzbekistan. (Photo Credit: © Christina LoNigro, UNDP)

MT: What happened of note at this year's 56th Commission on the Status of Women? [13]

HC: A key theme at this year's Commission on the Status of Women [14] was the empowerment of rural women and their role in poverty and hunger eradication. The event highlighted the critical role rural women play in supporting their families and communities to achieve food and nutrition security, respond to and mitigate the effects of climate change, generate income and contribute to agricultural and other rural enterprises. Yet despite the significant role they play, rural women in developing countries, may be unable to inherit, own property, or access credit, preventing them reaching their full potential.

MT: So, with regard to at least half of the human world, that of women, what is the most critical step to be taken, in your view, if women are to be accorded their absolute dignity and full empowerment?

HC: Overall investing in and opening up opportunities for women and girls is a breakthrough strategy for development. Their rights must be are upheld and their voices must be heard in order to accelerate development (Fig. 24.7).

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Chapter 25
A Jain Leader Addresses the World

This past July, [1] Gurudev Shri Chitrabhanuji, who spends part of each year in New York City, turned 90. For the millions of Jains and non-Jains worldwide, this former Muni (monk) is a global leader, pioneer, visionary, activist and profoundly affecting philosopher. His life and message are more relevant than ever (Fig. 25.1).

For decades, Shri Chitrabhanuji has rigorously, gently and persuasively advocated for peace throughout the world, ahimsa in Sanskrit, meaning non-violence. Shri Chitrabhanuji represents a living link to the great Jain sage, Mahavira (599–527 BCE) who is believed by some historians to have been an elder mentor to Buddha.

Mahavira proposed, among other things, a brilliant message of non-violence, tolerance, compassion, and the embrace of what was (then) a radical notion: the ecological interdependency of all living beings. After millennia, this potent ethical ideal has become key to the biological sciences, as well as inspiring such people as Tolstoy, Gandhi (who was tutored by a Jain monk early in his life), and Martin Luther King, Jr.

Shri Chitrabhanuji, a global ambassador for Mahavira's call to peace, is the author of over 26 books, but it is his very life [http://www.chitrabhanuji.com/] that offers us a particularly timely opportunity to reflect on his philosophy of world peace and an emphasis on our pressing need to appreciate the sanctity of all life. The photographs of Shri Chitrabhanuji seen here have never been published before and are done so with the most generous permission of the Chitrabhanu family.

Michael Tobias (MT): Gurudev, many people may not be familiar with Jainism. What is it?

Shri Chitrabhanuji (SC): The "ism" added to the end of "Jain" is an English construct. In Jain thinking, there is no "ism" as "ism" implies separation or competition with other systems of thinking. We prefer Jain "dharma" which is a complementary way of life that can co-exist with others, just like a healthy diet. Dharma means to be in one's original nature—the state an object will return to when not influenced from the outside. For example, the nature of water is to remain cool. You can boil it and it will become hot, however, when you put it down, after a while it will become cool again. The nature of fire is to be hot and burning—you can try to dampen it, but given a chance it will rage again.

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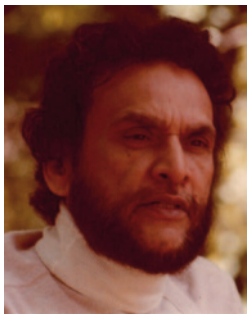

Fig. 25.1 The Young Chitrabhanu. (Photo Credit: © Chitrabhanu Family Archives)

MT: And humanity, human nature?

SC: What is the original nature of the human being? Is it peace, love and goodwill?

Today, due to the demands of our life, we have lost touch with this element. However, if you let people unwind, take a morning walk, spend time with children or work on our craft…we will return to peace, love and goodwill.

MT: So, what does "Jain" mean?

SC: Jain is derived from the word "ji" which means to conquer. Jains are they who seek to conquer anything inside themselves that takes them away from their original nature. Jains were born in a warrior culture. Perhaps that is what explains the importance of the notion of "conquest." However, the difference is that rather than conquering outside, conquest here is within the inner world. To live a long and fruitful life, be in harmony with your original nature. If you become raging with anger for an hour, you will get a headache. If you rage for the whole day, you may get a heart attack. You can't sustain long-term anger because it is not your original nature. But in peace, you can live your entire life.

MT: What is it about Jain traditions in India, the U.S. and elsewhere in the world, that lend themselves to an understanding of the world that is non-violent?

SC: Jain dharma adds to the singular personal vision the lens of plurality of perspectives or relativity of thinking (Anekanta). As children we grow to see life through the lens of personal preferences. Our parents and teachers instruct us to see life through the lens of others, as well, to "put yourself in the other person's shoes." Jain dharma takes this notion further by recognizing that the imposition of one's views on others is a subtle form of violence upon them. This influences how we think about our personal relationships as well as how we think about relating to other groups in society. Your point of view is as valid to you as my point of view is to me.

MT: The ecological dimensions of this should be obvious, no?

SC: Michael, Jain dharma encourages sensitivity towards not just human beings but all sentient life forms, which includes animals and plants—even single-celled

Fig. 25.2 Sculpture of Mahatma Gandhi in Independence Square, Paramabiro, Suriname. (Photo Credit © M. C. Tobias)

Fig. 25.3 Bovines meandering in their city, Pushkar, Rajasthan, India. (Photo Credit © J. G. Morrison)

beings. Every living being wants to live. You can see this in their actions and behavior. Even if you try to trap a small ant, it will try to run away. All life moves towards safety and away from danger. So, for a Jain, since it may not be possible to eradicate all forms of violence, the emphasis is on minimizing violence to all beings wherever possible. Thus, anyone who is Jain is also automatically an environmentalist and ecologist.

MT: The concept of "minimizing violence" is, of course, a brilliant philosophical stroke, because it not only references inherently the notion of pragmatic idealism, but also invokes the goal of symbiosis, of mutual respect, empathy and tolerance (Fig. 25.2).

SC: The symbiotic nature of non-violence and plurality of perspectives in Jain dharma has greatly inspired Mahatma Gandhi's non-violence movement. Through Gandhi, the emphasis on non-violence has influenced both Martin Luther King, Jr. and Nelson Mandela in their freedom struggles. So you can see how the core teachings of Jain dharma have trickled into our modern world in a profound way.

MT: The world can be brutal; and for many billions of animals and hundreds of millions of people, it is indeed so. For so many who are hurting, unemployed, desperate, and more than a billion people who are hungry, what can Jain dharma contribute? (Fig. 25.3)

SC: This is a good question and highly relevant today. The answer is subtle. The Jain notion of non-violence begins with one's self and moves outwards to others. The violence we see in the world is a secondary violence. The primary violence is experienced first by and upon the person committing the violence. A matchstick cannot burn something else without burning its own head, first.

MT: Very true.

Fig. 25.4 Chitrabhanu delivering talk. (Photo Credit: © Chitrabhanu Family Archives)

SC: For someone who is going through troubled times, often the first reaction is anger and blame. Jain dharma teaches us that the first thing to do is to accept that "this is my situation, my karma"—what I have sown somewhere else, that is what I am witnessing here today. However, the future is wide open. It may be shaped by my past but it's dominant influence is my present—and my present is something that I fully control. Therefore, in desperate times particularly, we should not spend our precious energy in blame or anger upon others. Our anger will likely not hurt the other but will certainly damage our own creativity and initiative. When we resolve to take full ownership of where we are, we are left with great energy to address the pressing matters at hand.

MT: But then what? (Fig. 25.4)

SC: So if an educated person is looking to earn money and the only job s/he can find is to wash dishes—what should that person do? Focus on what you can learn from your challenge—to treat it as an opportunity for growth—to treat with dignity whatever work or opportunity comes your way. Perhaps, for a certain phase a person may not be able to enjoy the standard of life s/he desires. But there is much they can still do. I am always inspired by Edward Hale, the American prodigy and clergyman who once said, "I am only one, but still I am one. I cannot do everything, but still I can do something; and because I cannot do everything, I will not refuse to do something that I can do." So the energy which is burnt in blaming others is applied to fulfilling one's needs and for growth.

MT: That's quite compelling. Now: Is there such a thing as "Jain economics" and if so—how can it help inform a more sustainable future?

SC: Jain dharma embraces the notion of "simplicity" (Aparigraha) as an elegant formula for a happy life. Simple is beautiful, and a simple life is a life we can handle. Beyond a point, accumulation of things, be it money or material objects, creates complexity. Managing this complexity can rob us of the very joy that our accumulation should have provided. I have seen closely the misery that wealth can bring to individuals and families, as well as the joy and happiness accompanied by a simple lifestyle. Doesn't modern research on happiness also find that beyond a point of necessity, money does not dramatically alter one's level of happiness?

Fig. 25.5 The Young Chitrabhanu. (Photo Credit: © Chitrabhanu Family Archives)

MT: Clearly, every major religious and spiritual tradition suggests that accumulations are, ultimately, ephemeral. One is reminded of the poet Percy Shelley's remarkable lines from his "Ozymandias:"

"My name is Ozymandias, King of Kings/

Look on my Works, ye Mighty, and despair!/Nothing beside remains. Round the decay/Of that colossal Wreck, boundless and bare/

The lone and level sands stretch far away."

SC: Accumulate to be able to manage one's life peacefully rather than to satisfy pride and vanity. It is like the man who asked "Why should I work so hard, if, at the end of it all, all I really want to do is spend time with my family in the evenings and celebrate each day?" What you want to do at the end, why not do at the start?

MT: And so how should people going to work each morning think about notions like creating a lifestyle and future for themselves and their families? (Fig. 25.5)

SC: We should aspire to create a simple and sustainable life style that meets our need but not necessarily our greed. The purpose of life is not to enter a competition and spend life saying I want to become "like him or her." This approach is often misunderstood as undermining enterprise and initiative. No. We should all strive to be the best version of ourselves as possible and contribute to the world as much as we can. Each person must set their own boundaries. However, in the pursuit of our aspirations, we should be mindful of the price we are paying on our personal well-being and relationships with others.

MT: Is there a Jain "mantra of simplicity?"

SC: The mantra of simplicity has a lot to offer our debt-ridden world where our needs and desires often out-pace our bank accounts. If we can balance the scales a bit and find more joy in simplicity, a culture can become a savings-society rather than an indebted one. This would create a path to building a sustainable and solid foundation for our children and the community's future (Fig. 25.6).

Fig. 25.6 Shri Chitrabhanuji seated, front center. (Photo Credit: © Chitrabhanu Family Archives)

Fig. 25.7 Chitrabhanu visiting and giving comfort at a hospital in India. (Photo Credit: © Chitrabhanu Family Archives)

MT: Speaking of sustainability, which most rational people are thinking about these days—ecologically, economically, politically—do Jains get involved with politics, and if so, could you characterize just a few of the leading points of view that best suggest the key Jain precepts for community life, especially with "sustainability" in mind?

SC: The main precept for community life amongst Jains is the notion that all life is bound together by mutual support and interdependence ("Paraspar Upagraho Jivanam"). So, in Jain dharma, one does not aspire to "politics." One aspires to "serve." The difference is important. And within politics is also embedded the acceptability of competition and defeat. This is a form of violence. So, for Jains, the primary intention is of utmost importance. Is the intention to defeat someone else, or, rather, to serve by bringing out the best from one's own self? Working with this clarity, a Jain can pursue any cause or mission that is worthwhile for society (Fig. 25.7).

MT: You were once a Jain monk. When I first had the opportunity to meet a Jain monk, it was at a temple in Central India. I took off my sandals, and was about to enter the sanctuary when someone gently asked that I remove my watch and leave it outside. I assumed it meant that I was entering a timeless sacred place, and watches were symbols of temporality and attachment, and hence, inappropriate. I later learned it was because my watchband was made of leather, and, of course, most Jains are vegetarian, if not vegan. That was a huge insight for me. In sum, what was life like for you as a Jain monk in India?

Fig. 25.9 Pramodaji and Shri Chitrabhanuji. (Photo Credit: © Chitrabhanu Family Archives)

Fig. 25.8 Shri Chitrabhanuji lecturing. (Photo Credit: © Chitrabhanu Family Archives)

SC: It was a beautiful life. I lived it for 28 years from the age of 22 to 50. I was born into a business family in Rajasthan. But at a young age, I witnessed the death of three people dear to me—my mother, my sister and a close friend from college. So, at 22 I became a Jain monk in search of answers. For the first 5 years, I maintained complete silence, except for limited dialogue with my Guru. We lived a minimal lifestyle, roaming from town to town, by foot. We must have walked over 25,000 miles over the years. The life was focused on daily practices, reading, meditating and meeting with the town people. Then, after many years of learning, I began speaking and lecturing broadly (Fig. 25.8).

MT: And your first travels abroad?

SC: In 1970, I was invited to the Second Spiritual Summit conference in Geneva and the Third Spiritual Summit conference at Harvard Divinity in 1971. I saw these as an opportunity to share the principles of Jain dharma with the Western world.

It was a difficult time for America, with the assassinations of JFK and Martin Luther King, Jr. and the ongoing war in Vietnam. The concept of Jain teaching—particularly the focus on non-violence as a way of living, was relatively unknown in the West at that time. So I decided to travel and teach [2]. Since then, many Jains and Westerners have embraced the teachings in their lives.

MT: Now, having helped establish more than 65 Jain centers across North America, under the umbrella of JAINA [3], and having delivered probably thousands of talks and meditations at universities, conferences, shrines, temples, symposia and gatherings around the world, have you changed over the years? (Fig. 25.9)

SC: Today, I am in my 90th year. So, you can say that my life has changed in many ways. Today, I have a beautiful family which began with my inspiring life partner

Fig. 25.10 The young Gurudev Chitrabhanuji. Photo Credit, © by, and Courtesy of the Chitrabhanuji Family Archives

Pramodaji. Pramodaji has become a sought after public speaker on Jain dharma in her own right, and I relish the rich conversations we have with each other. With her, our family has grown with our children and their children! However, essentially, I have not changed. I am still living a life of simplicity and living in harmony with one's nature which were at the core of my life as a monk 40 years ago. Another front that has changed is the audience. Today, I speak to more of an international audience whereas earlier it was largely an Indian audience. In the 1970s, 1980s and even 1990s, a lot of my time and energy was spent building the institutions that could provide a sustainable path for Jain dharma beyond the shores of India. Today, we have over 80 Jain centers across the world. These institutions are self-reliant, and are blessed with strong leaders at all levels. So, in essence, my job is done. I have the joy of looking at this blossoming community and it gives me great pride and joy. As a result, I have limited my public engagements and find myself relishing simple pleasures and the joys of my inner world.

MT: Although countless histories of religion and of India describe him, from your perspective, who really was Mahavir and what relevancy does his message have for a tumultuous twenty-first century?

SC: Michael, as you well know, Mahavir was the 24th enlightened teacher of the Jain dharma. By birth, he was a Prince of Maghadha, India in 599 BC. At the age of 30, he left his home for self-realization and to find the purpose of life. With the help of meditation he experienced harmony between his words, thoughts and actions. His teachings, more than those of any other Jain teachers, have been instrumental in shaping Jain thinking and practice today.

MT: And to sum it all up?

SC: The most important thing to realize within this brief journey of, on average, 100 years is that each of us is inherently holding pure divine consciousness. Once you realize this you will know that everyone else is also holding divine consciousness. This world has a lot to offer—countless experiences and gifts. The secret is to enjoy it all without being dependent upon any one thing. So, live in the world, enjoy it, appreciate it, but don't be attached to it (Fig. 25.10).

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Chapter 26
A Discussion with Jane Goodall

Michael Tobias/Jane Morrison (MT/JM): Jane, let us begin with more than just a question but a kind of modest little prelude [1]. Jacques Cousteau brought to the public's attention the magnificence, richness and vulnerability of the oceans at a time when the notion of the collapse of fisheries, the impact on the oceans of climate change, or the blanching of coral reefs, was hardly understood. Moreover, the ecological sobriety of his message was often superseded by the sheer joy and excitement he conveyed as the world's foremost oceanic explorer. Your own career, to date, in some respects reminds us of Cousteau's; except, in our opinion, you may be even more prolific. And you have managed amazingly to be accessible to everyone through all of your work and the Jane Goodall Institute (JGI) even while taking outspoken and courageous stands on issue after issue pertaining not only to biodiversity conservation and animal rights, but human animal rights, sustainability at every level, indeed, on the very fundaments of non-violence[1] (Fig. 26.1).

After all your time doing field research and global environmental outreach in virtually every form, what are your most urgent environmental concerns at this point? (Fig. 26.2)

Jane Goodall (JG): It is so difficult to single out the most urgent concerns since every thing is so interconnected. Crippling poverty on the one hand (you cut down the last trees in a desperate effort to grow food for yourself and family, make charcoal to sell and so on) and the unsustainable life styles of most of the rest of us—nearly everyone has way more than they need, some people obscenely so. And, in an increasingly materialistic world, those undesirable human traits of selfishness, greed and cruelty are flourishing. Then there is the destruction of our forests, wetlands, grasslands and other habitats, and the loss (locally or totally) of so many species. Oceans are increasingly polluted and over-fished. Supplies of fresh water are shrinking, while industrial, agricultural and household emissions and reckless burning of fossil fuels escalates, in addition to the increased meat eating globally that has led to the conversion of vast stretches of forest to pasture for livestock or to agricultural land for growing grain and (among many other problems!) the increased production of methane.

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Fig. 26.1 The Young Jane Goodall. (Photo Credit: © the Jane Goodall Institute/ Hugo van Lawick)

Fig. 26.2 Jane Goodall Today. (Photo Credit: © Michael Neugebauer)

MT/JM: Which is, of course, one of the most aggressive greenhouse gasses, more so, even than carbon dioxide.

JG: And so much of the above is contributing to the already-happening changes in weather patterns. And finally, and perhaps this is the most urgent concern, there is the growth of our human populations.

MT/JM: Absolutely. And it is interesting you say "populations," plural, since biologically speaking we know that some 13–15 million discrete populations of other organisms are going extinct every year, 40,000 per day, as pointed out by scientists like Paul R. Ehrlich, Norman C. Myers and Gretchen Daily.

When you first started studying fellow primates in East Africa, male-dominated science was also dominated by a distinct aversion to any form of emotion or sentiment getting in the way, so to speak, of objectivity, notwithstanding Albert Schweitzer's own embrace of it. You courageously named chimpanzees, and embraced a new language of ethology, of interspecies communications—as both you and our close friend Dr. Marc Bekoff have so championed—and which has literally become a new science.

How huge has the paradigm shift really been, in terms of the scientific community and its acceptance of, and willingness to attribute to other species a whole new realm of understanding and feelings?

Fig. 26.3 Chimpanzees. (Photo Credit: © the Jane Goodall Institute/By Fernando Turmo)

JG: The paradigm shift has affected science to the extent that animal intelligence is now an accepted area of study in major universities around the world, and it is acceptable to study animal emotions and even personality. But we have a long, long way to go before the recognition of the fact that animals are capable of emotions and, most importantly, suffering; which in turn leads to a real change of our attitude towards them (Fig. 26.3).

MT/JM: Not to mention our behavior towards them.

JG: The intensive farming of animals involves unspeakable cruelty to billions of sentient beings. Millions more are still used in research of all kinds, often involving much stress and suffering. The trade in wildlife and wildlife parts is flourishing. There is cruel training of animals in show biz. The pet trade treats animals as commodities. And so on. Of course none of this is at all surprising when we think of the way humans are treated by other humans, the horrendous images of torture, child soldiers, slavery, domestic violence, chemical warfare—the list goes on. As I say, we have a long way to go! But there are many groups fighting to end the abuses.

MT/JM: Tens-of-thousands of dedicated NGOs; millions of individuals.

JG: Yes. Many of us are working to save endangered species and environments. All our efforts will be in vain if we are not successful in raising younger generations to be better stewards than we have been. The challenge is very poignant: So many of the young people who seem to have little hope for the future; many are apathetic, depressed or angry. They tell us their future has been compromised and there is nothing they can do about it.

MT/JM: Some have spoken of the crisis of ecological illiteracy; but even worse is the notion of the very "extinction of experience" for our youth (Fig. 26.4).

JG: We have indeed compromised their future. I feel angry when I hear people quote (Chief Seattle): "We have not inherited this planet from our parents: we have borrowed it from our children"—for it is not true. When you borrow there is the intention of paying back. We have been relentlessly stealing our children's future. I have three grandchildren and when I think of the vast harm we have inflicted on Mother Nature since I was a child I feel a sense of desperation and anger. It is this that keeps me going, makes me determined to spread our program, Roots & Shoots, further and further around the world. Because I have seen how it changes the lives of young people, gives them a sense of purpose, rekindles hope.

Fig. 26.4 Colleagues of Jane Goodall in the Field. (Photo Credit: © Nick Riley)

MT/JM: And without hope…. well…. there is no hope. It is not a good outlook, to be sure.

JG: The greatest danger to our planet is that we lose hope—especially if our youth loses hope. Because, if we have no hope, we give up and stop trying to do our bit to make a difference.

MT/JM: Tell us more about your program, Roots & Shoots?

JG: Well, it is designed to provide an antidote to hopelessness and helplessness by encouraging young people to become involved in projects that have a positive impact on the world around them. Its most important message is that every individual matters and has a role to play—that each of us makes a difference every day. And, that the cumulative result of thousands and millions of even small efforts can result in major change.

MT/JM: How did it get started?

JG: The movement began in Tanzania when 12 students gathered to discuss some of the issues that concerned them—poaching, the illegal wildlife trade, stray dogs, street children and so on. How amazing that from such a simple beginning the program has now spread to 130 countries with some 15,000 active groups, involving young people from pre-school through university and beyond—there are even some senior citizens, prisoners and corporate staff involved.

MT/JM: And the nature of their gatherings, their discussions?

JG: Groups discuss local problems and decide what they can do to try to solve them. The projects they actually chose will vary depending not only on the nature of problems themselves, but also on the age of the members, their culture, socio-economic status, whether they are inner city or rural, which country they come from, and so on. Most importantly they work on projects about which individual group members feel passionate.

MT/JM: And the rationale for the name?

JG: The name is symbolic. Imagine a small seed that will grow into a mighty tree. Think of those first little roots and that first tiny shoot appearing. They look so fragile, yet there is so much energy, so much life force, in that seed that the roots can

Fig. 26.5 Jane Goodall with Many Friends. (Photo Credit: © Michael Neugebauer)

work their way through boulders to reach the water, and the shoot can push its way through the crevices in a brick wall to reach the sun (Fig. 26.5).

And eventually the boulders and the wall will be pushed aside. If we think of the boulders and walls as symbolizing all the problems we humans have inflicted on this planet, environmental and social, resulting from our greed, cruelty and lack of understanding and respect, then Roots & Shoots offers a message of hope: hundreds and thousands of young people—the roots and the shoots—can break through and, together, make this a better world.

MT/JM: You have repeatedly called for hope and optimism, which is certainly a rational response to so much widespread ecological doom and gloom in the media. Frankly, we see things continuing to deteriorate on all fronts.

What are your deepest fears in terms of the global environment, now that we are 18 months past the UN Rio+20 Summit and so many other conferences, and have some advantage of hindsight?

JG: My deepest fear is that we shall not rise to the challenge of restoring a sick planet. So many people either do not understand or do not care. And those that do so often feel hopeless and simply don't believe that we can bring about change fast enough. And as climate change leads to crop failures and food prices are raised and people get poorer they will, of necessity, buy the cheapest products without regard for how they were produced. Worst of all, unless there truly is a paradigm shift in the way we think about our impact on planet earth and its long-term implications, it will be business as usual. The rich will get richer, the poor poorer, the planet increasingly depleted.

MT/JM: With rapid climate change, many are now suddenly waking up to the fact that the surpassing of not only 350 parts of CO2 per million, but 400 parts, on average, in the global atmosphere, it is not only real, but possibly too late to halt the vast Anthropocene, as it is now called, rather than the Holocene. We may simply have to learn collectively—rich or poor—to adapt. There has even been discussion of

moving the boundary lines of entire parks to account for northerly migrating species seeking refuge from a planet quickly heating up. In just one shocking example, recently, in northeastern Mexico at a biological reserve, Cielo—the most northern tropical forest in all of the Western Hemisphere, it didn't rain for 9 months, killing off some 70% of at least two species of oak. Meanwhile, a garbage gyre, a dead zone the size of Texas, is growing even larger day by day across the planet's largely marine surface.

So, in terms of habitat, populations and species protections, what are the priorities that you feel require the most urgent recognition, where smart proactive decision-making by any number of concerned constituencies (as anthropologist Margaret Mead once made so pithy and famous), may well prove the difference between success and failure of our humanity here on Earth?

JG: Using alternative, green energy that is not dependent on growing vast areas of crops for biofuel—such as that generated by sun, wind, tide and algae. Adopting a vegetarian diet, or one with only a little meat. Ending what we quaintly call "conventional" farming—monocultures, GMOs and agricultural chemicals—and a return to small family farms and eco agriculture. Stamping out corruption. Electing governments that are not 'owned' by corporations. Small families. And, perhaps most importantly, changed attitudes towards what is most important in life. I love the happiness index of the King of Bhutan. And the experiment that showed that as people in the US rose from poverty, their happiness index increased. But as they then worked to get more and more money, their happiness index began to drop.

MT/JM: Bhutan, like Suriname, Denmark, San Marino and a few other truly blessed nations, is certainly a great template for the human conscience at work. All of them, by the way, possessed of tiny populations, a reality first intoned by Aristotle as critical to human sustainability and one, as you know, that has largely characterized the size of primate communities, namely, 150 individuals or less. That is certainly not the formula Homo sapiens have chosen, as we increase the number of cities exceeding 10 million by leaps and bounds.

JG: But let me harp back again to the importance of realizing that as more and more individuals make the right choices in what they buy and how they behave, that will, cumulatively, make a huge difference. Especially when CEOs of giant global corporations begin to make decisions that take account of future generations—like Paul Pollman of Unilever.

MT/JM: Animal rights has most assuredly come of age, and you are one scientist who has truly helped make that a reality.

With respect to our more than 634 fellow known primate species, what can Wall Street bankers, investment firms, philanthropists, and individuals with any sized portfolio—minute or other—as well as students, their parents, their grandparents, their children—all of us—do to help you and your colleagues make the difference you see as critical?

JG: Michael, Jane—it is clearly critically important to fund responsible programs that help to conserve the forests where most of the primates live. Thus it is important to invest in the preservation of forests. Villagers and local and national governments should be able to profit from trees left standing; there should be payment for the services forests provide in sequestering CO2 and ensuring a supply of clean water. There should be widespread endorsement of responsible, sustainable logging and wood products certified to be from such operations. There needs to be funding for education programs for people living in poverty in and around forests, and to ensure that they have livelihoods that do not destroy the environment. It is also important to fund programs working to conserve endangered primates (most are endangered), including captive breeding.

MT/JM: And vegetarianism?

JG: We should eat less meat, or best, become vegetarian. We can try to leave the smallest possible ecological footprint, which means, among other things, planning for small families.

MT/JG: Thank you, Jane.

JG: And thank you, Jane and Michael!

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Part VI
The State of the World

Chapter 27
China Declares Global State of Emergency: An Urgent Telegram from Taihu

On May 18th, China's 4th most powerful politician, Yu Zhengsheng, Chairman of the National Committee of the CPPCC (Chinese People's Political Consultative Conference) opened the Second Conference of the (carbon-neutralized) Taihu World Cultural Forum [1] in Hangzhou, a city one hour by speed train southwest of Shanghai. "What kind of a planet will we leave to our descendants? This is an urgent subject which deserves the collective attention of the whole world," he said with a sincere air of emergency (Fig. 27.1).

The ancient city of Hangzhou, with its gorgeous West Lake, in the Province of Zhejiang, was once thought of as "Paradise on Earth," at least when Marco Polo visited. It remains one of China's most beautiful and popular destinations. However, the 500 political leaders, scientists, NGOs, and bio-cultural experts from 23 countries were not simply there to enjoy the unusually pollution-free environs. Rather, this was the mother of all "middle of the night emergency sessions," with a singular and downright desperate focus: how to save China, how to save the world?

For Hangzhou, a city of nearly 8 million people, with a greater metropolitan population of over 21 million, this was the highest-level meeting since China's independence in 1949 (Fig. 27.2).

Present were world leaders like Mozambique's President Armando Emilio Guebuza, Greek Prime Minister Antonis Samaras, former Prime Minister of the Netherlands, H.E. Ruud Lubbers [2], Dame Louise Lake-Tack, Governor-General of Antigua and Barbuda, Her Royal Highness Princess Irene Emma Elisabeth of the Netherlands, two time Nobel Peace Prize nominee and Founding President of the Club of Budapest, Dr. Ervin Laszlo, Dr. Qu Geping, Honorary President of the China Environmental Protection Foundation, numerous ambassadors and a Who's Who of Chinese scientists. Each addressed from countless—and urgently conveyed perspectives—a candid and unflinching message: we are witnessing the potential extinction of humanity at our own hands, along with most other terrestrial and marine vertebrates. What can we do; what must we do to prevent it?

The stakes for China are daunting. Consider some of the following components of her ecological unraveling: Every year, 60 km or more of the country turn to desert, whilst 3.5 million square miles (some 2.1 billion acres) or 82 % of the country's primary forest has already been destroyed, and with it, an increasingly dire

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Fig. 27.1 Chinese press converge at Taihu. (Photo Credit: © M. C. Tobias)

Fig. 27.2 Hangzhou residents enjoying the lake on a sunday. (Photo Credit: © M. C. Tobias)

percentage of the 30,000 or so endemic plants (8% of the world's total). Over 27% of China's 6347 vertebrates (including 581 mammal, 1244 avian and 660 reptile and amphibian species) are at risk of extinction, including the largest number of threatened primates, from rare snub-nosed monkeys of the genus Rhinopithecus to the Hainan Gibbon.

As for the estimated 20,000 Chinese marine species—into whose in-shore and oceanic biomes the vast majority of Chinese chemical toxins are dumped—disappearing Pink, and Yangtze River dolphins are unambiguous indicator species. Other such bio-indicator species include Père David's Deer, Snow Leopards, the Chinese Alligator, Pangolin, and the world's largest number of endemic pheasants, not to mention a quarter of the world's unique Rhododendron species, rare ferns and other bryophytes, and—last but surely not least, the Giant Panda and—most tragically, the South China Tiger [3], deemed by the IUCN to be "functionally extinct" although it once ranged through the beautiful forests of Hangzhou (Fig. 27.3).

While in situ legislation is rapidly evolving (dating back to 1988 with the Law on the Protection of Wildlife, Order Number 9), and baseline data sets are increasingly refined for the country's vast biodiversity, abetted by all of the state-of-the-art science, geo- and bio-technologies that have so brilliantly powered China's applied

Fig. 27.3 From west lake, Hangzhou. (Photo Credit: © M. C. Tobias)

engineering Renaissance and economic miracles, there remains an undiminished, if brutal truth: China has the most wilderness left to lose of any country on the planet, roughly 28 % of her remaining wild countryside.

Or, one might say, China has the most wilderness yet to safeguard. That is, of course, assuming her new leadership under President Xi Jinping will maintain focus on this priority. Indeed, statistics now show that a true and lasting environmental movement has taken hold across the country.

Says Yang Zhaofei, vice-chair of the Chinese Society for Environmental Sciences, "the number of environmental protests [4] has increased by an average of 29 % every year since 1996, while in 2011 the number of major environmental incidents rose 120 %."

While the Taihu conference was taking place over the course of two days, cadmium-tainted rice and baby food scandals, as well as Chinese H7N9 virus human-to-human transmission prospects were making headlines. Four months earlier, Beijing—which maintains a sophisticated air quality index focusing on minute particulate matter smaller in diameter than 2.5 μm (the "invisible killer") [5]—had seen three days of the worst air pollution [6]—in the city's documented history reaching for the first time ever, the "Orange" [7] level of risk. Travelers to China are by now accustomed to seeing people wearing masks as particulate matter far exceeds on any given day World Health Organization recommended acceptable thresholds.

Among the salient components fueling such pollution are the fundamentally exponential GDP(s) driven by a human population explosion across the nation's 31 provinces poised to hit between 1.4-and-(in the most sobering projections) 2 billion Chinese. Then there is the dust, and the dust storms from the deforestation largely along the North China Plain where water levels are dangerously diminishing and forests denuded. But the most obvious contributor is the nation's vast consumption of coal (China is said to possess some 13 % of the world's recoverable coal reserves [8] for the generation of her more than 1,000 GW of currently needed electrical capacity, and with it an estimated abstraction of 12.6 m^3 of groundwater for every ton of coal across the fossil fuel's entire supply chain.

Add to these, China's rapacious appetite for animals on breakfast, lunch and dinner plates; what one commentator has likened to a kind of "revenge" eating of meat to make up for famines in past years. Writes Nicola Davison for the important bi-lingual magazine, "chinadialogue" (whose founder and editor attended the Taihu World Forum, Ms. Isabel Hilton, a renowned China expert and member of the Royal

Fig. 27.4 Intelligent, emotional pigs, en route to slaughter outside, Shanghai. (Photo Credit: © M. C. Tobias)

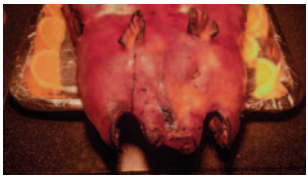

Fig. 27.5 Photo Credit: © M. C. Tobias

Institute of International Affairs), "In 1980 the average Chinese person ate 14 kg of meat. Today that person eats over four times more…." Moreover, says Davison, "pork is China's favourite meat [9]: last year the country produced 50 million tons—more than half the world's total." With increased income generation, more pigs will be slaughtered, more effluent emitted, contributing to the overall groundwater and air pollution drama deeply embedded in everybody's life across China (Fig. 27.4).

Professor Peter Li [10] has elsewhere stated that "China surpassed the US as the world's biggest meat producer in 1990, and the Chinese authorities have long looked to the industrialized West as the object of emulation in meat production." But, at the same time, "China has lagged behind the industrialized nations in animal protection law-making for more than 180 years (Fig. 27.5)."

China has also exported this lack of animal welfare in the same name of consumption, whether by driving the market for ivory and corresponding slaughter of elephants; or in the insatiable desire—often delusional—for aphrodisiacs or any number of other alleged animal-derived medicinals, resulting in the near extinction of rhinos and tigers, and the abominable torture and killing of bears for their bile which contains Ursodeoxycholic acid and is believed to help with human digestion and the dissolution of gallstones.

Add to this the melting of glaciers and the looming grain crisis. China's $ 120 billion annual surplus will not be enough to produce the 400 million tons of grain needed each year from an already arable land base whose productivity and soil nutrient turn-over rates are facing utter exhaustion and extraordinary nitrogenous fertilizer overshoot.

Ecological schizophrenia captures both the upside and colossal downside of human affairs in China. On the one hand, there is the current construction of the Shanghai Tower, second tallest and smartest building in the world, engineered at the

Fig. 27.6 Hangzhou, one of the world's great green corridor cities. (Photo Credit: © M. C. Tobias)

most formidably green standards ever devised. Moreover, China has long embarked on the largest reforestation program and national strategic plant conservation initiatives in human history. But the biodiversity hotspots and coldspots are increasing—those areas with the largest aggregates of species, populations and genetic diversity at risk that would, otherwise, service—hopefully humanely, wisely and sustainably—the agricultural and medical needs of future Chinese generations. All that on top of the greatest need of all: our species' humility before the far greater vastness of millions of other species which give us essential physiological, emotional and psychological health and solace (Fig. 27.6).

This is a universal quotient of ecology, by no means unique to China. What is unique—and what characterized the dominant theme of the Taihu World Cultural Forum—is the risk to which our species, and our species alone, has exposed the rest of the Creation.

The Chinese know this, both in terms of their glorious shan-shui landscape aesthetic traditions (from Confucius, Mencius, Buddha, Lao Tzu, Hseigh Ling-yun, Han-shan, Li Cheng, Kuo Hsi, and so many other luminaries of Chinese literature, painting and philosophy) to the environmental awareness that pervades Chinese rural culture with much the same contemporary reverence and sensitivity one might find in countries as diverse as China's neighboring Bhutan, or in Great Britain, Switzerland, Ecuador or the United States. To some, who know only the pollution of Beijing, the nightlife and commerce of Hong Kong, or the skyscrapers of Shanghai, this might seem off center, but it is not. China is brilliantly in tune with nature and has exactly what it takes to be a world ecological leader.

That is both my personal view, and the overall assessment that emerged at the Second World Cultural Forum, though not without rigorous self-reflection voiced openly at Taihu, all in a clear effort to make future Taihu gatherings the ecological equivalent of the Davos Economic Forum.

With an eight-part Proclamation signed by the delegates, Taihu promises to usher in what is hoped to be a new "ecological civilization" and one which Ambassador Jean-Jacques Subrenat (representing former French Prime Minister Jean-Pierre Raffarin) described as the precursor for much "action" in as much as "awareness is not neutral," or, as Prime Minister Samaras eloquently suggested, what is needed is a move from environmental protection to environmental improvement.

Such invocations from both the Chinese and their guests were the order of the day at Taihu.

This year being the 30th anniversary of bilateral relations between China and Mozambique, President Armando Emilio Guebuza's opening Keynote Address

Fig. 27.7 The New face of Asia. (Photo Credit: © M. C. Tobias)

made it abundantly clear that a flourishing biodiversity—whether in his native African nation, in China, or anywhere on Earth—is "the bedrock… of human civilization." That should we fail to halt climate change, the many "unknown consequences" will, among other things, impede our ability to enjoy "blue skies," a metaphor the President employed with unmistakable and fitting poignancy, thus setting the subsequent tone for the entire conference, both by his gravity and his great heart; his ebullience and unwavering "hope" for the world (Fig. 27.7).

The litany of concerns and concomitant convictions raised in Taihu's two days transcended, even, the June 2012 UN Rio+20 density of wake-up calls, perhaps because there was no time, nor intention to haggle and negotiate.

With Maui's brilliantly astute, affable and practical Mayor Alan Moriyoshi Arakawa sharing the podium with Pierre Laconte, President of the Foundation for the Urban Environment in Belgium (who stressed the necessity of walking at least 30 min every day) and others, this was a conference focused upon getting the job done; human survival; spiritual freedom; core values of sustainability that transcend greed and economic disparities; that overcome weapons of ecological mass destruction and extinction, redeem biological integrity for all sentient beings, redress what has gone wrong, re-wild our hearts, re-attune our compasses, achieve the achievable, live and let live before it is too late (Fig. 27.8).

Former Dutch Prime Minister Ruud Lubbers, a great environmentalist, human rights champion and original member of the Earth Charter Commission, reflected on how the word "culture" had changed in China during his many years visiting the country; from the days of the "Cultural Revolution" to the new ecological culture sweeping China and so much in evidence at Taihu.

Delegates from outside China—Russia, Estonia, Cuba, across the European Union and the United States—were not a little stunned by the remarkable candor aired by Chinese politicians, scientists, philosophers and cultural historians who each touched upon spirituality and religion; international collaboration; personal emotion; family life and the roots of all cultures as seminal to the enormous challenge of engendering a green, circular, low-carbon, equitable and biologically-restored planet. May 18th was named the official World Ecological Civilization Day.

Fig. 27.8 Former dutch prime minister Ruud Lubbers. (Photo Credit: © J. G. Morrison)

"We must restore the balance of man and Nature—[this is] our dream in China," Yan Zhaozhu gently intoned (Executive Chairman and Secretary-General of the entire Forum). While Ye Xiaowen, Vice President of the Academy of Chinese Culture, likened this challenge to the "Renaissance," but one that must get beyond industrialization, urbanization and the consumption of fossil fuels. Those were the vehicles, he described, that delivered prosperity to some but turned humans into "enemies of nature," a syndrome that today is manifested in poisonous wastes, the measurement of moribund health in parts per million, and outbreaks like SARS coronavirus. The sum total of all that prosperity, said Ye Xiaowen, has become "an ecological crisis plaguing the world."

This world view, said Matthew Hodes, Director of the United Nations Alliance of Civilizations, is paramount to a constellation of eco-crises "beyond debate." Hodes reminded participants that the first three words of the United Nations Charter are "We the Peoples" and sounded a cautionary note by invoking the UN Millennium Development Goal #7 [11] focused on environmental sustainability, particularly for the tens-of-millions of environmental refugees and economically marginalized peoples of the world. Hodes underscored the ecological interdependency of a climate-challenged global population by pointing to the fact that China had just joined the Arctic Council, noting that between 2010 and 2012, Arctic maritime commerce had witnessed ten times the ships and tens times the tonnage of commercial goods, as the ice continued to vanish (Fig. 27.9).

Such cautions were furthered by Dr. Roy Morrison, Director of the Office for Sustainable Development at Southern New Hampshire University, who referenced a world of "ghost cities" and marshaled acute logic on behalf of a "business proposition [that] is simple"—to extract trillions of dollars from obsolete, polluting mechanisms, and mine "savings streams" for natural capital, not destruction. Utilizing citywide utility scales and energy efficiencies, Morrison predicted that we could well hit zero emissions as a civilization within 20 years if we really set our minds and hearts to it, utilizing such instruments as a tax administered by the UN for all per capita emissions exceeding three tons.

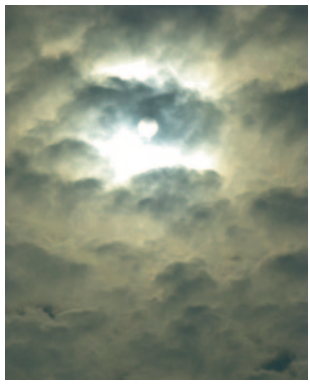

Fig. 27.9 Low tropospheric air pollution over Shanghai. (Photo Credit: © M. C. Tobias)

Ultimately, the Chinese ecological position was delivered in unadulterated form by Dr. Qu Geping, Chairman of the Environmental and Resources Protection Committee of the National People's Congress. I first met Dr. Qu Geping at his offices in Beijing in the early 1990s when he was the Chairman of the 8th Environmental and Resources Protection Committee of the NPC, a position equivalent to the head of the EPA. Back then he told me that the Chinese had widespread awareness of environmental crises sweeping the nation and that laws were quickly coming into being (Fig. 27.10).

But here in Taihu his message was terse: "I have noticed some progress… [but, so far,] we have failed to avoid the old path. I can say that the situation in China today is extremely severe. China must make tremendous and extra efforts."

Or, as Dr. Ervin Laszlo warned, humanity will become the "first self-endangered species. [But] humanity can evolve and mutate culturally. The nature of crisis is also an opportunity... ."

This biodiversity crisis, involving animal rights and human rights; this overwhelming and unprecedented crisis was the focus of Taihu—an urgent telegram to all of China, to all of the world. Will people read the telegram?

I, too, was a delegate at Taihu along with Jane Gray Morrison. In my address, I expressed the belief that 'we need to be compassionate and non-violent; to be focused upon the biological bottom-line.' I suggested that Hangzhou become a global biodiversity corridor, in keeping with her traditional Garden of Eden ethos; a greenbelt like that surrounding Kyoto, teeming with gardens and wildlife; or like Devonport, New Zealand—the first nuclear-free zone in the world; or Denmark's Samsø, a nearly carbon-neutral island; organic Mendocino, organic wine and olive regions in Spain—Andalusia and La Mancha—or the Haa Valley of Bhutan. A green space like the vast majority of the nation of Suriname, or any Jain monastery across India where Gross National Happiness and a reverence for all living beings reigns supreme.

Is this possible in China? I believe it is. This is a nation whose ancient philosophers echoed century after century that Heaven and Humanity can be one.

Fig. 27.10 Dr. Qu Geping, one of China's greatest ecologists. (Photo Credit: © J. G. Morrison)

Memorably, it was HRH Princess Irene Emma Elisabeth Prinses Van Oranje-Nassau (Princess of the Netherlands) who concluded with deep but unyielding emotion, "We are all nature. Do we remember?"

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Chapter 28
Japan's Tragedy: Global Ecological Uncertainty

Sendai, one of the largest cities in northeastern Japan has seen 260,000 people evacuated in the past three days. Thousands of people and scores of companion animals remain missing or injured, while an as yet unknown number are dead. With aftershocks continuing, as well as rampant media speculation regarding potential leaks of radioactive Cesium at the local Fukushima [1] nuclear reactor, what remains clear is that the terrible damage from this catastrophe underscores the reality that we are all fragile members of a community called Mother Earth; and she is not consistently motherly (Fig. 28.1).

Historically, residents of Sendai have endured great hardship. In the eighteenth century hundreds of thousands of people there perished from a famine caused by massive rice crop collapse.

The modern-day city has several world class research institutes, colleges and progressive environmental NGOs. Sendai joined 20 other cities throughout Japan last year to become a member of Local Governments for Sustainability (ICLEI) [2]. Earlier in 2010, a marine stewardship and biological research conference was held in Sendai to help identify biodiversity hotspots of the world's marine environments, which are sorely under-represented in the existing network of the world's protected areas.

Members of the Sendai scientific community were amply represented in the United Nations Convention on Biological Diversity (CBD) in the Japanese city of Nagoya, in mid-October 2010. There, nearly 20,000 ecologists arrived from nearly 200 nations to find ways to stem the tide of ecological destruction occurring around the world.

At that conference, Japan, as host country, was remarkably progressive and generous, committing over a 3-year time frame, the unprecedented sum of $ 2 billion for biodiversity preservation in developing countries [3].

In a statement confirming and clarifying the Japanese declaration, U.S. based Conservation International's (CI) Director of Biodiversity and Ecosystem Services Policy, Lina Barrera revealed CI's support [4] of a proposal characterized as literally saving life on earth during the coming decade, while there might still be enough time.

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Fig. 28.1 Japanese Coi in Garden Pond, northern Japan. (Photo Credit: © M. C. Tobias)

Fig. 28.2 Rare Japanese Frog (Toad) Species, central Japan. (Photo Credit: © M. C. Tobias)

Japan herself is one of 35 terrestrial hotspots in the world, a region of the planet containing huge arrays of biodiversity found nowhere else that are under threat from humans. Japan is one of the most recent nations in the world to be added to this list of regions ecologically under siege. To the country's formidable credit, this unwelcome designation has helped galvanize Japanese awareness of the importance of her own precious biodiversity and recognize, in turn, a financial and moral obligation to try and assist other nations suffering from similar systemic collision courses between native species and humanity's own ecological footprints [5] (Fig. 28.2).

According to CI's databank, Japan has at least 5,600 plant species, 94 mammalian, 366 bird, 66 reptile, 50 amphibian and 214 freshwater fish species. Many of these are endemic to Japan [6] and many are threatened with extinction.

The Miyagi Prefecture of Sendai (often referred to as the "food kingdom") in addition to a rare Blush Clover—and her much celebrated wild geese, is home to a species of Japanese Hornbeam known in the U.S. for having been planted as a substitute for the American elm because of the Japanese species' high resistance to Dutch elm disease. Sendai is even often called the green "City of Trees" (Fig. 28.3).

Japan has [7] promoted the notion of countries "living in harmony with nature" (in keeping with the nation's own aesthetic and ecological Fujiwara traditions dating back to the seventh century) and called upon the debt-ridden European Union [8] to step up its own collective commitments financially to reach goals long endorsed by the United Nations CBD that would greatly slow down the rate of species extinctions throughout the world (and thus, of entire populations). In December of 2010 Great Britain announced the largest marine protected reserve in the world, 55 islands scattered remotely in the British Indian Ocean Territory, and called

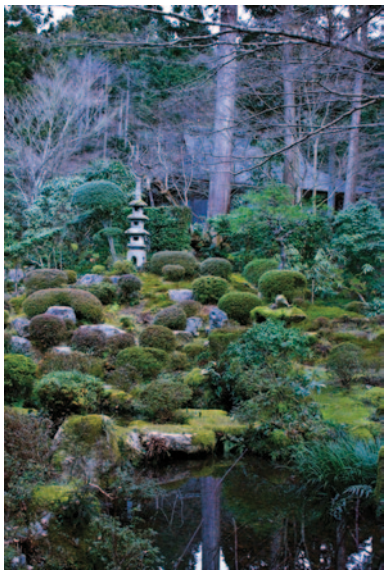

Fig. 28.3 One of countless famed moss gardens in Japan. (Photo Credit: © M. C. Tobias)

Fig. 28.4 Ancient Buddhist sculpture from a moss garden in Kyoto. (Photo Credit: © M. C. Tobias)

the Chagos Archipelago [9]. They have been likened to Ecuador's Galapagos in biological importance.

History has shown, however, that financial commitments targeted at environmental causes are easily compromised, if not thwarted. Between the seismic disaster in Christchurch, New Zealand (another country, like Japan, designated as a biological hotspot), and with Wall Street continuing to be roiled by political and petroleum uncertainties from events occurring daily throughout the Middle East, it is difficult to project next year's global conservation budgets.

But one thing is clear amid the chaos and tragedy of Sendai. Humanity's sorely needed financial exertions to inhibit the current pace of unprecedented extinctions are once again placed in further doubt. This does not reflect any absence of goodwill. Rather, such fiscal uncertainty mirrors the very mechanisms we least understand, namely, the destructive powers of nature herself, whose all too earthly ferocity can turn upside down in an instant every philosophy, economic engine and ethic (Fig. 28.4).

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Chapter 29
Before the Fall: Syria's Ecosystems

Less than a decade prior to the chaos and tragedy that has befallen the world's ancient and beloved Syria [1], scientists discovered members of the allegedly extinct Northern Bald Ibis in a Syrian desert. Found upon a cliff face, this "oriental subspecies" had disappeared many years before. This is one reason, albeit only infrequently proved to be right, that zoologists as a rule wait 100 years before conceding that a species is officially extinct in the wild. [1]

Similarly, doomsayers currently debating the future of this amazing nation, her people and traditions, should recognize that nature can teach us everything, particularly patience, humility and non-violence, if we are attuned. But amid the horrors of chemical weapons and a rising human death toll, the other all too real fall-out concerning Syria's biological crisis, has received little attention. But it is there, simmering, awaiting 11th hour recognition.

There are ecological remedies that have been outlined by the Syrian government herself; by NGOs and international consultants to Syria's Environmental and Agricultural Ministries, most assuredly. But the issues are time, the capacity for eco-assessment, human resources, infrastructure, and restoration policies amid a welter of clearly more pressing emergencies.

And yet, time and again as competing priorities absorb humankind at the price of biodiversity, the aftermath will necessarily be all the more difficult with every lost opportunity.

Syria's Biodiversity

Syria represents a unique mix of ecological wealth, vulnerability and weariness. For those steeped in such poems as Emily Dickinson's famed "Hope"—pertaining to the feathers of a bird. Syria is a globally critical piece of precious turf. The country is located in the wild and wonderful hub of stopover spots and staging grounds (food, water and sleep) for migratory birds on one of the world's seven most important avian migration routes, or flyways—the Rift Valley, which courses southward from northern Syria to Mozambique in East Africa. While the spiritual evocations

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Fig. 29.1 The feeding of pigeons in the square before the great Umayyad Mosque in downtown Damascus. (Photo Credit: © M. C. Tobias)

Fig. 29.2 An ancient mosaic of winged Griffiths, National Museum Of Damascus. (Photo Credit: © M. C. Tobias)

of "the road to Damascus" resonate throughout human history, if you are a bird then Damascus and the surrounding steppes have their own critical allures (Fig. 29.1).

There are a known "386 present or migratory species" in Syria [2], a nation that affords a drink of cool water in the desert, as well as food for pigeons in the Old City of Damascus on the very doorstep of the second oldest Mosque, the Great Umayyad Ğām' Banī 'Umayya al-Kabīr wherein local imams convey prayer beside the tomb of St. John the Baptist.

Despite nearly two-dozen protected areas, the country is nonetheless under siege ecologically. In part, this is fueled by the nation's dry steppe expanse, thirst for water and food to satisfy the needs of a population growing at some 1.8–2.0 % per year, or nearly 75 % higher than that of the world average (not accounting for the current exodus of refugees leaving Syria). Her primeval Palearctic ecosystems, part of the vast corridors encompassing Europe, northwestern Africa and all of Asia north of the Himalayas, are home to numerous threatened tree species including cedar, fir and oak, as well as wild relic domestic fruit tree species, are part of a fragile tapestry of flora and fauna at great risk given the narrow margins of rainfall (Fig. 29.2).

There are an estimated 2500 animal species in the country. Many of the large vertebrates, amongst a known 125, are gone from Syria, including the wild desert burros (Onagers), the Arabian ostrich, and what were once described as huge wild herds of Reem gazelle. Lions and leopards are no more. Moreover, the country has one of the lowest percentages of protected areas in the world, 0.6 %, versus 12 % of protected land area across most other nations. Syrian scientists and others have

Fig. 29.3 Syrian steppe village north of Damascus. (Photo Credit: © M. C. Tobias)

recommended numerous sites for protection, but there are now unprecedented obstacles to enshrining such sanctuaries.

Hence, little wonder that some 500 known Syrian plant species are threatened and half of these are endemic. That is a biological situation of a coldspot—regions of high biological vulnerability still beneath the "official" radar screen of listed species—quickly becoming one of the 35 known terrestrial "hotspots" where the vast majority of life forms on land can be found, and a huge percentage of them are at some risk of extinction. In addition, an estimated 40 million shrubs are extirpated each year for fuel across Syria's rangelands, or Badia (Fig. 29.3).

The sum total of such statistics is biologically ill-boding, indeed; but to add civil war to these ecological gasps and data-deficient gaps is nothing short of catastrophic. For the more than 160 breeding bird species in Syria, 11 globally threatened, the woes of the nation are taking more tolls than can possibly be accounted for at this point in time across the myriad of ecosystem levels [3]. Unlike, for example, the 50 scientists immediately dispatched to Yosemite National Park to ascertain biological fall-out and eco-restoration needs in the ongoing wake of a 400-square mile disastrous fire, Syria's scientific gaps are only likely to widen. The scientific community will probably have to wait on Syria.

For the 143 reptile and amphibian species, many already known to be threatened, attrition is likely to be extreme, as habitat, both urban and rural, is increasingly fragmented and, for now, no one knows what's coming; nor how such accelerated fragmentation translates into new bio-invasives and the migration of pathogens.

As for the 1,434 known insect species, including so many pollinators, well, it's pretty obvious that insects are not the first thing peacekeepers are going to worry about. And yet, no scenario in a nation as large and complex as Syria will survive without pollinators who provide critical services of nature in the form of food, soil stabilization, biomass and water purity; all those preconditions for biological bounty that can only be undermined by the human folly which is war.

Syria's Ecological Commitments and Her Future?

It is worth recalling the country's numerous statutory protocols as spelled out in the Syrian Arab Republic National Report (data from which much of the species inventories in this essay have been utilized), "Biodiversity Strategy and Action Plan"

Fig. 29.4 Local scene north of Damascus. (Photo Credit: © M. C. Tobias)

Fig. 29.5 A cat in downtown Damascus. (Photo Credit: © M. C. Tobias)

(NBSAP Project SY/97/G31). Write its authors, Dr. Youssef Barkoudah, Dr. Akram Issa Darwish and Dr. Michel Abi Antoun, "Syria is committed to the protection of its environment." To that end, numerous international treaties have been signed, including "the Convention to Combat Desertification," the "Ramsar Convention" (on wetlands), the "Convention on Biodiversity" (in 1995), treaties on marine pollution ("MARPOL"), "Ozone," and of particular interest at present, "The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes," adopted in 1991 [4] (Fig. 29.4).

The more than 100,000 murdered, human victims of Syria's tumult mirrors the same kinds of ecological unraveling that historians of nature and culture have long dissected. The International Union for the Conservation of Nature (IUCN) in its tallies of hunger and ecological disruption, in nation after nation, including Syria has shown the obvious correlations between violence between people and the attrition upon nature.

More than half of the nation's population is less than 15 years of age, which means that this dry-steppes collection of biomes, under the aforementioned demographic, biological and internecine conditions, have desperate need for a global coalition of sincere support. A gentle but effective rallying cry in response to so many prayers of the human voices heard around the world, but also of the voiceless (Fig. 29.5).

Time tests ecosystems, as it does people, communities, whole civilizations. At stake in Syria's extraordinary mosaic of distinct biological corridors is an oasis that, if left in peace, would deliver future genetic evolution in a crucial region of the planet. If abandoned, or left to teeter upon an ongoing abyss, then all ecological bets are off the table, not just for Syria, but a vast surrounding region of dependent life forms [5].

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Chapter 30
Sir Simon Jenkins, England's National Trust, and the Future of Conservation in Great Britain

With a human population over 51 million, projected to hit a whopping 70 million by 2027 [1] , the increasingly fragmented British wilds—ancient, prized, and ever contested—are more urgently relevant than ever. Romantic poets did little to allay ill-boding premonitions—Wordsworth, for example, had little use for locomotives plowing through the Lake District. He, Shelley and Byron would have shuddered at the prospect of a third runway at Heathrow. The idea of a Constable or John Crome sketching the likes of busy, sprawling airports, is equally unimaginable (Fig. 30.1).

Despite her admirable and (historically unprecedented) embrace of animal rights, and generations of ecologically-aware activists on every front, Britain's looming budget and national planning crisis pit Shakespeare's "blessed plot, this earth, this realm, this England" ("King Richard II," Act 2 scene 1) against a seemingly blind onrush of newly-planned development. But there is also a not ungrounded fear of the wild economic gyrations now hammering much of the European mainland spreading into the British outback. It is a dynamic, if disagreeable tension (Fig. 30.2).

All of this human babel deeply matters, particularly to those concerned about biodiversity in England. At least 52 bird species out of a total known 246 English avifauna [2] are threatened and could one day go extinct. Most English residents or tourists will never encounter—at least out in the wild—the rare Slow Worm, [3] Natterjack toad, [4] Black Bog Ant, [5] Violet click beetle, [6] Duke of Burgundy butterfly, [7] Large Marsh grasshopper, [8] Lady's Slipper Orchid, [9] Water vole; [10] and Harbour Porpoise, [11] the Greater Horseshoe bat, [12] European Otter, [13] European Hare, [14] or Hazel Dormouse [15]. Their populations are eroding. The lovely Scots Pine of the Caledonian ecosystem has been successively attenuated to barely 1% of its earlier 1.5 million ha. All such human-induced insults add up. If Great Britain is keen to balance her budget, she would be equally, if not more wise and judicious to care deeply for, and hold on to her ancestral biological heritage, a point both salient and germane to National Trust Chairman Sir Simon Jenkins' carefully-considered message.

Jenkins' prolific career, [16] unabashed convictions and deep love of country life and English history have placed him in a unique position, and just in time: England needs his rallying cry. As Chairman of Britain's National Trust since Autumn, 2008, Simon (he does not tout titles) has unstintingly articulated the gold-standard that the

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Fig. 30.1 Simon Jenkins, the Chairman of The National Trust. (Photo Credit: © National Trust Images/ John Millar)

Fig. 30.2 The front of the mainly c17th Hill Top, Sawrey, Cumbria, where Beatrix Potter wrote many of the Peter Rabbit stories. (Photo Credit: © National Trust Images/Stephen Robson)

Fig. 30.3 The gorse-covered cliff-land at Dinas Oleu above Barmouth, Gwynedd. (Photo Credit: © National Trust Images/Joe Cornish)

Trust has enshrined since its first humble late nineteenth century founders promoted British environmentalism on behalf of all concerned—private landowners, gorgeous sites of unique historic and aesthetic importance, the need of wild places and a sense of place felt by the public, and every species. Great souls like Octavia Hill, Robert Hunter and Canon Harwicke Rawnsley—the three founders of the National Trust—would have been supremely relieved to see a man of Jenkins' character and intellect shepherding the nation's largest conservationist non-profit institution.

The Trust's commitments, and Jenkins' stamina (as well as the Trust's President, HRH Prince Charles) are soon to be tested as Britain's new budget, and National Policy Planning Framework, (NPPF), are about to be unleashed (Fig. 30.3).

With a Charitable portfolio containing over a-half-million hectares of extraordinary property—much of it high in biodiversity value and—critically, of very great

Fig. 30.4 Wind turbines on the Whitehaven coast, Cumbria. (Photo Credit: © National Trust Images/Joe Cornish)

beauty; some 500 miles of coastline, 10,000 structures, hundreds of cottages, mansions, even palaces, along with vast artistic and literary treasures, the National Trust has been a veritable godsend for 117 years since the first 4.5 acres of cliff-side in Wales were endowed to it by Ms. Fannie Talbot. In her gift, Talbot included overt language defining real preservation, [17] "I wish to avoid the abomination of asphalt paths and cast iron seats of serpentine design…." Honoring such mandates, the National Trust [18] has been one of the leading conservationist and preservationist organizations in the world.

With the soon-to-be-released NPPF, Jenkins and company have their hands full. Jenkins tells me, "The original document was just a disgrace. It was written by the house-builders. It was a cowboy's charter… It would go to land use that was essentially suburban, or vulnerable to being built-over at will, and that would have been a disaster after fifty years of protecting it. That's what we're fighting now."

Last year, in response to the British Government's PB13583 "Biodiversity 2020: A strategy for England's wildlife and ecosystem services" from the Department for Environment, Food and Rural Affairs (Defra) [19] the National Trust gently urged the British public to ask the hard questions and consider all of its options, in unabashed, if rational favor of conservation. Declares the Trust, officially, "The National Trust exists to promote the preservation of special places for the benefit of the nation. This doesn't just mean the places we own or have covenants over. It goes wider to mean any special places which are under threat. We support the legal and policy safeguards that protect such places, and would be very concerned if those safeguards were diluted or removed. We have a duty to oppose such measures and to bring the issue to the attention of our members and supporters (Fig. 30.4)."

Now, Jenkins' poignant leadership and the Trust's millions of seriously committed followers, are "on tenterhooks" awaiting the government proposals this month, particularly the NPPF. In a conversation with Jenkins earlier this week, he shared with me some of his most serious concerns, notably, those dealing with huge development projects in the name of "job creation" slated for the very countryside the National Trust has always endeavored to protect; projects Jenkins views as "shortsighted," whether in the form of "wind turbines going up almost everywhere in the UK with almost no impediment," or a new high speed railway from London to Birmingham, a third runway at Heathrow, or "new housing estates in the countryside largely because the building industry wants them there because those are the

most profitable places to put them." In other words, "on almost every front" [a] "Keynesian demand that government spend large sums of money in a recession [that] is clashing with what we regard as the long-term importance to preserve the rural heritage."

And what is "rural heritage" if not those very components of traditional British country life of which most of the world has always been enamored; those "absolute values that any society should protect…environmental beauty, landscape beauty, natural beauty…something that's good in itself and needs protection," Jenkins reiterates with a statesman-like poise.

Such protections are indeed in jeopardy, and it's not just about noise from airports over marshes in Kent, Ealing and Notting Hill, and the multitude of sensitive "eardrums." A February 15, 2012 article in the much esteemed Country Life magazine declared, "As much as 55% of England's green and pleasant land could be at increased risk of development due to Government reforms of the planning system," according to the Campaign to Protect Rural England (CPRE) [20].

March 22nd is the first full day of Spring this year, the day-after the budget release and the same week as that of the NPPF. Here's what the National Trust is officially "waiting for" according to Claire Graves, National Trust Senior Press Officer: "Presumption in favour of sustainable development…" "Definition of sustainable development… [a] clear, robust and practical definition…and it must include environmental limits…. Duty to cooperate… Brownfield first…priority given to allocating previously developed land where it's located appropriately, and has little biodiversity value… Town centre first…a stronger emphasis on the importance of affordable housing…" [21].

In an Op Ed piece written by Jenkins for The Guardian in January this year, [22] Jenkins the journalist (not wearing his National Trust hat), was slightly more provocative. With respect to the airport debate he wrote, "The vales of Aylesbury and Severn, the Cambrian mountains and coasts of Argyll can be trashed with subsidised intrusions any day of the week, but the backyards of London are sacred." And he went on to ask, "Who will protect the local environment if government will no longer do so?" And "what is the cost benefit in government now directing new building away from existing towns and into the country?"

Cost-benefit analyses are always tempting and important, but national environmental audits are notoriously difficult to assess. Ground-water pollution, for example, continues to pose real difficulties in (particularly real time) data capture. "In talking about the course of the world economy," Jenkins told me, "it's very clear that leisure and the enjoyment of the outdoors are going to be huge assets which people will travel great distances to see…. The more delicate landscapes in Western Europe which have on the whole been conserved since the war are going to be hugely valuable…people are going to pay money to go and see them… the National Trust is a profitable organization as a charity and we are profitable because people absolutely love going to see old buildings and the unspoiled landscape, so it is just crazy to destroy these things."

Landscape beauty might be characterized by some as a poetic intangible, but for the National Trust, these are the very core values that make the Trust the international gem

Fig. 30.5 Herbaceous borders along the path leading to the front porch at Hill Top, Sawrey, Cumbria. (Photo Credit: © National Trust Images/Stephen Robson)

it is; one that chimes precisely with the economist in Jenkins. Consider the marvelous gift to the Trust by the celebrated author Beatrix Potter: 4000 acres of her Cumbrian hill and dale, in addition to its homes and farmsteads; a green sward (in summer) populated by pure Herdwick breed sheep [http://www.herdwick-sheep.com/]. Today's England is more crowded, certainly more tried and tested, far more unsure of herself, than during the days of Peter Rabbit's [23] author's life (Fig. 30.5).

"I was there recently," Jenkins imparted, "and this is a tiny cottage now under complete siege from Japanese who absolutely love Beatrix Potter, and there are just thousands of tourists trying to get in.… It's a beautiful place that has been well-conserved…it evokes all the romance and allegory of Potter." From an explicitly practical perspective, says Jenkins, "these kinds of experiences are going to be huge economic drivers and the National Trust is a custodian of a big chunk of it. In the twenty-first century, this is a serious part of the world economy. The assets upon which that economy depends are essentially open spaces, countryside, and the past."

Jenkins goes on to explain the National Trust's financial and human resources commitment, as guardian of one of the largest rural estates in the UK, for "all species… moths and butterflies, cattle, bugs, plants, trees, everything…it's a very important part of our work. I would like to think that the values the National Trust represents—which are essentially conservationist ones—are held by the generality of society. We shouldn't just be a lobby group. We ought to be a national movement to which people subscribe, even if they don't belong to it."

"Michael, we have a slogan, 'Everyone feels like a member.' [Jenkins apparently coined it.] I'd like to feel we're not controversial… that what we represent is a bit like the Medieval Church and everyone's a member, even if they don't believe in God."

The Church metaphor plays hugely in Jenkins' romance of the world, it would seem. He loves the past, and he is potently drawn to ecclesiastical architecture. Among the many books he has written, one of his most popular is entitled **England's Thousand Best Churches** [24]. Another is called **England's Thousand Best Houses** [25]. There is a rumor about that he has visited each and every one of them.

It is in that very spirit of the open house that the National Trust profiles some very intriguing campaigns and a non-exclusive membership, to be sure. Consider

Fig. 30.6 The church of St Mary Magdalene at Croome Park, Croome D'Abitot, Worcestershire. (Photo Credit: © National Trust Images/Andrew Butler)

even a smattering of its representative interests and, most importantly, protective umbrella: many of England's most magnificent and rare heritage trees; countless sites of Special Scientific Interest and Conservation, such as a variety of special bogs, peat lands, fens, wet and oak woodlands and endemic cave spiders.

In addition, the Trust looks after over 73,000 archaeological sites, including remote hills festooned with Roman mosaica, and groves wherein dinosaurs once roamed the primordial northern supercontinent between Eurasia and North America, their stone-cold bones telling reminders of how even the greatest and the grandest are, indeed, vulnerable (Fig. 30.6).

The Trust is steward of an astonishing 10% of the coastlines in England, Wales and Northern Ireland; it watches over the fifteenth century Chantry Chapel, and three great rare libraries at Sissinghurst, whilst ensuring protection of the actual apple tree at Woolsthorpe Manor in the Midlands, birthplace of Sir Isaac Newton and the very tree off which the famed apple fell atop Isaac's head in 1665, inducing "the notion of gravitation." Ironically, that very 400 year-old tree has had to be protected with a willow barrier due to root compromise from some 33,000 visitors [26] per year all wanting to sit in its shade and get the religion of physics.

The Trust also oversees long-term ecological restoration of the important fortified house at Ightham Mote in Kent, dating to 1320; and is caretaker to the renowned Gideon Tapestries, as well as a portrait by Velazquez at the Ickworth estate in Suffolk, and the incredibly rare 1487 Lyme Missal.

Jenkins tells me that he is a huge fan of America's National Parks but also sees a tendency in parts of America where there are no strict limits to the town (he mentions northern New Jersey); no barriers preventing a blur between the city and the country; suburbs, in other words, which have certainly made a big name in the UK, as well (Fig. 30.7).

A conservationist movement that has no shred of controversy because everyone is included. Not a bad idea at all. What would it come down to in the end? Says Jenkins, "That everybody knows that when there is a big row about whether a new airport is going to be put somewhere…there are considerations of rural conservation, and biodiversity, or of whatever it may be that have to be a part of that decision. You can't just automatically put things wherever the market says they should go, because in the very long term we'll regret it. They don't make countryside anymore, and if we don't defend it nobody else will."

Additional thanks to Barbara Forster and Anna Bell.

Fig. 30.7 A view of the Yockenthwaite Top Farm surrounded by rolling hills and countryside, Yorkshire Dales National Park. (Photo Credit: © National Trust Images/Joe Cornish)

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Chapter 31
Extinction: Poachers Test the Right to Life

Simon N. Stuart PhD, has been associated with the Species Survival Commission [1] since the early 1980s, when he started work on the African Bird Red Data Book. He joined the International Union for Conservation of Nature (IUCN) [2] Secretariat in 1986, and was Head of the Species Programme (1990–2000), Acting Director General (2000–2001), Head of the Biodiversity Assessment Unit (2001–2005), and Senior Species Scientist (2005–2008) (Fig. 31.1).

For 25 years, Dr. Stuart has been in the frontlines of the fight to save the world's wildlife, much of it imperiled at the very moment that local humans, co-habiting the regions wherein so much of the world's threatened species [3] and populations still survive, are themselves impoverished. The challenges are huge. Dr. Stuart is presently based at The Innovation Centre of the University of Bath in the UK. We spoke during his recent Species Survival Commission work in New Delhi, India.

Michael Tobias (MT): Simon, this past September Prince Charles, the new President of the World Wildlife Fund within his own country, warned, as have so many before him, that, in his opinion, we are facing the "sixth extinction event" [4] and that 'surviving ourselves' (referring to everything our species is doing to destroy the natural world), must be our number one priority (Fig. 31.2).

Meanwhile, the headlines pertaining to poaching of wildlife, and the data emerging from many wildlife trafficking conferences [5] appear to be grim. This would seem especially to be the case when one looks at regions like eastern and southern Africa, as well as India. These areas have many of the highest concentrations of large animals in the tropical world. That said, we know that in South Africa's most famous national park, Kruger [6] soldiers have been placed near the Mozambique border to try against all odds to stop rhino poachers. One report has indicated that one rhino is killed every 41 ha throughout Africa.

In India's state of Assam [7], whole gangs come into places like Kaziranga [8] and Orang National Parks [9, 10] to poach Indian Rhinos. In South Africa, there have been instances of foreign nationals carrying out legal trophy hunting, but then almost certainly taking the horns (which are supposed to be personal trophies) and selling them into the illegal medicinal trade in Asia. The demands of traditional Chinese medicine and other uses in Asia are wiping out rhinos and elephants, not

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Fig. 31.1 Dr. Simon Stuart. (Photo Credit: Courtesy of Simon Stuart)

to mention tigers. The African Conservation Foundation [11, 12] reported this past June that in just 1 week the nation of Chad saw 22 elephants killed.

As the Chairman of the Species Survival Commission of the International Union for Conservation of Nature, and at a time when, for example, the World Wildlife Fund is marking its 50th anniversary, and as the United Nations launches its International Decade on Biodiversity [13] are we losing the battle to save large terrestrial vertebrates?

Simon Stuart (SS): Michael, yes and no. In some parts of the world, poaching is clearly out of control. For example, in West and Central Africa and in Southeast Asia, we are experiencing large-scale megafaunal wipe-out [14], with the exception of a tiny handful of tightly protected areas. Antelopes from West Africa such as Jentinck's Duiker [15] and the Zebra Duiker [16] are now very close to extinction, as is the Saola (a relative of the buffaloes) from Laos and Vietnam that was only discovered by scientists in 1991 [17] (Fig. 31.3).

There are many other species on their last legs from these regions. But by contrast, there are also many examples of species increasing after poaching has been brought under control. This is particularly true in North America and Europe (for example American Black Bear, White-tailed Deer, American Bison, Alpine Ibex, Alpine Chamois and Eurasian Rose Deer).

There are some very negative trends in many places, but also examples that conservation really works when we put our mind to it.

MT: In West and Central Africa, as well as much of Southeast Asia, there is, to my understanding, significant devastation [18] occurring amongst its rare remaining populations of mega-fauna. That would include gorillas, orangutans and numerous

Fig. 31.2 Florida Panther. (Photo Credit: © M. C. Tobias)

Fig. 31.3 American Bison, Oklahoma. (Photo Credit: © J. G. Morrison)

other primate species; the Javan rhino, African and Asian elephants, canids, mustelids, and felines—to name just some of the groups of astounding, but fast diminishing species varieties.

Expanding human populations in all of these regions; and the escalating global markets—of which the West is no small part—for such commodities as paper, zircon, pulp, and palm oil [19], are certainly destroying an abundance of what was once viable habitat. But on top of that, do you not also see an utter epidemic of poaching? What's the answer?

SS: In these regions you name, yes, there is an epidemic of poaching. In many instances this is driven by high prices for animal products, especially for medicines (for example in China and Vietnam). Of course, the rhinos are the best example of this, and the Javan and Sumatran Rhinos are now very close to extinction (less than 50 and less than 200 animals respectively, and both species still decreasing).

The Javan Rhino is now extinct on the Asian mainland, despite having once had a huge range there, and the Sumatran Rhino is now very close to extinction on the mainland. However, many other species have products that are used medicinally in East Asia, including Primates, Deer, Bears and Pangolins. In addition to the high-price wildlife trade associated with traditional Chinese medicine, there is also highly commercialized bush-meat trade [20] in many parts of Africa, especially in the West and Central parts of the African continent (Fig. 31.4).

There is no single answer to the problem, but there can be no solution without strong, locally effective enforcement on the ground in places where economically valuable species survive. The successes in recent years in, for example, South Africa and India, both of which still face huge poaching pressure, are largely attributable to very strict anti-poaching programmes.

In addition, strict enforcement of controls and bans in the trade of high-value wildlife products is also essential. This requires all countries to implement CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) effectively, and this can be hard because a lot of the products are traded as medicines, and we all know how difficult North American and European countries find it to stop the illegal drugs trade.

Nevertheless, a number of countries could do much better with respect to their CITES enforcement. In certain instances there probably need to be programmes to

Fig. 31.4 Mother White Rhino and calf, South Africa. (Photo Credit: © M. C. Tobias)

Fig. 31.5 Arabian Leopard, Saudi Arabia. (Photo Credit: © M. C. Tobias)

increase public awareness of the problems, and to reduce the demand for medicines that use highly threatened species (Fig. 31.5).

MT: Unemployment and significant economic marginalization throughout much of the Western world has fueled a new generation of dismay and socio-financial unrest. Yet, western GDP is a downright bonanza in contrast to those billion people or more who eke out livelihoods on US$ 1.25 per family per day, in many of the very aforementioned heavily-poached countries and regions (Fig. 31.6).

Clearly poverty alleviation [21] as I think most people can understand, is key to impeding further assaults on remaining global biodiversity. But is there time, in your opinion, to crack the poverty question and still be able to have that window of days, months and years in which to save all of these marvelous other species? Are there interim remedial measures we need to be looking at?

SS: I agree with you that abject poverty is a major underlying factor that creates the conditions under which poaching can thrive. The inequities (and frankly iniquities) that allow us to tolerate our fellow human beings living in dehumanizing conditions cannot be fixed in time to create the conditions for the survival of many of the most threatened species. Many of these species are down to tiny populations, and these animals can only survive if, as I said above, we enforce strict protection in the most important places where animals survive.

To be sustainable, local human communities need to be engaged in these conservation efforts, and they should become the beneficiaries of new jobs and investment

Fig. 31.6 East Africa. (Photo Credit: © M. C. Tobias)

that comes from conservation programmes. Effective conservation needs to be people-friendly.

In countries where it is very hard to achieve law and order around a key site for a species on the verge of extinction [22] it might be necessary to consider innovative mechanisms to save species—perhaps some clever sort of economic incentive schemes which makes it more valuable to a local community to keep a species alive rather than dead.

This is still very experimental, but the idea would be for communities to be paid more for keeping their endangered species than they would get by poaching them and marketing the products. Obviously, this would need very careful monitoring to prevent abuses, but there may be places in the world where traditional approaches to conservation simply don't work (Fig. 31.7).

MT: In these "wipe-out" regions, as you've described them, aren't NGOs and leaders of those countries aware of these terrible biological calamities? Are they in complete denial? Why can't they get a handle on this? Are they not at all committed to financing, as the South African government is doing, a counter-offensive with dollars and education and coordinated anti-poaching efforts? This is their children's future we're talking about.

SS: Obviously it varies from place to place. In some countries, especially in parts of Africa, governments are very poor and civil society is poorly developed. In addition to lacking money, they also usually lack the necessary institutions and trained human capacity. These problems are especially true in West and Central Africa.

In some of the countries in Eastern and Southern Africa there is, by contrast, a long tradition of anti-poaching work. Often this is under-funded, but the institutions tend to be in place, and it is often harder to get away with poaching than is the case in West and Central Africa.

In Asia, most governments are wealthier than in Africa. Some countries have a long history of on-the-ground anti-poaching (notably India and Nepal), but this is much less of a tradition in most countries of Southeast Asia.

Fig. 31.7 Trio Indian children with fledgling, Suriname. (Photo Credit: © M. C. Tobias)

There the problem is not so much lack of money (though that is sometimes true), as building new institutions, human capacity and political will to address the problem. Also these countries are closer to larger wildlife markets in China, and so poaching pressure is often higher.

The awareness of the seriousness of the problem is still inadequate among many politicians in most of the countries where the problems are worst. I think that developing national pride in some of the most threatened species is a real priority. Vietnam should "adopt" the Tonkin Snub-nose Monkey [23] and Delacour's Langur [24] as icons of national pride, and the Ivory Coast could do likewise with Miss Waldron's Red Colobus [25] and the Roloway Monkey [26].

MT: Notwithstanding the serious concerns voiced by conservation groups around the world, there appears to be some evidence that so-called "well-managed sport hunting" in countries like South Africa, correlates with low poaching levels. First, I'd like your opinion on this alleged correlation, and whether that makes sense to you. And second, what about such collaborative systems as WEMS [27] or the "Wildlife Enforcement Monitoring System" that is part of the data gathering methodology in parts of Africa to secure hard numbers in terms of extrapolating such correlations?

Ultimately, the science yields a vivid picture that should, theoretically, drive policy in terms of poverty alleviation, conservation of biodiversity, but also the best environmental practices, namely, the ethics that can, in the end, win out and save the most number and diversity of populations and species. What are your thoughts on these issues? (Fig. 31.8)

SS: Whatever one's ethical views about sport hunting, where it is well-managed (i.e., not too many animals are taken) and where a significant proportion of the revenue is returned to conservation and local communities, it does tend to be correlated with lower levels of poaching. This is especially evident in several countries in Southern Africa.

There is also a good example from Pakistan where, despite significant security problems, a well-managed sport hunting programme has led to an increase in the endangered Markhor in the Torghar area, a spectacular goat with spiral horns, from 100 animals in 1985 to 2540 in 2010. Sport hunting is not always well-managed,

Fig. 31.8 Orangutans, Borneo. (Photo Credit: © J. G. Morrison)

Fig. 31.9 Somewhere in Malaysia. (Photo Credit: © M. C. Tobias)

nor is it the cause of the dramatic decline of most species. Unregulated commercialized medicinal and bush-meat trades are much more serious problems.

MT: Simon, despite efforts at securing regions from poachers, at the end of the day, it appears that for many creatures, their extinction is near. I'm thinking of the Javan and Sumatran Rhinos, the Pygmy Hippo and Miss Waldron's Red Colobus. In the case of the Vietnamese Javan rhino [28], I gather it is extinct. And there are many other species nearing the brink of non-existence, which you know better than most. What can be done? What has to happen? (Fig. 31.9)

SS: The species you mention will come to their end if drastic measures are not taken very quickly (and we might already be too late for Miss Waldron's Red Colobus), and there is nothing natural about it. If it wasn't for poaching, all these species would have done fine, even despite habitat loss. IUCN lists almost 100 species of large mammal as Critically Endangered (on the edge of extinction), and in the great majority of cases this is driven by poaching. And this is not just a few species. The most urgent action is to protect them on the ground.

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Part VII
Animal Rights

Chapter 32
Compassionate Conservation: A Discussion from the Frontlines with Dr. Marc Bekoff

Marc Bekoff [1] is Professor Emeritus of Ecology and Evolutionary Biology at the University of Colorado and a former Guggenheim Fellow. Dr. Bekoff has published more than 500 scientific and popular essays and twenty-three books including **The Ten Trusts** (with Jane Goodall), **The Emotional Lives of Animals**, and **Wild Justice: The Moral Lives of Animals**. In addition, Dr. Bekoff edited two editions of the **Encyclopedia of Animal Rights and Animal Welfare** (Fig. 32.1).

Dr. Bekoff's book, Ignoring Nature No More: The Cast for Compassionate Conservation [2] was published June 1st, 2013, from the University of Chicago Press. In November, 2014, Dr. Bekoff's upcoming book, **Rewilding Our Hearts: Building Pathways of Compassion and Coexistence** comes out from the New World Library.

Michael Tobias (MT): Marc, our species causes deep and enduring pain all over this amazing planet, as if human destruction of other life forms were instinctive. No species or landscapes are immune. While the various animal protection movements [3] (animal liberation, animal rights, animal welfare, veganism, etc.) seek to save individuals, conservationists—and conservation biology specifically—are invariably more focused on habitat, or whole populations, or taxonomic groups at the species or sub-species level, a standing bias, obviously, since the late eighteenth century binomial nomenclature of Carolus Linnaeus (1707–1778). Is "compassionate conservation" the ultimate scientific and ethical reconciliation? (Fig. 32.2)

Marc Bekoff (MB): At a symposium on biodiversity, conservation, and animal rights held in March 2012 at the School of Oriental and African Studies at the University of London, you, Michael, in your Keynote Address, [4] referring to all those myriad of places on earth where our species has had the most devastating effects as "pain points;" noting that there are many "pillars of pain" on Earth, some right in our own backyards. I was deeply moved by what you said and couldn't agree more.

MT: I greatly appreciate that. That was key material in the book Jane Gray Morrison and I wrote, **God's Country: The New Zealand Factor** [5] (Fig. 32.3).

MB: And, this is where compassionate conservation can come to the rescue because we must be motivated by the universal moral imperative, namely, "First do no harm." We need to ask how other animals feel about the loss of their homes

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Fig. 32.1 Dr. Marc Bekoff and Bessie. (Photo Credit: Courtesy of M. Bekoff)

Fig. 32.2 A Brokpa, Eastern Himalayan boy and his family dog. (Photo Credit: © M. C. Tobias)

Fig. 32.3 A beloved friend, not dinner, Outside Auckland, New Zealand. (Photo Credit: © M. C. Tobias)

because solid science tells us that they suffer like we do when we lose a safe and peaceful place to live, thrive, and survive.

MT: Of course, we all know that it is impossible to fully do no harm. A Digambara Jain monk tries, and comes about as close as is humanly possible. But I realize you are speaking directly to a specific, narrower context. How would you summarize the concept?

MB: Compassionate conservation is concerned with the humane treatment and welfare of individual animals within the framework of traditional conservation biology in which the focus is on species, populations, or ecosystems, as you pointed out.

Fig. 32.4 A bird market in Malaysia. (Photo Credit: © M. C. Tobias)

Often there is polarization between those interested in animal protection and those interested in conservation. It is all too easy to trump individual animal welfare for the widely shared goal of preserving biodiversity. Compassion for animals should be fundamental for conservation because poor conservation outcomes are often consistent with the mistreatment of animals (Fig. 32.4).

MT: Are we only now waking up to this?

MB: Not necessarily but the implications are becoming increasingly important as conservation actions intensify in the wake of climate change, losses of critical habitat, and changes in the behavior of animals that influence activity budgets, social organization, and mating patterns. Dr. Daniel Ramp at the University of Technology, Sydney (Australia), where a centre for Compassionate Conservation is being established, notes, by placing compassion alongside conservation, decision-making that results in poor animal welfare and conservation outcomes should become more transparent and avoidable and this will be a great aid to wildlife management.

Compassionate conservation is a rapidly growing international and interdisciplinary movement. An inaugural symposium [6] was organized in 2010 by the Born Free Foundation and the Wildlife Conservation Research Unit (WildCRU) of the University of Oxford and to date there have been three further international meetings [7] in the UK, China, and Australia. The unedited text of the talks can be seen online (Fig. 32.5).

It's very important for traditional conservation scientists to embrace the feelings of other animals: No longer is it the case that human interests should necessarily override those of individual animals and within this avenue of thought and action exists a broad, bold, challenging, and forward-looking agenda that is compassionate conservation.

MT: What are some of the most relevant and urgent areas of focus? (Fig. 32.6)

MB: Reducing or eliminating altogether the harm being meted out to individuals in captivity and in the wild. These include keeping animals in zoos or aquaria in the name of conservation and education, captive breeding, methods used to mark or tag animals for identification, conservation consequences of wildlife rescue, reha-

Fig. 32.5 At a temple in Western India. (Photo Credit: © J. G. Morrison)

Fig. 32.6 Pacific Pocket Mouse, one of the most critically-endangered mammals in the United States, with radio transmitter, Marine Corps Base Camp Pendleton. (Photo Credit: © M. C. Tobias)

bilitation and release, the reintroduction (repatriation) of animals into habitats from which they have disappeared, the international trade in live wild animals, pest management and sustainable use, and the whole substitution concept, wherein one death is ethically proposed as the solution for another's life—so-called pest eradication as the salvation for certain native or endemic species. This is very tough.

MT: These are indeed difficult areas of burning concern for conservationists. I know that for the more disengaged lay public, many people find zoos to be a major problem. Others, in the name of conservation and education swear by them (Fig. 32.7).

MB: There's very little evidence that zoos actually make any meaningful contribution to conservation, and it's important to note that few animals who live in zoos are ever introduced to the wild. While some money does go from zoos to conservation there are ample data to indicate the vast majority of people who visit zoos don't make any meaningful contributions to conservation projects later on.

Fig. 32.7 In Bangkok. (Photo Credit: © M. C. Tobias)

MT: In your new edited work, **Ignoring Nature No More: The Case for Compassionate Conservation** the range of subject matter within this field is quite illuminating, the topics covered at the heart of animal protection and ecology—and certainly key to much of my own research and initiatives and that of my many colleagues around the world. And it obviously echoes many of your own earlier investigations over the years, as in such pieces as "Ethics and the study of carnivores: Doing science while respecting animals," (with Dale Jamieson) [8]. But what do you now see as key for people to better appreciate differing perspectives between animal welfarists, animal rightists, and conservation biologists?

MB: The differences can be enormous, leading to very different priorities about who lives, who dies, and why. Welfarists and conservation biologists argue over whether, for example, a specific project needs to be put on hold until animal suffering is eliminated, or that a project needs to be terminated if this is not possible.

People who believe that it's permissible to cause animals pain, but not unnecessary pain, argue that if we consider the animals' welfare or well-being, or their quality of life, that's all we need to do.

These people are called "welfarists" and they practice "welfarism." Welfarists believe that while humans should not wantonly exploit animals, as long as we make animals' lives comfortable, physically and psychologically, we're respecting their welfare.

If animals experience comfort and some of life's pleasures, appear happy, and are free from prolonged or intense pain, fear, hunger and other unpleasant states, they're doing fine. If individuals show normal growth and reproduction, and are free from disease, injury, malnutrition and other types of suffering, they're doing well and we're fulfilling our obligations to them.

This welfarist position also assumes that it is all right to use animals to meet human ends as long as certain safeguards are employed. They believe that the use of animals in experiments and the slaughtering of animals as food for humans are all right as long as these activities are conducted in a humane way. They also believe keeping animals in zoos and aquariums where there are high death rates is permissible. Welfarists do not want animals to suffer from any unnecessary pain, but they sometimes disagree among themselves about what pain is "necessary" and what humane care really amounts to (Fig. 32.8).

MT: But in the end?

MB: In the end, welfarists agree that the pain and death animals suffer is sometimes justified because of the benefits that humans derive.

MT: That the ends, in other words, justify the means.

MB: Right. As long as humanity somehow benefits. That's the logic.

MT: What about the animal rights position?

MB: These advocates stress that animals' lives are valuable in and of themselves, not valuable just because of what they can do for humans or because they look or

Fig. 32.8 Freddy with loving visitors, Tiere von Michael Aufhauser. (Photo Credit: © Gut Aiderbichl/Weyrich, Jürgen)

Fig. 32.9 Conservationist luminary, Marieta van der Merwe and friend, Harnas Wildlife Foundation, Namibia, Africa. (Photo Credit: © M. C. Tobias)

behave like us. Animals are not property or "things," but rather living organisms, subjects of a life, who are worthy of our compassion, respect, friendship, and support. Rightists expand the borders of species to whom we grant certain rights.

Thus, animals are not "lesser" or "less valuable" than humans. They are not property that may be abused or dominated at will. Any amount of animal pain and death is unnecessary and unacceptable (Fig. 32.9).

MT: And the conservation biology and general environmentalist camps?

MB: Typically, they're welfarists who are willing to trade-off individuals' lives for the perceived good of higher levels of organization such as ecosystems, populations or species. Witness the reintroduction of Canadian lynx into Colorado or wolves into Yellowstone National Park. Some conservationists and environmentalists, in contrast to rightists, argued that the death of some individuals (even the agonizingly painful starvation of lynx who were placed in a habitat where it was known that there wasn't enough food) was permissible for the perceived good of the species. Some even say that we should concentrate on the animals who are known to be alive, rather than the dead or the missing.

Fig. 32.10 Dr. Francisco Fonseca, President of Portugal's Grupo Lobo with rescued Iberian wolf friend. (Photo Credit: © M. C. Tobias)

MT: And the utilitarian view?

MB: Yes, people who claim it's all right to kill "pests" such as brown rats, coyotes, and other animals because they are numerous.

MT: "Pests" in quotation marks, of course. Namely, bio-invasives. Not inherently "bad," so to speak, just misplaced, like weeds, through no fault of their own.

MB: Right. And then there all those who advocate for captive-born predatory animals to kill and eat other animals (prey who can't get away); to even go so far as to train them so they can be released into the wild. These are forms of the utilitarian position. One such case involves the reintroduction of black-footed ferrets [9]. Golden hamsters were bred only to be used as practice prey for the ferrets.

MT: Now: herein lies the rub. Should we be breeding animals as "ambassadors" for their species only to have them live out their lives in cages or released into wild habitats expressly for purposes of their death? Aside from such huge questions as sport hunting—people killing for fun—your book addresses other extraordinarily compelling issues with respect to conservation practices, from the Giant Panda to wolves to kangaroos.

MB: Absolutely. As compassion for individuals is factored into conservation practices and decision making, more people are asking, for example, if it is ethical to breed captive pandas who will never be released into the wild to be "ambassadors" for their species. These charismatic animals generate a lot of money for zoos and are shipped here and there and made to breed. People are also re-evaluating the reintroduction of wolves into Yellowstone National Park because many wolves died or were killed "for the good of their species." And, despite the cost to individual wolves, these predators are well on the way to being removed from the U. S. Endangered Species List. Why bring wolves back if we're only going to kill them again? (Fig. 32.10)

MT: Which invokes a re-consideration—if repeat killing becomes a conservation vogue—of the whole Endangered Species Act ("ESA"). It also touches deeply upon the whole national park, or scientific reserve arena; protected area networks, and

the like. Now, we actually have park managers speaking (theoretically) of moving whole national parks due to climate change; or reconstructing past biomes, ecosystems, based on linear perceptions of what those systems used to be like.

MB: To the point exactly. Moreover, people who actually study wolves strongly disagree with the de-listing (off the ESA) of these wonderful beings. Some argue it is better to sterilize animals than to kill them.

MT: We've been looking at immuno-contraception for years, as you know. For island nations particularly, where bio-invasives frequently spell the number one cause of native species mortality, we feel it to be a conservation priority, as it has become in many nations, including parts of the US and also Australia. But many will argue it is not yet ready to be unleashed in the wild; that there could be collateral genetic damage. This remains a point of pressing controversy. My argument is: if it has come of age for humans in the form of birth control, why can it not be perfected, targeted, and rendered efficacious and humane for other vertebrates, whether possum, rat, mustelid-family species, mice or deer?

In places like the Channel Islands National Park, California, or the Galapagos, the Falklands, New Caledonia, Guam, Hawaii—not to mention New Zealand, it is really crucial.

MB: I agree. A truly humane way to impede the need of further mass-killing. And there is another interesting, if not critical point. Take kangaroos. In Australia, there is great concern that killing kangaroos in the name of conservation, a widespread practice, is not only inhumane but also ineffective in reducing their numbers. When kangaroos are killed, often for sport, targeted individuals and other group members suffer and die. Daniel Ramp notes that shooting breaks up groups when an individual is killed or another flees the group and these losses fracture social learning and pathways [10] related to foraging and predation risk vital for survival to adulthood.

Compassionate conservation enters into the discussion because when we kill individuals there is a good deal of collateral damage—a different type of collateral damage than you referenced—but one that equally harms numerous other individuals who are not the "target" animals. Moreover, this totally unnecessary conservation tactic incentivizes recreational hunters [11] who legally kill for the apparent "fun" of it. Whether in a conservation estate, or the urban setting, such mindless killing is ineffective.

MT: They certainly have a robust debate in the UK on this front [12].

MB: Especially with regard to urban red foxes. There is no shred of evidence that killing foxes works; or, in the US, the killing of coyotes or gray wolves, species which, in fact, inflict minimal damage to livestock and even less to humans.

MT: In surveying the field of resurgent ethical conflicts within the conservation arena, you have cited any number of case studies [13] that, on face value, would appear to reject the efficacy, let alone morality, of many projects involving introductions, or re-introductions of species back in to the wild.

MB: Yes. In one instance, it was determined that approximately 160 Golden Lion Tamarins (Leontopithecus rosalia) died in a long-term reintroduction program [14] dedicated to saving this species. People vary in their opinion about whether trading off lives is ethically acceptable. I feel the loss of 160 lives is really an issue and it raises a number of questions including why are Golden Lion Tamarins so important? Who really cares if they exist? Could the money have been used for other projects? I know the people who worked on this project really do care about animals so I'm forced to try to understand why the trading off of lives "for the good of their own species" is permissible. I wonder what the animals would think about it all.

Liv Baker at the University of British Columbia has noted that reintroductions often fail because of the lack of consideration of the behavior of animals with different personalities. It has been estimated that 50–80 % of introductions are not successful, but much hangs on the definition of success.

MT: I believe this is core frontier ecology, or, as you put it, "applied philosophy" at its most manifestly needed level.

MB: I think that our increased understanding of how certain personality types (I'm speaking of individuals of other species) respond to potential social and environmental stressors would help increase the survival of introductions and re-introduction projects.

MT: I would add that such profound considerations should be employed in the strategic planning stage of any future conservation biology endeavors involving real lives under what can only be characterized as improvised situations and unrealized scenarios. Ethics need not lag behind, or be merely relegated to the province of hindsight.

But I also know from experience that every situation casts a different ethical shadow over what is often a crisis right there in front of you. Incremental metaphysics creeps into the drama; too many wildfires amidst a welter of imperatives. Do we have an "ethics gene" that can effectively prioritize? Is triage ever morally acceptable in a brutal world that demands one precedent over another, particularly in the realm of ecology and animal rights?

MB: That's precisely right. Sometimes there is no principle that can be easily generalized. I've seen that situation arise in human-tiger conflicts, for example, in Bangladesh.

MT: I've seen it in both Asia and Africa with farmers and elephants. Or throughout the US where authorities or so-called "animal control" experts, suddenly confronted with wild animals at large, were either imperfectly acquainted with humane mitigation techniques, or found themselves confronted with scenarios they simply couldn't get a grip on. We read the newspaper and declare: they should have tranquilized, relocated, etc. but no one is ever certain how to cope with an explosive situation. Whether with a mountain lion, or even a human in a lock-down situation, where their medications were improperly prescribed, or the dose level was off.

There are so many vagaries of wild experience that the ethics can become blurred. But what impresses me about the "compassionate conservation" ethos are its underlying assertions and goals. How would you summarize them?

MB: Michael, as I indicated initially, "First do no harm." In the real and messy world it is essential to have informed discussion about the ways animals are treated and compassionate conservation brings to the table people with rather different views on animal protection. Among the questions that need to be asked are: Is intervention necessary and what are the most humane alternatives.

We squash ants and overfish; we kill billions of "pests" and poison millions of birds without blinking or thinking about how they suffer when we do so.

MT: Hence, the critical re-examination of the individual within; the individual within a species, a population, a habitat. And, at the same time, disabusing people of the word "pests." They are not pests, inherently: they are living beings, sentient beings.

MB: Exactly. We need to be able to identify those characteristics of an individual or species that warrant keeping them alive or allowing them to suffer or die and when we factor in ecological variables this becomes a difficult practice. Our attempts to draw lines separating species are fraught with error, many actually favoring native species over non-native invasive species.

Yet, I would subscribe that it is a fair and important question to ask when can a non-native or introduced species be considered native? In his seminal work on the notion of "ecological inclusion" [15]—my Australian colleague, Rod Benninson, notes that the term "invasive species" has a negative overtone that already stacks the deck against certain species. You referenced the famous line that a weed is simply a misplaced flower. Bennison suggests using the term "out of place" rather than "invasive"—a move with which I agree (Fig. 32.11).

MT: Can conservation biology truly atone for all of our human meddling? We can't truly rectify the wave upon wave of past cultures that swept over whole continents irreversibly changing ecosystems and driving countless species to extinction. We might try to re-establish niches as they might have existed 10,000 years ago, but is this ethical in light of fiscal constraints and current biological hemorrhaging on all fronts?

MB: Very good point. We certainly must prioritize. Can we really recreate or restore ecosystems? Should other animals pay for our destructive and selfish ways? What are we really doing? Can we or should we try "to do it all"?

In an internet survey conducted by University of York's Murray Rudd, of 583 conservation scientists questioned 60% agreed that criteria should be established [16] for deciding which species to abandon in order to focus on saving others. Since we decide who lives and who dies compassionate conservation can easily be integrated into decisions about the fate of individual animals.

Fig. 32.11 A family at Farm Sanctuary, Upstate New York. (Photo Credit: © J. G. Morrison)

Compassionate conservation has catalyzed a much-needed paradigm shift for everyone concerned with protecting animals as well as populations, species, and ecosystems—'saving nature'—by opening the door for interdisciplinary discussions (Fig. 32.12).

MT: Every major ethical tradition of which I am aware speaks of sentient living beings. I often wonder why so many of my fellow conservationists and conservation biologists shy away from sentience.

MB: That's right. It's critical to avow that sentience matters. Science tells us animals have feelings, emotions, and preferences and individuals care about and worry about what happens to them and to their families and friends. We need to consider what we know about animal sentience when we intrude into their lives, even if it is on their behalf.

MT: And to summarize?

MB: A humane framework that considers individual animals is long overdue.

Fig. 32.12 Ms. Tashi Payden Tshering, Executive Director, RSPCA-Bhutan, and rescued friends. (Photo Credit: © M. C. Tobias)

MT: And I've known you for enough years to remind readers that you are an optimist, correct?

MB: Absolutely. I'm personally hopeful that more and more people will come to value the lives of individuals in their work and that compassionate conservation will lead the way. It's difficult for me to imagine that striving for a more compassionate world wouldn't be high on the agenda of everyone who has the opportunity and privilege of working with other animals.

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Chapter 33
Animal Rights in China

Peter J. Li, Ph.D., (PL) an Associate Professor of East Asian Politics at the University of Houston-Downtown and China Policy Specialist of Humane Society International [1] first came to the U.S. from China to study at Syracuse University in 1987. Almost immediately, he had several "cultural shocks," as he puts it. I asked him about two epiphanies, in particular, which—to my way of thinking—are truly emblematic of one man's remarkable journey (Fig. 33.1).

PL: On campus I saw squirrels jumping around and chasing each other. My eyes were wide open, since I had never seen squirrels in my life in China. What a great place where small animals were not afraid of people. Then I went on a school outing to an orchard in the suburbs of Syracuse to experience the life of an ordinary American family. One of the hands-on assignments of this activity was to help pick apples. Before we started, the owner of the orchard told us to leave five or six apples on each tree. "Why do you want to waste them," I raised my hand and asked. His reply touched the deepest part of my heart. "No, they will not be wasted," he answered calmly. "We will get a lot of snow in the next few months, and I want to make sure that birds have food for the winter." I was speechless. Never before in my life had I ever been so touched. What he said caused the collapse of my belief in the selfish nature of capitalists indoctrinated by China's school system. What he said taught me that a small sacrifice on our part can mean hope of survival for a disadvantaged person or nonhuman individual.

Michael Tobias (MT): Many economists have examined China with an emphasis on the country's rapid efforts to reduce its blistering air pollution, increase energy efficiency and agricultural harvests. And there is no question that China's GDP, and tens-of-millions of per capita incomes, have risen spectacularly during the past three decades. Your chapter for the forthcoming University of Chicago Press book, **Ignoring Nature No More—The Case for Compassionate Conservation**, [2] is entitled "Explaining China's Wildlife Crisis: Cultural Tradition or Politics of Development." Which is it—tradition or developmental politics—and how bad is the crisis?

PL: China is a comprehensive challenge in environmental protection. Many China experts have researched and written about this subject. The question of China's

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Fig. 33.1 Dr. Peter Li.
(Photo Credit: © Dr. Peter Li)

animal welfare and animal protection crisis has been largely ignored in China studies in the West. To join the scholarly investigation of China's environmental issues, I have, in the last 15 years, focused my attention primarily on the country's animal protection and wildlife conservation challenges.

I have taken many field trips to China, where I visited some 20 factory farms, two tiger farms, two bear farms, and a bear rescue center in Chengdu of Sichuan operated by Animals Asia Foundation [3]. Working as a China Policy Consultant for Humane Society International [1], I maintain daily contact with the animal protection community in China (Fig. 33.2).

MT: And what can you tell me?

PL: China is the world's biggest animal farming nation. Billions of farm animals are raised on the industrialized farms on the Chinese mainland. When I conducted a survey of China's factory farms in 2005–2006, I saw a nationwide enthusiasm for Western farming practices such as gestation crates, battery cages, ear-clipping, beak-trimming, early weaning (for calves), castration, tail-docking (for pigs), and forced feeding (ducks and geese for weight gains and foie-gras production). While EU nations are phasing out such practices, China is massively employing them. The sheer number of farm animals in China suggests the world's greatest number of farm animals are raised in welfare compromised farming conditions in China [4].

Long-distance transport of farm animals from as far north as Inner Mongolia to as far south as the border city near Hong Kong suggests enormous suffering of livestock on that long and dreadful journey. Humane slaughter is a new concept in China. It is yet to become a requirement for the nation's massive slaughter facilities across the country.

MT: There has been considerable news about the maltreatment of bears in China. What has your research revealed? (Fig. 33.3)

PL: Bear farming is arguably China's most brutal operation [5].

Fig. 33.2 Tiger farm, China. (Photo Credit: © Dr. Peter Li)

Fig. 33.3 Bears forced to live in these cages for up to 20 years. (Photo Credit: © AAF)

In China today, some 10,000 Asiatic black bears, China's state-protected species, are caged for life for extracting bile from their gallbladders through an open wound cut in their stomachs. This brutal surgery procedure often causes irreparable damage to their internal organs. Scientists have confirmed the many physical and mental traumas of bear farming. My own visit to two bear farms added additional evidence to the cruelty of this farming operation. When I was visiting China's biggest bear farm in Northeast China's Heilongjiang Province, what I witnessed was humanity's gross inhumanity to an intelligent nonhuman species. China will not be a part of the modern world if bear farming is not outlawed (Fig. 33.4).

MT: As I understand it, China is one of the largest "fur farming" nations?

PL: It is the largest. In 2005, international animal protection groups exposed the shocking farming and slaughter practices [6] on the fur animals. A recent video a Chinese animal protection group sent me showed the heart still beating in a raccoon dog skinned alive. While the Chinese government is trying to standardize slaughtering procedures, small farmers continue to use wooden sticks to beat the animals to death. But the eating of dogs is increasingly controversial, both among foreign visitors, but also among Chinese youth, some of whom, in 2011, made five rescues [7] along highways where a total of 2,000 dogs had been bound for slaughterhouses.

MT: Apparently, in preparation for the 2008 Summer Olympic Games, the Chinese were quite open about the slaughter of dogs.

PL: Michael, dog slaughter has long been a hugely offensive scene in China. It is often conducted on the side of the streets in broad view of young children and often conducted in front of other live dogs. Chinese activists continue to call for an end to its inhumanity and this totally uncivilized eating habit.

Fig. 33.4 China Xiamen students say NO to seal hunt, XAPA 2012. (Photo Credit: © Dr. Peter Li)

MT: What about practices in Chinese zoos?

PL: The Beijing Zoo, Shanghai Zoo, and Nanchang Zoo are improving their management and animal care conditions, but most Chinese zoos are a sad reminder of humans' insensitivity to the needs of nonhuman animals and to the feelings of the zoo visitors. Outdated housing and poor management explains some of the most shocking animal cruelty practices such as live feeding, animal performance, photo-ops, and other practices (Fig. 33.5).

MT: China's remarkably beautiful artistic traditions, poetry, landscape painting (shan-shui), Buddhist and Daoist ethical views all seem to utterly contradict the country's twentieth century animal rights and biodiversity track record? (Fig. 33.6)

PL: China does have a cultural legacy of compassion for nonhuman animals. Daoism calls for compassion for all other creatures on earth. Many of China's Emperors were Buddhist believers who called upon the people to practice vegetarianism, the liberation of animals, and suspension of slaughter in times of mourning or celebration.

MT: So what has happened?

PL: China's politics of reform offer us a better explanation for the nation's animal welfare crisis. Since 1978, China has seen a nation-wide drive for prosperity and, as you know, more than 500 million Chinese have been lifted out of poverty. But there remains a collective fear of hunger in the minds of people over the age of 50 in China. And, this fear has a regime stability connotation to the Chinese Communist leaders.

MT: Interesting.

PL: Deng Xiaoping, China's reform architect, once remarked that people would revolt if the food security situation could not be improved. So Chinese reforms, initially, were intended to improve the food supply to the 900 million Chinese people, while ethics, morality, social responsibility, environmental impact, labor rights, etc., were often ignored.

MT: And China's animal abuse concentrates on economic development? I'm thinking, for example, of bears, and pigs.

Fig. 33.5 Terrified tigers and harsh trainer in China's biggest tiger farm in Guilin. (Photo Credit: © Dr. Peter Li)

Fig. 33.6 Buddhist prayer shrine, Bangkok, Thailand. (Photo Credit: © M. C. Tobias)

PL: Yes. In the case of bear farming, one is speaking of an industry across China that generates annually more than 10 billion yuan (approximately US$ 1.6 billion). A bear farm in Mudanjiang in Northeast China's Heilongjiang Province is one of the biggest taxpayers of the city. Such income is translated in China as political stability.

MT: Now a Chinese think tank is calling for the rapid phasing out of the country's one-child policy [8], which would easily drive the nation's population to 2 billion consumers. Even at China's current population of over 1.34 billion people—the largest human population in history—the animal protection challenge, given this economic context you describe, seems daunting.

PL: Chinese authorities are not motivated to tackle the problem of animal cruelty for fear that economic growth would be slowed down. Again, that could be interpreted as leading to a regime stability crisis. You referenced pigs. Since meat consumption is so important to the Chinese consumers, like gasoline for Americans, the Chinese government established a "strategic pork reserve" [9] to counter possible vicissitudes in pork supplies on the market.

This also explains why China does not have animal welfare laws or anti-cruelty laws.

MT: None?

PL: China has lagged behind the industrialized nations in animal protection law-making for more than 180 years.

MT: In your work, you point out what you call "The State's War against Nature: 1949–1978." You describe how, in 1958, "this hostility reached a climax in that Mao, the 'great leader,' called on the entire nation to engage in a frenzied sparrow killing campaign sending billions of the birds to their brutal death by gunshots, slingshots, bamboo poles, poisons, or out of sheer exhaustion. Truckloads of dead sparrows were paraded on Beijing's Tiananmen Square." And then, how during a 3-year famine that started in 1959, Chinese policies unleashed "one of the most intense assaults [ever] on wildlife."
Thirty years later, China, as I understand it, finally adopted a "Wildlife Protection Law" in 1988, the first such law in the nation's history.

PL: Yes, with two objectives in mind: the conservation of wildlife, and the reasonable use of wildlife animals.

MT: Reasonable?

PL: The biggest flaw of the Wildlife Protection Law (WPL) is its positioning of wildlife animals as 'natural resources' to be used for human benefits. Local authorities and businesses have, however, chosen to use the WPL as their bible to justify their business operations of wildlife exploitation.

MT: Such as?

PL: Bear farming is the best example of local authorities jealously protecting the cruel farming operation in regions under their jurisdiction. Over the years, we have heard China's central government officials expressing concerns over bear farming and other wildlife exploitation operations. We have not heard local officials voicing the same kind of concerns. To local officials, closing bear farms could trigger a ripple effect leading to demands for closing other businesses found to be environmentally, ethically, or socially questionable.

Local growth and local GDP growth rate are direct indicators of leadership or performance qualifications, as judged by those higher up in the political hierarchy in Beijing. Upward career mobility in the reform era for local officials has been closely tied to their ability to generate local growth, create employment and generate revenue. Therefore, local support for animal abuse related industries and production has a lot to do with the reform politics and the Chinese Communist Party Center's cadre evaluation policy.

MT: So across China, at the local level, it's a political quagmire guaranteed to perpetuate animal suffering? (Fig. 33.7)

PL: Local protectionism is manifested in many different ways. In addition to direct incentives such as preferential land use right, tax breaks, less red tape, local authorities also provide a production environment that is "obstacle-free."

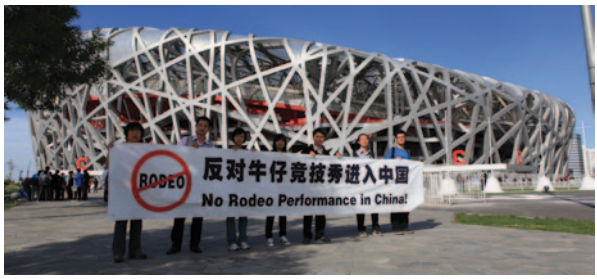

Fig. 33.7 Chinese say NO to rodeo show in Beijing, Yu Fengqin 2011. (Photo Credit: © Dr. Peter Li)

Businesses are not expected to meet any environmental standards or labor standards. Local businessmen, particularly those businesses that are big local taxpayers, are showered with all kinds of honors. Some of them are "elected" deputies to local and provincial people's congresses. In China, there is no other better way to show support to local businesses than to make them government officials.

MT: So a fur farmer, for example, who is, so to speak, "successful" is a local hero.

PL: Well, consider the fact that fur farming can employ directly or indirectly up to 50% of the labor in a farming community, thus making it an indispensable tax contributor to a local government. Local authorities find it hard not to support this production in their localities (Fig. 33.8).

MT: You've stated that "Never in its 5,000-year history did China ever raise and keep hundreds of millions of wildlife species in captivity as it is today." And you went on to ask, which I find pretty courageous on your part, "Are the Chinese culturally predestined to be indifferent to animal suffering?"

PL: Many Chinese mainlanders (I am using this word to distinguish Chinese on the mainland from those in Taiwan and Hong Kong) are, in my opinion, possibly indifferent or insensitive to animal suffering (to varying degrees). But let me also state for the record that, again in my opinion, they themselves are not to blame. Neither is Chinese traditional culture to blame. People become indifferent or insensitive perhaps because they have been socialized to be so, particularly under Mao, when sympathy for the downtrodden, love of pets, wearing make-up, and displaying individual taste in fashion were all condemned as bourgeois and rebellious.

MT: What about current consumption patterns in China?

PL: Today, Chinese consumers, according to a recent BBC report [10], eat twice as much meat as those in the United States. This is not surprising. China surpassed the US as the world's biggest meat producer in 1990, and the Chinese authorities have long looked to the industrialized West as the object of emulation in meat production. While Westerners greet each other by asking "how are you," Chinese people traditionally greeted each other by saying 'Have you eaten?'

MT: That's very interesting.

Fig. 33.8 Dogs for the meat market, Du YF 2013. (Photo Credit: © Dr. Peter Li)

PL: I guess how people feel is more important to Westerners, while if people are hungry or not was more important to the Chinese. When I met some of my old classmates back in China 30 years after graduation, I was some 40 pounds lighter than they were. They actually wondered if I got enough to eat in the US (Fig. 33.9). Today, people "greet" friends and relatives at a dinner table that may involve lavish banquets of 24 courses of mostly meats and "delicacies from the mountains and seas."

MT: Which is pretty terrifying when one considers, as you have elsewhere pointed out in your chapter for the forthcoming Marc Bekoff book, that China's "rapid industrialization" and other increasing human intrusions "have threatened the survival of 398 species of vertebrates" across China. This raises issues, of course, with regard to what is generally thought of as traditional Chinese medicine (TCM), in terms of the exploitation of Chinese biodiversity—with so many species on the brink of extinction, like South China tigers, the Chinese river dolphin, the Chinese alligator and Mongolian gazelle among many others. You've cited a 2004 China State Forestry Bureau release that indicated numerous known extinct species in China.

PL: Progressive and forward-looking TCM doctors have vowed not to use wildlife animal products as ingredients. Indeed, farmed wildlife parts, allegedly claimed as natural ingredients by supporters of the bear farming industry, are not natural products at all. Scientists have confirmed that bile collected from bear farms is often contaminated with drug residues, blood, pus, germs, and cancerous cells.

Tiger bone wine made from dead tiger bones has, at best, a dubious curative effect. The claimed healing power of tiger bone wine for rheumatism, to take but one example, can be replaced by other medicines.

In fact, one has to ask whether all these allegedly indispensable and life-saving ingredients for illnesses ranging from eye irritations to cancers, coma, severe acute respiratory syndrome (SARS) and even liver transplants are really nothing more than the wildlife farming industry capitalizing on the anxiety of patients.

Today, bear bile, for example, has been used in cosmetics, toothpaste, and tonic products for profits contravening government policies that are aimed at limiting its use in a selected number of prescriptions. Consumption of wildlife is most rampant in South China, where it has been promoted as body-building, disease-preventing, and manhood enhancing. But in the past, the consumption of wildlife was never

Fig. 33.9 Yao Ming says NO to shark fin soup in an ad at the Beijing airport. (Photo Credit: © Dr. Peter Li)

deemed an honorable food choice, and was limited to communities that were economically backward. Today's runaway consumption of wildlife in South China has no precedent in China's past.

MT: So what does the future look like for animal protection in the world's most populous nation?

PL: Animal suffering is unprecedented in China in magnitude in both numerical terms (having the largest number of nonhuman animals in farming units) and in welfare conditions. With regard to China's ranking on a global report card, so to speak, I would not hesitate to say that it may be at the bottom, if not the very bottom. Why do I say so? Look at the facts: Mainland China does not have a comprehensive animal protection law. Animal cruelty is not a punishable offense. China has the world's largest number of animals in the industrialized farms. China's continuing development model gives priority to productivity increase defined in terms of material gains. China's pro-business politics has made societal voices for animal protection a nuisance to policy-makers and the business communities alike. The overall political environment is against activism for animal protection, certainly in the foreseeable future.

MT: And for a nation that looks to the West for any kind of development templates, there are plenty of lamentable missteps.

PL: That's exactly right. Canadian seal slaughter, dolphin massacres in Japan and Denmark, rodeos in the U.S., bullfighting in Spain, fox hunting in the U.K., bear baiting in Pakistan.

MT: And yet, I've detected in our discussions a certain optimism on your part?

PL: China is changing beyond recognition in many areas. Dog eating is rejected by the majority of the younger generation, many of whom are the single child of their parents. They have no recollection of hardship days and are enormously more sensitive to suffering. They demand and get care and love. To them, it is natural for the same kind of emotional care to be given to others including nonhuman animals. Many of these youngsters display great sympathy and compassion for the

Fig. 33.10 Young boys leave food for birds in winter, Yu FQ 2012. (Photo Credit: © Dr. Peter Li)

disadvantaged. Those who stopped the trucks of dogs on China's highways were all young Chinese activists; members of China's burgeoning animal protection movement.

Also keep in mind, Michael, China today has an estimated 130 million dogs, many of whom are household pets. As a result, China's animal protection community is expanding. Some Chinese activists estimated that as many as 30–50 million Chinese are animal lovers, bigger than the total population of Canada (Fig. 33.10).

Chinese animal protectionists are one of the most active interest groups in China. They have also been very successful. In 2010, they succeeded in stopping a proposed Spanish bullfighting introduction project. In 2011, they succeeded in stopping the introduction of American rodeos to China. Since 2010, Chinese activists have campaigned against Canada's attempt to market seal meat in China.

Recently, more officials who graduated from humanities and social sciences are entering politics. It is expected that these officials will have a more complex vision of China's development.

Michael, China is an integral part of the global economy and the third largest contributor of tourists. A humane China is only a matter of time. I am optimistic about the animal protection in China in the not too distant future.

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Chapter 34
Animals Occupy Wall Street

The Great Escape

When a 6-year-old Bavarian "dairy" cow made her bid for freedom [1] on May 24th, 2011 getting past an electric fence and lunging from the captivity of a field about 50 miles from Munich, her passion for freedom brought her to a deep fir forest where she hid out with (not surprisingly) well-honed and primeval instincts (Fig. 34.1).

The genome of these magnificent animals was first mapped in 2009 by the United States Department of Agriculture. We know that several sub-species of Bos primigenius have gone extinct, and that the intensive breeding amongst today's 1.3 billion living bovines has resulted from a rage for by-products that started early in human history and seems to have no surcease in sight. Prior to their "domestication," however, it is clear that bovines were venerated by human artists, as witnessed at numerous Paleolithic cave sites throughout the world.

Bovine anatomy limits their facial musculature, but they do shed tears and know very decidedly when harm is in the air. A six-year-old cow on the run would either be shot and killed, or—depending on who rescued her—capable of living out a wonderful, rich and storied life. The oldest known cow, "Big Bertha," was 48 human years in age when she passed away in 1993.

Despite all the forced breeding inflicted on cows, they have retained their wildness, which worked in this particular cow's favor, to be sure. She would show off those traits to the world as she brilliantly eluded re-capture by farmers and others for 92 days. That's not easy to do in Germany, or any other country in Europe.

The combination of a cow defying police and farmers quickly nurtured human instincts, as well. A media circus descended on what was, indeed, a very touching perfect storm of sentiments. Who could not identify, after all, with a "lonely" cow on the run, or, as one paper labeled her, "a kind of freedom fighter for the animal-loving German republic" [2].

That is, until the cow dashed out of a forest onto a road one night and was nearly struck by a police car. At which point, she was deemed some kind of threat to society. Hunters were given the signal to go after her. That's also when the story really sunk in. With a bounty on her head, time was running out. She could be shot at any

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Fig. 34.1 "Yvonne". (Photo Credit: © Gut Aiderbichl)

Fig. 34.2 Michael Aufhauser and friend. (Photo Credit: © Gut Aiderbichl)

time. People everywhere were applauding this wild, fast-moving 500 kg mother of two who wanted not just to be free, but to be with her family and friends, like her 2 year-old son, Friesi, thought to be dead (but who would turn up), as well as her sister Waltraud (Fig. 34.2).

When Destiny Calls

Destiny saw to that. Mid-way through the epic chase, a poignant meeting took place in a Frankfurt am Main hospital between Michael Aufhauser and Mrs. Yvonne Hauschin. Mr. Aufhauser had grown up under the spell of Austrian author and critic Felix Salten, best known for his 1928 novel, "Bambi, A Life in the Woods," written in the same part of Vienna where Beethoven took walks in the woods and wrote his Sixth ("Pastoral") Symphony. Mrs. Hauschin, stricken with cancer, had just learned she had only weeks to live. She and her husband had gotten in touch with Mr. Aufhauser to see if the animal sanctuary he'd created, Gut Aiderbichl (the largest of its kind in Europe) [3] would take their two cats, "Sina" and "Johnny."

"Absolutely," he said.

Mr. Aufhauser flew to Frankfurt, met Mrs. Hauschin and while he was there a phone call informed him that the bounty had just been placed on the rogue cow all the press was talking about.

He knew there was only one way to bring part of the story, at least, to a happy ending: he would purchase the cow, as well as her offspring and close friends. He had to purchase the animals "by the kilogram." Seeking a name that could appropriately honor the woman by his side, he asked Mrs. Hauschin if he might endow the cow with her own name, Yvonne. "Yes," she said. For the coming few weeks before she passed away, Yvonne Hauschin was able to see her name in print and on the television non-stop as the stakes escalated and the time was running out, both for her, and for her namesake.

Teams dispatched by Aufhauser included "the George Clooney of bulls," whose operatic voice it was hoped might tempt "Yvonne" from the woods [2]. No such luck. Even a Swiss telepath made contact with Aufhauser and was able to divine the basic situation: "Yvonne," reported the Swiss expert, wanted desperately to be reunited with her kind, but she was afraid. And the fear was mounting as the dozens of trappers closed in. A telephonic seance with "Yvonne" through the telepath, revealed a farmer praying for the noble cow's safety.

By now, authorities had called off the snipers, inspired by the legacy the charismatic and deeply benevolent Mr. Aufhauser had already engendered. Gut Aiderbichl's 30,000+ membership, and millions of web-page visitors comprise a formidable force for nature, while Mr. Aufhauser himself has already helped established new gold standards for animal rights across Europe.

Unconditional Love (Fig. 34.3)

Says Michael, "Humanity should not stop at human beings." It is at the core of his vision for a kinder world [4], which did not evolve in an instant for Mr. Aufhauser. There were plentiful epiphanies along his itinerary, beginning in Spain where he witnessed the gassing to death of scores of animals, none of whom had even been given any anaesthetic. He was able to rescue many of them, the beginning of a journey that has resulted in his creating sanctuaries in numerous European countries, information and pictures instantly accessible in Gut Aiderbichl's magazines, open sanctuaries, and user-friendly website.

On day 92, the best that could happen, happened: "Yvonne" received a tranquilizer and later found herself in paradise, on the outskirts of Salzburg, at Gut Aiderbichl, in the village of Henndorf (Fig. 34.4).

"Yvonne's" escape and resurrection mirrors the Hollywood movie ending that has brought Michael and his compatriot, Gut Aiderbichl executive, animal activist and loving father, Mr. Dieter Ehrengruber to Los Angeles, for—as it happens—a movie deal has been signed [5], the Hollywood wire services abuzz.

Fig. 34.3 The remarkable Michael Aufhauser, Founder and President, Gut Aiderbichl, Salzburg, With Friends. (Photo Credit: © Gut Aiderbichl)

Fig. 34.4 "Yvonne" on day 92. (Photo Credit: © Gut Aiderbichl)

"'Yvonne'" is no actress," Michael assures me over coffee. It will be an animation feature [6] from some of the best teams in the world, including Producer Max Howard, whose magic touch was deeply felt in such other epics as "The Lion King."

Two flies will be on the back of "Yvonne" speaking to each other as the cow escapes in the movie….

Where Farmers' Hearts Weep

Cows on the run… loquacious flies… to-die-for piglets and lambs… parrots and/or dogs traversing continents in search of their companion humans, such are the legends of the best of Hollywood, and the consequent approbation on Wall Street.

A few thousand rescued animal residents converge to make Michael Aufhauser's Gut Aiderbichl a kingdom where farmer's hearts weep, our gentle natures rekindled. It is not any sort of revolution, but, rather, a new beginning, the eliciting of our new nature, where animal salvation—our own, and those of other species—comports quite eloquently with the majesty of films that Disney's entertainment arm has long accomplished, along with other producers and studios; entertainment at the box

Fig. 34.5 Life at Gut Aiderbichl. (Photo Credit: © J. G. Morrison)

office whose gentle power to exert moral suasion and empower human cultures is cathartic (Fig. 34.5).

Indeed, the history of animal and nature-driven films has always enjoyed a strong reception on Wall Street. "Bambi," was released by Walt Disney Pictures during the world tumult of 1942 and has gone on to gross (inflation-adjusted) almost $ 3 billion. Others of its ilk, with not inconsiderable box office returns [7], have included such familiar titles as "101 Dalmations" ($ 1.7 billion), "The Jungle Book" (over $ 932 million), and "The Lion King," (over $ 712 million) (Fig. 34.6).

While such films are not demonstrably characterized by strict advocacy for animal rights, invariably, there is that moment where the connection between an animal's hopes and dreams, and the menace looming over his/her life becomes central, whether in the 2003 feature, "Finding Nemo," the story of the abducted son of a clownfish on the Australian Great Barrier Reef which to date has earned a world-

Fig. 34.6 Compassionate companions. (Photo Credit: © Gut Aiderbichl)

Fig. 34.7 A curious Gut Aiderbichl goat checks out a refreshment kiosk. (Photo Credit: © J. G. Morrison)

wide gross [8] of over $ 867 million or "Free Willy," with well over $ 153 million in worldwide gross (Fig. 34.7).

These movies—animation, wildlife, documentary, environmental series—all have one thing in common, generally speaking, that the official consumption and bad news statistics never come close to evoking, namely, the countless "Yvonnes" of this world. Real individuals. Not packages of food in grocery stores, disassociated from the truth of who they were, the tributes utterly lacking; most importantly, who they are.

The long-term impact upon audiences of such films is not entirely untraceable; certainly baffling for the contradictory emotional evocations and subsequent behavioral transformations, if any, but unquestionably provocative in terms of global outreach, salient consciousness raising, as well as possible conscience-evoking. This has been the case, more than likely, with "Babe," the block-buster 2007 film "Ratatouille" ($ 620 million to date) [8] "Black Beauty," "Mouse Hunt," "The Shaggy Dog," "Lassie," the 1938 Disney release of the short, Oscar-winning "Ferdinand the Bull," "Alvin and the Chipmunks," and the 1998 release, "Paulie," (one of my personal favorites) where Tony Shalhoub's character, Misha Belenkoff, plays a loving janitor-turned animal liberationist—and the happy outcome showers ultimate kindness upon the freed animals, and a little girl, now grown up (Fig. 34.8).

Other notable (often jaw-dropping) films of these animal genres have included "Winged Migration" (2001), "The Wild Parrots of Telegraph Hill" (2005), "The Story

Fig. 34.8 Michael Aufhauser feeds "Yvonne" and friends. (Photo Credit: © Gut Aiderbichl)

of the Weeping Camel" (2003), "March of the Penguins," (2005), and the astounding "Microcosmos" (1996). Films, like Oscar winning "The Cove" (2009) have elicited great critical response and social support; in the case of "The Cove," for dolphin protection, though meager economic traction, certainly compared with so many of the classic animation features, of which "Cow On The Run" ("Yvonne's" story) has all the trappings. Wall Street, and many viewers, prefer happy endings. The 2006 animated Emperor Penguin hit, "Happy Feet," warmed hearts and minds, even though the Antarctic was heating up, profoundly hinted at in the film. While serious science grapples with a changing world and fickle, if too often untoward, or ecologically illiterate collective human behavior, serious cinema has ways of turning pain into dramatic and yearned-for hope. In the case of "Yvonne," that is likely to be a crucial, cinematic element, given the underlying reality of humanity's ill-treatment towards most bovines. Viewers of the film, when it is released, can then further satisfy their thirst to look into the eyes of a cow, commune with a fox, fall in love with wild horses, champion a goat, and purify their souls with gurus in the guise of a pig, a chicken, a turkey, a burro, by visiting Gut Aiderbichl [3], or at least going to its website [3]. This is the great gift—and genius—of Michael Aufhauser and his hundreds of colleagues at Gut Aiderbichl. And it is the gift of Austria, one of the countries whose tax authorities are kindly disposed toward non-profits, as are Germany's (Fig. 34.9).

The Movie Versus the Reality

Gut Aiderbichl has rescued some 400 cows and bulls. These are the lucky ones, on a continent where, opines Mr. Aufhauser, "the EU gives more than 20 million € every year under the rubric of sports and tourism to finance bull fighting and dog racing. Yet, there are actually very few people who want this," he surmises. Meanwhile, meat eating is on the rise.

Michael used to eat meat. He does so no more. But his approach involves no bully pulpit. He speaks of ethics, but is neither hortatory nor didactic. "For one

Fig. 34.9 A visitor to Gut Aiderbichl. (Photo Credit: © Gut Aiderbichl)

steak a bull has to drink twenty-five bathtubs of water. Yet, we have a shortage of water on this planet. 80-to-100 bathtubs of water for steaks for a family of four. It is no longer a personal option: we have to change our eating habits," he believes. Moreover, he says, after having spent time in slaughter houses, "when you see cows shiver and how they beg for their life…. Now we have the information to tell us what is really going on…how many animals are being tortured….We have to break frames. Kids want to know what is real. "Yvonne's" plight happens to millions of cows (and bulls) every day. I am inviting many people to embark on a new path of thinking. The design for how the world could be, or how it once was….it is sincere…it creates happiness. Maybe people will learn that cows should never be put on a chain." The spirit of every act of kindness, of each companion animal one has loved in life, wafts philosophically like misty DNA around every word Aufhauser conjures. He is a true blue, the real deal. He does not parade his gentleness. He just lives it (Fig. 34.10).

Mr. Aufhauser's sanctuaries are considered "farms" within European legalese and he is happy with that designation. It has helped him to build friendships with his hard-working neighbors, traditional farmers, whom he loves and greatly admires. But, suggests Aufhauser, "In my opinion, ultimately, the only way to truly help animals is to become vegan. Eating meat will be impossible. Very few people will be able to afford meat in a world of 7 billion people, a world without water."

Fig. 34.10 "Yvonne" and "Friesi". (Photo Credit: © Gut Aiderbichl)

Fig. 34.11 A happy resident at Gut Aiderbichl. (Photo Credit: © Gut Aiderbichl)

The reality of human consumption of animals, and of animal suffering, clearly informs noble heartstrings that not only educate, inspire, and haunt the imagination, but also end up in quantifiable box office earnings. This might not be so colossal an ambiguity if the global environmental data pertaining to persons like "Yvonne" were not so painfully astounding.

Humans currently consume over 55 million t of beef as measured by carcass weight. According to one estimate published in the New York Times, "The world's total meat supply was 71 million t in 1961. In 2007, it was estimated to be 284 million t. Per capita consumption has more than doubled over that period. (In the developing world, it rose twice as fast, doubling in the last 20 years)" [9]. In that same New York Times article, its author, Marc Bittman, cited data suggesting that world meat consumption would again double by 2050, quoting a "relentless growth in livestock production" as one outcome, and an estimate by the United Nation's Food and Agriculture Organization of "30 percent of the earth's ice-free land" as being "directly or indirectly involved in livestock production."

An abundance of statistical data correlates the human population explosion, country-by-country census data, and the ever increasing demand for animal products [10], particularly meat and poultry. Lacking in all such computations, like the FAO's online statistical calculator [11] and the tens-of-billions of animals, and nearly one trillion fish killed annually, are the realities of individual lives, like that of "Yvonne."

Meanwhile, according to the U.S. Department of Agriculture's "Livestock and Poultry: World Markets and Trade," "Beef exports are forecast to rise 5 percent in 2012 on robust global demand [12], particularly by Southeast Asia, the Middle and North Africa. India accounts for nearly half of world growth in 2012 on increased supplies and price-competitive shipments to emerging markets." (Fig. 34.11)

Concludes Mr. Aufhauser, "My goal is to achieve something with 'Yvonne,' and this is an idealistic goal. I want to support cows. I love cows. I know what they are going through." (Fig. 34.12)

Fig. 34.12 Gut Aiderbichl. (Photo Credit: © Gut Aiderbichl)

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Chapter 35
Why Insects Sing: A Conversation with David Rothenberg

Philosopher and musician David Rothenberg is the author of **Why Birds Sing**, also published in Italy, Spain, Taiwan, China, Korea, and Germany. Rothenberg has also written **Sudden Music, Always the Mountains**, and **Thousand Mile Song**, about making music live with whales. His last book was **Survival of the Beautiful**, on aesthetics in evolution. His first CD on ECM Records, with pianist Marilyn Crispell, "One Dark Night I Left My Silent House" was released in 2010. Rothenberg [1] is professor of philosophy and music at the New Jersey Institute of Technology (Fig. 35.1).

Michael Tobias (MT): David, this marvelous new book of yours **Bug Music**: **How Insects Gave Us Rhythm and Noise** [2] involved several years of travels to Sweden, England, Ireland, Missouri, Virginia and elsewhere, tracking 17-year cicadas, snowy tree crickets, bush katydids, three-humped treehoppers, and Lesser Water Boatmen, among others. You have a warning in your new book, "Don't Try This At Home," pertaining to this latter creature, the Lesser Water Boatman, who happens to be endowed with "the loudest penis in the world," as you describe him. Why does any insect need so loud a private part?

David Rothenberg (DR): This is definitely one of the most surprising sounds [3] I came across in all of my research. The voluminous underwater scratching noise of a half-centimeter long insect that is nearly as loud as a rock concert. When James Windmill and Jerome Sueur first heard this sound by sticking an underwater microphone into an Irish pond, they thought something was wrong with their equipment. This thing is almost as loud as a whale. The story could make a good children's book except this little guy remarkably makes the noise by vibrating his penis back and forth at an alarming rate. When I gave a talk about this at the Science Gallery in Dublin I saw a mother cover her son's ears rather than letting him take in this shocking information.

MT: Well, of course. That could give any young lad a trauma, let alone his Mum. But what's the story here?

DR: Like many of the most extreme traits and behaviors evolution has produced, we have no idea. Perhaps it is runaway sexual selection, which has led to such extremes as the peacock's tail and the 23 hour long humpback whale songs. If evo-

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Fig. 35.1 David Rothenberg playing saxaphone covered by his collaborators. (Photo Credit: © Charles Lindsay)

Fig. 35.2 Cicadas in Love. (Photo Credit: © David Rothenberg)

lution can get away with producing extremes, occasionally it will. Not most of the time, but sometimes. The female boatmen (boatwomen? boatbabes?) must really like this noise.

My previous book, **Survival of the Beautiful** [4], (just out in paperback last week) deals with this fact that evolution is not just survival of the fittest, but survival of the weird, the cool, the extreme, the amazing. And no surprise that my investigation into the wild world of insect music and sound would dig up tales like this.

MT: Cicadas, for example (Fig. 35.2).

DR: Absolutely. It is a phenomenon we cannot explain. Some species of cicada are periodic. They come out the ground in the millions only once every 17 or 13 years, depending on the species. This only happens in the Eastern United States, and we really have no idea why. I first thought of writing this book 17 years ago, the last time millions of these bugs came out of the ground in the Hudson Valley, where I live. They're coming back in about a month, and this time I will be ready for them, having practiced jamming along with other broods that came out in Illinois 2 years ago and in Virginia last spring. Although I usually play clarinet or saxophone with animal musicians, this time the iPad worked pretty well. All of these interspecies jam sessions are documented on my **Bug Music** CD [5].

MT: I've experienced a cicada boom, in Maryland. It was far more than music to my ears. More than utter cacophony. It was sublime.

DR: When you first come across a forest full of periodic cicadas, all you hear is a wash of overwhelming noise. But when you learn that what you actually are hearing are three related species, each with their own three distinct mating calls, pretty quickly you can hear the differences, and the whole forest starts to sound like an

entomological symphony, with nine different sounds all pulsing in an out of each other at once. Meaning arrives to the sound, it turns from noise, into music.

MT: From music to something quite other: bark beetle infestations throughout the Southwest and Northwest, which are devastating whole sylvan ecosystems. They arise, in great part, through the desiccation of trees—lack of water. The immune systems in trees, when severely compromised (e.g., more than 40 %) lends them utterly vulnerable. You have made an astonishing suggestion in your book, not unlike the playing of music to marine mammals… .

DR: I am merely reporting David Dunn's suggestion [6] that we might be able to stop these malicious critters by playing music to them right inside their trees. Now Dunn is the guy who first discovered that these bark beetles have a complex acoustic life, because no one before him thought of sticking microphones inside their tree hosts (via modified meat thermometers). He heard an astonishingly rich acoustic world. Then he wondered, what would happen if he played sounds back to them. When he tried the sounds of rival bark beetle species, they started to devour each other! Hell, he even played the voice of Rush Limbaugh. I'd tell you what happened then except Dunn says that part of the story has got too much publicity.

MT: The smallest individuals rule the world, from amoeba and unicellular protista to such lovely creatures as fleas, about whom the late Miriam Rothschild was—during her lifetime—the world authority. What is it about the music of the petite that is so charismatic and probably vital to the biological world?

DR: There are millions of insect species in the world and we hardly know anything about most of them. I have played music with birds and whales for many years but insects have been singing on this planet for many millions of years longer than these more charismatic species. Their thrums, hums, ratchets, beats, and swells might seem far away from what we usually consider music, but think of the steamy sounds of a hot summer night—it's all bugs, and most people embrace such sounds with a warm nostalgia, as long as no one is biting. I consider the idea in my book that perhaps our whole human interest in rhythm and noise comes from our own evolution in the midst of a singing world of bugs.

MT: Noise? Or Music?

DR: Why do I say we like noise? We are always adding buzz, hum, feedback, and other sonic complexities to our human musics. Think of the fuzzboxes plugged into electric guitars, the bottle-caps added to African mbira thumb pianos. We humans love a diffuse, rich, complex sound in addition to pure dulcet tones. No one does buzz better than a cloud of singing katydids of crickets (Fig. 35.3).

MT: Having made a film in Yasuni National Park (Northeastern Ecuador—the most invertebrate rich spot on the planet) I share with you an intense passion for insects. Where does your love of entomology stem from?

DR: I never loved insects until I began to listen to them. Then I heard swirls and layers of musical complexity, ancient symphonies and electronic experiments made

Fig. 35.3 David Rothenberg playing live with crickets (projected on the screen) at the House of World Cultures Berlin. (Photo Credit: © Umru Rothenberg)

out of the emergent order in nature. The main message of my book is simple: go out and listen to the natural world and you will value it just a little bit more. Pay closer attention to our environment and you will know why we have to save it. These sounds are in our blood, in our pulse, in our minds, and we cannot survive without them.

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Chapter 36
Protecting Bambi with Drones: PETA's Ingrid Newkirk on Hunters, Horsemeat and More

PETA president [1] and co-founder Ingrid Newkirk has led the world's largest animal rights organization for more than 25 years. Her passion and dedication to making this world a better place for all living beings has inspired countless others to do what they can to help animals (Fig. 36.1).

Michael Tobias (MT): The horsemeat scandal has been in the news in Britain and Ireland, with horsemeat found in everything from school lunches to supermarket lasagna. Some companies have demanded DNA testing [2]. What's going on there, and with the fiery debate in the U.S. over horse slaughter?

Ingrid Newkirk (IN): The horsemeat scandal dominated the news in Britain for weeks recently, with consumers outraged over a series of discoveries that it was horse, not pig or cow, in meat pies and more. It was nicely summed up with a cartoon in which a boy comes home from school and asks, "Mum, what's for dinner?" and is told, "Sorry, I've no idea what it is really." Consumer outrage caused meat sales to plummet, just as they did years ago with the mad cow revelations, when McDonald's in the U.K. banned beef and served only veggie burgers. It is estimated that 2000 people were already going vegetarian every week in England, so that number has probably risen considerably.

MT: So is that the end of it, or do you see additional ramifications?

IN: Although people were upset over hidden horsemeat, there was scant connection made between where it ended up and where it came from. The Grand National [3] England's most prestigious horse race, took place right after this major food scare and was almost as hyped in the media as the Olympic Games. But although two horses were killed [4] in the first 2 days, few people seemed to realize that the bodies of racehorses—not necessarily those two famous ones in the spotlight but hundreds of thousands of others—have to end up somewhere. The fact that Butazolidin, a painkiller commonly used to mask injuries and keep racehorses running even to the point of catastrophic breakdown, was found in European horsemeat should have helped connect the dots.

MT: What about here, in the U.S.?

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Fig. 36.1 Ms. Ingrid Newkirk. (Photo Credit: © PETA)

IN: Here in the U.S., at least three horses die on the track every single day. Appallingly, they can be considered the lucky ones, given the fate of many of those who survive but don't win races. A move to re-open U.S. horse slaughterhouses was recently thwarted when President Obama [5] released his proposed budget in which funding was removed for horse slaughter inspectors—without them, there can be no horse slaughterhouses. This, however, is scant comfort to anyone who cares about stopping cruelty to horses because U.S. horses will still be slaughtered at almost the same rate.

MT: How so?

IN: Racehorses who end up lame, which is very common, or with other physical problems, are simply shipped to Canada and Mexico—on hideous, grueling, terribly cruel journeys [6] that PETA has followed from inside the truck—and are slaughtered there. There is a bill in Congress, the Safeguard American Food Exports (SAFE) Act, that would stop that deadly trade in its tracks [7] (Fig. 36.2).

MT: On a very different topic, is it true that PETA is investigating the use of drones to overfly hunters this Fall and, if so, won't the drones themselves be easy targets for trigger-happy hunters?

IN: Indeed, it is true. We're quite excited to find a life-saving use for aircraft thought of as lethal bomb-delivery systems.

Fig. 36.2 Sambar deer (*Cervus unicolor*). (Photo Credit: © M. C. Tobias)

Fig. 36.3 Curious and welcoming bovines in central New Zealand. Photo Credit: © M. C. Tobias

MT: What do drone-manufacturers say about PETA's proposal?

IN: We have lots of support from drone manufacturers, garage hobbyists, military personnel, etc., and we're excited to see if we can make this work—finally go after hunters who have felt shielded from scrutiny out there in the woods.

MT: What other problems does PETA have with hunters? I know there are one or two issues….

IN: Every hunting season, we get complaints from people who find animals dying slowly [8] of blood loss and gangrene because hunters didn't even have the decency to follow them and finish them off. PETA investigators have seen Canadian hunters [9] wound bears who then ran off, grievously injured. We've also seen hunters shoot mother bears dead, leaving behind orphaned cubs, who are unlikely to survive alone. We'd rather the hunters shoot down our drones than a deer or a dove or a bear, and we'll catch them on real-time video feed if they do.

MT: I know that one of PETA's primary emphases is on diet. Your organization has laid it out in a wealth of information on your various websites, collaborations, and events.

So how is the quest coming along to substitute one diet paradigm—which you have described frequently as "environmentally devastating" with a meat- and dairy-free one? Do you feel PETA is making any headway there, seeing any great adoption of this way of eating? I know that the statistics are rather complicated to pin down, in as much as some cultures still think of a vegetarian diet, for example, as one that excludes meat, but includes fish, or chicken. On the other hand, with the eruption of the latest deadly strain of bird flu, some of those cultures may give up chicken, finally—in China, for example—but still eat fish (Fig. 36.3).

IN: Michael, I'm tremendously optimistic, especially as the talk around EarthDay recently seemed to be more and more about the benefits and importance of going vegan; how, of all the things a person can do, refraining from eating meat and dairy foods, in my opinion, does the most to cut down on factory farm pollution, water and land resource depletion, the pollution of waterways, and so on. There are already companies like Beyond Meat [http://beyondmeat.com/] joining the popular Gardein

Fig. 36.4 Goose Down Protest in Detroit. (Photo Credit: © PETA)

[10] brand to produce vegetable-based "meats" that pack the protein while—in the opinion of many—keeping one's arteries clear. PETA just held a faux-caviar tasting in London. A Danish company, Cavi-Art [11], provided everything from the blackest beluga to salmon roe. It's already being served at restaurants like Sublime in Ft. Lauderdale, and it certainly shows that there isn't a flavor that you can't mimic.

MT: PETA's press releases [12], and other articles suggest that the firm of Puma has said that the day is coming when people will have to stop using leather for environmental reasons. Does PETA see other changes coming to clothing manufacture and sales? (Fig. 36.4)

IN: Yes, leather has to go, but not just leather and not just for environmental reasons. There is growing disgust at the painful live-plucking of geese [13]. The birds are reduced to a quivering mass, and if they are wounded during the procedure, many workers just stitch them up with a needle and thread but administer not so much as an aspirin. PETA has launched a campaign against down feathers, and so far, dozens of companies have pledged not to use it, including Under Armour, Haband, the Sport's Authority's private label, and BB Dakota as well as furniture and bedding stores, motel chains like the Red Roof Inn, and resorts like Club Med, and the list is growing (Fig. 36.5).

MT: What about companies that sell wool, one of the mainstays of human use?

IN: We are working to help switch companies away from using wool for lots of reasons—environmental consequences being just one, cruelty to animals another (Fig. 36.6).

MT: So, animal friendly wool, versus animal unfriendly wool?

IN: Certainly the Australian farmers who still use "mulesing" [14] cutting the flesh off lambs' rumps) have seen their wool sales fall, while there has been a 17.9%

Fig. 36.5 July 2012 China feather farm investigation. Geese with feathers plucked. (Photo Credit: © PETA)

Fig. 36.6 "I'd rather go naked than wear fur."—Christy Turlington. (Photo Credit: © PETA)

Fig. 36.7 Lambs in southern New Zealand. Photo Credit: © Dancing Star Foundation

increase in sales of wool from non-mulesed sheep in the last year. That is 129.2% higher than 4 years ago, and it's on the uptick. PETA has now convinced almost every U.S. and European company—from Limited Brands and Kenneth Cole to PUMA, H&M, Aeropostale, Abercrombie & Fitch, and American Eagle—to stop buying wool that comes from mulesed sheep (Fig. 36.7).

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Part VIII
Why Your Neighbor is Important: New Strategies for a Bright Future

Chapter 37
The Heart of Education: A Discussion with Zoe Weil

Zoe Weil is a long-time leader in humane education in the U.S., and throughout the world. As president of the Institute for Humane Education, which she co-founded in 1996, and as author of numerous books, Ms. Weil has passionately championed a movement which, she says, has the "potential to solve every problem we face and create a restored, healthy, and humane world for all." Her TEDx talk, "The World Becomes What You Teach" [1] eloquently conveys the essence of humane education and its importance to all living creatures (Fig. 37.1).

Michael Tobias (MT): Zoe, what is unique about the Institute of Humane Education? How broad is it, in terms of the environment, animals, humans themselves, and the future of our planet?

Zoe Weil (ZW): At the Institute for Humane Education (IHE) [2, 3] we offer the only graduate programs in comprehensive humane education, as well as online courses, workshops, Summer Institutes, and a free, award-winning resource center. IHE believes that education is the fundamental root solution to injustice, exploitation, and destruction, and our programs are designed to help people become humane educators who can teach others within traditional and non-traditional educational venues. Humane education has four elements that are keys to its power and success, and these include: (1) providing accurate information about the pressing issues of our time so people have the knowledge they need to address global challenges; (2) fostering the three Cs of curiosity, creativity, and critical thinking so people have the skills they need to address challenges; (3) instilling the 3 Rs of reverence, respect, and responsibility, so people have the will to address challenges, and (4) providing positive choices and the tools for problem-solving, so people can solve challenges.

MT: And the scope of it?

ZW: In terms of breadth, humane education covers human rights, animal protection, environmental preservation, and cultural issues such as globalization and systemic change making. This makes it perhaps the broadest educational movement to date, encompassing sustainability ed, character ed, social justice ed, global ethical ed, animal welfare ed, and media literacy.

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Fig. 37.1 Zoe Weil, President of the Institute for Humane Education. (Photo Credit: © Edwin Barkdoll)

MT: In your opinion, why is humane education so important?

ZW: While there are many ways in which humanity is becoming less violent, less prejudiced, and less cruel, the reality of a warming planet with over 7 billion people and limited resources means we face potential economic, social, and environmental catastrophes. While every generation has faced its challenges, only in this century do we confront the possible loss of half of all species on earth, with the simultaneous breakdown of the ecosystems which sustain us all. At the same time, through the Internet, only in this century do we now have the capacity to work together across every border, and collaborate and innovate so quickly and powerfully. There is great and realistic hope that we can solve the challenges we face and transform dysfunctional, inhumane, and destructive systems, but we'll be hard-pressed to succeed if children in school continue to be taught under centuries-old models, and if our grand purpose for schooling remains to "compete in the global economy," [4] which is the buzz phrase of our time regarding education reform.

MT: But the basic proficiencies?

ZW: Of course our children need to become verbally, mathematically, and scientifically proficient, but these are foundational tools, not endpoints. At IHE, we believe that the goal of schooling in today's world ought to be to provide all students with the knowledge, tools, and motivation to be conscientious choice makers and engaged change makers for a prosperous, healthy, just, and humane world for all people, animals, and the environment, or as we like to put it: we need to graduate a generation of solutionaries [1].

MT: Solutionaries. I like that.

ZW: Evidence is growing that education that addresses pressing global issues and which fosters compassion, responsibility, and integrity results in graduates who know more, care more, and become more involved in creating positive change [5].

MT: What are the typical impediments to introducing a humane "agenda" in public and/or private school curricula and in this country?

ZW: Public schools lack funds, freedom, and flexibility. They're inclined to teach-to-test so as to ensure that they maintain funding, so anything that doesn't immediately improve standardized, bubble test scores can't easily gain a foothold. Meanwhile, our country is so politically polarized that anything that smacks of controversy is often automatically excluded, dumbing down the curriculum. A couple

of years ago I spoke at a middle school assembly program, and I began by asking the kids what they thought were the biggest problems in the world. One boy said "war." I agreed with him that war was a big problem. After the talk was over, the principal was very upset. We had a long talk, and he told me he was concerned that he'd get calls from angry parents who were veterans or who had a spouse serving in Iraq or Afghanistan. So I asked him to go into each classroom and ask the kids what they learned from my talk. I had spoken about the need to make connections between our choices and their effects on others; to model the message they hoped to convey in the world; to pursue joy in life by being of service, and to take responsibility for their actions.

MT: So what happened?

ZW: After visiting each class, he was relieved that these points were, indeed, what the students took away from my presentation, but his fear had been so intense, and that's worrisome. If a child can't say war is a big problem and have a teacher agree; if we can't speak about global warming, healthcare, factory farming, immigration, and a host of other "controversial" issues in our classrooms, where will discussions and problem-solving happen? School is exactly the place to grapple with global challenges and to explore multiple viewpoints and perspectives. We all have biases, of course, and teachers need to take care to "own" theirs because their role is to teach their students to be critical thinkers, not to disguise opinions as facts and indoctrinate them. This is why humane education is so important, because one of its core goals is to foster critical and creative thinking, without which our children are at the mercy of every sort of manipulation, group-think, and even simply mainstream norms and habits that may be destructive and inhumane.

MT: What about in private or independent schools?

ZW: For independent schools the issues are different. Many parents send their children to private schools to give them a better chance at getting into elite colleges and to ensure they receive a strong "traditional" education. In meeting parents' expectations, such schools may neglect innovative approaches like humane education because they're new and not fully tested. While the reality is that humane education provides the most relevant and important skills for today's world, parents who want their child to get into Harvard or Berkeley may feel more comfortable with traditional curricula. But there are many independent and charter schools that have adopted new approaches to and goals for education, and these may well be where humane education takes root and becomes replicable.

MT: It seems that this whole realm of compassion and humaneness in educational curricula, not to mention, as core values, is still lacking in large measure, no?

ZW: Comprehensive humane education is still relatively unknown, and there aren't yet enough assessments to demonstrate either its effectiveness at achieving its own goals (graduating knowledgeable and wise solutionaries), or its ability to increase academic achievement on standardized tests, which is all that we generally measure. IHE is working to remedy this by raising awareness of the field and its importance

Fig. 37.2 IHE residency students. (Photo Credit: © Institute for Humane Education)

as well as through a longitudinal study of the effectiveness of humane education which we're launching this year.

MT: What's the situation with humane education in other countries?

ZW: While I'm not an expert on the educational systems in other countries, I can say that some are much more open to humane education and some much less. Humane education is far more popular in the U.S. than Asia, while Canadians seem generally more receptive than Americans. It will be interesting to see whether humane education takes root in Finland which has arguably the most advanced, successful approach to schooling of any nation [6].

MT: I'm not surprised. That nation's tenth president, Martti Oiva Kalevi Ahtisaari won the Nobel Peace Prize as you know in 2008 for 30 years working in the trenches of humane conflict resolution throughout the world.

ZW: Finland has rejected standardized testing, competition in classrooms, long school days and school years, grading before middle school, even teaching reading before the age of 7, yet they consistently outperform other nations in reading and math by age 15. Given Finland's success and willingness to embrace new approaches, it could be where humane education is embraced wholeheartedly, too, although I hope the U.S. takes on this opportunity because the impact of a generation of U.S. citizens who have received humane education could have a profound global impact as our graduates become solutionaries through the various fields they pursue and within the various industries in which they work.

MT: At your school, can students/teachers get accredited? (Fig. 37.2)

ZW: Our online graduate programs are fully accredited through an affiliation with Valparaiso University [7]. We also have online courses for teachers, parents, and the general public. For those who learn best in person, we bring our workshops to communities throughout the U.S. and Canada and sometimes overseas, and we offer a residency component to our graduate programs and a Summer Institute for teachers

at our beautiful facility in coastal Maine. We have students in our programs from across the globe learning how to be humane educators and bringing humane education into their classrooms, universities, religious institutions, and communities through traditional classroom teaching as well as through the arts, as filmmakers, writers, actors and playwrights, designers, and singer/songwriters.

MT: Do you see unique job niches for this next generation of so-called solutionaries, who have had humane training?

ZW: Some of our graduates are entrepreneurs who are creating humane education-oriented businesses. We're still building the market for the field, but there are more and more opportunities for humane educators all the time.

MT: Share with us some success stories.

ZW: Michael, after the very first week-long humane education class I taught in the summer of 1987, two students started a Philadelphia area-wide group and won awards for their activism. A few years ago I was giving a talk in New York, and one of them attended. He was working for the mayor of New York City in public health. After the talk, I introduced him to some friends as having taken the first humane education course I ever taught. Before I could finish my sentence he interjected, "That course changed my life!"

MT: That's wonderful!

ZW: More recently, I received a packet of thank you letters from 8th graders whom I taught each morning over the course of a week. One wrote, "Spending that week with you was the most inspiring 5 days of my life so far. You made me realize how much just one person can do to help the world and how much more we can do by educating others…." The letter went on about what she planned to do with her new knowledge. I felt so great when I first read her letter, but later I came to see it as pretty depressing. Spending a week with me, or any humane educator, shouldn't be the most inspiring 5 days of a teenager's life. Her education should always have been inspiring, relevant, and meaningful. Another girl, who heard me speak at her National Honor's Society induction, exclaimed after the talk, "We should have been learning this since Kindergarten!" This is exactly right.

MT: That's an interesting wake-up call for educators, isn't it!

ZW: It was obvious to me from the very beginning of my career as a humane educator that this work had the potential to create profound and lasting change if we could just embrace it fully as an educational goal. I could tell you so many success stories about the impact our graduates are having in their classrooms and communities, but my hope is that soon we won't need to talk about success stories because humane education will be the norm, infusing all curricula, taught in every school, and ushering in a solutionary generation.

MT: This definitely puts any future education debates, let alone any legislation, into a whole new realm of compelling possibility, and plausibility.

Fig. 37.3 IHE residency students engage in hands-on field study. (Photo Credit: © Institute for Humane Education)

ZW: Just imagine what would happen if every child learned about relevant global issues and examined the underlying production, agricultural, defense, transportation, energy, economic, political, and other ubiquitous systems so that they could use their great minds and big hearts to explore innovative approaches that maximize justice, sustainability, and peaceful coexistence.

MT: Indeed. Yes.

ZW: Imagine our students participating not just in debate teams, but also in solutionary teams that demand that they come up with practical, cost-effective, and viable ideas for solving problems instead of just arguing about who's right and wrong. When humane education is integrated into our schools, every child will graduate ready and able to ensure that the systems within their chosen professions are healthy and humane, and when that happens we will witness a profound transformation as we solve the challenges we face and build a more humane and sustainable world (Fig. 37.3).

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Chapter 38
Journey to the Center of the World—An Interview with Dr. Wayne Clough, Secretary of the Smithsonian

Dr. G. Wayne Clough is the 12th Secretary of the Smithsonian Institution, America's massive success story created with a specific $ 500,000 bequest by nineteenth century British naturalist James Smithson [1] (Fig. 38.1).

Though having never traveled to the U.S., Smithson was intent upon an American "establishment for the increase and diffusion of knowledge." This month marks the Smithsonian's 165th birthday [2]. As one of the foremost science and research organizations in the world the Smithsonian is a champion of many critical ecological frontiers.

Indeed, Dr. Clough's turf is very much the center of the world, including more than 137 million artifacts—many extraordinarily rare—like the uniquely handcrafted Jefferson Bible, and ambassadors of countless now extinct species, such as the famous "Martha," the last member of the once prolific American Passenger Pigeon; 11 museums, the National Zoo, and nine research centers.

A civil engineer by training and President Emeritus of the Georgia Institute of Technology, Dr. Clough spoke with me about several of his concerns regarding the fate of the Earth, biodiversity, climate change and the sheer enormity of information with which people are grappling, as well as new tools for helping to transform what he has described as "an epochal flood of information" into some form of coherence and hope.

Rectifying Scientific Illiteracy

In a recent monograph [3] regarding scientific literacy Dr. Clough described how 2010 saw the generation of 1200 exabytes (1 exabyte equals 1 billion GB). According to the U.S. Council on Competitiveness, says Dr. Clough, a mere 40 of those exabytes is "new information, equivalent to all of the information generated by our species in its previous 5,000 years." Yet, with so much data in the air, a California Academy of Sciences survey just 2 years ago revealed that over 70 % of Americans were scientifically non-literate. For example, 61 % of Americans deny the existence of evolution, according to a Gallup poll. Not surprising, then, that

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Fig. 38.1 Dr. G. Wayne Clough. (Photo Credit: © Tamara Hoffer)

41 % of Americans assumed dinosaurs and humans coexisted. A large percentage of Americans apparently have no idea how long it takes the Earth to orbit the sun, that is to say, how many days there are in a year.

That said, Dr. Clough and his many colleagues at the Smithsonian continue enthusiastically to nurture—in the grand American tradition—a culture of perspective, tolerance and respect for all that is possible (and paradoxical) in the world, mindful that there's no time to waste, not with the current outbreak of ecological stressors hitting an information blizzard and battered global economy.

The Tree of Life

A sampling of recent discoveries and innovations from within the Smithsonian affords ample evidence of this new culture of intellectual and artistic innovation.

Consider the more than 1000 tree species in the United States, many under threat. In the Washington, D.C. and New York Central Park regions (and soon throughout the United States) a new Smithsonian application—Leafsnap—recently enabled Dr. Clough and his wife, Anne, to instantly identify trees. Any school kid on an outing can now do so as well. For those of us who can't distinguish an oak tree from a maple but profess to care, this first tree identification mobile app [4] will become a crucial component in any backpack.

Galleries That Go Forever

Smithsonian envoys have framed the exploration of knowledge with an excitement bar none. One of their most resonant endeavors is conveyed via the new Smithsonian Wild [5] melding over 206,000 camera trap images of species together into a photographic gallery from around the world. Some are species never seen before.

Fig. 38.2 Jefferson Bible after treatment page 6. (Photo Credit: © Hugh Talman)

Just a half-hour outside Washington, D.C. and covering over 3000 acres of southwestern Chesapeake Bay is the Smithsonian Environmental Research Center [6] where scientists are engaged in numerous short and long-term research projects of great importance to Americans and the world, from monitoring the discharges of bilge tanks to local impacts in the Bay on oysters, Blue Crabs, nitrate and phosphate pollution issues, leaf litter composition and decay rates under current climate regimes.

At the Smithsonian Tropical Research Institute in Panama [7] for 85 years scientists have been studying the forests of Barro Colorado Island in what constitutes one of the longest-running continuous biological studies anywhere on earth.

The sad story of course is that we have a number of species in our collection that have gone extinct. And that actually extends to humans because we have skeletons of the Neanderthal, of Homo erectus that went extinct, possibly for some of the same reasons numerous animals are going extinct—habitat destruction and inability to adapt to changes in climate.

Darwin's Dice, a Vegetarian Rat and Dog-sized Dinosaur

While many argue that Darwin's "dice" have rolled badly, there is good news, as well. Species go extinct (and it's a torrent at present), but some new ones are discovered, like that of an enormous and congenial rodent, found in 2009, along with nearly 40 other previously undescribed species. This is big. Smithsonian biologist Kristofer Helgen was the first to see the cuddly giant of a rat, through rainstorm and the impenetrable, deep in an extinct volcano in Papua, New Guinea. The Bosavi Woolly rat [8] is 3 ft long, a herbivore who appeared totally at ease with the researchers.

More recently, in the Spring of 2010, a Smithsonian team led by Hans-Dieter Sues discovered a 205 million year old "missing link," [9] bones belonging to a remarkable dog-sized dinosaur from the Late Triassic, uncovered at the same Ghost Ranch in New Mexico where Georgia O'Keefe did so much of her best work (Fig. 38.2).

The Jefferson Bible

Dr. Clough moves from the search for life in outer space, to preservation of the rich cultural heritage of Haiti. And then he describes an extraordinary upcoming exhibition of Thomas Jefferson's own, homespun Bible [10]:

"Thomas Jefferson was such an intellectual resource for our country, not only as our president and vice president, but also his diplomatic work and his great love of science. He sent Lewis and Clark out on a science-based expedition and he had a lifelong correspondence—and once spent three weeks—with Alexander von Humboldt. As for Jefferson's Bible, it was his effort to try to take the moral stories that he felt were so important to the new Republic to help guide us in our decisions. He literally cut little pieces out of the bible and pasted them into a scholarly version in four languages," Dr. Clough explains.

When the exhibition of the work opens this November at the National Museum of American History in Washington, D.C., visitors are likely to discover a new side to the man most identified with the Declaration of Independence, the Louisiana Purchase and his gardens at Monticello [11].

Says an admiring Dr. Clough, "Here was this man, seventy years old, who'd just finished opening the University of Virginia which he felt was important for the new Republic and then turned toward creating this set of moral lessons and doing it by hand and doing it with such incredible precision. He chose his paper, the papermaker, even the ink and binder."

He describes how Jefferson wanted every member of Congress to read this particular version of the Bible that was so steeped, among other things, in environmental parables and clear guidance for America's future.

Of A World Undimmed

It is clear that Dr. Clough harbors that hope, in his own undimmed passion for all things Smithsonian.

"It's really great that you haven't lost that because kids are the future, needless to say, and millions of kids come to the Smithsonian," I am reminded. "It's an inspiration every day to see all these young people up here," he says, with a feverish imagination befitting future generations.

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Chapter 39
How a Single National Park Might Help Transform a Nation: Haiti's Pic Macaya

Haiti's Challenges [1]

Haiti's President Michel Martelly ("Sweet Micky" to his music fans https://myspace.com/michelmartelly/music/songs) has been urging the world to view Haiti as a tourist destination. It certainly used to be. In 1975, Hillary and Bill Clinton honeymooned in Haiti, as have countless other couples. More importantly, Haiti is, for all her heartache, simply magnificent. And it is worth reminding people that Port-au-Prince is less than a 90 min flight from Miami or Fort Lauderdale.

In addition to the country's extraordinary cultural, historic and artistic traditions, Haiti possesses a unique ecological situation, certainly challenged but also, sublime.

The challenges are all too recognizable. Unlike, to the northwest, neighboring Cuba's 53 protected areas, 3 of them being World Heritage Sites, approximately 22% of that country being under some form of protection; and to the East, the Dominican Republic, with its 67 protected [2] areas including 16 national parks, a demonstrative network of eco-tourist sites and accompanying revenues, Haiti—especially since her terrible earthquake—has seen a virtual stand-still in terms of any wildlife vacations into the nation's undefined outback. Indeed, the majority of recent visitors to Haiti tend to be with one or other of the thousands of relief-related NGOs present in the country.

And understandably so: Haiti has suffered more than most nations, and currently must combat widespread unemployment amongst a population of nearly 10.3 million; persistent crop failures; energy outages; other resource constraints and ongoing reconstruction since the earthquake of January 12, 2010. Throughout Port-au-Prince, the country's capital, as well as numerous other districts of Haiti, UNOPS (the United Nations Office for Project Services, based in Copenhagen) and other agencies are working day and night to re-supply basic infrastructure to the population, including seismically-engineered new modular housing units. These structures, which I had an opportunity to visit, are being built in Port-au-Prince by UNOPS and partners involving every nuance, skill set and insight attendant upon the human condition. Such endeavors, among many (including wonderful new hotels emerging throughout the country) are symptomatic of the incredible energies looking towards a bright future for Haiti.

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Fig. 39.1 Unique Eco-Tourism Destination—A wetland of international importance near Pic Macaya, Plaine de La Cahuane. (Photo Credit: © M. C. Tobias)

It was UNOPS with whom I worked on a short visit to Haiti in early December 2012, and came away—as like so many other visitors to this country—deeply moved and encouraged. There is a spellbinding love that Haiti elicits in most visitors: the country's unique history, cultural mix, profound arts and vodou spirituality. But also her wondrous ecosystems.

My goal in being in the country was to better understand the national park question and to see if a such a park could, in fact, serve as the catalyst for an entire eco-tourism revival. Revenues in the Dominican from eco-tourism have been huge. Haiti needs its own ecologically-sustainable version, a most plausible scenario: For, in addition to the complex national and international efforts to rebuilt Haiti's economy and confidence, eco-tourism looms large [3] (Fig. 39.1).

A Haitian Revival

High value bio-cultural, historic and World Heritage destination sites existing throughout the country, particularly to the far north, the south and southwest, could, indeed, become the collective core of a vibrant economic driver for Haiti

In late 2012, Michaëlle Jean, UNESCO Special Envoy for Haiti, led a delegation to the country to examine the prospects for sustainable tourism [4]. Critical to an ecological vision of protection and tourism in Haiti is the work being undertaken in the southwest of the country, near the nation's 2nd highest summit—Pic Macaya. This mountain's magnificent karst limestone formations, cloud and dwarf forests, as well as its high rate of endemic flowering plants (over 30% unique to Hispaniola—the island encompassing both Haiti and the Dominican Republic) has been one of the centers of interest of the Government of Haiti and the International Community. During my trip in this region of Haiti, I met with the biologist Antonio Perera, a great conservationist who for many years was instrumental in helping research and shape Cuban national parks. Perera is the UNEP (United Nations Environment Programme) [5] Haiti Programme Manager. Together with UNOPS

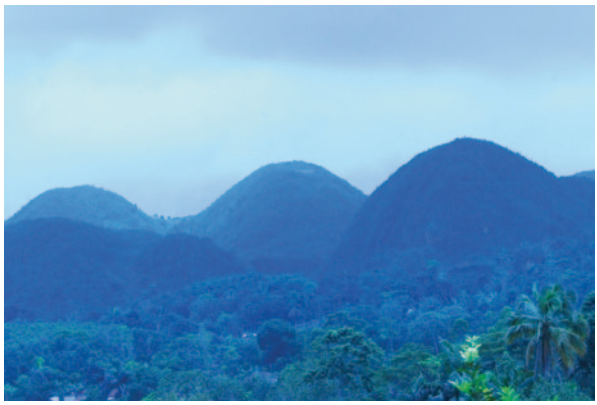

Fig. 39.2 Pic Macaya National Park. (Photo Credit: © M. C. Tobias)

and in the framework of the Côte Sud Initiative, UNEP works on catalyzing the ecological potential of the region which is dominated by the biodiversity hotspot of Pic Macaya (Fig. 39.2).

Countering A History of Deforestation [6]

Pic Macaya's inevitable standing amongst other great national parks of the world has been, to date, somewhat undermined by the Republic of Haiti's overall ecological situation. A vast majority of the nation's primary forest has been cut down over the course of more than two centuries for purposes of human survival.

Estimates on remaining native and non-native forest canopy vary, but it is likely that more than 1.5% remains, versus the global average [7] of between 9 and 12%, with some countries—such as Suriname and Bhutan—exceeding 60% primary canopy coverage. That 1.5% is at a near critical threshold.

The proposition is this: If 1.5% of remaining habitat in Haiti is to rejuvenate the nation's ecological services, like fresh water, and a continuing abundance of wildlife, a new lens is required through which to better grasp this nation's environmental possibilities. Fortunately, replenished perspectives are never implausible, in Haiti.

The "One Percent Solution"

During many hours in helicopters photographing much of the country, I examined closely Haiti's patchwork, particularly in the southwest, where some of the best remaining large forested areas, and mangroves remain.

And while I recorded nearly 100 separate burning fires (small fires driven by the economics of charcoal production), I also witnessed, in sum, what I term "the one percent solution," namely, an alternative version of Haiti's ecological map: solutions, biological bounty and promise, not merely the obvious deficits.

Fig. 39.3 The Hispaniolan Lizard Cuckoo, Pic Macaya. (Photo Credit: © M. C. Tobias)

That promise is the result of easily discernible seed source; existing stands of primary forest that afford great hope for genetic and wildlife corridors. There are, in other words, abundant remaining natural (many, native), in situ nurseries sufficient to the cause of reforestation. With reforestation will come viable watersheds, clean drinking water for hundreds of thousands of locals, and predictable waves of wildlife seeking "mainland islands" [8] in a greater Caribbean "hotspot" [9] that is already, in many instances, depauperate.

All of the edges and margin-lands that constitute so much of that patchwork on the ground, and seen from the air, do not take away from the fact that this Haitian hotspot within a hotspot of endangered species has the potential to become a key eco-tourism site in the Western Hemisphere (Fig. 39.3).

Nature and culture coincide in Haiti on a vibrant edge of artistic, spiritual and ecological realities. What is lacking is the focal point for a significant scientific cause célèbre. That's where the southwestern paradise of Haiti, and with it two central Massifs, comes into powerful perspective.

Paper Parks, Charcoal Burning

The cornerstone of this potential economic and environmentally sound concept [10] Pic Macaya herself, a roughly 150 km_2 region that encompasses the largest quasi-pristine wilderness in the entire country, overlooking to the north, the west and particularly the south, magnificent beaches, islands and mangroves. Macaya is the largest extant biologically intact series of connected ecosystems in the country.

Pic Macaya (along with Morne La Visite) was actually consecrated as a National Park back in 1983 [11]. However, it remains a "paper-park," one without protections.

When famed botany professor Walter S. Judd from the University of Florida at Gainesville, did his groundbreaking 1987 research [12] at both Morne la Visite and Pic Macaya, confirming earlier reports of hundreds of rare floristic species, he described what, at that time, were considered "two recently established national parks in the poorly known mountains of southern Haiti…." Earlier researchers had been there, like Swedish naturalist Erik Eckman, but Judd escalated the scientific community's profound interest in Pic Macaya, recognizing its extraordinary global significance.

While maps, hand-outs, brochures and documents of every persuasion have referred to two national parks in Haiti for 30 years—Pic Macaya, with its 7,700 ft peak, about 260 km from the capital, Port-au-Prince; and the much smaller, 30 km_2 Parc La Visite, which is about 22 km from the capital.

Pic Macaya, in actual fact, is under threat. The National Park status is still a dream, pending government resolve to find appropriate alternatives that would counteract local charcoal burning incursions, and effectively engage the coming population boom that is likely to take up habitation of the park as the road that crosses through Macaya's eastern fringes going over a pass from the southern to the northern peninsular coast at Jeremie, improves, which it will.

Scattered populations along the park's eastern fringes have some of the highest family sizes in all of Haiti. Family welfare, medical and social services are needed, in addition to sustainable long-term prospects for poverty alleviation and dignified, meaningful employment that fully respects local vodou traditions, counteracting existing, seemingly intractable dilemmas.

Those dilemmas stem, in part, from vying political, economic and cultural imperatives. Each, in turn, is compounded by the fact that Haitian vodou spirituality encompasses some 80 % of land investiture throughout the country. That 4/5ths figure also intimates the fact 80 % of Haiti is democratically open for multi-use, even if that translates into revenue streams from unsustainable practices. This is most notably evidenced in the form of burning down patches of biomass (shrubs, grasslands and remaining forest) for the making of charcoal. For the 72 % of [13] Haitians who, on average, earn less than US$ 2.00 per day, [14] US$ 11 to 15 approximately per 100 pound sack of charcoal [15] is a temptation seen throughout the country, and is utterly destructive from any ecological point of view.

A Unique and Timely Opportunity

From a strictly biological standpoint, perhaps the most telling scientific data [16] in Haiti emerged from a series of expeditions some nine years ago. These "Ornithological Field Investigations in Macaya Biosphere Reserve" recorded a large number of species, including numerous natives and endemics throughout the two adjoining massifs along the southern coast, de la Hotte and de la Selle, the latter being the largest of mountainous plateau, a 5,500 ha area at the heart of Macaya. The 2004 study found "diverse forested habitats, ranging from wet limestone forest at lower elevations to a complex mosaic of pine and cloud forest at upper elevations [which] may support the highest levels of endemism found on Hispaniola. The park's remnant forests are also among the island's most endangered, as deforestation has steadily encroached on Macaya's last remote areas."

Because Pic Macaya hosts such remarkable levels of avian, mammalian and flowering and non-flowering plant endemism (with the invertebrate diversity yet to be fully grasped) in so small an area, its global importance [17] cannot be overstated.

Once thorough scientific baseline data is verified with seasonal regularity, it is likely to push the estimates on Haitian biodiversity and endemism far beyond existing numbers for plants, 6,500; for birds, a known 21 endemic, and 199 other avian species; as well as for important terrestrial mollusks (snails), ferns and mosses.

To add international "buzz" to this looming symphony of possibilities, six species of frogs, long deemed extinct, including the "Mozart Frog," have been discovered in the past few years across this region, adding to the profound hopes so many Haitian biologists are now feeling.

These amphibian discoveries were "incredible," [18] according to lead scientist Dr. Robin Moore of Conservation International in Alexandria, Virginia, and Dr. Blair Hedges of Pennsylvania State University.

A National Park for the People and Their Children

Thousands of people inhabit the towns of Duchiti and Beaumont, along the road between Les Cayes and Jeremie, skirting Macaya. By implementation of a suite of economically sensible enterprises, including first and foremost an association of eco-tourist guides, visitor center, non-impactful tourist opportunities and educational outreach, a Pic Macaya National Park could be the ultimate winning ticket for Haiti, at every level of governance and local community life.

This engagement would encompass seven municipalities with stakeholders who all likely share some ancestral spirits within the globally significant floristic province that constitutes the KBA (Key Biological Area) that is uniquely Pic Macaya.

Downstream from Pic Macaya are approximately a quarter-million people for whom this National Park would provide safe drinking water. And, with an anchor in Pic Macaya as the supreme destination of choice for eco-tourists longing for a true Caribbean wildlife experience, all of Haiti wins, as the rest of the country's other biological assets can be brought into an income-generating, life-altering configuration that will assuredly benefit Haitians, and the planet.

One ecological stroke of the brush remains to be manifested if Haiti is, indeed, to embrace a powerful and productive future: the 1983 national park designation needs to be fully ratified and made operational by the Government. The road to the east of the Park needs to be completed to best international environmental standards, and donors who have already stepped up to the plate financially should forthrightly re-affirm their commitments to the project and, hopefully, offer additional and/or matching funds to inspire others to do the same—not for themselves, but strictly for Haiti. This is the kind of project that inspires the new twenty first century bold and breathtaking conservation.

Recently, Antonio Perera and team climbed to the summit of Pic Macaya. Says Perera, "It was one of the greatest conservation adventures of my entire life."

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Chapter 40
Conservation International: Stemming the Tide of Environmental Crises

Dr. Russell Mittermeier has been the President of Conservation International [1] since 1989. Mittermeier is one of the world's leading primatologists and field biologists. In many respects the entire Earth is Dr. Mittermeier's backyard: he lives and breathes and dreams to keep it as safe, as biologically rich as possible (Fig. 40.1).

Michael Tobias (MT): As one of the most influential advocates for global conservation, what are the most pressing dilemmas facing Conservation International today, as it works assiduously on so many fronts?

Russell Mittermeier (RM): We face several major challenges in achieving our conservation objectives, both short and long-term. First of all, amazingly enough given the overwhelming evidence, the environment in general, and biodiversity conservation in particular, is still not seen as a top priority by the global community. This manifests in a variety of ways, including the glacial pace of progress on an international, legally-binding climate agreement, the relatively low priority given to the Convention on Biological Diversity, the lack of understanding of the importance of natural capital in ensuring human survival, and the tiny budget allocated to conservation in most countries.

The continuing increase of human population in most developing countries and the rapid growth of consumption in the BRICS countries (Brazil, Russia, India, China, and South Africa) and in the emerging Mini-BRICS (Mexico, Turkey, South Korea, the Philippines, and Indonesia) are also of great concern. Although they have every right to aspire to the same standard of living as North America and Europe, it is questionable whether the planet's limited resources can meet such demand. The patterns of natural resource extraction from poorer developing countries by some of the BRICS, esp. China, is becoming increasingly serious, and will push many of the poorest countries into an even deeper hole.

That said, we have come a long way in the past 30 years. Conservation is a much higher priority than it was in the 1960s and 1970s, when the modern conservation movement began in earnest. The growth in protected area coverage is a good example. We have increased protected area coverage from 3 % terrestrially in the early 1980s to nearly 13 % now, and the Biodiversity Convention has set a terrestrial target of 17 % by 2020. In the marine realm, we are still under 1 %, but we have seen

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Fig. 40.1 Dr. Russell A. Mittermeier showing photos on his digital camera to Kayapó children, Kayapó, Pará, Brazil, March 2006. (Photo Credit: © Cristina G. Mittermeier)

rapid growth in recent years, esp. through the CI-pioneered concepts of Seascapes and Oceanscapes, and are on our way to achieving the ambitious Convention target of 10% in marine protected areas by 2020. But much more needs to be done if we are to wind up with an ecologically viable planet by century's end. Indeed, many of us believe in the concept of "Nature Needs Half," pioneered by our friends at the Wild Foundation, which recognizes that at least 50% of the world needs to receive some level of protection if our planet and our global society have any hope of being sustainable. We are currently collaborating with the Wild Foundation and other partners to provide a strong scientific basis for this idea (Fig. 40.2).

MT: What are the major "headlines" that give you pause in terms of the biological damage occurring throughout so much of the world?

RM: We are currently using natural resources at twice the rate that the Earth can replenish them; the population will increase by more than 2 billion people in the next few decades; the middle class will double at the same time, which will at least double demands for food, fresh water and energy; recent reports indicate that some critical fisheries have been depleted by more than 90% and are near collapse; and we are seeing dramatic changes in weather patterns (droughts, floods, temperatures, hurricanes, tornados, etc.). On the positive side, this is the first time in history that individuals, corporations and governments are paying this much attention. We are at a critical decision point and need to seize the moment by choosing a more sustainable path. Protecting the biodiversity and ecosystems that provide vital services (food, fresh water, fertile soils, pollinators, etc.) is the fundamental enabling condition for continued economic development and stability.

MT: CI has championed numerous approaches to not only saving species, populations, and vast stretches of critical habitat, but the organization has also distinguished itself in coming to the aid of indigenous stewards of the world's natural heritage. Where are the successes you can point to that serve as a good example of win/win situations for biodiversity and for locals whose lives depend directly on that same biodiversity?

Fig. 40.2 Baobab forest burning in the Analabe region of the Menabe Forest of southwestern Madagascar, 1984. (Photo Credit: © R. A. Mittermeier)

RM: From its inception, CI has understood that strengthening the rights of indigenous peoples to their lands and cultural traditions is key to maintaining their historic role as stewards of ecosystems and biodiversity. CI and the indigenous peoples and communities with whom we partner have demonstrated a number of successes that combine support for land and management rights with the protection of biodiversity and the development of sustainable economic activities within these communities. In Brazil, CI and local partners have worked for 20 years with the Kayapó people to both protect their Amazonian homeland, an enormous area of 11.5 million ha, and support the development of non-timber based economic opportunities, such as the commercial distribution of Brazil nut oil, honey, and cocoa. The Kayapó's great leader, Megaron Txucarramae is on CI's Board of Directors and our Brazil Program just announced the creation of a new 20 million real (US$ 12,823,000) trust fund for the Kayapó to support them in protection of their homelands and to give them some measure of long-term security. The resources for this new fund came from both CI's Global Conservation Fund and from BNDES, the Brazilian National Development Bank—an historic first in which an indigenous community, an international conservation organization, and a major development bank have joined forces to make it all a reality.

Another success is the establishment of Guyana's first Community Owned Conservation Area (COCA), which the WaiWai people of southern Guyana declared after receiving absolute title to their traditional lands. CI worked with the WaiWai to develop a management plan for the 625,000 ha COCA, which includes a focus on a "conservation economy," creating jobs in conservation activities such as monitoring and research, ecotourism, and the sale of traditional crafts.

On the other side of the world, CI has been working since 2002 with the Kanak tribes of Province Nord, New Caledonia, to manage the Mont Panié Protected Area on the territory's northeast coast. As part of that effort, CI helped to establish Dayu Biik, the first indigenous non-government organization in Province Nord. Dayu Biik brings together customary tribal landowners of Mt. Panié to focus on improved livelihoods through better management of the protected area and ecotourism development. And these are just three examples from the many partnerships that we have with indigenous peoples.

MT: What should Americans, and Western-style consumers in general be most concerned with in terms of the key issues that CI, and you personally, are grappling with on a daily basis?

RM: In the first place, all of us, not just Americans and Western-style consumers, need to be concerned about the health of the global environment and the continued availability of critical ecosystem services like fresh water and other renewable natural resources. Consider the path we're on. We're putting more pressure on the planet than ever before. At the same time, the human demands for everything Nature provides us have never been greater. And I do mean everything. Everything that sustains us is a gift from Nature: our water from aquifers, rivers, lakes, and forests; the pollinators that are essential for food crops; our fisheries from healthy coral reefs and clean oceans; our stable climate from the carbon storage of forests, grasslands, mangroves, sea grass beds, and other natural systems; the prevention of natural disasters by forested slopes and coastal mangroves and coral reefs; and the list goes on. For too long, we have taken these free services from Nature for granted. Continuing to do so will result in widespread ecological collapse in many parts of the world, ultimately and inevitably impacting those of us in the richest countries as well and potentially threatening national and global security if populations are forced to migrate to find these services. That is why CI has embraced a strategy of conservation for human well-being, recognizing that "people need Nature to thrive," or, in the worst case scenario, simply to survive. What is more, we have taken as our central strategy the development of "Healthy, Sustainable Economies," in which the valuation and maintenance of a robust, functioning environment is central to a viable long-term economic development strategy.

MT: In terms of priorities for saving habitat, species and populations, where do you now stand?

RM: In the terrestrial realm, there is no doubt that the Hotspots and the High Biodiversity Wilderness Areas remain at the top of our priority list in extinction avoidance and maintenance of our planet's unique biological diversity. The 35 Hotspots that we have identified have by far the highest levels of extinction risk, and they are the places where we will most likely see total ecosystem collapse if appropriate measures are not taken. Together, they once occupied about 16% of Earth's land surface, but what remains in them now accounts for only about 2.4% of the terrestrial planet, nearly a 90% loss of their original natural vegetation. In spite of their small area, they have packed within them, as endemic species found nowhere

else, more than 50% of all plant species and more than 42% of all vertebrates. If one looks at the IUCN Red List, the global authority on threatened species, the concentrations are much higher, with 83% of the most threatened birds, 82% of the most threatened mammals, and 90% of the most threatened amphibians concentrated in the Hotspots. The High Biodiversity Wilderness Areas (Amazonia, the Congo forests of Central Africa, the Miombo-Mopane Woodlands of Southern Africa, the island of New Guinea, and the North American Deserts) are similar to the Hotspots in that they have very high levels of diversity and endemism, but unlike the Hotspots they are still largely intact. However, given the rapid increase in demand for natural resources from countries like China and other BRICS countries, they have become the new targets of resource extraction and could wind up like the Hotspots within a few decades.

We are also making a big push on marine and fresh water conservation. On the marine front, under the leadership of Greg Stone, the head of our Marine Program, we have been instrumental in the creation of some of the world's largest marine protected areas, most notably, the Phoenix Islands Protected Area (PIPA) in the Pacific Island nation of Kiribati. This 410,000 km^2 reserve—roughly the size of California—was declared a World Heritage Site in 2010, making it the largest and deepest site of this kind in the world. We have also developed and implemented the concept of Seascapes, the marine equivalent of landscapes, and have demonstrated how marine conservation can be carried at scale in several different high priority marine areas, notably the Eastern Tropical Pacific Seascape (from the Galapagos to Cocos Island in Costa Rica and including the countries of Ecuador, Colombia, Panama and Costa Rica), the Birdshead Seascape at the western tip of the island of New Guinea in Papua Province, Indonesia (which includes the fantastic Raja Ampat Islands, with the highest known coral diversity in the world), and in the Sulu-Sulawesi Seascape shared by the Philippines and Indonesia. The Seascape concept has now been expanded even further to the level of an Oceanscape in the Pacific Islands, with some 16 island nations in that region signing onto this new concept last year. With fresh water, we are working hard to establish biodiversity priorities and to demonstrate how incredibly important biologically rich, intact natural systems like rain forests are in ensuring a continued supply of clean water to human societies (Fig. 40.3).

MT: What do governments worldwide need to take very, very seriously where it comes to policy analysis and policy enactment with respect to biodiversity?

RM: The Convention on Biological Diversity (CBD), which was one of the outcomes of the 1992 Earth Summit in Rio de Janeiro, is a very important policy instrument. At its most recent Conference of the Parties in Nagoya, Japan, in October, 2010, it succeeded in developing an Action Plan for the next 10 years with some very specific and strong targets (now referred to as the Strategic Plan for Biodiversity), a Protocol on Access and Benefit Sharing, and a very preliminary plan for funding. Countries are now engaged in preparing their own National Action Plans. These will be very important and should be taken seriously by countries and by the global community. To ensure that this important work maintains momentum, the

Fig. 40.3 Dead monkey on display. (Photo Credit: © R. A. Mittermeier)

richer countries of the world need to make much stronger financial commitments to put some teeth into this international agreement, which is critical to save biodiversity and equitably share the many ecosystem services that derive from it.

MT: Where are some of the most serious gaps that you see in terms of government perception of ecological priorities, particularly during economic hard times, as now?

RM: Unfortunately, the environment remains a low priority, both in good times and bad. In part, this is because the impacts of environmental degradation are usually not felt immediately, but rather medium to long-term, especially in developed nations like those of North America and Western Europe. This is quite different from a recession, an oil crisis, or a rapid rise in unemployment that hits us in the pocketbook from one day to the next. In poorer nations, where many cultures still live below the poverty level and are more directly dependent on biodiversity and ecosystem services, there is sometimes more interest in the environment, but their concerns are simply not driving the global economic agenda. This is folly, but it will take a lot more work, especially by organizations like ours, working closely with powerful Global Agents of Change such as the multilateral and bilateral development organizations (e.g., the World Bank, USAID) and major corporations. This is one of CI's highest priorities and it is integral to our new mission.

MT: CI has demonstrated a remarkable ability to partner with corporate stewards of the environment. How has this worked in terms of on-the-ground successes?

RM: Yes, we have always placed priority on developing strong relationships with the corporate sector, in recognition of the fact that this sector drives so much of what is happening in the world. This is largely thanks to the vision of our Founder and CEO Peter Seligmann, who from the outset recognized the need for such engagement. If this sector is not brought on board and does not buy into a new vision for the world, we will not succeed in achieving our long-term objectives. To further our relationships with the corporate sector, we created a Center for Environmental Leadership in Business back in 2000, and recently took stock of results from the first 10 years of this center. Among other things, our corporate partners have provided crucial funding and technical support that have enabled us to implement innovative local projects in many priority regions where CI works, and, in many

cases, have sought our scientific expertise to advise them on potential placement of planned development activities.

More specifically, we have engaged with leading corporations on precedent-setting field projects in more than 20 countries, demonstrating positive on-the-ground results for people and healthy ecosystems. A key example is Starbucks, which is supporting projects in Mexico and Indonesia to demonstrate how sustainable coffee growing practices (e.g., shade-grown coffee, which helps to preserve natural forests) can contribute to climate change solutions and improved farmer livelihoods. Lessons from these projects are feeding into the Starbucks global coffee-sourcing program known as C.A.F.E. Practices, which has become the industry standard for sustainability. In a recent assessment of the on-the-ground results of C.A.F.E. Practices, we confirmed that coffee farms enrolled in the program are making valuable contributions to environmental stewardship in globally important areas for conservation. Participating farms have designated more than 100,000 ha as conservation areas, and 99% have not converted any natural forest areas to coffee production since the C.A.F.E. Practices program began in 2004. Moreover, the assessment revealed that participating farms employed 1.1 million workers, and that most large and medium-sized farms in the program made efforts to extend health care and education benefits to workers and their families.

We estimate that our corporate relationships alone during the last decade have enabled protection or improved management of nearly 7 million ha—an area roughly the size of Massachusetts, Vermont, and New Hampshire combined. An excellent case in point is the $ 7 million funding commitment we received from Disney—the largest contribution of its kind—for forest carbon projects covering 658,000 ha in the Democratic Republic of Congo and Peru. The Disney investment is also noteworthy because it fits within a broader portfolio of actions by the company to cut energy and water consumption and reduce greenhouse gas emissions. Through its Worldwide Conservation Fund, Disney has also supported CI-led species conservation efforts affecting 1 million ha in Colombia and Brazil. Other important examples include CI's engagement with Alcoa on an Amazonian sustainable landscape initiative in the Brazilian state of Pará (2.7 million ha), Marriott International's support for a community payment for ecosystem services program to protect key watersheds in the Mountains of Southwest China Hotspot (567,000 ha), and CI's partnership with Walmart—Brazil to promote nature conservation and sustainable development in the state of Amapá in the northeastern portion of Amazonia (412,000 ha).

MT: How might Wall Street best understand the options and opportunities at hand to better invest in, and protect this planet's invaluable, non-renewable resources?

RM: The financial sector has tremendous influence because it is the gateway to capital for the world's economic development, whether it is project financing for a hydroelectric dam or balance-sheet financing to expand a company's agricultural capacity. We would like to see the value of environmental "externalities," such as the availability of fresh water, incorporated into the financing decisions of corporations and their lending partners. We call this idea "Healthy, Sustainable Economies," the notion that you cannot have sustainable economic growth and job creation without

accounting for the economic value of the natural systems that give us our healthy soils, pollinators, fresh water, clean air and other benefits. Ultimately, we think that the credit ratings of companies—and the GDP of sovereign nations for that matter—should include a measure of whether they are appropriately valuing and sustainably managing the natural systems we all depend on.

There have been some encouraging signals that Wall Street is increasingly recognizing the importance of biodiversity and ecosystem services in business decisions. For instance, JP Morgan Chase and Bank of America helped CI and other partners to launch the Integrated Biodiversity Assessment Tool (IBAT) for Business, a web-based platform that provides information on the highest priority sites globally for conservation. The IBAT tool helps enable commercial banks and other financial services institutions assess risks and make more informed lending and investment decisions.

MT: Have CI's priorities shifted in terms of the methodologies it is pursing to best effect habitat protection? For example, for years you championed the "hotspots" approach [2]. Others now speak of "coldspots." Tell us about that, and how CI's various approaches to saving life on earth continue to be fine-honed?

RM: Both the Hotspots and the High Biodiversity Wilderness Area concepts continue as a focus. In fact, most of our Core Countries and other priority geographies still fall within the borders of these areas. There is simply no getting around the fact that these areas are extremely high priorities, not just for extinction avoidance, but also for maintenance of the genetic diversity of some of our most important crop species, for the continued maintenance of human cultural diversity, for provision of ecosystem services for people—including a large portion of those living below the poverty level, and even in terms of global geopolitical security. Indeed, a paper that we published recently demonstrated that more than 80% of the violent conflicts of the past 50 years took place within the ecologically-stressed Hotspots. Another paper that we are working on now shows that of the roughly 6912 languages still spoken in today's world, 3475 (50.2%) are spoken in the Hotspots. If one adds those in the High Biodiversity Wilderness Areas, the total goes to 5092, or 73.7%, a very high concentration indeed. What is more, the vast majority of those languages (and cultures) most at risk of disappearing, those spoken by just a few dozen, a few hundred, or a few thousand people—the language equivalent of endangered species—are found mainly in the hotspots and High Biodiversity Wilderness Areas. In other words, these areas are also tremendously important in maintaining human cultural diversity.

Of course, it is not only the biodiversity of the Hotspots that is important. We have long maintained that all biodiversity is important in its own right and essential to long-term human well-being, and that all countries should do everything possible to maintain their natural capital. However, in terms of immediate risk, the Hotspots remain at the top of the priority list, with the High Biodiversity Wilderness Areas following close behind. The so-called "coldspots" are also important, but there is simply no comparison between these and the Hotspots in terms of imminent

extinction risk and potential ecological collapse. The bottom line is that if we fail in the Hotspots, we will lose a major portion of the world's terrestrial and freshwater biodiversity, regardless of how successful we are everywhere else—and with those losses go untold global benefits to humanity—and with the most immediate impacts being felt by the poorest of the poor. The geopolitical and national security issues resulting from such collapse could be enormous.

What is more, it is critically important to recognize that conservation of these Hotspots is not just about saving species and avoiding extinctions. Take a country like Madagascar, probably the single highest biodiversity Hotspot on Earth. No more than 10% of Madagascar's original natural vegetation remains, and much of what still survives is in a network of protected areas continually under the gun from illegal timber extraction (to serve a Chinese luxury market) and poaching. Without these protected areas, there is no doubt that the vast majority of Madagascar's unique biodiversity will disappear. However, what is usually not recognized is that the vast majority of Madagascar's essential ecosystem services—so important for the poorest of the poor—also are derived from these protected areas. Destroy these protected areas, and the human population will enter a severe, possibly irreversible crisis in short order. Fortunately, the World Bank has recognized this, and on June 21 approved a 3-year extension of its support to protected areas in Madagascar, in spite of the precarious political situation there. This $ 59 million over 3 years will help to prevent a major extinction episode, and the Bank, and its visionary President, Robert Zoellick, deserve a great deal of credit for recognizing the global value of this Hotspot.

It is also important to note that the Hotspots have served as an excellent fundraising mechanism. I estimate we have raised no less than $ 1 billion for Hotspot conservation over the past 20 years, including such innovative mechanisms like the Critical Ecosystem Partnership Fund and the Global Conservation Fund. The Critical Ecosystem Partnership Fund (CEPF) was created in 2000 to focus on empowering civil society organizations in the Hotspots, and it came to fruition, after 4 years of negotiation with the World Bank, shortly after the launch (at the World Bank) of our first book on the Hotspots, entitled Hotspots: Earth's Richest and Most Endangered Ecoregions, in 2000. The brainchild of CI CEO Peter Seligmann and then World Bank President Jim Wolfensohn, the Critical Ecosystem Partnership Fund targets with great precision the highest priority areas within the Hotspots, and brings teams of global and regional scientists together with representatives from local communities, often for the first time, to help them develop comprehensive strategies for biodiversity conservation (Fig. 40.4).

Once these strategies are in place, the Fund enables local community associations, NGOs, private businesses and other civil society groups to engage in conservation activities by rapid provision of capital to make direct conservation action possible. Initially, the CEPF was supported by the World Bank, the Global Environment Facility, the MacArthur Foundation in Chicago, the Government of Japan, and CI, each with a total commitment of $ 25 million over 5 years. The first 5-year phase was completed successfully in 2007 and we are now in a second phase, with the Government of France joining as a sixth partner. Other countries are also showing interest.

Fig. 40.4 Baobab trees and local individual, Madagascar. (Photo Credit: © R. A. Mittermeier)

Thus far, the CEPF has provided over $ 120 million to more than 1600 civil society groups and individuals, in the process leveraging over $ 260 million, and it has supported the establishment of 12 million ha of new or expanded protected areas and improved the management of over 20 million ha of critical ecosystems.

The Global Conservation Fund (the GCF) was intended to finance the creation, expansion and long-term management of new protected areas in the Hotspots and High Biodiversity Wilderness Areas. Made possible by a generous $ 100 million grant from the Gordon and Betty Moore Foundation, it is the first global fund designed to target two critical needs—creating and expanding protected areas and providing financial mechanisms to ensure effective management of those areas well into the future. The GCF makes investment decisions based on sound science to benefit the highest priority places for conservation. To create a steady flow of funds for managing protected areas in perpetuity, GCF helps design and support endowments, trusts and other mechanisms, such as debt swaps. It also explores other potential revenue streams, such as site fees, tourism, or initiatives involving payment for ecosystem services such as the water rights or the sale of carbon credits from avoided deforestation.

Thus far, the GCF has invested $ 60.4 million, in the process leveraging an additional $ 108 million leveraged by those grants, and it has created or expanded more than 70 conservation areas. Together these total more than 75 million ha of critical terrestrial and marine habitat in more than 20 countries, an area almost twice the size of the state of California. In many ways, I think that this fund and the CEPF stand out as CI's most impressive conservation achievements, since they have had an impact on an area so large that it could be seen from outer space.

Yet another mechanism, entitled Verde Ventures, is an investment fund founded on the belief that the synergy of enterprise and stewardship is at the core of successful conservation efforts benefiting both people and nature. The fund provides debt and equity financing to small and medium-sized enterprises (SMEs) that are strategically placed to contribute to conserving Earth's biologically richest and most threatened areas.

SMEs are the backbone of the global economy, and are especially important in the economies of developing countries. Yet they have trouble finding capital because they are too big for microfinance and often fall short of the collateral required

Fig. 40.5 Northern giant mouse lemur, Madagascar. (Photo Credit: © R. A. Mittermeier)

by commercial lenders for larger projects. Verde Ventures fills this niche, lending to commercially viable enterprises in the range of $ 50,000 to $ 500,000, providing crucial resources to companies that benefit healthy ecosystems and human well-being. Its clients include businesses involved in agro-forestry, ecotourism, sustainable harvest of wild products, and marine initiatives (Fig. 40.5).

Thus far, Verde Ventures has invested $ 16.4 million, with the enterprises supported protecting more than 308,000 ha, employing 15,000 people in 13 countries, and safeguarding habitats for 191 globally threatened species.

MT: We hear much about the Sixth Extinction Spasm and it is clearly a depressing, if not overwhelming message of bad news. Tell us just how bad, but also where the good news can be found, if any? (Fig. 40.6)

RM: Yes, there is no question that the Extinction Spasm that we are entering is bad news for us all. It could severely reduce our planet's ecological resilience, dramatically eliminate future options, and impact our long-term chances for survival. However, in many ways the saddest part is that our world will become a much poorer place culturally for the human species. The wealth of Nature has fascinated us since our earliest days as a species, and it is integral to all human cultures. "Biophilia," a term invented by Edward O. Wilson, the greatest biologist of the twentieth century, captures this well, and is defined by Wilson as "our innate tendency to focus on life and life-like processes."

For me individually, I want to make sure that my children inherit a world as rich and diverse and exciting as the one into which I was born. As one of my main contributions, I have focused the past 40 years on maintaining the diversity of our closest living relatives, the nonhuman primates—the apes, monkeys, lemurs, lorises,

Fig. 40.6 Cardamom mountain aerials, Cambodia, tropical forest, land development, deforestation, aerial view. (Photo Credit: © R. A. Mittermeier)

galagos, and tarsiers that make up the mammalian Order of which we are a part. I have served as the Chair of the Primate Specialist Group of the International Union for Conservation of Nature's Species Survival Commission (SSC) since 1977, coordinating and supporting a global network of primate conservation professionals, and continue to do so as part of my direct personal contribution to conservation.

Although there is a lot of bad news out there, we have been successful in many places. One of the best examples of success is in the Atlantic forest region of eastern Brazil, one of the highest priority Hotspots. This is the second great forest block of Brazil, after Amazonia. However, unlike Amazonia, which is still largely intact, it has been heavily impacted by human activities for the past 500 years—to the point that it is down to 7–8% of its original extent. I began working there in 1971, and found a very receptive audience in Brazilian society. What remains in the region is now well-protected, further extinctions are unlikely, and there is now a "Pact for the Atlantic Forest"—with more than 150 civil society, corporate and government signatories—that aims to double the area of natural forest by 2050.

An excellent example on the species front is that of my friends, the nonhuman primates. Although the primates have one of the highest percentages of threatened species of any group of organisms (48% of all species in the critically endangered, endangered, and vulnerable categories of IUCN's Red List), we managed to come through the twentieth century without losing a single species or subspecies. This is an enviable record that is unmatched by any other larger group of mammals. We have a strong strategy in place, and a global cadre of primate conservation professionals working hard to ensure the survival of these wonderful animals. Resources are always in short supply, but the work continues nonetheless and achieves many successes around the world (Fig. 40.7).

Yet another striking success story is the return of the Arabian oryx. This is a spectacular flagship species that once had a wide distribution on the Arabian Peninsula. Uncontrolled hunting led to this species becoming Extinct in the Wild, with the last remaining wild individual believed to have been shot in Oman in 1972. As the extent of the decline became apparent, some of the last animals were captured to form a 'World Herd' at the Phoenix Zoo and then the San Diego Zoo, which, along with individuals from royal collections in Saudi Arabia and Kuwait and from the Zoological Society of London, provided stock for re-introductions into the wild.

Fig. 40.7 Verreaux' sifaka, Madagascar. (Photo Credit: © R. A. Mittermeier)

The first re-introduction occurred in Oman in 1982, and was a success, demonstrating the ability of captive oryx to adapt to the harsh wild conditions. Subsequent reintroductions have taken place in Saudi Arabia, Israel, the United Arab Emirates, and most recently in Jordan. As a result of the reintroduction programs, the current wild population now stands at approximately 1000 individuals, with a further 6000+ in captivity, mainly on the Arabian Peninsula, but also in Kuwait and Iraq. Several reassessments of the status of this species have taken place since the start of the reintroductions, and in 2011 the species qualified for listing as Vulnerable. This is the first time that a species which was once Extinct in the Wild has improved in status by three full categories on the IUCN Red List.

MT: What are the most salient prospects, in your view, for the successful interplay of biodiversity and economics?

RM: We need to continue to demonstrate that biodiversity conservation must be a basic element in any long-term economic development strategy. Biodiversity, which includes species, ecosystems, and ecological processes, is essential for the long-term maintenance of ecosystem services like photosynthesis, nutrient recycling, soil fertility, provision of fresh water, disaster prevention, and many others. Without this natural capital maintained, and restored where it has been lost or degraded, our prospects for long-term economic development are weak at best, and likely doomed to failure. This is precisely why CI has adopted a new mission to demonstrate that biodiversity and healthy ecosystems are essential to human well-being, and why we are taking on the task of demonstrating this in a series of core countries, large and small, highly degraded and still largely intact, with both high and low levels of capacity and political commitment to creating Healthy Sustainable Economies.

We also have a wonderful new tool available to us, and that is the TEEB study (**The Economics of Ecosystems and Biodiversity**) by Deutsche Bank's Pavan Sukhdev and colleagues. This study is the most comprehensive assessment to date of the value of the natural world to global economic development. In it, Pavan, an internationally renowned economist who recently joined CI's Board of Directors, estimates that the annual global cost of biodiversity loss is close to $ 3 trillion,

and that is most heavily felt in the poorest countries—and particularly in the Hotspots—where much of this loss in taking place.

MT: I know you to be an optimist, even in the face of very troubling circumstances. What can each of us do to better situate ourselves and our entire species in a place more likely than not to favorably interact with other species in what is likely to be a more humanly-crowded, difficult future?

RM: The actions that we can take as individuals and as societies have already been identified for years now. We can reduce our individual resource consumption, we can take an interest in what is happening elsewhere in the world and not just in our own backyards, and we can encourage our governments to be more enlightened in terms of the major threats facing our planet. The issue of Climate Change is a case in point. In spite of clear warnings by scientists for the past two decades, the global community has still not arrived at a legally-binding agreement on this key issue. With rare exceptions, countries are acting in their own short-term self interest, with little or no attention to even the medium-term consequences, never mind what could happen long-term. Enlightened, collaborative leadership at a global level is sadly lacking. That is not to say we haven't made progress, but it has come in small increments and not at the scale or pace that is needed.

MT: What should we fear most about the continuing biological havoc our species is meting out? (Fig. 40.8)

RM: Ultimately, it is the long-term viability of our planet and our own survival that is at stake. We can justify the continued loss of a certain percentage of the world's biodiversity and the continued loss of ecosystems, but every piece that is lost reduces resilience, eliminates options, impacts our quality of life, diminishes our cultures, and, in the final analysis, will result in both ecological and societal collapse. Examples of this abound, and are very well outlined in Jared Diamond's classic book, **Collapse**, but now we face the risk of planetary collapse as well, as human resource use far outstrips Nature's capacity to bounce back. We simply have to recognize the fundamental importance of Nature in our global economic development strategies, and to make the necessary changes in these strategies in the immediate future. In the final analysis, this has to be done by governments, but the corporate sector—which is usually much more agile than governments—can play a major role in both demanding and demonstrating it. What is more, the public must be much more informed and actively engaged as well. But time is of the essence. As Tom Friedman says, "Later was a luxury of previous generations. You could paint the same landscape or eat the same fruit that you had in your childhood. You could do it later because Nature seemed bountiful and all threats to it insignificant. But later will be too late. Whatever you want to save, start saving it now."

MT: What are the newest paradigms and pragmatic details of nature conservation we should look to as the UN Climate Conference in South Africa this coming December, as well as the 20th anniversary of the famed 1992 Rio Summit next June 2012, are upon us?

Fig. 40.8 Deforestation in Madagascar. (Photo Credit: © R. A. Mittermeier)

RM: Perhaps the most important new development is the concept of "Green Economies," which we refer to as "Healthy, Sustainable Economies." This is sure to be a major topic of discussion at the upcoming Rio+20 Conference in Rio de Janeiro in June, 2012. Although this concept still means different things to different stakeholders, our position is that a Green Economy, or indeed any economy that is to be healthy and sustainable over the long-term, has to have at its core the maintenance of our natural capital. This means that our biodiversity, our healthy ecosystems, and the ecosystem services that derive from them—our renewable natural resources, must be central to the economic development strategies of all nations. Without this, we believe that we will be building a "house of cards," which ultimately will collapse. To demonstrate how this can be accomplished, we are working at a high level with about a dozen countries to help them in this process, we are making very significant contributions of various kinds to a dozen more, and we are providing some level of support to a total of more than 70 countries.

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Chapter 41
The Future of Life on Earth

I sat down recently with Dr. Ahmed Djoghlaf [1], the Executive Secretary of the United Nation's Convention on Biological Diversity (CBD), a position he held from January 2006 until January, 2012, to talk about the state of species extinction globally and ways we can stop the irreversible loss of biological diversity.

The Many Threats to Life: How Serious is the Situation?

Michael Tobias (MT): Why isn't the sixth extinction spasm in the annals of earth's biology headline news around the world, every day? What are the major areas of loss? Where is the earth suffering the greatest losses at this point in time? (Fig. 41.1)

Dr. Ahmed Djoghlaf (AD): The main reason the current mass extinction is not in the headlines is widespread ignorance among both the public and policymakers about the contributions biodiversity makes to human well-being on so many levels, including spiritually, culturally and materially. Because of this ignorance, biodiversity has simply not yet penetrated our collective consciousness. For example, a 2007 Eurobarometer survey [2] showed that 65 % of Europeans either had not heard of the term biodiversity or did not know what it meant.

With the current rate of extinction up to 1000 times higher than the natural background rate, this needs to change. And we have the means to effect that change. For example, a recent UN study entitled **The Economics of Ecosystems and Biodiversity** (TEEB) [3] estimates the annual global cost of biodiversity loss at close to $ 3 trillion. This is more than what three major sectors of the economy gross in a year, the car industry earning $ 1.9 trillion, the IT industry $ 950 billion, and steel $ 600 billion. Such numbers would no doubt come as a surprise to most people, and help to make them rethink their relationship with nature.

The headlines should therefore not only emphasize that life on earth is in serious jeopardy, but that humans will suffer irreversibly from this loss on every level imaginable. We stand to lose just as much as any other species from the ongoing

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Fig. 41.1 Dr. Ahmed Djoghlaf. (Photo Credit: Courtesty of Convention on Biological Diversity)

destruction of nature, which is why the UN General Assembly has declared 2011–2020 the UN Decade on Biodiversity.

As for major areas of loss at the moment, the majority of the world's most biodiverse regions are found in developing countries, and it is precisely these regions where biodiversity is under the greatest threat. Tropical forests, coral reefs and other diverse ecosystems are being rapidly lost or degraded. In addition, climate change is having particularly dramatic effects in critical mountain habitats.

MT: What are the stakes with regards to the enormous loss of biodiversity currently occurring globally and is there a financial fix that could make it right?

AD: The stakes are high, because we depend on biodiversity for so much. It is our ultimate source of food, fuel, medicine, and much of our fibre and building materials. Moreover, the planet's many ecosystems provide human beings with a range of irreplaceable services. These include air and water purification, detoxification and decomposition of wastes, stabilization and moderation of Earth's climate, moderation of floods, droughts, temperature extremes and the forces of wind, renewal of soil fertility, nutrient cycling, pollination of wild plants and crops, and control of pests and diseases.

All of this is why, as shown last year by Global Biodiversity Outlook 3 [4] biodiversity loss is guaranteed to push more and more people into poverty and hunger over the coming years if we do not do anything about it. To illustrate this with statistics: 1.6 billion people worldwide, the majority poor, are estimated to depend substantially on forest biodiversity, including non-wood forest products, for their survival and livelihood. And yet 13 million hectares of the world's forests are lost due to deforestation each year. One billion people depend on fish as their sole or main source of animal protein, while fish provided more than 2.6 billion people with at least 20% of their average per capita animal protein intake. And yet 80% of examined world marine fish stocks are fully exploited or overexploited. Around 30 million people in the poorest and most vulnerable coastal and inland communities entirely depend on coral reefs for their livelihoods. And yet 60% of coral reefs could be lost by 2030 through fishing damage, pollution, disease, invasive alien species and coral bleaching.

The only sustainable financial fix to this problem is a complete overhaul of how we interact with nature: we must stop treating biodiversity as an infinite resource that remains uninfluenced by what we do. Initiatives such as **The Economics of Ecosystems and Biodiversity** [3] have now given us the tools to start asking development planners to directly take into account the economic value of biodiversity and ecosystem services. Both developed and developing countries have to start incorporating the value of biodiversity into their economic models and mainstream biodiversity into all sectors of governmental decision-making. Just as importantly, environmental departments need to start integrating their objectives into policies and programs for economic development and poverty eradication.

MT: Ever since the formation of the 1964 Wilderness Act, the U.S. Environmental Protection Agency, the 1972 Stockholm Summit, and then the Rio Summit, increasing global awareness has obviously come of age with respect to environmental crises to all sides. Yet, there is astounding complacency, it would seem, from the human collective with respect to enacting a true sea change in terms of our sustainable relationship with the natural world. Is this a problem inherent to human nature? Many are saying just that.

AD: The problem so far is that it has not been clear to the average person how environmental destruction and biodiversity loss affect their lives. It may be part of human nature to not care about a problem until you see its consequences right in front of you, but that just puts a greater onus on us to more clearly articulate those consequences to the public and to policymakers, a challenge that is being tackled head on by the above-mentioned TEEB initiative. Public outreach is also a key component of the CBD's 2011–2020 strategy and the 2011–2020 UN Decade on Biodiversity.

MT: Could you explain what the Aichi Biodiversity Targets mean, and why have they been extended to 2020, when the CBD's proposed "Vision of Living in Harmony with Nature" is targeted 30 years beyond that, in 2050? Remember, by 2050 there are likely to be another 2 or 3 billion more human beings, the majority seeking a Western-like high consumerist lifestyle? The population explosion continues to look Malthusian to many.

AD: At the Nagoya Biodiversity Summit in October 2010, some 18,000 participants representing our 193 Parties and their partners adopted the 2011–2020 Strategic Plan of the Convention, also known as the "Aichi Targets." [5] The year 2020 was chosen as the deadline for achieving the targets because what we do—or fail to do—during this decade will determine the status of life on earth for years to come. As Global Biodiversity Outlook 3 warns, ecosystems are approaching tipping points beyond which they will be irreversibly degraded, with long-term consequences for all life on earth, including humans.

Hence, the 2011–2020 strategy includes not only explicit conservation targets, for example with respect to forests and coral reefs. It also includes targets relating to reducing direct pressures on biodiversity and, most importantly, addressing the

underlying causes of biodiversity loss by mainstreaming biodiversity preservation across government and society. The latter targets aim to bring about a profound change in our lifestyles, and particularly in our development paradigm—they are concerned with moving us away from unchecked consumption toward sustainable use. Population growth will of course factor in as countries translate these general global targets into national policy.

Overall, achieving the Aichi Targets by 2020 is an obligatory first step if we are to fulfill the longer-term 2050 vision of a world where "biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people." Needless to say, if we achieve the Aichi Targets, there will still be much work to do beyond 2020—but at least we will be on the right track.

MT: Many have argued that this generation is the last, best hope for inhibiting total ecological collapse worldwide. First, what would such collapse actually bode of? What would it mean to you and me and everyone else? Second, is this generation up to it, in your view?

AD: If ecosystems pass tipping points beyond which irreversible degradation takes place, the poor would face the earliest and most severe impacts since the majority of them depend on biodiversity for their day-to-day livelihoods. Ultimately, however, all societies and communities would suffer. The Amazon forest provides a relevant example: due to the interaction of deforestation, fire and climate change, it is predicted that the Amazon could undergo a widespread dieback in the future, with parts of the forest moving into a self-perpetuating cycle of more frequent fires and intense droughts, leading to a shift to savanna-like vegetation. This would lead to regional rainfall reductions, compromising agricultural production. There would also be global impacts through increased carbon emissions and massive loss of biodiversity.

Equally worrying scenarios are predicted for freshwater ecosystems and coral reefs if currents levels of pollution are not reduced. So yes, the actions of this generation will make or break it when it comes to the ability of future generations to benefit from biodiversity and the irreplaceable services that ecosystems provide. But with the CBD's 2011–2020 strategy having been adopted by the international community as the biodiversity strategy for the whole UN system, we have a blueprint for action and I am confident we can rise to the challenge.

MT: People throughout time tend to put themselves, and their species (*Homo sapiens*) first, as if to argue that we are superior somehow to the rest of nature. What are the primary instruments of a new way of viewing the natural world that might help us circumvent, or at least better integrate, our sense of superiority or self-importance, within a new and more enlightened framework of all of nature, what some have termed "deep ecology" and what many religious leaders have looked at as a spiritual transformation waiting to happen?

AD: Although it has been overlooked, when it comes to nature there is room for agreement between those who do and do not put humans first. On the one hand, seeing our species as just one of many million on the planet is humbling—what right do we then have, one species among countless others, to so thoughtlessly destroy the wonders of nature? On the other hand, even if we put our own needs first it makes no sense to destroy the web of life that sustains our very presence on earth—we are very clearly not apart from nature, but a part of it, and so we exterminate the life we depend on at our own peril. Hence, although they might start from worldviews, both deep ecologists and the more anthropocentric among us should have ample motivation to conserve and sustainably use biodiversity.

MT: What are some key financial resources and mechanisms (e.g., the CBD "clearing-house mechanisms", cap-and-trade, REDD, etc.) that individuals, communities, governments and corporations should be urgently thinking about and acting upon, and what are the key priorities economically, as well as the most important pathways to be embracing? What are the most difficult hurdles to achieving the success of these mechanisms? Please spell it out for readers.

AD: The CBD financial mechanism is operated by the Global Environment Facility, which provides financing to countries to help meet their obligations to the CBD, for example by funding biodiversity projects on the ground. However, the 2011–2020 strategy of the CBD recognizes that biodiversity protection must be integrated into governmental accounting and decision-making. A prime example of how this needs to be done is for governments to phase out environmentally harmful subsidies. Resources gained from the removal of harmful subsidies can then be used to create positive financial incentives for biodiversity protection, such as payment for ecosystem services schemes, whereby incentives are offered to landowners in exchange for managing their land to protect biodiversity and ecosystem services. Mexico, for example, has generated over 300 million USD for forest conservation in the past seven years through its 'Payments of Hydrological Environmental Services of Forests' scheme. Such excellent initiatives, which exist in many countries, should be rapidly scaled up and replicated widely.

Promoting and supporting markets in biodiversity-friendly goods produced in a sustainable manner is another important avenue for governments, businesses and individuals to follow. That is why the CBD is cooperating closely with the United Nations Conference on Trade and Development (UNCTAD) to foster such markets through its Biotrade Initiative.

At the intergovernmental level, Reducing Emissions from Deforestation and Forest Degradation (REDD) is a UN initiative to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions by slowing deforestation and to invest in low-carbon paths to sustainable development. "REDD+" goes beyond deforestation and forest degradation, and promotes the conservation and sustainable management of forests and the enhancement of forest carbon stocks. It is predicted that financial flows for greenhouse gas emission

reductions from REDD+could reach up to US$ 30 billion a year, which could produce a meaningful reduction of carbon emissions and support new development in poorer regions while helping to conserve biodiversity and securing vital ecosystem services.

MT: In light of every "precautionary principle" what do you recommend to individuals, stockholders, corporate executives, movers and shakers of every persuasion, consumers and all of the nearly 7 billion human stakeholders on the planet with respect to their personal choices, where nature is involved? One Nobel Laureate heading the Intergovernmental Panel on Climate Change suggested that human beings must go vegetarian.

AD: Ultimately, each and every one of us needs to lead by example and incorporate environmental concerns into our day-to-day decision-making. It is particularly important to make responsible consumption choices, starting with curbing unnecessary consumption. Reducing wastage, for example by buying products with little packaging, is a key component of sustainability. In addition, buying sustainably made products is a central part of creating a sustainable lifestyle. It takes many resources to produce some foods, especially meat, so minimizing consumption of high-energy input foods is a great way to reduce your ecological footprint. There are many other ways of reducing your ecological footprint: the most important thing to do is to get informed, and be willing to start taking everyday steps to minimize your impact on the planet for the sake of future generations.

MT: The CBD is legally binding. What does that really mean? Does it have teeth?

AD: While the CBD is legally binding, instead of taking a punitive approach to enforce implementation we take a facilitative approach, meaning that when Parties fail to meet targets we try to find ways to help them do better in the future. For example, the CBD financial mechanism, operated by the Global Environment Facility, has enabled action in over 155 countries to safeguard biodiversity through projects funded by over $ 2 billion in grants and $ 5 billion leveraged funding, while supporting the work of communities in over 101 countries through small grants to more than 5000 biodiversity projects.

MT: What nations have not ratified the CBD, and—especially in the case of the United States—what does that mean, and what would you like to see happen?

AD: Almost every nation on earth has ratified the CBD, the only two holdouts being Andorra and the US. While the US participates as an observer to all major CBD meetings including its Conference of the Parties, the time has come for the US to stop having an observer status and to play its role as a world leader in showing the way ahead in protecting life on Earth.

Having the US as a Party is immensely important due to the country's leadership role in the world and the knowhow and resources it can bring to bear on biodiversity-related issues internationally. The implementation of the Convention's 2011–2020 strategy will require the full engagement of all stakeholders and all governments

without any exception. US accession to the CBD by the next Conference of the Parties in India in 2012 would be the best possible contribution to the celebrations of the 2012–2020 UN Decade on Biodiversity and a good omen for the success of the 2011–2020 strategy.

MT: The CBD website mentions the fact that "it recognizes for the first time that the conservation of biological diversity is a 'common concern of humankind.'" By declaring this, do you feel you and your colleagues have gone out on an idealistic limb? Is this goal mere tilting at windmills a la Don Quixote, in view of the alarming escalation of the gap between the rich and the poor; the increasing economic marginalization of several billion people, and the ever heightening dilemmas enshrouding the world's remaining indigenous people, many of whom inhabit some of the last wilderness environments on earth?

AD: To recognize that the conservation of biodiversity is a common concern of humankind is to recognize that we cannot solve humanity's most pressing problems without factoring in biodiversity. Biodiversity loss is linked to poverty, reduced economic opportunity, reduced human health, climate change, the marginalization of local and indigenous communities—and the list continues. That is why the CBD has programmes of work on all of these issues, and why our 2011–2020 strategic plan was negotiated and adopted with the participation of stakeholders at every level: youth, indigenous leaders, city mayors, development agencies, the climate change community, parliamentarians, business leaders, environment ministers and heads of state. We have long moved past the stage of pure idealism and are increasingly engaging all sectors of society and government in order to make a difference on the ground.

In addition to the Aichi Targets, an example of the progress we are making is the adoption at COP10 of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization. The Nagoya Protocol is one of the most important legal instruments in the history of the environmental movement. It formalizes the relationship between those who want to use the genetic resources of a given area, say as a basis for developing cosmetics or pharmaceuticals, and those who live in the region where the resources are found, for example an indigenous community in the Amazon. More specifically, it allows access to genetic resources based on prior informed consent and mutually agreed terms, while ensuring that the benefits arising from the development of those resources are shared with the local provider. This situation is a boon to the economy, the environment, and human livelihoods—and it is these kinds of solutions that we are increasingly focused on finding.

MT: What is your worst nightmare, in terms of our species failing to live up to its compact with nature?

AD: The worst-case scenario is that the international community collectively does not live up to the commitments it made in Nagoya and we fall well short of achieving the Aichi Targets by 2020. This would mean that we have not only failed to

make short-term changes to save biodiversity, but that we have also not made the underlying institutional and behavioral changes that would take us off the long-term course we are on toward the catastrophic loss of species and ecosystems by the end of the century.

MT: What is the most optimistic scenario you are would venture might happen in terms of our species turning the global biodiversity crisis around?

AD: The most optimistic scenario is that the international community not only collectively achieves but in fact surpasses the Aichi Targets by 2020. This would mean that we have installed immediate safeguards around biodiversity as well as made substantive progress in mainstreaming biodiversity into governmental and societal decision making, thereby taking us off the course of catastrophic destruction and on a course of sustainability. Unfortunately, in the short to medium term we will not be able to confidently say we have stopped species loss entirely: because of amplifying feedbacks and time-lagged effects leading to "tipping points" (abrupt shifts in the state of biodiversity and ecosystems), the full impacts of our actions on biodiversity are hard to predict. Nevertheless, we can confidently say that doing nothing is sure to produce catastrophic results, while achieving the Aichi Targets is the most realistic hope we have of creating a better future.

MT: Do you feel there is a blind-spot that exists amongst the world's scores of billionaires who, theoretically, could come together and commit billions of dollars to saving vast habitat that might otherwise be destroyed in coming years? This question begs the obvious: Hundreds of billions of dollars is the currency held by a few thousand families around the world. Many have committed to President Bill Clinton's call to action for the super-rich to donate at least half of their fortunes to worthwhile causes. Yet, we see very little of those commitments going towards the environment. In fact, is there an actual price-tag for saving the earth?

AD: While donors have become increasingly concerned with environmental degradation, its ability (that of environmental degradation) to erode the stability of human society and modern civilization remains underappreciated or ignored. That is why the CBD is increasingly reaching out to private donors. The Second Global Private Donor Forum took place at the margins of COP10 in Nagoya, gathering prominent figures from diverse sectors, including business, private foundations and the international political platform. It was held with the participation of Mr. Douglas Tompkins, President of Foundation for Deep Ecology and Chair of the First Global Private Donor Forum, and Mr. Takuya Okada, Chairman of AEON Environmental Foundation, and called upon its participants to move forward towards private financial commitment for biodiversity conservation. The generosity of private donors can only help as we take steps toward achieving the Aichi Targets and preserving life on Earth.

What Are Our Global, Biological Priorities?

MT: What are the priorities at this point in time that the CBD urgently recognizes? What do we need to do as a collective if we are to stave off the engendering of a global wasteland?

AD: On an immediate level, we need to address the direct causes of biodiversity loss, these being pollution, overexploitation, climate change, invasive alien species and habitat loss. However, this cannot be done without addressing the underlying or indirect causes of biodiversity loss, which is the first strategic goal of the CBD's 2011–2020 strategy. Under it fall such key targets as increasing public awareness about the harmful consequences of biodiversity loss, integrating biodiversity preservation into development policies, phasing out government subsidies that are harmful to biodiversity, and incorporating biodiversity preservation into our economic and consumption models.

MT: What would such a wasteland mean in terms of the ability of our species to survive, let alone millions of others? This connection seems continually lost on so many human beings, who, not surprisingly, are simply trying to survive, to feed and house their families, to live a dignified, meaningful life.

AD: As mentioned in the answer to your second question, the destruction of the world's ecosystems would severely compromise our existence on this planet because of all of the goods and services that biodiversity provides us. To drive this point home, allow me to highlight the effect that biodiversity loss will have on something that is of immediate concern to everyone: food security.

As it stands, we are losing agricultural biodiversity at a tremendous rate. Seventy-five per cent of the food crop varieties we once grew have disappeared from our fields in the last 100 years. Twenty-one per cent of the world's 7000 livestock breeds are classified as being at risk, while more than 60 breeds are reported to have become extinct during the first six years of this century alone. Of the 7000 species of plants that have been domesticated over the history of agriculture, a mere 30 account for 90 % of all the food that we eat every day.

This loss of genetic diversity has potentially devastating consequences. For example, widespread failure in our handful of remaining major crops and animal breeds due to disease or pest outbreaks is a very real possibility: given that pest and pathogens are constantly evolving, a diverse gene pool is essential if we are to develop insect- and disease-resistant strains in the future. Moreover, our reliance on so few plants and animal breeds makes human populations that much more vulnerable to climate change: as growing conditions change, the most suitable species, breeds or strains in a given region may likewise change. Given that the UN's Food and Agricultural Organization (FAO) estimated that 925 million people worldwide were undernourished in 2010, what will happen if biodiversity loss continues unabated over the coming decades?

MT: Recent studies have yielded little hope for any meaningful, win/win scenarios involving conservation AND poverty alleviation. What approaches are you and your colleagues working on to surmount this apparent critical gap in thinking, action, and vision?

AD: In terms of action, instruments such as National Biodiversity Strategies and Actions Plans (NBSAPs)—the country-level vanguard instrument for guiding national implementation of the CBD—are made to facilitate the mainstreaming of biodiversity across development processes. This process has gained new impetus following the Nagoya Biodiversity Summit, where the representatives of development agencies, development banks and development cooperation policy institutions unanimously adopted a declaration for the mainstreaming of biodiversity agendas into development plans. Countries are now in the process of updating their NBSAPs to reflect this commitment and help them achieve the Aichi Target. In terms of thinking and vision, the CBD has been a strong supporter of the above-mentioned study on The Economics of Ecosystems and Biodiversity (TEEB) [6] which provides local and national policymakers and the private sector with the methodologies required to synergistically promote conservation, poverty alleviation and development.

I should also highlight that the Nagoya Protocol on Access and Benefit Sharing, discussed in the answer to one of your previous questions, is a central tool for achieving sustainable development and alleviating poverty. The Protocol is a win-win outcome for the environment and economics: it is a multilateral environmental agreement that provides solutions to economics, and it is also an economic treaty that provides necessary protection for the environment. Moreover, it is the first international economic instrument that is explicitly guided and driven by consideration of fairness and equitability, which sets the stage for a new international economic order in the twenty-first century.

MT: In order of damage to the global environment, what are—in your view—the most serious challenges facing policy leaders and corporate stewards, as well as consumers everywhere?

AD: We must address the underlying causes of biodiversity loss. This means we have to increase public awareness about the harmful consequences of biodiversity loss, integrate biodiversity preservation into development policies, phase out government subsidies that are harmful to biodiversity, and incorporate biodiversity preservation into our economic and consumption models.

MT: Where do economics and biodiversity most potently, injuriously clash and what should multi-nationals, policy makers, and each and every one of us be doing about it?

AD: We need to stop seeing environmental and economic interests as antagonistic to each another. Unfortunately, economic reasons for conservation measures have thus far been underemphasized due to a dearth of reliable methodologies and

relevant data. However, the situation is rapidly changing because of methodological progress, accumulating statistics and case studies, as exemplified by the reports released by "The Economics of Ecosystems and Biodiversity" project under the aegis of UNEP's Green Economy Initiative.

Biodiversity decline is predominantly caused by economic activities in the broadest sense, and the policy debate thereon all too often tends to pit 'economic' interests against 'environmental' interests. The recent work shows that this juxtaposition is fundamentally flawed—because the services generated by healthy ecosystems, and the underlying biodiversity, are of tremendous importance to human well-being—hence as well of economic importance. Conversely, the loss of biodiversity and associated ecosystem services will lead to a loss in economic welfare, and to a loss of economic opportunities. Ignoring or underestimating biodiversity decline will therefore not just mean bad environmental policies, but, in the long run, bad economic policies as well. Making this point and substantiating it with hard data is important for better communication with economic decision makers and for better policy integration.

MT: On a most personal note, what was your own wake-up call? Was there some epiphany, if you will, that galvanized your heart, your intellect, your passion to help save biodiversity?

AD: I had the unique privilege of growing up as a child among nature as well as being saved by nature through traditional medicinal plants. I wish that my children and all the children of the world can continue to benefit from the bounty of nature.

MT: Do you have children, and does that same passion to give mother earth some breathing space resonate with them? With your family and friends?

AD: Yes, I have two children and they are like most of today's youth far removed from nature, which is why we have launched the Green Wave campaign [7] aimed at reconnecting the young generation with nature.

MT: In the face of so much bad news swarming the headlines, what keeps you going every morning when you wake up?

AD: The unique support that I keep receiving form a large number of partners from all over the spectrum of civil society is for me an additional argument for why we should always continue to strive for a better world for us and for our children.

MT: Should this generation fail to honor the creation—a virtually systemic crisis that has gripped our kind not just for decades, but for centuries—what do you envision could happen?

AD: We are currently on a course toward the catastrophic loss of species and ecosystems by the end of the century. This is because ecosystems are in very real danger of approaching tipping points beyond which we will be unable to stop their continued degradation. If we do not make profound changes in our way of interacting

with nature during this decade, we will be passing on a barren planet to our children and grandchildren—a planet that will offer them very few of the biological goods and ecosystems services we currently take for granted everyday, from clean air and water to an abundant food supply.

MT: As we see continued habitat destruction, fragmentation, species extinctions, human and animal suffering, where do the nearly 18,000 people who attended the Nagoya CBD Summit that occurred in mid-October 2010 in Japan go from here?

AD: Building on the success of Nagoya, the UN Decade on Biodiversity is beginning with a new wave of national biodiversity planning. A series of regional workshops are being held around the world to help countries translate the Aichi Targets into new National Biodiversity Strategies and Action Plans (NBSAPs). To assist eligible countries in translating the Aichi Targets into NBSAPs before COP11, Japan has established a Japan Biodiversity Fund, while additional funds have been made available through the Global Environment Facility.

In addition to revising NBSAPs, the signing and ratification of the Nagoya Protocol is an urgent topic. The CBD Secretariat and the Global Environment Facility are working to ensure that the first meeting of the governing body of this historic instrument will take place in India in October 2012 back-to-back with CBD COP11. To this end 50 ratifications are required before 19 July 2012. Governments need to put the development of new NBSAPs and the signing of the Nagoya Protocol high on their list of priorities, because any delay on these fronts will augur poorly for the achievement of the Aichi Targets. Citizens need to put pressure on their leaders to make sure they act with the required urgency.

MT: Finally, what can readers of Forbes do today to start to make a difference for biodiversity? To be the change they hope for the world? And why should they take this call to action very very seriously?

AD: Each and every citizen needs to be fully engaged in the battle for life on earth. A paradigm shift in our relations with nature is essential: we need to learn to live in harmony with the environment. To this end, the first thing to do is to learn: find out about biodiversity in your city, region and country, and about how your consumption patterns and everyday actions impact biodiversity both locally and globally. The second thing to do is to speak: make your views known to the government and the private sector, share your knowledge with people around you. The third thing to do is to act: make responsible consumption choices, support activities and organizations that conserve biodiversity, and join a local environmental group or organize your own activities to help preserve biodiversity. I would also like to call on the citizens of tomorrow and the children of today to be engaged in shaping their future by contributing to the Green Wave campaign.

They should take this call to action extremely seriously for the many reasons detailed above—in a nutshell, biodiversity loss will have a hugely negative impact on the future of humankind, and we have very little time left to change our ways and so avoid worst case scenarios.

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Chapter 42
On Parrots, Eagles, and Fighting Species Extinction

Mike Parr, Chair of the Alliance for Zero Extinction, graduated from the University of East Anglia, U.K., in 1986. He worked at BirdLife International as Development Officer before joining American Bird Conservancy in 1996. His first book, **Parrots—A Guide to the Parrots of the World** (with Tony Juniper) was published by Yale University Press in April 1998 [1]. He is a co-author of two further books: **The 500 Most Important Bird Areas in the U.S**., [2] and **The American Bird Conservancy Guide to Bird Conservation** [3]. He is also a member of the Advisory Committee of ProAves Colombia (Fig. 42.1).

Michael Tobias (MT): What does the Alliance for Zero Extinction do that no other group of organizations has taken on?

Mike Parr (MP): The Alliance for Zero Extinction [4] set out to identify the places around the world where species extinctions could be expected to happen most imminently based on endangered and critically endangered species that are only found at a single site. Prior to this, a lot of people understood we were facing a global extinction crisis but there wasn't a clear path to halting this crisis at the global level, or even a front line where we could fight it. Now we know that by protecting a relatively small portion of the planet's surface we can go a long way to halting it. Of course we need to protect large areas too, but in terms of halting extinctions, AZE can help us address the imminent species crisis very effectively.

MT: How did you come to be personally committed to the organization?

MP: I was one of a few people in the conservation community who, during the late 1990s, were becoming increasingly concerned that the international conservation effort was drifting into identifying ever-larger priority areas and missing the small but often more vital sites for key species. A conversation began in 2000 between myself, Tom Brooks who was working at Conservation International,

John Lameroux who was at the World Wildlife Fund, and our friend Ken Berlin who was at the time Chairman of the board of American Bird Conservancy. These informal conversations led to increasingly larger and more formal meetings and resulted in the concept of mapping these "AZE sites." I'm not exactly sure why I ended up as Chair, but as I work for American Bird Conservancy, I think some of the other

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Fig. 42.1 Mike Parr in Mexico (Photo Credit: © Mike Parr)

conservation and environmental NGOs saw us as a convener and broker. In fact, over the years our efforts have proven to be remarkably successful with 75 member institutions signing on to join the alliance globally, and nearly 100 more organizations joining national zero extinction alliances. Many of these organizations, including American Bird Conservancy [5] where I work, are dedicated to protecting AZE sites and species, and now approximately half of the sites worldwide have at least some protection (Fig. 42.2).

MT: What is the really bad news we need to comprehend where it comes to the loss of species, populations and habitat? The big headlines, and the hardest details to grapple with?

MP: There's enough bad news already. Why not start with some good news? Species can recover from even very small populations if they get enough help. Just look at the Bald Eagle [6]. The worst news is always when people give up hope. For the most part, if you protect a species' habitat it has a good chance of taking care of itself thereafter- so long as we are not hunting it, trading it, or spreading disease to it somehow. Most wild species are even capable of building resistance to disease, some Hawaiian birds have adapted to avian malaria for example. One piece of bad news is that there is a persistent, mistaken school of thought which suggests that species with small populations are somehow doomed solely due to inbreeding. This is not true. For example, we know of multiple bird species that have been reduced to double or even single digit global populations and have been able to recover. There are examples right here in the U.S. in fact, the Whooping Crane [7] which was once reduced to fewer than 20 birds, and the Laysan Duck [8] which was once down to fewer than ten. Both have survived for many decades since and their populations have grown considerably. Misinformation regarding the lack of viability of small populations can be very damaging to conservation since it makes people want to give up on species that could otherwise definitely survive with sufficient help.

MT: What are AZE's priorities at this time? Could you perhaps spell them out for us in some detail?

MP: We are working closely with the Convention on Biological Diversity [9] to help signatory nations develop specific programs to deliver conservation under Targets

Fig. 42.2 California Condor, Big Sur: saved from extinction. (Photo Credit: © M. C. Tobias)

11 and 12 of the Convention's goals for 2020. These targets relate to expanding the coverage of protected areas and preventing species extinctions. We are also working to support national AZEs that are starting up, especially in Colombia, Mexico, India, and Brazil. We have just completed an update of the global AZE site list, which was primarily spearheaded by Matt Foster and his colleagues at Conservation International [10]. The results can be found on the AZE web site. We are also working with the Global Environment Facility [11], the World Bank [12] and BirdLife International [13] to create a global funding mechanism for AZE conservation to support national AZE efforts.

MT: Where can corporations, Wall Street, venture capital, and everyday consumers and stakeholders make a difference in terms of the critical biological problems AZE is focused upon?

MP: AZE is working primarily at a science and policy level, and AZE's member organizations are doing on-the-ground conservation projects that people can support directly. AZE hopes to create a bottom-up and top-down approach to conservation, so we work with national governments, international conventions, and multilateral funders; but our member organizations also work with local communities, indigenous groups, state governments, and regional conservation initiatives. We also aim to bring the private sector on board through the development of nature tourism, carbon projects, ecosystem service agreements, and sustainable agriculture, and these initiatives are implemented by AZE members such as American Bird Conservancy and its partners. We are also looking for the next billionaire who wants to lead on a really meaningful under-championed global challenge (in which case email me) [14] (Fig. 42.3).

MT: There has been much talk of the Sixth Extinction Spasm. In terms of the homefront (North America, in this case) what are some of the truly surprising success stories? And where are we losing precious ground? Give us some examples of very unusual species that have been saved from the brink, and other groups of organisms (e.g., amphibians) that are clearly in crisis?

MP: Well as I already mentioned, the U.S. national bird, the Bald Eagle has been saved from extinction in the lower 48 states.

That's strong evidence that conservation works. Bats and amphibians are facing some difficult hurdles right now with disease in particular, and in some cases, captive-breeding may need to be employed to create insurance populations. Work that

Fig. 42.3 SE Farallon Island Cormorant. (Photo Credit: © M. C. Tobias)

my organization, American Bird Conservancy, has done with partner groups such as ProAves Colombia [http://www.proaves.org/] has shown that the Bald Eagle isn't an isolated case. ProAves helped the population of the beautiful Yellow-eared Parrot increase from fewer than 200 to more than 1,000, and the population is still growing. Our Peruvian partner, ECOAN, has created a network of community reserves managed by indigenous groups that have stabilized the population of the Royal Cinclodes in the high Andes of the Cusco region. This cinclodes occurs at just a few locations and we think there are no more than 300 on Earth. In Brazil, Biodiversitas [15] helped the charismatic Lear's Macaw increase from 78 birds to more than 900. And recently in Ecuador, another partner, the Jocotoco Foundation [16] helped the tiny population of the Pale-headed Brush-Finch rebound from the brink of extinction.

MT: Who are the key players in saving species, and how can they work together to effect positive change?

MP: Right now, I see the Convention on Biological Diversity [17] as being the key forum for making this all work. Ahmed Djoghlaf, the Executive Secretary of the Convention, has done a stellar job there. There was a tremendous amount of skepticism coming out of the Copenhagen climate talks regarding the UN process, so the fact that Nagoya was a success was a huge step forward. I think CBD is the driver for all this, but the Global Environment Facility, the World Bank, national governments, NGOs, and the private sector all have roles. This needs to be a real team effort by the human race. Again, in terms of preventing extinctions, AZE provides a blueprint for early action that we can use immediately.

MT: Has the Endangered Species Act fulfilled the promise of its authors?

MP: I think so. I think the U.S. has among the best, if not the best protection for endangered species of any country on Earth. Of course the Act comes under periodic attack and it is easy to find things to quibble over if you want, but the U.S. has overcome some significant species conservation challenges thanks to the Act. Some of the species that have become officially extinct since the Act was passed may already have been lost prior to 1973 since extinction is almost impossible to prove for certain, so I don't look upon the Act as having failed those species. If I had to pick one thing to critique it would be that Hawaii is still receiving far too little in terms of species recovery funding under the Act. That needs to be rectified.

Fig. 42.4 South African cheetah. (Photo Credit: © M. C. Tobias)

MT: Are there huge gaps and inconsistencies in U.S. legislation that hamper American policy maker's abilities to focus the public's undivided attention on the task of conserving biodiversity? And what is AZE doing to keep that focus?

MP: Well, there are two issues here. U.S. policymakers often seem reluctant to sign international conventions. In the case of the Convention on Biological Diversity, the U.S. is already doing more than it would need to meet the obligations of the convention, so I think it is time to put pen to paper there. I think the U.S. and perhaps Andorra are the only two countries on Earth that have yet to sign. Regarding public perception, I'm not sure that it is policy makers that can do that so much as celebrities and the media these days. The high profile policy debates are over issues such as the economy and health care. I don't see biodiversity conservation even in the top 10. Of course it should be, but natural cycles take longer than political cycles. I just hope that we can be far-sighted enough to realize that human destiny and the destiny of biodiversity on Earth are sufficiently closely related that we need to take care of Earth's other residents, not just the human ones.

MT: What should citizens of every nation be doing to better safeguard the future of life on earth?

MP: Start simple. Trying to answer all the most intractable environmental problems will surely tie us in policy knots for so long that we'll miss doing the straightforward positive actions that can help right now. Protect all your AZE sites is step one.

MT: Where do you see the most intense challenges looking forward, as we approach the 20th anniversary of the Rio Summit, as well next November's U.N. Climate talks in South Africa? (Fig. 42.4)

MP: We need to start valuing biodiversity and paying the real environmental cost of the products we consume. One big challenge is that the Northern countries are balky about the potential cost of forest conservation, and the South wants the same development advantages that the North has had in the past. Both points of view are understandable, but we will all need to compromise or the environment and biodiversity will continue to suffer. If we don't, perhaps our children will see more sense than we have and be able to come to agreement at a later date. Of course the challenges will only grow, so we should be willing to make the hard choices now.

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Part IX
Ecological Paradise?

Chapter 43
An Ecological Paradise in Southern India: A Discussion About the Todas with Dr. Tarun Chhabra

Environmentalism is, by definition, given to skepticism, dismay, political cynicism and the seemingly endless endeavors to guide human nature along a path more sustainable than that currently on display worldwide.

Yet, in India, the second most populated nation on earth, with her inordinate share of ecological turmoil and over 1.241 billion people, there exists an ancient, indigenous community of vegetarians, the Todas, whose lifestyle and footprint suggests a true window on what humanity—at its best—is capable of.

I'm referring to a community, in 2013, that is ethically vegetarian, non-violent; that may well be the most sustainably-committed community in human history. The Sistine Chapel of pure living; a "Maria Vespers" of the moral and geographical compass. A group of denizens who, if you are tracking ecological success stories, are front-page news.

Moreover, at the core of some of this community's habitat remains the last remaining "wilderness" in all of India; unexplored by most. This region—the inner Nilgiris—hosts the last best hope for India's wild tigers [1] and one of three remaining wild populations of Asian elephants [2]. Moreover, it is a botanical collective of astonishing dimensions in which—depending on the precise season, and day (or night)—are a vast number of endemic species known particularly well by one man—Dr. Tarun Chhabra.

Thanks to this remarkable ecologist, a practicing dentist by profession, and brilliant ethnobotanist, Dr. Tarun Chhabra, I have had the privilege over the course of many years, of spending time with this community: the Todas, on numerous occasions. In 1992, Dr. Chhabra and colleagues set about to preserve the Toda heritage, which was facing increasing pressure—demographic, toxicological, economic, genetic, cultural, legal—all those bedeviling challenges that can exponentially accumulate in the name of modernity and India's increasingly palpable habitat fragmentation. Indeed, the Toda heartland was the same Western Upper Nilgiris aggregate of ecosystems that were also being threatened. Urgent measures were needed to save what was left of this habitat that is unique in all of Asia. Dr. Chhabra and colleagues established a non-profit Trust "EBR" [3] which stands for the Edhkwehlynawd Botanical Refuge to help rally support for the Toda who dwell within the core

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Fig. 43.1 Toda family. (Photo Credit: © Robert Radin)

biological area of India's first recognized biodiversity hotspot [4] and UNESCO biological World Heritage Site [5].

What endows this community with such a unique place in the bio-cultural context of southern India, and—for that matter- the whole world—is not merely the fact that they are one of the only vegetarian tribal groups left on Earth (while surrounded by meat-eating communities); or the computable realization that their ecological footprint, by even today's economically-much marginalized rural Indian standards, is statistically zero (Fig. 43.1).

What is utterly amazing about the Todas is their true biological sustainability. They magnificently integrate their own culture and rich biodiversity; a markedly restrained humanity, shy ethos, distinctly pan-Asian reclusiveness, and poetic landscape revery inherent in the tools of personal and community existence. This defines ecosystem person-hood. In the case of the Todas, it would appear to derive, at least in part, from their explicitly animist cultural rituals, traditions, beliefs, and worldview. This Renaissance-ecological orientation is a powerful argument in favor of the possibilities of the human species, after all. For thousands of years the Todas have worshipped a rare species of (now endangered) Asian river buffalo and have practiced non-violence with rare, consistent vigilance. Even their so-called "noyim," a form of conflict-resolution, is so subtle that to be present at such a gathering (as I have been) you would never know a problem was even being resolved. Toda crises are not fought out at the last second, like fiscal-cliffs in Washington, although the stakes—if you are a Toda—are no less critical.

It must be professed that the Todas argue for one of the most advanced lessons on Earth in reference to how human beings can harmoniously engage in what Voltaire summarized in his novel, **Candide** (1759) when he suggested, in the end, that we simply cultivate our gardens. Remarkably, the Todas are not even that inflictive upon nature. Trans-montane ritually nomadic pastoralists, [6] they restrain from nearly all traditional agricultural exploitation (not unlike the majority of India's Jain communities—except that the Toda hamlets are to be found in rural, even wilderness areas, not in the urban environments, where most Jain communities are located).

In 1873, a British ethnographer, W. E. Marshall [7] visited the Todas and wrote of them that they were, in essence a total ethnographic anomaly, or anachronism; that they engaged in no hunting, no meat eating; no violent sports, no violence whatsoever. Marshall wondered, therefore, whether he had not come upon "the tracks of an aboriginal reign of conscience?" and asked, "Was man originally created virtuous as well as very simple?" His famed riposte to his own culturally-condemned conjectural inanity was that "in this absence of vigorous qualities; in the disregard of gain and thrift; as well as in their [the Todas'] ultra domesticity, we have the attributes of a primeval race."

That "primeval race"—that ultimate "reign of conscience" remains true to form in southern India; a bio-cultural Eden about which the human twenty-first century needs urgently to take notice.

I asked my friend, Dr. Chhabra [8]—who lives just a few miles away from one of several Toda hamlets, about this wonderful and unique community of Todas today; their beliefs (herewith simplified, to be sure); and the threats to their livelihood. Toda environmentalism [9] offers a rare window on human possibilities and optimism. Its anodynes and rudiments have tested the arc of time, whilst at least 22 other known human civilizations have risen, and fallen, as chronicled by such historians as the late Arnold Toynbee [10] and Clarence Glacken [11].

Michael Tobias (MT): Dr. Chhabra, what makes the Todas so globally unique, certainly from a ecological point of view?

Dr. Tarun Chhabra (TC): I would attribute it to a combination of the following factors: The Todas live at the heart of the Nilgiri Biosphere Reserve [12]—in the highlands where they have traditionally been strictly pastoral people, with no history of farming. Much of their entire worldview revolves around an endemic breed of buffalo. They rely on the buffalo for the mainstay of their economic livelihood, derived from dairy products—sacred milk and butter.

MT: Of course, then, they are not vegan, but, as I have witnessed, they treat those buffalo like dignitaries, royalty.

TC: That, and the fact the Todas are generally vegetarian folk with apparently no history of hunting. Moreover, their traditional architecture has been celebrated. The Head of Architecture at MIT is bringing out a book on "First Societies and their Architecture" where he is including the Toda structures [13]. Moreover, their language has been reported to have the most complex phonetic system in India. Most importantly, the Todas have managed to adopt a manner of sustainable living and have kept their own population low over the centuries.

MT: Zero population growth in India is certainly uncharacteristic, notwithstanding an inspired array of family planning luminaries and legislation throughout the nation. But India's Democracy, as you well know, has not managed, ultimately, to come to grips with a demographic speeding train, most saliently in those EAG (Empowered Action Group) states [14] where the TFR, or Total Fertility Rates are still as high as 3.9, such as is the case within the States of Bihar, or Rajasthan. To

Fig. 43.2 Expedition into the Nilgiri biosphere reserve. (Photo Credit: © M. C. Tobias)

Fig. 43.3 Unique shola habitat. (Photo Credit: © M. C. Tobias)

come upon a community of replacement fertility trends, and one with sovereign, historic staying power, is miraculous.

TC: Even today, the orthodox Toda community number just over 1400 persons (Fig. 43.2).

MT: And the Todas' spiritual and practical relationship to the botanical refuge [15] in which they reside? (Fig. 43.3)

TC: The Todas use specific plant species in their rites of passage, in the construction of their traditional dwellings and dairy-temples and even for denoting a person's age, wisdom and anxiety levels accurately. They have also used the flowering cycles of plants not only to denote the different annual seasons, but also the stage of each season.

MT: I gather the Todas have a complex belief system in terms of the afterlife, or Heaven?

TC: The Todas believe in an afterlife and their afterworld is located at the Southwest corner of the Upper Nilgiris.

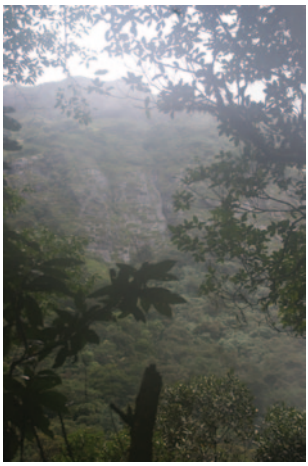

Fig. 43.4 In the Sacred Heartland of the Nilgiris. (Photo Credit: © M. C. Tobias)

MT: For referencing paradise that's remarkably specific, a bit like that of famed John Bunyan's 1678 **Pilgrim's Progress**, with its maps; but, in this case, veritable GPS coordinates [16]?

TC: Well, the location of their ascribed paradise can certainly be ascertained. The eighteen mythical landmarks that a departing spirit is believed to cross en route, can all be seen as actual physical landmarks. For instance, at the place where the spirit is to ascend steps, we can see an actual, nature-created series of rocky stone steps.

MT: It's on a huge cliff, as I understand it?

TC: Yes. The assumption is that only those who have used all the mandatory plants in their rites of passage and other important ceremonies, are eligible to enter Amunawdr, the Toda afterworld. This belief in their afterworld is what has ensured that Toda cultural heritage has been maintained (Fig. 43.4).

MT: If the more than 50% of the human species now occupying major cities around the world were told that their "heaven" or paradise were dependent upon the preservation of specific plant species in their very neighborhoods, specific locations (à la Central Park, in Manhattan) one might suppose the emergence of a true and universal ecological revolution. People would be utterly motivated (as in the case of Ecuador and her enshrined Yasuní National Park) [17] to preserve all in situ native and endemic plant and animal species [18]. To firmly swear that Paradise is here and now, right there, in one's own backyard.

And here, in the heartland of India, you have this community of 1400 venerable back-to-nature Gurus, in the name of the Todas, who are telling us just that. It's really bewitching, mystifying and magnificent. So where's the downside? What are the crucial threats facing the Todas' livelihood, and how do you view their current situation as emblematic of the problems across Asia, with respect to most indigenous peoples and their extremely complex ecological challenges?

TC: One of the Toda's biggest hurdles concerns future stewardship of their traditional homeland in modern times. The Toda people have sustainably managed their surrounding ecosystem for millennia. Although they continue to observe indirect methods of management by conducting, for example, so called saltwater pouring rites for their buffaloes during different seasons of the year (this ceremony, which is still observed by all Toda clans at every major hamlet, is basically a plea for ecosystem health); or by their gathering on the Paw(r)sh hill to pray to the Pykara River deity for general wellbeing and on the deity hill, Kawnttaihh, to pray for a healthy environment in which they reside, most direct forms of ecosystem management have been undermined or proscribed outright by India's Government Forest Department, in recent decades.

MT: Translate such legal ambiguities and outright debacles?

TC: Well, during the onset of the winter season, the Toda priest of the highest-grade tea institutions performs a ritual where, using firesticks (Todas continue to use Litsea wightiana sticks to make fire in other rituals), they selectively set fire to the grassland and wetland. Although many officials now grudgingly acknowledge that a lack of firing is leading to ecological degradation in the Toda homeland, there is yet no move to rectify this.

MT: To many, this might seem extraordinarily obscure. But it is not. In fact, it is this same conflict/discrepancy, in other guises, that invites serious debate amongst park managers across North America and Europe: the use, or lack thereof, of fire as a form of maintenance of forest tracts and parklands. It goes to the heart of forest management [19] whether in Yellowstone, [20] Yosemite, or throughout Europe.

TC: Here, in southern India, vast swathes of the Toda's sacred grasslands have been planted by the Forest Department with exotic non-native trees. These include Blue Gum and Black Wattle.

MT: Fast growing timber. Bio-invasives, in other words, that out-compete indigenous tree and shrub species, thereby abetting the impoverishment of native seeds and fruits upon which native species, particularly invertebrates and avifauna, are dependent. And no more so than during the quadruple-cascade effects of cumulative bio-invasive shock, climate change, poaching, and habitat fragmentation [21] with profound impacts upon mammals and other vertebrates, in particular.

TC: Yes. And, additionally, for a people who only drank dairy produce and had no native intoxicants, the onslaught of a cash economy that was imposed on them, has brought about all the usual problems, like alcoholism.

MT: In searching for species like the endemic Tahr, Black Langur, and Laughing Thrush, I -like many -have seen firsthand the problem of habitat disruptions, [22] whether in the form of tea plantations, or simply the spread of cities like Ooty (Ootacamund, in the State of Tamil Nadu) in all directions. Some of the rivers have long been polluted, and eco-tourism had resulted in economic boom-towns, with proliferating human surroundings [23].

Fig. 43.5 The remote Nilgiri biosphere reserve. (Photo Credit: © M. C. Tobias)

TC: Moreover, the fragmentation of habitat in the biosphere preserve that adjoins and encompasses much of Toda territory is obviously under increasing threat from encroachment, not to mention—as you indicated—of climate change, poaching and development.

MT: In a region that is recognized for its biological World Heritage status by the United Nations; that prides itself on having the last free-ranging viable genetic populations of tiger and Asian elephant, what do you see as a crucial component of the Todas' assured protective measures by the Government of India?

TC: Well, thanks to sustainable management of their homeland by the Todas over centuries, areas like the Mukurthi National Park [24] now constitute the core of the first formally-consecrated biosphere reserve in all of the Nilgiri Biosphere Reserve. But much of the Upper Nilgiri plateau has now been populated by hundreds of thousands of people; tea estates stretch over tens of thousands of hectares as do other highly destructive methods of agriculture. The grasslands and wetlands of the Todas have been planted with exotic trees solely for commercial purposes by the Government. Several hydroelectric dams and reservoirs now inundate the heart and soul of Toda country, with the rich biodiversity of the wetlands now under severe threat [25].

The grass species that the Todas know as avful in their ancient Ahl language (to Western science it is known as Eriochrysis rangacharii; the Todas use avful to thatch their sacred dairy temples) is, incidentally, endemic to some Nilgiri wetlands and found nowhere else on this planet, and it is now on the verge of extinction.

MT: So, if the sacred species upon which their ecological heritage pivots are lost, what can we imagine, expect, envision for the Toda culture as a whole? (Fig. 43.5)

TC: Michael, as you yourself have seen and researched firsthand, all the indigenous groups of the Nilgiris are now dwarfed culturally and demographically. People who reside in the vicinity of the Todas almost invariably do not even care to learn or understand anything about Toda culture at all.

MT: So what do you predict, and what are you and your colleagues working to engender, in terms of Toda bio-cultural preservation?

TC: I see that involving indigenous people like the Todas in joint management of their traditional homeland with the Government as a vital component for the long-term protection and rejuvenation of the climax shola-grassland ecosystem, as it is

Fig. 43.6 Native Nilgiri amphibian. (Photo Credit: © Dr. Tarun Chhabra)

termed. We are taking initial steps to begin such an experiment with one Toda clan at present. The thousands of hectares of exotic tree plantation "forests" must revert back to grassland status.

MT: These are universally trying issues that cascade in any ecologist's imagination; a plethora of problems facing every high biodiversity region on the planet [26]. In this case, it is especially critical, and unnerving, because we are talking about not only some of the most critical habitat (e.g., montane wet temperate forest) in all of the Indian sub-continent, but, as previously noted, possibly the last vegetarian tribe on Earth (Fig. 43.6).

The Toda comprise a veritable constellation of like-minded souls who are ecologists by first nature; environmental philosophers without skipping a beat; wilderness poets in their souls. With that in mind, what should the good people of India be especially mindful of when it comes to the Toda?

TC: Well, on a very practical level, people should at least acknowledge the role of the Toda heartland in generating phenomenal quantities of freshwater and electricity for the multitudes in the plains who are dependent on this. This year in 2012, the Nilgiris suffered a failure of both monsoon seasons—with the result that crops in the plains down below (several thousand feet) are perishing and the people there are being subjected to power cuts that often stretch to ten hour day!

MT: Aside from the practical, I'd like to conclude with the ideal: What astonishes you most about the Todas?

TC: The fact that they were one of the very, very few indigenous people who did not look up to their colonial masters during the British era. The fact that the Toda people considered their cultural heritage to be of a truly superb character; and this Toda state-of-mind, or nobility, utterly fascinated the British who, in fact, did their utmost to help these people, to continue to nurture the rare Toda ethos.

MT: The Toda are largely vegetarian, but surrounded by numerous meat eating communities. To what do you attribute their vegetarian persuasion, their unflinching, unabashed love of nature, their worship of river buffalo, and their overall veneration of the habitat which clearly constitutes their sole survival?

TC: Perhaps a combination of all three factors that you mention. Michael, I would recommend putting together a list of all the largely vegetarian indigenous groups and cultures from the world over and then look for the common characteristics.

MT: I have endeavored to do just that, over the years. What is unique, I think, about the Todas is that there is evidence, as you know, that once they may have eaten meat, occasionally. And more recently, would sacrifice a buffalo once a year. Yet, something in their psyche changed; the whole culture switched to vegetarianism, by and large. I think it would be very important to discover what exactly triggered that dietary and ethical transformation, for it is a fundamental paradigm shift; one that encompasses a new nature; a new template [27] of non-violence for future human survival, I suspect.

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Chapter 44
J. P. Morgan, Edward Curtis and Christopher Cardozo: An Inspired Collaboration

Christopher Cardozo lives in Minneapolis. His own photographs of Native people have been widely exhibited and are found in many collections including the permanent collection of the Museum of Modern Art. Christopher has spent 40 years of his career collecting, exhibiting, and publishing Edward Curtis' work. During that time his exhibitions and books have reached millions of people around the world with a message of beauty, heart, and spirituality; and inspired others to reflect upon the possibilities for greater diversity, understanding, and environmental sustainability (Fig. 44.1).

Three new exhibitions and two new books on Curtis are being launched [1] beginning this year and next.

Michael Tobias (MT): This past week marks the 100th anniversary of the death of John Pierpont (J.P.) Morgan. I know that Morgan has a particular importance in your own life given your extraordinary commitment to the great artist, photographer, explorer and ethnographer, Edward Sheriff Curtis, and Curtis' own indelible connection to Morgan. Tell me about it? (Fig. 44.2)

Christopher Cardozo (CC): Edward Curtis created the most valuable and sought-after set of rare books in US history and left the world a legacy of inestimable importance. It is a deeply human story that, at its essence, is imbued with beauty, heart, and spirit. I believe that in no small part, this is why these iconic images have endured for over a century. It also helps explain why Curtis is the most widely collected photographer in the 170 year history of the medium, and why his photographs have been exhibited to rave reviews all over the world, from Papua, New Guinea to Paris.

MT: And J. P. Morgan? (Fig. 44.3)

CC: Curtis' extraordinary contribution would not have been possible but for the insight, commitment, and inspired patronage of a man who at that time was among a small coterie of individuals who were, undoubtedly – in terms of Western and European notions of monetary value—one of the wealthiest of men, J.P. Morgan. As you noted, we are this week celebrating the 100th anniversary of Morgan's passing

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Fig. 44.1 Christopher G. Cardozo. (Photo Credit: © Larry Lamb)

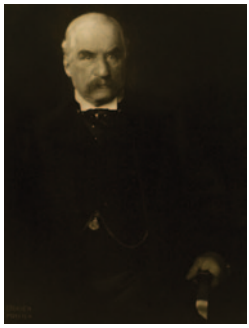

Fig. 44.2 J. P. Morgan, Photogravure by Edward Steichen. (Photo Credit: Courtesy of Christopher Cardozo Collection)

Fig. 44.3 Edward S. Curtis self-portrait, 1899, Photogravure. (Photo Credit: Courtesy of Christopher Cardozo Collection)

(March 31st, 1913). The heritage that Morgan left us is extraordinary: in business, finance, collecting (rare books, gems, magnificent works of art), etc. It is an endowment that lives on today at the Morgan Library [2] and Museum, the Metropolitan Museum of Art, the New York Public Library, Harvard, etc., as well as in major international financial institutions.

But particularly with respect to art, culture, and rare books, there are few individuals in history that have left us with such a rich inheritance. The fact that the life of this Titan of Wall Street intersected with a grade-school dropout—Edward Sheriff Curtis—who grew up in abject poverty, is simply extraordinary. That their collaboration resulted in the unparalleled preservation of crucial aspects of a 10,000-year old culture is all the more amazing (Fig. 44.4).

Fig. 44.4 Princess Angeline, Puget sound, 1899, Photogravure by Edward S. Curtis. (Photo Credit: Courtesy of Christopher Cardozo Collection)

Fig. 44.5 Mosa, Mohave, 1903 Photogravure, by Edward S. Curtis. (Photo Credit: Courtesy of Christopher Cardozo Collection)

MT: Tell me about that fateful meeting between Morgan and Curtis?

CC: When Curtis approached Morgan in 1906 for assistance with his grand plan, Morgan turned him down without even looking at a single photograph. Curtis, of course, was expected to graciously exit the massive wood-paneled office of this all-powerful financier who had just given him an "unequivocal" no. Curtis was undaunted. Before leaving he prevailed upon Morgan to do him the courtesy of looking at a small portfolio of his photographs of Native Americans. Morgan complied, and then according to Morgan's secretary, Morgan did the unthinkable, [3] he changed his mind for only the second time in 25 years! (Fig. 44.5).

MT: Then what?

CC: Morgan agreed to advance Curtis $ 75,000 to launch what was soon heralded as "the most gigantic undertaking since the King James version of the Bible." Today, fine examples of those sets of rare books, which never would have been created but for Morgan's faith and commitment, can sell for nearly $ 3 million.

Over the next two decades Morgan and his heirs ultimately contributed $ 400,000 to the production of Curtis's magnum opus, **The North American Indian** [4].

In today's dollars this would translate into $ 10 million based on the Consumer Price Index, or a whopping $ 200 million as a relative percentage of the GDP. An

Fig. 44.6 Canyon de Chelley, Navaho, 1904, Contemporary-original Goldtone, by Edward S. Curtis. (Photo Credit: Courtesy of Christopher Cardozo Collection)

Fig. 44.7 The three chiefs, Piegan, 1900, Contemporary original Goldtone, by Edward S. Curtis. (Photo Credit: Courtesy of Christopher Cardozo Collection)

extraordinary commitment to the world of art, rare books and to the preservation of a record of a people and a culture which otherwise would have been lost forever. Morgan once said: "I like a man who attempts the impossible" [5] (Figs. 44.6 and 44.7).

In Curtis, Morgan saw a kindred spirit and I am sure, this was an important aspect of Morgan's leap of faith in backing this grade school dropout named Curtis.

MT: And I gather we're speaking of between 40,000 and 50,000 images?

CC: Yes. Over a 30-year epic journey Curtis made 40–50,000 negatives, most on glass and many as large as 14″ × 17″! As for the sets of rare books, **The North**

American Indian, each complete Set of the 20 illustrated text volumes and 20 accompanying portfolios of original photographs comprises over 2,200 original photographs, several thousand pages of text as well as transcriptions of language and music; all lavishly hand-printed.

MT: Since 1971, with the major retrospective exhibition of Curtis' work at the Morgan Library and Museum in New York, there has been a true recognition [6] of the genius that was Curtis, worldwide. You have authored some eight books on Curtis, devoting many years to a man who languished in obscurity for decades during his own life-time. And in Timothy Egan's [7] biography last year of Curtis, [8] **Short Nights of the Shadow Catcher: The Epic Life and Immortal Photographs of Edward Curtis**, Curtis' struggles are painfully outlined against a backdrop of a United States preoccupied by a major financial panic and the first "Great War," not the yellowing, dusty archives of a virtually forgotten romantic, as some thought of Curtis. What, in your estimation, are the essentials that we should, today, be mindful of in assessing the life of one of the world's greatest photographers and ethnographers?

CC: Curtis became impassioned by this dream to preserve a written, oral, and visual record [9] of Native peoples and their way of life before it was lost forever; a struggle which continues today in the United States and throughout the world. Were it not for Curtis, tens-of-thousands of contemporary Native people would have no idea who their ancestors were, what they looked like, what they believed, how they lived, and what they accomplished. Today, Curtis's photographs, writing, film footage, [10] and wax cylinder recordings of language and music are frequently used by Native people for critical cultural and linguistic revivification [11].

In that record, we see how Native people were able to live sustainably and in harmony with their environment for millennium after millennium. We see the tremendous respect they had for the natural world and the profound understanding they had of their dependence—all of humanity's dependence upon, and inter-dependence with, the natural world.

MT: It's a perennial message, [12] to be sure.

CC: Yes, and this message has enriched lives, both Native and non-Native, throughout the world. Indeed, since the modern environmental movement gained momentum in the early 1970s, many people have looked to Curtis's visual and written record as an indispensable source of inspiration of how to live sustainably and harmoniously in an increasingly complex, crowded and interdependent world.

MT: Beyond Morgan's largesse, Curtis benefited from others' contributions. He had, for example, the unwavering support of the famed Native American scholar at the Smithsonian, Frederick Webb Hodge [13] in addition to an impressive cadre of assistants and researchers who would always precede Curtis into the field to begin the research and establish the relationships. There were also the Native interpreters and elders, medicine men and chiefs who made quintessential contributions.

CC: Hodge was an exquisitely gifted human being: long-time Director of the Southwest Museum, on the Board of the Smithsonian, noted author, respected editor, etc.

Fig. 44.8 Geronimo, Apache, 1905, Platinum print, by Edward S. Curtis. (Photo Credit: Courtesy of Christopher Cardozo Collection)

The North American Indian project and the extraordinary set of rare books that resulted, was a highly collaborative initiative. While one amazingly talented, energetic, strong-willed, and highly entrepreneurial visionary was at the heart of this 30-year project, it really was a massively collaborative endeavor involving kings, the president of the United States, Morgan, numerous academics and scholars—in addition to Hodge—translators and interpreters, field assistants, studio assistants, cooks, wagon-masters, fine papermakers, master letterpress and photogravure printers, master bookbinders, sales and marketing staff. And more importantly, Curtis' collaborators included an estimated 10,000 native people. It was undoubtedly the largest participatory, collaborative undertaking of this kind the world had ever seen.

Ultimately, however, none of this would have been possible without the active participation and collaboration of Curtis's Native co-creator's, those estimated 10,000 individuals. The Native people knew that their way of life and possibly even their race, was disappearing in front of their eyes. There were actually Americans still vocally advocating for their "extermination."

Thus, they actively sought Curtis out because they knew that he would create a record that truly represented their essential nature, who they were before significant contact with the Europeans. To this end, they shared intimate details about their religious and spiritual beliefs, their personal lives and histories, and in the view of some, were actively imparting part of their spiritual essence. Information they shared with no one else (Fig. 44.8).

MT: Christopher, do you have any personal experiences in this realm?

CC: Actually, work I've done with a Native American shaman convinced me that there was a conscious intent by Curtis's Native subjects to imbue part of their individual essence into the images. Rarely done, this speaks directly both to the tremendous importance that these Native collaborators placed upon the imagery they were helping create and to the power that has allowed these images to reach into the future and touch us today.

It is also a significant part of the inspiration and obligation I feel having "picked up the baton" that was left along the trail by Curtis 80 years ago. My life has been

fundamentally informed and transformed by this work. I know it is incumbent upon me to help fulfill the dream for which Curtis sacrificed his health, financial security, and family, and that gave his Native co-creators hope that their legacy would be preserved for future generations.

My life has been inalterably changed by the beauty and wisdom I experience in those century old photographs by Curtis of people who inhabited this continent for thousands of years before I was born. Those photographs are my teachers, my mentors, my soul mates. But for them, I would not be who I am today and my life would be infinitely less rich and interesting.

MT: And I understand that the Curtis story finally has a happy ending financially [14]?"

CC: Curtis sacrificed everything in the pursuit of his dream. He was never even able to draw a salary from the 30-year project that defined his life. In fact, after recovering from a 2 year hospitalization at the end of the project, he lived out the rest of his life in obscurity and financially dependent on his daughter and son-in-law.

His photographs, and even his magnificent sets of rare books also fell into obscurity. One of the most extraordinary sets of **The North American Indian** in existence, the John Batterson Stetson Set, sold for $ 650 at Sotheby's in New York in 1953. Almost 40 years to the day in 1993, at the same auction house, I purchased that Set for a client for $ 650,000. Since then, it has appreciated five-fold again.

Curtis prints that sold for hundreds of dollars when I began 40 years ago can now sell for hundreds of thousands of dollars. Interestingly, when you do the math, one realizes that while that project cost a staggering $ 30–35 million in today's dollars, the aggregate value of everything Curtis created is now approaching three quarters of a billion dollars. And with the sale at Christie's a year ago of a complete set of **The North American Indian** for $ 2.88 million (a new world record for Curtis' work) a new Curtis revival appears to be underway.

MT: I gather that you are working to establish the first Edward Sheriff Curtis Museum in the world, having already taken much of your collection to over 50 countries. What are your goals for a Curtis Museum, and why now?

CC: The Edward S. Curtis/Sacred Legacy Museum will bring the Sacred Legacy of beauty, heart and spirit to the world in ways that Curtis and his Native friends could never have imagined. It would also establish a single source facility for research on Curtis's body of work. It will create increased understanding of and appreciation for, the beauty of the natural world, her diversity and to honor the inclusion of all peoples. The Christopher G. Cardozo/Edward S. Curtis Collection will be the foundation of the Museum. We hope to be open in 2018—the sesquicentennial of Curtis's birth. I believe The Museum will be a significant cultural, artistic, and economic asset for the city in which it is ultimately located. I am currently in early stage discussions in Denver, Dallas and Seattle.

In addition, I am currently working on a 10,000 print "repatriation" of Curtis' imagery to Native peoples, Tribal colleges, and Tribal cultural centers throughout North

Fig. 44.9 An Oasis in the Bad Lands, Sioux, 1905, Photogravure by Edward S. Curtis. (Photo Credit: Courtesy of Christopher Cardozo Collection)

America. Next week we are bringing Native American school children in to view a Sacred Legacy exhibition and have them create artwork and text in dialogue with the Curtis images they encounter there. Educational outreach is an important part of our mission.

MT: Curtis photographed rituals, [15] dances, landscapes, but also—and most poignantly, I believe, individual Native Americans. In gaining their trust and respect and then being allowed to photograph these beautiful and awesomely dignified individuals from over 80 tribal groups, Curtis passed along an eternal gift to indigenous peoples everywhere: a sense of true love of not just who they were, but of who they are.

CC: At a recent exhibition that my company presented I was deeply moved by many responses but, one really touched me; a visitor wrote in the guest book, "Thank you for showing me my culture."

MT: That says it all.

CC: The gift these Native people and Edward Curtis and his other co-creators left us is of inestimable value. It is not uncommon for people to be moved to tears when viewing these images. The strength and dignity of the human soul shines through brightly, even after a full century has passed. These magnificent images, filled with beauty and wisdom are both windows and mirrors. They reflect back to us essential aspects of our nature as human beings: They touch us and inspire us to live more compassionately, more consciously, and more sustainably (Fig. 44.9).

The images also celebrate diversity, courage in the face of soul crushing adversity, and the resilience of the human spirit. And while this story is fundamentally about one man and his vision and the Native people with whom he lived and worked, it is as importantly a story about all human beings and those qualities that will help us survive as a species.

Special Thanks To Christopher Cardozo. Additional Thanks to Peter Bernardy of Christopher Cardozo Fine Art. All photographs Courtesy of the Christopher G. Cardozo/Edward S. Curtis Collection (Fig. 44.10).

Fig. 44.10 Qahatika Girl 1907. (Photo Credit: Courtesy of Christopher Cardozo Collection)

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Chapter 45
A New Natural History Blueprint for Universities: A Discussion with Graham Arader

Back in October, 2011, when W. Graham Arader III was profiled in Forbes [1] he described himself as "…the only guy in history who used Yale as a trade school." It was as an undergraduate at Yale that Mr. Arader learned the fine art of rare map collecting, buying and selling. Yale, of course, is legendary for its collections. In Arader, the passion for maps grew to encompass natural history paintings and rare books to such an extent that today his personal collection of nature in a myriad of human recreations and interpretations—rare natural history paintings, books and maps—is worth, by his estimate, in excess of $ 600 million, a figure matched by his philanthropy. Mr. Arader [2] may well be the most generous and visionary donor of natural history-related materials in American history (Figs. 45.1 and 45.2).

In recent years his largesse has focused on a unique approach to education: He has championed university curricula in cartography and aspects of natural history that can benefit from hands-on materials he donates to various universities and other institutions. He has, in other words, figured out that books -no batteries; paintings by John James Audubon that are the real deal, not copies; ancient maps and magnificent traces of the original North America have value, not merely replicated, or behind guarded museum walls of bullet-proof glass, but in the hands of professors and their students within a classroom.

It is a beautiful strategy, a university blueprint for the study of natural history dating, in fact, from antiquity (this is how Leonardo and Linneaus learned it), which I recently had the pleasure to ask Mr. Arader about (Fig. 45.3).

Graham Arader (GA): Michael, for the last 40 years my inventory has been used to inspire students in the teaching of art, art history, history of cartography, Linnaean classification and nomenclature, environmental science, technology and business. Programs have been very successful at Northeastern University and the University of Florida.

Michael Tobias (MT): Actual syllabi? (Fig. 45.4)

GA: Absolutely. Syllabuses have been established and courses are being taught using the woodcuts, engravings, aquatints, lithographs, chromolithographs and watercolors of maps and natural history images from my inventory. Programs are currently in development at the University of South Carolina, the University

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Fig. 45.1 Graham Arader (*right*) with Friend Alan Ripka. (Photo Credit: Courtesy of Graham Arader)

of Chicago, Prescott College, Franklin College, the University of Tennessee and Marymount College. The primary focus has been to inspire students by hanging the actual art in the classrooms or bringing it to them from the institution's art museum.

MT: This "marriage of art and science" as you have described to me, has clearly been inspirational for thousands of students. We live in a time of global environmental crisis. You have been way ahead of the curve for decades by endeavoring to preserve the great biological heritage of this country on works of paper. And also by your charitable giving, to institutions and non-profits with environmental leanings, such as the Los Angeles County Museum, the Santa Barbara Museum of Natural History, The Wilderness Society, the Fine Arts Museum of San Francisco, Columbia University, Harvard University, The Wildlife Conservation Society, NYC Outward Bound, and the New York Historical Society, to name just a few of the beneficiaries. Can the art of natural history work to remedy ecological problems, in your opinion?

GA: My dream is to share this artistic and scientific legacy with our young and give them a reason to do the research that has been so invigorating for me for the last 42 years. There is nothing like the thrill of being face to face with the original work.

Right now my focus is on the University of South Carolina. Tom McNally, the University Librarian, has inspired me to assemble a $ 30,000,000 collection that will be the finest in the American Southeast. With the Dean of the School, Mary Anne Fitzpatrick, professors and catalogers are being hired to implement this program.

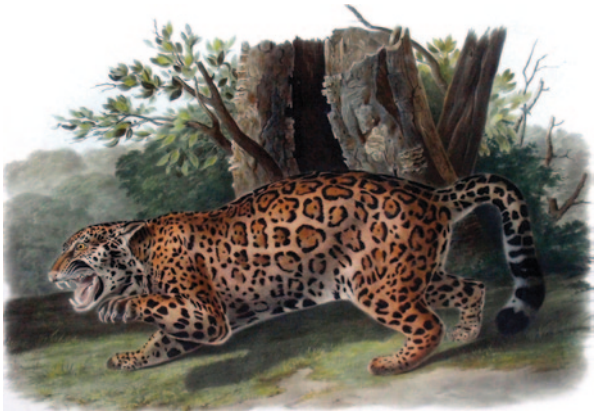

Fig. 45.2 John James Audubon (1785–1851). Plate 101 "The Jaguar." From: "Viviparous Quadrupeds of North America." Hand-colored lithograph. Imperial folio. Philadelphia: J.T. Bowen, 1839–1844. (Photo Credit: Courtesy of Graham Arader)

Fig. 45.3 John James Audubon (1785–1851). Plate 96 "Columbia Jay." Double Elephant folio. From: "The Birds of America." Hand-colored aquatint engraving. London: Robert Havell, Jr. 1827–1838. (Photo Credit: Courtesy of Graham Arader)

Fig. 45.4 John James Audubon (1785–1851). Plate 366 "Iceland, or Jer Falcon." From: "The Birds of America." Hand-colored aquatint engraving. Double Elephant folio London: Robert Havell, Jr. 1827–1838. (Photo Credit: Courtesy of Graham Arader)

Students will be taught courses using the actual artwork in the University's collection. It is very exciting (Figs. 45.5 and 45.6).

MT: But how do you see students translating that aesthetic excitement into real world solutions? Or does that matter to you? I realize that is probably an impossible question to answer. Everyone would like to believe that education and great art will go on to inspire our species to do the right thing, stop utilizing gas guzzlers or killing animals and whole ecosystems. What are your personal views about this?

GA: Basically, spreading the word of Linnaeus [3] the genius who taught us how to classify all living things in 1735, was done with great natural history art. The story of learning about the natural word is filled with the artwork that these great early scientists and classifiers commissioned. The greatest artist of birds was Audubon because of his great skill, monumental presentation and scale and understanding of how to create dimensionality using gradations of color and great line. My collection of 7,000 original works of art in this field is the largest in the world and has been my passion for 42 years. By working to share it with students, I suppose I'm praying quietly that they will get the message (Fig. 45.7).

Fig. 45.5 John James Audubon (1785–1851). Plate 1 "Wild Turkey, Male." From: "The Birds of America." Hand-colored aquatint engraving. Double elephant folio. London: Robert Havell, Jr. 1827–1838. (Photo Credit: Courtesy of Graham Arader)

Fig. 45.6 John James Audubon (1785–1851). Plate 6 "Wild Turkey, female." From: "The Birds of America." Hand-colored aquatint engraving. Double Elephant folio. London: Robert Havell, Jr. 1827–1838. (Photo Credit: Courtesy of Graham Arader)

Fig. 45.7 John Speed (1552–1629). "A Map of New England and New York." From: "A Prospect of the Most Famous Parts of the World." Copperplate engraving. London: Thomas Basset, 1676. (Photo Credit: Courtesy of Graham Arader)

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Chapter 46
God's Country: The New Zealand Factor

New Zealand may well be the most desirable tourist destination in the world. It is certainly among the most beautiful island nations on the planet, its biodiversity magnificent in every respect. New Zealand's artistic and scientific communities are remarkable; the nation's politics a model of true democracy in action. In fact, there are so many wonderful things to say about the country that my co-author Jane Gray Morrison and I were hesitant, in our newly-released Dancing Star Foundation book, **God's Country: The New Zealand Factor**, [1] to lavish too many superlatives on a country that might find it difficult to live up to our shared belief in, and love of, this particular nation, her people and her wildlife (Fig. 46.1).

With just over 4 million human occupants, approximately 80 endemic bird species (including those sea birds which visit and breed there), three native bats and countless marine mammals, but no snakes or other predators in the normal sense (other than Man himself), New Zealand—for some 80 million years—has enjoyed relative tranquility.

Then things started to change. Settlers from England, Norway and elsewhere brought cows and sheep and dogs and (inadvertently) mice and rats. Possums were deliberately introduced in the early 1800s for the purposes of hunting and a fur trade (a tragically omnipresent fact today: possums kill native biodiversity). The result of this misstep in many decades past: conservation in New Zealand has meant, in many guises, killing: the killing of bio-invasives. Not just the "eradication" of possums, but the killing of three introduced members of the Mustelid family, namely, stoats, weasels, and ferrets, whose rapacious hunger for native birds (along with that similar hunger on the part of three species of rats, feral cats, dogs, and mice) has exerted horrific impacts upon native species who for millions of years had no concept of fear and are, today, sitting ducks.

This is where immuno-contraception for predators (that might necessitate genetically modified organisms) has become a major public and scientific debate as in few countries. Where human rights versus animal rights has taken on dimensions that countries like the United States can scarcely identify with, given the fact North American birds and other mammals co-evolved with native predators, whether coyote, bobcat, mountain lion, rattle snake or wolverine. Such creatures never existed in New Zealand.

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Fig. 46.1 Milford Sound, Fiordland National Park. (Photo Credit: © M. C. Tobias)

The country's native birds, like the Kiwi, after whom the resident locals have nick-named themselves, never had to worry about being eaten and thus, in a few cases, gave up the need of flight, saving their energy, and becoming ground dwellers (Kiwi and Kakapo, for example, not to mention the numerous species of now extinct Moa as well as a giant penguin nearly the size of the equally giant penguin fossils found recently just South of Lima, Peru).

New Zealand has been called a "capital of extinctions" as a result of the human introduction of those aforementioned non-native mammalian predators. A pet dog once devastated an entire penguin rookery in a single evening on the South Island a few years ago. In addition, there are thousands of invasive plant species, like Darwin's Barberry or Chilean Fireweed, in addition to non-native wasps that compete for tree sap with native parrots—the two sub-species called Kaka, or *Nestor meridionalis* and Kea, or *Nestor notabilis*.

New Zealand is unique in a myriad of ways, not just because parrots and penguins live side by side, but in the fact that much of her foreign exchange income comes from the sale of animals, shipped live or dead, as well as animal by-products like wool and dairy products. An inordinate amount of New Zealand land has been given over to pasturage for grazing farm animals, a percentage much higher than in the majority of all other nations.

For these, and countless other reasons, New Zealand is truly a template for the study of human nature and ecology. The country probably has more scientists, artists, intellectuals and environmentalists per square kilometer than any other political entity in the world. Her farmers are among the most hardworking, well-read, witty and generous of any. And her history is one that is inextricably tied to the arts, science and exploration. Mark Twain did stand-up comedy in Dunedin after going bankrupt in Connecticut; visits by Charles Darwin, Captain Cook and the great painter William Hodges, as well as (allegedly) Medieval Chinese mariners. Not to mention the original settlers, the glorious Maori and Maorori indigenous cultures.

New Zealand was also the first nation in the world to give women their rights back; to suggest that Antarctica be declared a World Park; and to make itself the first nuclear free nation.

New Zealanders who read of such superlatives will yawn, or exhibit knee-jerk reactions of one sort or another, as should be expected. They share something of a conspiratorial secret (the reason most Kiwi college students who explore the world upon graduation typically return to New Zealand: they know they are living in one of the best countries on earth). Indeed, for most of the world, this is a democracy that represents what a human paradise must look like.

Which is why my co-author, Jane Gray Morrison and I chose New Zealand as a fitting example of a test-case for what the country has exported by way of a welcoming (though somewhat debated) mantra, namely, "Clean, Green New Zealand." Could it be true?

To find out more about the dialectics of this tourism slogan, and all of the "Middle Earth" glories that the "Lord of the Rings" locations made globally manifest, we suggest a visit to New Zealand. She can certainly use your tourist dollar revenues right now, especially in Christchurch, following one of the worst natural disasters in the nation's history, nearly three months ago on February 22nd, Tuesday, at 12:51 pm, the 6.3 devastating earthquake.

Notwithstanding that tragedy, there is no better place to examine what a human paradise might, could, or should mean in the twenty-first century.

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Chapter 47
New Territories: Artist Astrid Preston Celebrates the Earth in a Landmark Nature Exhibition

Los Angeles based Swedish born painter Astrid Preston [1] has long explored and invented new frontiers of an aesthetic naturalism, elegantly remaking urban and rural wildness into provocative, soul satisfying tapestries of life and parkland utopias. Her work has consistently taken technical and philosophical risks, achieved unique depth, and established Ms. Preston as one of America's most important contemporary landscape painters (Fig. 47.1).

She conveys a never-sated astonishment about the work of other painters as diverse as Albrecht Dürer, Rembrandt, Vermeer, Van Gogh, Anselm Kiefer and—in three recent trips to Japan—a profound Asian connection, particularly to Hiroshige, as well as Japan's remarkable eighteenth century painter, Itō Jakuchū. This latest exhibition, "New Territory" (Craig Krull Gallery, running through March 2nd), [2] combines a philosophical array of brilliant sensuality in forty-three new works. It follows upon more than four decades of a highly public presence. Most of these paintings are on richly-veined hardwoods, some on stretched linen which resembles flawless silk. These works have transformed genial frames of both contemporary as well as historic reference into Zen-like masterpieces of restraint that at once challenge and comfort. Ms. Preston spent two years assembling this dazzling collection of her work, a quiet, habitable reminder of the critical haikus and the "awe and reverence for nature" that is core to her ethic and art-form.

Her Nordic origins are not obvious. There is little to suggest, for example, the influence of such Scandinavian giants as Edvard Bergh, the brothers Wilhelm and Magnus von Wright, Carl Larsson, Alfred Wahlberg or Johan Sevebom. Indeed, this most recent exhibition altogether heralds a unique approach to landscape, though one as luscious and inviting as any Édouard Vuillard interior across Paris (Fig. 47.2).

But there are other Swedish influences that reign supreme in Ms. Preston's governing similes; all seeming to center upon humanity's clear and present need to be immersed in as much nature as possible. As we ourselves are Nature, and a most meddling part of it, to be sure, I asked her about her particular passion for trees, which insinuate a looming, iconic centrality in much of her work.

"I photographed hundreds of trees across Japan. Everyone of them has a biography," she ruminates aloud. "Certain trees are in the paintings, and if you were to come upon them in a park, or on a mountain top over Kyoto, for example, you

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Fig. 47.1 Astrid Preston beside her painting, "Mountain Path," 1989, 96 × 72 in. (Photo Credit: © M. C. Tobias)

would recognize an individual red or black pine; you can know them for who they are, I believe," she says. "Do you think of yourself as an environmental activist, in some sense?" I ask (Fig. 47.3).

To which she replies: "My friend, the cinematographer Haskell Wexler once said that every time one paints a leaf, he/she is making an anti-war statement," Ms. Preston declares; and she goes on to express how human beings all want to feel their fingers in the dirt. "We miss that. No matter how benign my landscape paintings, I suppose in the end they might well be construed as political acts. We look for beauty

Fig. 47.2 "Villa Garden," 2012, oil on wood, 16 × 16 in., by Astrid Preston. (Photo Credit: Courtesy of Craig Krull Gallery, Santa Monica)

Fig. 47.3 "New Territory," 2012, 16 × 16 in., oil on wood, by Astrid Preston. (Photo Credit: Courtesy of Craig Krull Gallery, Santa Monica)

every day. And when a tree dies, we mourn the loss." Hence, societies around the world need a great nature painter of Ms. Preston's stature like never before.

In this same vein, Ms. Preston acknowledges the huge difference between, say, Baron Georges-Eugène Haussmann's ca. 1865 civil engineering of Paris—well laid out Reconstructionism, with enormous and orderly boulevards—versus the Paris she is particularly fond of, backstreets, with sinuous wandering lanes more in keeping with the animal trails we would all prefer, in our hearts, to follow: The difference between the Left Bank, and the Right Bank.

In Ms. Preston's latest exhibition she discloses a new-found desire to embrace still water—which has always posed theoretical problems for her, she confesses; but now, she has discovered how to make ponds and reflections work towards that aesthetic liberation she seeks; one that enables her to lavish in a single, brave line, painted with a five-zero (super-fine) brush, all the dreams of a songbird or a crane; to give mottled light upon the dabbling mallards; a Monet-like ephemerality that anchors, in this instance, all of Japan to the fact it is an island, after all. Many islands.

And, while there are nearly 128 million human inhabitants in Japan, including Astrid and her physicist/inventer husband, Howard Preston's son, Max, who loves, and has worked in Japan for nearly five years, Ms. Preston quietly computes the evocative challenges of Japan's endless contradictions, emerging with an awesome clarity. Japan has never looked so good. And while the free extent of a bonsai tree's predilections may be held back, its intimations are not. The river through Kyoto is encased in concrete, but the thousands of garden monasteries across that great heartthrob of a city bring perpetual renewal to all sides of Japanese artistic, spiritual and emotional life. Ms. Preston captures that as never before.

She renders commentary and a painter's reckoning made all the more poignant in the sense that Japan is fully exposed to the forces of the wilderness—earthquakes, tsunamis, volcanic eruptions, typhoons. A cosmos as artistic and religious as it is hazardous.

Indeed, Japan is the 35th biological "hotspot" on the planet (Ms. Preston's home, Southern California, also a biological hotspot); stricken with a huge number of endemic plants and animals on the verge of extinction. In Ms. Preston's art form, these underlying truths are something of a sub-text; a potent divining rod that emerges—if one takes the time to contemplate humanity's unique plight—as something of an ecological dangling modifier: What is our true place in the world? Clearly, art as championed by this technically-flawless painter, has a huge capacity to heal wounds, mend morbidity, dispel bleakness, and signal at once a rejuvenation of the spirit that harkens back to the wilderness so consciously celebrated by luminaries like Thoreau, George Inness, or Guo Xi of the Northern Song Dynasty in China (ca. 1020–1090).

As a child growing up in suburban Stockholm for her first six years, Ms. Preston was enchanted by Nordic nature. Her family had a rural house atop a small hill above a lake, surrounded by forest. The three year old used to ski down that hill, skate on the frozen water, and wander off on animal trails. Immersed in forests, as Sweden happily remains, in the Summer and Fall the young Astrid loved roaming, lying upon the giving Earth and drawing apples upon large sheets of drafting paper (both her parents being architects). But to this day she ponders whether the apples were "upside down" or not, a conjecture that confronts viewers of her prolific work with similar issues: what is vicarious nature (visited upon our consciousness through the intercession of others) and what is true original nature, the "source," as she describes it one morning in her Santa Monica home, surrounded by large vistas but mostly (with the exception of an arroyo of sycamores) populated by characteristically non-native species from all over the world: pines, a cypress, palms and an explicitly-glorious garden of herbs, mulberry, exotic succulents, home-grown vegetables and a who's who of flowering plants leading to one of the highest hills in the region along a moss-covered stone walkway.

Ms. Preston spent years hiking through the Sierras, or, closer to home, the Angeles Crest, as it is known. But this human inveigling within our backyards, and views crowded with insensate things presents a beguiling opportunity for a daring artist, which Ms. Preston most certainly though unassumingly is. Her work encompasses every familiar tone of our inhabited margins, borderlines, treetops, and birds—especially raptors, ducks, Blue birds, and those of the Corvus genus. She describes the day a red-tailed hawk hit one of her home's windows. The bird got over it soon enough, but sat near the painter, a foot or two away, "this simply enormous gorgeous hawk, right there, right here, in the heart of Los Angeles." The awe in Ms. Preston is the awe of an unceasing child's imagination, schooled in the worlds of a Simon Schama (she brings out his great book, **Landscape and Memory**), but most charismatically, in nature herself. Ms. Preston's ecology of forms, color and uncanny evocation transcends the familiar. It does not adhere to the rules set forth by the most powerful Shoguns, Emperors, connoisseur collectors, or great gallery and art academy mavens of aristocratic taste. She is neither consumed by mulch or starry countenance (Fig. 47.4).

But her seasons might well be identified in Shakespeare, marked in Edmund Spenser or catalogued in Chaucer, as Ms. Preston describes to me her last three trips to Japan during glorious Springtime.

Fig. 47.4 "Tapestry of Spring," 2012/2013, oil on wood panel, 16 × 16 in., by Astrid Preston. (Photo Credit: Courtesy of Craig Krull Gallery, Santa Monica)

One of her paintings in the exhibition is of a very tree at the reclusive fifteenth century Ashikaga Yoshimasa's famed residence, Ginkaku-ji, a hallmark of Japan's greatest period of homegrown artistic treasures, and resplendent gardens, encompassing 22 indigenous moss species, in Kyoto.

When you are next at Ginkaku-ji, look for this tree. It's there.

Over the years critics have applied unusual epithets, accolades and descriptive inventions to Ms. Preston's work: "self-effacing" [3]; "halfway hallucinatory" [4]; or, most prescient, "a complex notion of the idealized physical world" [5].

When explorers of yore sought out some version of Paradise, they did so in the firm knowledge that it had to be good; that distant horizons were better; that the past was Golden and the future equally bright. Ms. Preston does not parade Bierstadt's glowing Yosemite or Moran's Yellowstone of pure gemstone for our vote. Quite to the contrary: Ms. Preston has the confidence of vision to know that nature is subtle, not grand; that most of us will recognize the modest borders of a backyard receding into memory or dream-time, more than we are likely to identify with the summit of K2. In this latest "New Territory," the world is just fine, composed of a few dozen trees, ponds, clouds, songbirds, a wide-mouth Asian carp (bioinvasives in this country), ripples in water, bare branches, the odd flower, perspectives that come from astonishingly clear reflection: A combined sensate power that demonstrates conclusively the universal throb of recognition that is Japanese elegance, contrast, and livable worlds highlighted by human intelligence.

Moments of surreal bifurcation intrude upon this otherwise Apollonian confluence of aesthetic perfections. Proportions are subdued; light infiltrates with the diffident power displayed in Winter on frozen ponds, or as backlit premonition against the grain of wood that might as well be the veins of our humanity, such is the artist's cognizance of the way nature dreams during the daylight hours. We are held suspended in this trance of recognition, whereby the world is become a luscious tool of our deliverance. Love is plentiful; the all-seeing transmuted into the all-abiding urgings of conscience (Fig. 47.5).

If there is an environmental message it is this: the world abides and we, in our best, spellbound throes of bounty, partake of the spirit of goodness. Astrid Preston's paintings dispel fear, embrace the heart, take on the life that we all aspire to. These

Fig. 47.5 Ms. Astrid Preston, Organic gardening. (Photo Credit: © M. C. Tobias)

refreshing coordinates of life strike at once of a new geography that combines Edo-School subtlety with precise patchworks of commentary on the state of the world through the eyes of a critically informed, astutely sensitive observer. Ms. Preston's ability to render drama without incident may be likened to the greatest of seventeenth century Chinese recluse paintings. Her palette—at times approaching raw impasto—as a rule does not divine disaster; she is no anatomical disseminator of particulate matter or abdominal muscle. Moreover, she does not demand that the eye follow every sinew from head to toe, like a Constable (Fig. 47.6).

Rather, her purity is soft-spoken, its piano keys winnowed and beguiling as that of, say, seventeenth century Shitao (figured in the National Palace Museum, Republic of China—Taiwan) or other masters of a generic Shangri-la. Ms. Preston delivers on a promise that combines a sovereign secret garden that gains fervor the longer one stares at it. Such that, after a time, we have occupied the landscape just as it has indelibly and forever crept into our own imagination. But without true occupation. We linger, the susurrations of art arranging our biorhythms in their own mystical fashion.

The choices we make whilst meandering between Preston canvasses may be likened to a puzzle of twenty-first century environmental challenges. Like William Wordsworth who knew of the encroaching madding crowds; the angry railroad with its belching reminders on the very borders of the Lake District, such that after a day of quiet eloquence, he was busy denouncing the advent of those trains, as Plato had so long before agonized over very real deforestation throughout Greece; so too, Ms. Preston anticipates, throughout her work, some fashion of discord. But shadows are rarely literal.

Fig. 47.6 "In Bloom," 2012, oil on wood panel, 16 × 16 in., by Astrid Preston. (Photo Credit: Courtesy of Craig Krull Gallery, Santa Monica)

Rather, a dynamic tension seems to echo off her paintings, or they do in my mind; just as they season with reality the whole history of the picturesque: ecological fears amid Romanticism and Transcendentalism—whether in a Phillippe de Loutherbourg or Francis Danby; the Hetch Hetchy syndrome some historians ascribe to John Muir's premature demise; and the blood-strewn avenues of Kyoto during the Ōnin War (1467–1477)—at the height of the loving sand and moss garden revolutions.

Today, knowing that Chisso-Minamata disease, war and unprecedented tragedy have afflicted a country as cradled yet exposed as Japan is to the seismic currents of world history, Astrid Preston's Japanese-based exhibition explores, in its perfect assurances, the very material substance of Humphry Repton's famed **Observations on the Theory and Practice of Landscape Gardening** (London, 1803). These are the patent juxtapositions of those marvelous vistas that every visitor to the National Trust properties of England and Scotland knows only too well, including the homes of Wordsworth and Beatrix Potter. Equally, one feels that dialectic, the aesthetic tension, throughout Kyoto, where the quite mundane downtown, with its honking horns and concrete, encroaches upon a spiritual green belt, teeming with hundreds of spectacular monastery gardens. Ms. Preston is all about the gardens, fortunately. The stop signs and train tracks will come later. We know that.

For now, the artist gives us a deeply appreciated respite. Her optimism is magnanimous. Profoundly, in almost no instance do human beings ever appear in Ms. Preston's work, as she openly expresses a desire to enlist aesthetic elements beyond the human narrative, except to the extent that our transformative energies of any generic day can be deciphered: a path, a human-manipulated garden.

Reflecting upon the great Renaissance painting in the Gallerie dell'Accademia in Venice, "La Tempesta," by Giorgione, Ms. Preston describes a belief that wants human nature, in general, to reconnect with "the source," a point that the late Sir Kenneth Clark made much of in his groundbreaking study in 1949 on landscape and art. "To love and appreciate nature," says Ms. Preston, "is in so many ways key to our survival."

And, I would add, to the survival of most other species.

Fig. 47.7 "Coming to the Edge," 2012, oil on panel, 16 × 16 in., by Astrid Preston. (Photo Credit: Courtesy of Craig Krull Gallery, Santa Monica)

This conundrum—magnificent works of the landscape, shorn of a human presence—offers up a living testimony to our need to be re-connected to such places. It explains the hundreds-of-millions of visitations to national parks and wilderness areas throughout the world. It also makes sense of the fact that the opening night of this, Ms. Preston's latest exhibition drew a formidable attendance at the Craig Krull Gallery; hundreds of art aficionados ruminating aloud whilst crowding before these extraordinarily detailed marvels of quiescence, such is the paradox with which we all grapple. It is a generous and hopeful wish that Ms. Preston poses, namely: "How can we not revere the natural world?" she asks. "We are so affected …. No matter how much we might try to isolate ourselves."

There is an interesting comparison worth noting, here. Frederick Law Olmsted and Calvert Vaux, in obtaining the commission for Central Park, New York in 1858, were given a go-ahead to create nature, planning every single tree and plant across the entire 3.4 km^2, 843 acre city garden which today sees over 30 million visitors annually (Figs. 47.7, 47.8).

Ms. Preston's landscapes—no less orchestrated, tree for tree, with endless paths to lose oneself upon- remain absent a single personage (Fig. 47.9).

Fig. 47.8 Meditation at Ryōan-ji. (Photo Credit: © M. C. Tobias)

Fig. 47.9 "Early Spring Kyoto," 2012, oil on linen 66 × 33 in., by Astrid Preston. (Photo Credit: Courtesy of Craig Krull Gallery, Santa Monica)

The cusp of language is there, yet not so much as a whisper; no handshake. Lacking a human presence, other than the viewer of the painting, the painter manages something quite extraordinary, an artistic trigonometry lacing both hedgerow and greensward with a habitation that is all of the mind. There are no discernible Vibram-soled boot prints in the mud. The context for all this fluent chicanery is the sheer contagion of an enigmatic biosphere that exists quite splendidly without us. Ms. Preston's many paths to paradise—and they comprise multihued oxygen bubbles, a plenum of bush, a glen of glistening broadleafs, schools of grass, and pine barrens populated by the odd movement of a bird or carp within the fog-bound arcadia's of the ephemeral hush—exist in an intoxicating exile.

Such living testaments pose not one precarious volt. Rather, the prestidigitator effects a magical realism in the palpable mists of anticipation, by the mere shock of biodiversity insinuated around a verisimilitude of natural splendor that makes its presence plausible, indeed, essential, to our viewing pleasure and very survival.

And what she has to say is original. Ms. Preston has a unique gift and her voice has never been so well tuned, so rich, so urgent.

All Images from the Exhibition Photographed by Brian Forrest; All Exhibition Paintings Courtesy of Craig Krull Gallery, Santa Monica. Special Thanks to Ms. Beth Parker.

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Chapter 48
Ecuador's Vice President Lenĩn Morẽno, 2012 Nobel Peace Prize Nominee, Reflects on Human Welfare and the Rights of Nature

Michael Tobias (MT): Mr. Vice President, when we first met, in Quito's Botanical Gardens, surrounded by indigenous bromeliads, orchids and the Espelitia plant, now endangered because much of its habitat has been usurped by potato agriculture in your country, you spoke of a "magical upbringing" in Ecuador's Amazon, in the town of Nuevo Rocafuerte, in the wild province of Francisco de Orellana. Years later, having seen your country grapple with significant environmental challenges—as all nations do—what is the most important message you carry with you from that childhood in the Amazon that you could share with readers?

Vice President Lenĩn Morẽno (LM): Michael, the most wonderful teaching was to be in contact with Nature, from whom I learned to love and to fear at the same time. It was a dialectical duality that was permanently in contact. It was the taste of travel on the river, but also the danger of eddies. It was the satisfaction of seeing a large cat (Fig. 48.1).

MT: And in Ecuador's Yasuní National Park and surrounding buffer areas a large cat is virtually "tiger" sized, a jaguar, puma or the much smaller ocelot.

LM: And at the same time the risk of what that meant. It was unforgettable. I have experienced the hurricane-like storms, endless rain, fishing, hunting, surrounded by trees, orchids and [all the] flowers of the rain forest.

MT: Do you ever have the opportunity go back there?

LM: Whenever I have the chance, I return to the Amazon.

MT: Mr. Vice President, in 1998, you were nearly murdered by thieves, as I understand it; shot in the back. Your survival, abetted by that infectious smile and goodwill of yours, has become legendary. And much more: for now, you have been nominated for this year's Nobel Peace Prize [1] in recognition of your extraordinary, and wide-ranging commitments to those with physical challenges and mental anguish—through "Ecuador sin barreras" (Ecuador Without Barriers) [2]—as it has been widely hailed. As an ecologist I find the notion of breaking down barriers extremely critical. And, it would appear, so does Ecuador's Constitution which, in 2008, added an Amendment [3] to declare that all of Nature is deemed to be vital,

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Fig. 48.1 Vice President Lenīn Morēno. (Photo Credit: © Dancing Star Foundation)

Fig. 48.2 Capped Heron, Yasuní. (Photo Credit: © M. C. Tobias)

interdependent, and that if we erect barriers between ourselves and Nature, we are likely to ignore her; to exploit places like Ecuador's Amazon—at our peril. Two of Ecuador's ecological jewels, the Galapagos [4] and Yasuní National Park, [5] are among the most biologically diverse protected areas on the planet, particularly Yasuní, a UNESCO World Heritage site [6] that is theorized to contain as many as 100,000 species per hect are—an astonishing biodiversity zenith [7].

Surely, Yasuní is a fitting tribute to this "Ecuador Without Barriers" concept, wouldn't you agree? An explicit relationship between human health and happiness and the environment. And in your case, specifically … (Fig. 48.2).

LM: A couple of young men assaulted me. One of them shot me, but despite this fact, I did not put up resistance. At that moment came a health condition, a Via Crucis. This condition was marked by pain that was left by the pieces of bone, pockets of nerve bundles in the spinal column. This induced my searching for some remedy for the pain, but I couldn't find it, either in classical or alternative medicine.

MT: So what happened?

LM: I ended up spending four years in bed, which prevented me from working. And it was then, when I had a chance to meet with good humor. A friend told me a joke. I laughed a lot. And then, the pain disappeared. But it was only while I laughed. It was at that point I realized that the mood [the laughter itself] had an analgesic effect. I had spent too much time with the pain [vibrating with the pain] and that is dangerous.

Fig. 48.3 Vice President Lenīn Morẽno. (Photo Credit: © J. G. Morrison)

MT: So one should not allow pain to vibrate for too long in oneself?

LM: [Exactly] Don't vibrate too much time in the pain of the body or the soul.

MT: And your recovery?

LM: The recovery was long and difficult (Fig. 48.3).

MT: I can't imagine.

LM: [You see] I started to study humor and to practice it. Finally, the pain began to diminish, slowly … [then] it became somewhat bearable. I discovered the immunological and therapeutic effects that humor could induce. I started to give lectures.

MT: And the odyssey leading you into politics?

LM: President Rafael Correa invited me to accept the nomination as Vice President. We won on two occasions and now surely the President is going to have a third chance.

MT: But I understand you are preparing to retire from politics?

LM: I would like to devote myself to my health, my family and personal activities; promoting respect, optimism, transparency, truth, delicacy, solidarity.

MT: "Delicacy, solidarity…" These are beautiful concepts, juxtapositions. You've also mentioned to me the concept of "devaluated values?"

LM: Yes, I think it is worth rescuing them, insisting on them, identifying with them.

MT: When I hear you speak of such values, as an ecologist I am immediately wonderstruck by Ecuador.

LM: The ecological jewels of the Ecuador that you have mentioned [earlier], not only encompass the Galapagos Islands and the Yasuní, but all of the natural wealth that exists in the world. The first concept [to consider] is the defense of "Pachamama" (Mother Earth), a Nature that we have to respect, love and care for.

MT: There are countless NGOs around the world who are advocating "in defense of the earth;" the very concept—Mother Earth—leading us far back into time, at least to

Fig. 48.4 Members of the Anangu Quichua community, Yasuní National Park. (Photo Credit: © J. G. Morrison)

the ancient Greek Goddess of Earth, Gaia. What is Pachamama as those in Ecuador think of it, feel it?

LM: Pachamama has rights which can be claimed by any person at the time in which they are violated.

MT: I'm already thinking of U.S. Supreme Court precedents, as well as the World Court. A great concept, and one that comports with international community standards, ethical standards, quality of life standards. It opens up the prospect for international ecological standards not unlike hard-won treaties, trans-national environmental alliances, and the like. Pachamama also reminds me of Aristotle's concept of the ultimate in life, namely, holistic happiness, human welfare, the Greek word, Eudaimonia, one of the classic philosophical injunctions of Western thought.

LM: Michael, this great concept is combined with the right of persons to have a nice, quiet, happy life: the so-called Sumak Kawsay [8] which is the sum of well-being.

MT: Mr. Vice President, how does one even begin to hope to achieve Sumak Kawsay?

LM: This is achieved through a respect for people, [for one's] neighbor. [It presupposes] a respect for [those peoples'] situation, their capacity, education, and even one's personal wealth. And it puts into practice the provisions of Ecuador's Constitution, namely, the rights of Nature and the rights of all human beings to be able to have a good living (Fig. 48.4).

MT: I understood you studied psychology at the Universidad Central del Ecuador. Now your country faces an archetypal psychological challenge: jobs, income generation, lifting those who are economically marginalized out of hardship, while ensuring the very survival of all those species and populations of species in the jungle, the Andes and all the other remarkable ecosystems found throughout Ecuador. Is a sustainable balance possible between humans and other species?

LM: Respect is fundamentally [necessary].

Fig. 48.5 One of several indigenous primate species, Yasuní National Park. (Photo Credit: © M. C. Tobias)

MT: What about respect for Nature, for that magical childhood in the Amazon you referred to?

LM: [Well], unfortunately, Nature has been depredated and now we are in a very serious situation: the danger that [Nature] will vanish.

MT: Well, there are people who deny our responsibilities to the environment; who deny the reality of extinctions, or that climate change is real; who attack the IPCC, the Intergovernmental Panel on Climate Change—no matter how definitive the scientific and indigenous data one provides. Ignoring the overwhelming biological opinions of scientists worldwide, such people will forever, it would seem, remain cynical, professing to other priorities. In the first 2012 U.S. Presidential debate, the word "Nature" was not even mentioned.

LM: There are people who don't care about Nature. But for those who love Nature and want our children and grandchildren to [be able to] enjoy animals, plants, landscapes, their beauty, it is necessary to take care of Nature, and to maintain a relationship of respect and affection. Sometimes Nature is taken, perceived, treated as if it were an inert element, when in reality Nature embodies a truly wonderful life, which we must respect and share with her (Fig. 48.5).

MT: Your President, His Excellency Rafael Correa, and great champions of the Yasuní-ITT [9] Initiative like Secretary of State for the Initiative, Dr. Ivonne Baki [10], are calling upon the rest of the world to help Ecuador with its goal of safeguarding Yasuní [11]. There will always be skeptics who prefer to see humanity's future written in ledger books of profit and loss; and cubic board feet of fallen timber. As America's environmental hero, John Muir once said, "Any fool can destroy trees. They cannot run away." With an election coming up in Ecuador in 2013, and the world economy still terribly fragile, what is your prognosis for Yasuní at this time?

LM: Quite good. Firstly, because it [the Yasuní-ITT Initiative] is a unique project, which people of the world fall in love with every time they hear about it, even without knowing [anything about] Yasuní.

MT: In the Yasuní-ITT Initiative 21 min film, [12] in which you have a major presence, and seen here in Forbes for the first time by an international audience, other

Fig. 48.6 From *Left* to *Right*, Jane Gray Morrison, Ecuador's Secretary of State, Dr. Ivonne Baki. Vice President Lenĩn Morẽno and Michael Charles Tobias. (Photo Credit: © Dancing Star Foundation)

than in the film's official release this past June at the United Nations Rio+20 Summit, and most recently in September 2012 at the IUCN World Conservation Congress at Jeju, Korea, you speak of faith and of the environment. Could you explain that connection more specifically, in terms of Yasuní?

LM: People, who have visited [Yasuní National Park] can see the natural beauty of forests, which preserve unique species in the world. That is because this part of the Amazon rainforest in Ecuador resisted glaciation (Fig. 48.6).

MT: And the significance of that?

LM: It is because this area was not covered with snow and ice that plant and animal species have been preserved.

MT: That is essentially the definition of a "Pleistocene Island," an ecological concept first applied to places like the tepuis in Venezuela and other parts of the Guiana Shield and of the Amazon. As Shakespeare described the "teeming Autumn, rich with increase," in the case of Yasuní, that increase enshrines what is possibly the most important, astoundingly diverse cornucopia of life to be found anywhere. Yet, this biologically-critical region of Ecuador is not without her own challenges, including the potential revenues, by way of oil exploitation, from areas bordering upon Yasuní National Park.

LM: Michael, we have a living paleontology in Yasuní. I have great faith that we are going to keep it.

MT: Mr. Vice President, Thank you!

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Chapter 49
Nigel Brown: A New Zealand Original

Meditation on a Rural Idyll

If David Hockney or Gerhard Richter can rightly be considered among the most prolific and brilliant painters alive in the Northern Hemisphere, the same can easily be claimed for the much younger Nigel Brown, down in the Southern Hemisphere and half-way to the Antarctic.

Brown's commentary on the natural world is visually compelling, his work hanging in the balance of ecological communion that may, or may not be going the way any of us would prefer. Indeed, as an astute observer, thinker and painter focusing to large degree on Nature and environmental paradox, Nigel Brown [1] is one of the most complex and profound narrative storytellers on record (Fig. 49.1).

Brown lives along the South Western coast of the South Island of New Zealand, looking out upon a windswept, sea-crashing Foveaux Strait, with its elusive rocky crags; Whenua Hou ("Codfish Island")-site of the determined ecological recovery efforts for the great flightless parrot, the kakapo; abutting New Zealand's third great land mass, the island of Rakiura ("Stewart Island"); as well as the three extinct volcanic Solander islands, named after a scientist aboard Captain Cook's ship Endeavor—and sighted in March of 1770. To the Maori, these mystical lost horizons are called Hautere, "flying wind." Upon Solander's vertiginous Pleistocene steeps—soaring to over 100 stories—Buller's Albatross breed, amid some 53 floral species dominated by tenacious fern and orchid.

In this "lost world" of the southern ocean, Nigel Brown and his partner Sue McLaughlin have dwelt since 2001, having given up city life far to the North, in Auckland, to be nestled between thundering waves and luscious meadow, wherein several companion Scottish Highland bovines—primeval, shaggy and brooding—meander gracefully.

Sue and Nigel's art deco home combines a sleek modernist addition, along side a two-story atelier with renovated rural barns. Around this perfect ensemble are sprawling windbreaks of Macrocarpa, flax and cabbage tree, the iconic species utilized by early agricultural settlers in New Zealand for holding back constant gale-force winds. Five seasons per hour, ten rainbows per minute, some days. At night, says Nigel, he and Sue hear the fantastic harrowing cry of Moreporks/ruru,

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Fig. 49.1 Nigel Brown in his studio with "Tauranga Quartet," 2008, painting. (Photo Credit: Courtesy of Josh Thomas)

Fig. 49.2 Do it yourself, 2004, acrylic on board. (Photo Credit: © Nigel Brown)

New Zealand's only surviving native owl. In Winter this far South, draped by air as pellucid and crisp as any in the world, the stars overhead are of the original Earth, chilled and sprawling (Fig. 49.2).

Brown invites consideration of the New Zealand rural idyll that has always been the region's indelible identity. But this great talent also incites a vision of a complex, even flabbergasted society poised upon the brink of ecological mayhem (Figs. 49.3 and 49.4).

Fig. 49.3 Glass Wall, 2003−04, oil on board. (Photo Credit: © Nigel Brown)

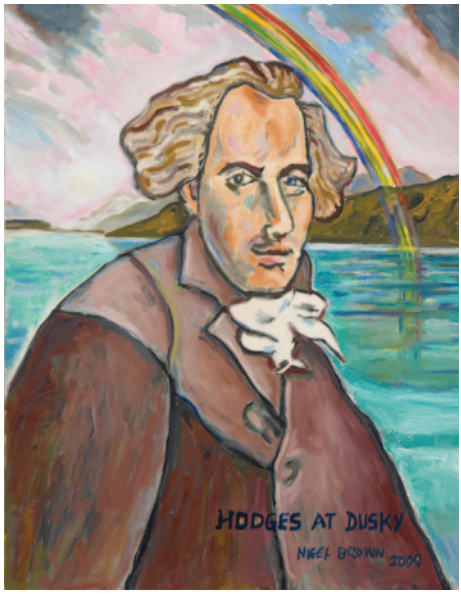

Fig. 49.4 Hodges at Dusky, 2009, oil on canvas. (Photo Credit: © Nigel Brown)

Growing Up a Kiwi

Michael Tobias (MT): Nigel, while every viewer of your work will have something utterly original to declare about it, what do you say in terms of so many clear links, in one guise after another, to both real and generic, imagined, lost or aspired to environments?

Nigel Brown (NB): Michael, I think the environment has been very inspirational to artists here. It's the obvious thing in a rugged string of big islands. Although I was taught by artists trying to get beyond pretty landscapes to what then was considered more demanding which was something reductive and Modernist and had to do with "essence" and philosophy.

Fig. 49.5 All Our Days, 2007−08, acrylic on loose linen. (Photo Credit: © Nigel Brown)

Painters here such as Colin McCahon [2] and Toss Woollaston [3] introduced a tougher version of landscape more in tune with our masculine "All Blacks" [4] back of beyond, do it yourself legacy. Landscape still plays a major part in our painting. Birds are also what this country is about and feature repeatedly in artists such as Don Binney, [5] W. D. Hammond [6] and Shane Cotton [7]. My character as a painter is founded on a childhood spent on orchards with a father who each year took us boys hunting in the Urewera, who read us tales of wild places and man eaters and shot deer with the 303 rifle, and later, the bow and arrow in emulation of the late great American archer, Howard Hill. It was experience that was both mystical and brutal. I have probably spent my life coming to terms with the masculine role in relation to Nature, particularly tied to a New Zealand vernacular and lifestyle (Fig. 49.5).

Coming to Terms with Captain Cook

MT: And the history of New Zealand—figures who have loomed large in your works, like Captain James Cook (1728–1779) whose legacy [8] commencing around 1770, is inextricably linked to the mapping of New Zealand's coasts, the introduction of domesticated pigs, and the intersection of two vastly different cultures -the Maori and the European?

NB: My long exploration of Captain Cook has led me away from New Zealand identity and Modernism to use the past to question the now.

MT: How so?

NB: I learned through Colin McCahon that painting could be a way of speaking and that text could function in a work. Many artists here love Nature and that shows vigorously. However, the junction between Nature and the human is I feel the critical area.

MT: There's always been this "think globally, act locally" ideology underpinning ecological issues. Do you relate to that?

NB: I now think that the global environmental crisis demands a bit more from artists and we must consider means to record that situation expressively. That's not easy

Fig. 49.6 Nature of hope, 2011, acrylic on black arches. (Photo Credit: © Nigel Brown)

because art today is often about avoidance, obscurity and denial and, at worst, even a superiority over Nature (Figs. 49.6 and 49.7).

MT: What about Maori art, in terms of recalibrating the environmental context?

NB: Indigenous art both Maori here and Aboriginal in Australia are sometimes inspirational to me as are passionate poets and artists of the past.

MT: Such as?

NB: William Blake, Samuel Taylor Coleridge… Old debates and passed over ideas can be useful in our new context.

Taking Issue

MT: Global ecological issues specifically?

NB: Well, for example, I think for me climate change is an issue focusing my passions of late. How that translates into art beyond a despairing rant is the challenge. It's certainly a mood changer if you value ecological variety. When I look out at landscapes already appearing empty this greater change looms up. A few degrees is all it takes.

Fig. 49.7 Deeper vision, 2011, acrylic on black arches. (Photo Credit: © Nigel Brown)

MT: What about good drinking water? Droughts are increasing in parts of New Zealand. In many of your paintings, waterfalls abound.

NB: Yes, water was once taken for granted in green New Zealand. Now it's a big issue! Once you could drink from a bush stream or swim in a river. Water has been abused and plundered. I have always celebrated waterfalls but there is a precarious aspect to them now.

How Do Birds Cope with "Progress"?

MT: And birds? Probably the most salient element in New Zealand's natural history, certainly as celebrated here and abroad.

NB: Birds are what New Zealand is all about. But so are introduced species, like stoats, possums, rats and deer. The two are in conflict and our hope has been in the creation of sanctuaries. I like to portray birds as essential as sunlight and trees.

MT: And modernity itself?

Fig. 49.8 Reading for Aotearoa, 1985, Stone Lithograph. (Photo Credit: © Nigel Brown)

NB: Well, for one thing, information overload is a big issue, and certainly in terms of its implications for ecology. The world is cluttered with devices, distractions and resultant human removal from the environment. This can be portrayed in art as a condition of our times. The alternatives are simple icons in revolt against that overload. Both may be valid (Fig. 49.8).

MT: In a massive tome Jane Gray Morrison and I wrote, God's Country: The New Zealand Factor [9] we looked intensively at New Zealand's eco-tourism mantra, "a clean green New Zealand." Is that a reality or fiction, in your view?

NB: Michael, I don't see New Zealand's green image as faring well at the moment. Maybe it has always been a lie. Some good people have endeavored, and are continuing to try to make the story come true. But, to take one expansive example, the forces of intensive dairying are devastating, in my opinion. Long-standing safeguards to the environment and preservation of national parks are being removed through legislation by the current government. New Zealand has shown past initiative in areas such as opposition to nuclear arms, bird recovery, treaty settlements and child-care, and pockets of progress exist but new enthusiasm and protection requires values beyond the dollar. Art—be it music, words or painting at its best—touches people and endures.

MT: So is it fair to say that here, in New Zealand, aesthetics play a key role in working to safeguard those things that matter the most?

Alternative Imaging

NB: Put differently, I don't think art is ineffectual in all this loss of ecological priorities. I feel driven in my work to some sort of communication and alternative imaging. It's a long-term cultural testimony that I, and others, are working towards. What society does with it is beyond my control. I have a well-developed language and parallel world to inhabit where birds and sun, sky and land all co-exist with male/female humanity. That's the comfort for myself and others.

MT: And your home?

NB: The richness and tentative nature of Cosy Nook motivates me strongly. The air is full of ideas! Sure, it's isolated and wild but that nurtures thought. Bush is on the hill, farms of controlled and manipulated animals surround us, out on islands sea birds gather. It's not a place for rosy glasses because the weather can be demanding and we face on to Foveaux strait. Birds live their short lives and hawks patrol. Lately, karoro, the black backed gulls have become an obsession for Sue and me (Fig. 49.9).

Birds are a challenge artistically. Flowers defeat me! In any event, art was never meant to replace the natural world. A life style block, as this would be characteristically called here in New Zealand, is not leisurely but you are forced outside with chooks and highland beasties to look after. A native planting is both work and sanctuary. A small dog needs walking. Old fragile trees—vulnerable to windblast—loom above you. The sea is not quiet for long. And you can't turn your back on stoats and possums.

MT: Nigel, based upon what you've said, and the evidence in your artwork, I would imagine you have some concerns about New Zealand's biological future (Fig. 49.10)?

The Tentative, Biological Future?

NB: Michael, I worry that New Zealand is losing ecological values through shifts in government policy. A lot of good work can be undone quickly. So much forest has been cleared already. In my art I attempt to explore the human relationship to land and nature or even to reinvent it. There should I feel be an emphasis on "the great simplicities" and by that I mean our relationship to the basics: sun, moon, creatures, plants. If I can leave a collection of useful icons, not of a dogma so much as a quest, well and good. I'm an intuitive person, not an intellectual. I see human perception of nature as tied up with our brains and their strengths and weaknesses. In sum, I feel we need a new language for this era of tentative nature.

MT: Tentative?

Fig. 49.9 Birdless days (Richard Henry), 2007–2008, oil on board, by Nigel Brown, text by Gregory O'Brien. (Photo Credit: © Nigel Brown)

NB: In a manner of speaking, yes. We need to rethink our priorities and symbolically voice both the slightly mad contemporary complexity and the ancient simplicities and weld them together as a "human to nature."

MT: There are solutions to problems through art?

NB: For me, painting has never been about quick fixes or simple solutions but urgency is in the air. Tentative times should alert the senses not dull them. I suppose I've carried some sort of Garden of Eden vision in my head since I first planted a fern garden as a child. I know many people want a more balanced earth and I respect activism and organizations such as Greenpeace.

Remember, the environmental issues in New Zealand really began with ferocious land clearance in colonial times. We tried to turn the whole country into a farm. Green New Zealand was not seen as the sombre green of our bush. Instead, we embraced super-phosphates and in more recent times large-scale irrigation. Effluent

Fig. 49.10 Dominion Bitter, 1977, oil on board. (Photo Credit: © Nigel Brown)

has been an issue for years as has erosion. And while we have 14 National Parks, some attitudes toward them are suggesting changes, basic changes in some quarters whereby some portion of the New Zealand public now apparently believes they should be open to mining and evaluated strictly according to various byzantine economic criteria.

MT: That's a pretty serious shift in public opinion. On the other hand, not just with such organizations as Greenpeace, but throughout modern New Zealand history, there have been significant and effective environmental protests? (Fig. 49.11)

NB: Michael, absolutely. Such waves of public involvement were really galvanized by the Campaign to save Manapouri [10]. For me personally, the damming of the Clutha [11] for hydroelectric power was closer to home in that it destroyed an area associated with my father and grand-parents. In fact, my large Stained Glass project at Auckland's Cathedral of the Holy Trinity in the 1990s really forced me to look at nature intensely. After this project, and later going to Antarctica in 1998, my vision of the earth and Nature expanded dramatically. More recently I've contributed to campaigns to save water in Canterbury.

Several artists have been working for years to stop the visual pollution of Central Otago with wind turbines so even alternative power sources have issues. Offshore oil drilling and fracking mean nowhere is safe really. As a painter I deal in specifics and am forced to come to terms with a cut tree; or to re-examine my black dog, local landmarks, or the face of a kakapo before I even begin.

Fig. 49.11 Save our water, 2011, acrylic on black arches. (Photo Credit: © Nigel Brown)

The Quest to Find a New Language

MT: Nigel, I've noticed with more than a few artists in New Zealand, the use of text in their paintings. But none to the extent of actually integrating textual frames, as you have it. This is interesting, and challenging. What is it about the language factor inside your paintings? I can't imagine a Rembrandt with words all round a self-portrait.

NB: With Colin McCahon you get an addressing of the audience with words that keep reappearing.

MT: You have sentences, run-on sentences and poetic speech…

NB: William Blake utilized a similar approach at times. You see it in Asian art, Medieval books and so on.

MT: True enough, especially illuminated manuscripts—whether in Urdu-speaking culture, the Rajput painting school, some Chinese, Korean and Japanese calligraphy, Persian—I think of the glorious epical **Shahnameh** Book of Kings illustrations of Tabriz in the seventeenth century or, for that matter, the Horae across the Burgundian Empire—the famed **Book of Hours** genre so critical to the European Renaissance. You're in good company.

Fig. 49.12 Hump Back Pacific, 2010, acrylic on black arches. (Photo Credit: © Nigel Brown)

NB: In my case, those words around the border are a quest to find that new language; new and potent symbolic compositions. After that it's the hope of engaging with a modern audience [12]. I can't really speak to the cultural ethos of painting styles outside New Zealand as I'm not all that in touch with current trends. But I find encouragement here from poets such as Glenn Colquhoun [13] and the environmentalist and writer Denys Trussell [14].

The potter Barry Brickell [15] and Maori instrument exponent Richard Nunns [16] are inspirational for me as well as a powerful young musician, Dudley Benson [17] for whom I've done a backdrop for his touring of "Forest" performances. The late James Baxter [18] had a saying, "love is not much valued" which says it all. Peace and the environment are interlinked. And, I retain my long-term heroes such as Edvard Munch, Van Gogh, Gauguin, Sydney Nolan, Francis Bacon, Picasso, the German Expressionists, which all might sound very out of touch with contemporary practice.

MT: Not at all.

NB: Well, put differently, I would not be living where I live if I was desperate to be the latest fad for consumption (Fig. 49.12).

MT: And I gather you are now at work on what you've called your "Provocation paintings"?

NB: Yeah... They're going to take another year or so, I imagine.

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Chapter 50
The Last Shangri-la? A Conversation with Bhutan's Secretary of the National Environment Commission, Dr. Ugyen Tshewang

When flying to Paro, within the Kingdom of Bhutan, one is likely to see Chomolungma (Nepal's Mount Everest, out the left side of the Drukair jet. You might also view Kanchenjunga, the third highest mountain in the world, within India, and then—on the steep descent—one catches a glimpse of Bhutan's own glorious peaks, including Chomolhari (23,997 ft). These sacred mountains, indeed, all of the Himalayas, are being profoundly affected by climate change (Fig. 50.1).

Bhutan, the eastern-most Himalayan nation and a global icon of ecological due-diligence, may be in for some rough weather ahead. With her motto, Gross National Happiness (GNH) [1] as opposed to Gross National Product, embedded in the exquisite Bhutanese culture's Buddhist mind-set, accelerating climate change does not bode well for the country's economy, her people, or her remarkable ecosystems [2].

Just recently, The World Bank, in preparation for the November 19th Climate Summit [3] in Bhutan's capital, Thimphu (a city of over 90,000 in a country approaching 700,000) declared that "In the Himalayas where the impacts of global climate are manifesting at a rapid pace, the time for action is running out." With a major UN global climate conference (COP-17) [4] coming up in Durban, South Africa the first week of December, 2011, Bhutan—one of the world's newest democracies—harbors serious hopes and needs that are emblematic of significant problems affecting hundreds of millions of people throughout the Himalayas, and another billion or more people downstream, in India, Bangladesh, Pakistan and elsewhere.

The fact of whether the snows of Everest are melting at an alarming rate, or not, exploded into world media last year when the Intergovernmental Panel on Climate Change (IPCC) announced that a few paragraphs on Himalayan climate change data out of a nearly 1,000 page document from 2007 had not adhered to the "clear and well-established standards of evidence required by the IPCC procedures" [5]. This provided loud ammunition for climate change deniers, and no little embarrassment for the world's top climate change organization (winner of the 2007 Nobel Peace Prize).

Nonetheless, scientists worldwide were quick to rectify the error [6] and are only too aware of the fact that, with the possible exception of parts of the western

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Fig. 50.1 Chomolhari. (Photo Credit: © M. C. Tobias)

Fig. 50.2 Dr. Ugyen Tshewang. (Photo Credit: © M. C. Tobias)

Karakoram [7] "Himalayan glaciers are thinning and retreating at a rapid pace …" [8]. In parts of Bhutan, the last several years have witnessed 60 % less snowfall than ever before recorded or remembered. And even within the Karakoram the largest of its glaciers, the Siachen, "the second largest glacier known outside the polar and sub-polar region, has receded by approximately 76 km [9] compared to the past inter-glacial period [10].

As one who has conducted field research and been mountaineering in the Himalayas for over four decades, I can personally attest to unbelievably dramatic changes in the glacial profiles I have witnessed over those many years, as well as recognizing what is now termed aerosol hot spots [11], the warming combination of dust and carbon in the air. Most of the glaciers are receding fast (Fig. 50.2).

To discuss climate change and other environmental issues in Bhutan, I spoke recently with the distinguished Dr. Ugyen Tshewang, founder of Bhutan's National Centre for Biodiversity, as well as the country's National Gene Bank, and Herbarium, and currently the Secretary of Bhutan's National Environment Commission [12] about his ecological concerns for one of the world's true twenty-first century Shangri-la's (and a Kingdom I have loved ever since my childhood) .

Michael Tobias (MT): Kuzuzangpola Dasho Dr. Ugyen Tshewang. (Greetings). With so much of your nation's agriculture carried out in relatively small plots, there would appear to be significant vulnerability to flooding. What does your country hope to do to try and mitigate future climate change impacts, and what message do you have for other nations on this point?

Dr. Ugyen Tshewang (UT): Glaciers are melting [13] and in the Bhutan Himalaya, the average retreat has been 30 m per year [14] from 1963 to 1993 [14].

MT: I've seen that data in the 2002 ICIMOD Inventory [15]. I've read that during that same period a total of 8% [9] of Bhutan's glacier area had been lost. The receding glaciers [16] affect the water flow in the rivers and this will severely affect the climate sensitive sectors like your nation's hydropower, not to mention agriculture, one of the most important backbones of your country. I know there has been discussion of the Wangchu Basin [17] in western Bhutan, a watershed containing a hydroelectric dam at its southern end. How is Bhutan preparing to cope with worst-cast scenarios?

UT: Bhutan will bear the brunt of climate change impacts and as a Least Developed Country it is one of the least able to adapt to these changes. Nonetheless, Bhutan was one of the first countries to develop the National Adaptation Programme of Action (NAPA) in 2006 [18]. We are already implementing a project under NAPA that involves artificially lowering the level of Thorthormi Lake that has been identified as the most dangerous of the 25 high risk glacial lakes which can cause Glacial Lake Outburst Floods (GLOFs).

MT: In the past, there have been tragic floods and loss of life in Bhutan due to this problem.

UT: Yes, and there are still many more potential lakes that will cause GLOFs, but not enough support to implement any adaptation measures. Technical and financial constraints have not set back Bhutan, however. Besides trying to adapt to the impacts of climate change, Bhutan is also making an effort to mitigate emissions by declaring that Bhutan will remain climate neutral. Even if Bhutan may have been one of the least contributors to GHG (Global Greenhouse Gas) emissions, it has not stopped us from doing our part in reducing global emissions.

MT: With an appreciable component of Bhutan's export revenue accruing from the sale of hydropower to neighboring countries, like India, how will glacial retreat potentially affect your nation's economic outlook? Are there other sectors towards which Bhutan is looking to make up potential water power gaps? New alternative energy substitutes? New market niches?

UT: Though we could resort to adaptive and alternative measures such as solar energy, bio-fuel, fossil fuels etc., we firmly believe that our policy should be to cut down carbon emissions leading ultimately to a carbon neutral policy. We all have to do our part, but we look to leadership among the industrialized countries to mitigate and cut down emissions. We are all interconnected so this, hopefully, will become a major priority—to halt climate change—by all the countries of the world, but particularly those who, in turn, are responsible for the majority of greenhouse gas emissions (Fig. 50.3).

MT: For years there has been enthusiastic discussion, numerous forums around the Bhutanese concept of Gross National Happiness [1]. How has GNH actually

Fig. 50.3 Brokpa Yak herders, Sakteng, Eastern Bhutan. (Photo Credit: © M. C. Tobias)

Fig. 50.4 Children in Eastern Bhutan. (Photo Credit: © M. C. Tobias)

played out in real terms for the nation and what might other countries learn from this experience?

UT: Our GNH policy [19] has been instrumental in maintaining this country as one that is truly peace loving, with intact bio-cultural heritages, and substantial international relationships and ties (Fig. 50.4).

MT: Bhutan's National Park and protected area network, as well as the amount of un-deforested closed canopy remains one of the highest of any countries. In a world of competing altruisms and unceasing economic challenges, how do you view the nation's ecological future? Are there "bubbles" you worry about?

UT: Bhutanese forest canopies are the dominant biological feature of this nation. While this forest comprises what is certainly—by global standards—a high percentage, namely, 81.5 % of the country (our most recent updated data)—and a Constitutionally-enshrined commitment to maintain at the very least 60 % of our exquisite forest in perpetuity, the fact remains: our gorgeous forests [20] of Bhutan can come under threat.

Fig. 50.5 Bhutanese Himalaya. (Photo Credit: © M. C. Tobias)

MT: Please elaborate.

UT: Deforestation due to forest fires and conversion of forested areas to accommodate agriculture and other developmental activities pose deeply growing concerns for Bhutan. Our GNP may not look entirely "impressive" when placed in the same league with countries of the West, but Bhutan considers ecosystem services and the immense biodiversity stored in those forests of utmost importance.

MT: So what actions are being taken?

UT: We are working assiduously to engender responsive measures in policy making, legal frameworks and capacity building. In the meantime, demand for timber and fuel wood is on the rise across much of Bhutan in large measure because, as you know well from all of your own scientific work in our country, a large portion of the Bhutanese population remains dependent on the direct utilization of forests for fuel wood and to cope with what can now be fully described as a construction boom in all of our urban communities, not least of which, our capital city of Thimphu.

MT: So the country's available land resource constraints are becoming a problem? (Fig. 50.5)

UT: Bhutan's usable land resources are limited due to the fact Bhutan by percentage of overall landscape-level ecosystem diversity, constitutes the most mountainous nation on the planet. A majority of our more than 670,000 Bhutanese depend upon domestically consumed agriculture. While Bhutan's pristine forest habitat is something of a biological showcase for the benefits of ecological constraints and a true quest for sustainability, the fact remains: arable agricultural lands account for only 8 % of Bhutan's total of 47,000 km^2 (18,147 mi^2, a nation about half-the-size of Indiana).

MT: So what are your choices?

UT: I can tell you that as our economy grows and our commitment to development remains the bed-rock of a self-sufficient populous, in terms of policy, we are confronted by some stark realities: if we succumb to dire needs and permit expansion of agriculture in areas characterized by a multitude of soil types upon exceedingly steep landscapes, this, in turn, escalates the human hegemony over terrain that is unsuited to progressive agricultural yields. Bhutanese farmers are often times com-

pelled to accelerate conversion of primary canopy to agricultural niches within our economy at the mercy of a no-win situation.

MT: How will your country get it right?

UT: Our choices are few, and we need to capitalize on fewer options while the Bhutanese Government struggles to get this right for today's and tomorrow's generations. With rapid socio-economic development activities underway, solid waste generation and disposal have emerged as other major environmental problems. Rapid urbanization, changing consumption patterns and inadequate waste management facilities stare back at us in the many mirrors of modernity. We are currently developing the first waste management facility in our country and this will, hopefully, become an ecological template.

MT: There has been much discussion of late regarding the capacity of democracies to cope with complex ecological problems. As one of the world's newest democracies, how has this democratic change in governance affected Bhutan's environmental policies and approaches to policy implementation?

UT: To begin with, my government has developed an "Economic Development Policy" that emphasizes Green Growth. About 51 % of Bhutanese territory has been brought under our Protected Area System. This represents an increase of 36 % of total protected area during just the last three-year tenure of this government, and 9 % of that amount falls within our so-called critical biological corridors. My government has long promoted Gross National Happiness as a crucial "quality of life" barometer. Environmental well-being and protection will always remain top priorities for us. Gross National Happiness (GNH) places an imperative upon the Bhutanese people and the government to ensure continuing socio-economic development without compromising environmental protections. [21]

MT: The ecological legacy of your country is really second-to-none, notwithstanding the above-discussed issues.

UT: Yes. When the Constitution of Bhutan came into place, its authors acknowledged the duty of every citizen to preserve, protect and respect the environment as enshrined in Article 5 of the Constitution. We have inherited rich natural wealth with intact ecosystems and this can be attributed to the wise environmental policies [22] adopted by our Kings and the 4th King [22] in particular. In fact, our policies have adopted a carbon neutral policy orientation through our "Declaration of the Kingdom of Bhutan—The Land of Gross National Happiness to Save our Planet" wherein Bhutan has stepped up its commitment to "keep absorbing more carbon than we emit—and to maintain our country's status as a net sink for Green House Gases." We have, among many other things, advanced the cause of organic farming.

MT: While Bhutan's demographic profile suggests a country meagerly populated, there has been increasing urbanization. What are the most serious challenges that you see for the nation as it works to achieve sustainability in the key sectors affecting GNH, including the maintenance of that stellar environmental record to date?

Fig. 50.6 Taktsang Monastery. (Photo Credit: © M. C. Tobias)

UT: It's true that such challenges are imminent and daunting. Global consumption patterns appear almost limitless and are so wasteful. Conversely, environmental education and a pronounced awareness of the reality of ecological carrying capacity must be built in to our administrative outreach, and hardwired into this upcoming generation of young people throughout Bhutan and the rest of the world who realize, I think, that this is something of a make-or-break generation; that destiny is—for better of worse—in our hands. We need some "new nature" technologies and paradigms to help enact this sea change of ecological sustainability that can ultimately eliminate what many have called "the tragedy of the commons." Urbanization is occurring at a very rapid pace with 31 % of the country's population inhabiting the urban centers as compared to 15 % 10 years ago, as per the Population and Housing Census of Bhutan 2005. Out of this, 47 % of the urban population are actually people who have migrated from rural areas.

MT: This is definitely a delicate and problematic issue, no?

UT: Well, the situation is further exacerbated because the urban population is concentrated in mainly two Dzongkhags (states), Thimphu and Phuentsholing. The rapidly growing urban population will lead to air and water pollution, municipal waste generation, water shortage, traffic congestion, new buildings and land degradation, yes, even in Shangri-la, as some think of Bhutan (Fig. 50.6).

MT: Yes, even in the last Shangri-la there are solid wastes to contend with, food insecurity, garbage dumps, leaching…

UT: And for us to adequately meet the demands of the urban population pressure, urban centers have not only converted agricultural land for infrastructure development purposes but have also encroached upon steep slopes that were once forested. Solid waste segregation is almost non-existent and existing landfills are more like garbage dumps with no measures to control pollutant emissions, leaching and scavenging. This is changing with the Waste Prevention and Management Act 2009 now in place, as well as private sector initiatives to recycle waste.

MT: What about rural electrification initiatives?

UT: Yes. There is project and program support to retain people in the villages through rural electrification, farm roads and supporting economic activities (Fig. 50.7).

Fig. 50.7 Mother and children, eastern Bhutanese highlands. (Photo Credit: © M. C. Tobias)

Sustainable land management practices (SLMP) are also being implemented. The RGoB (Royal Government of Bhutan) has identified issues in the legal and institutional framework that need to be addressed for long term sustainable development of cities and some of the issues are streamlining land registration procedures, revision of government housing and efficient use of existing serviced land among others.

MT: Are there any particular lessons you have personally gleaned from being Bhutanese and having grown up in your culture that are especially poignant and telling in the context of so complex a world we all inhabit?

UT: I think Bhutan has a role to play by promoting GNH policy (Gross National Happiness), 22 the very real potential to be a carbon neutral, even negative, climate leader, maintaining its rich culture and tradition with intact ecosystems and a very high quality of life that is in harmony with the environment.

MT: What will be some of Bhutan's key concerns and recommendations at the upcoming November 28th Durban, South Africa Climate Change Conference (COP 17)?

UT: Bhutan is a very vulnerable country and deeply concerned about the level of commitment to combat climate change on both fronts of Mitigation and Adaptation. We need the deepest level of emissions reductions that will limit average global temperature rise to 1.5 °C. Even the two degrees agreed to by Climate Change signatories as a global average goal is too high for us in the Himalayas, where warming will be much higher than 2 °.

MT: Financial commitments to abate climate change from the super-powers—and that includes India and China—is certainly a key issue.

UT: Unfortunately, commitments currently on the table for emission reductions are nowhere near meeting a 2 ° goal, let alone 1.5. With this in mind, adaptation to the adverse impacts of climate change will be critical. For Durban, we hope to see agreements for meaningful commitments for emission reductions, and the implementation of the agreements from Cancun towards supporting adaptation. This means we need to see commitments towards real emission reductions that are binding and real financing for adaptation in the most vulnerable countries. During COP-17, Bhutan will focus on forest coverage, a carbon neutral policy declaration, a stringent

Fig. 50.8 GNH Yak, Sakteng Wildlife Sanctuary. (Photo Credit: © M. C. Tobias)

regulatory framework for environment clearances, Forest and Nature Conservation Acts, Protected areas, a National Adaptation Program of Actions, capacity building and mitigation measures for climate change and financing, and—finally—a definite time-line for emission cuts by the industrialized countries, in hopes of lowering global temperature rise by at least 1.5 °C, to those levels witnessed in the early 1990s (Fig. 50.8).

MT: I really appreciate your taking the time for this conversation. Tashi delek!

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Afterword- A Paris Declaration on Climate Change:Humanity's Last Chance for Meaningful Action to Combat Irreversible Global Biological Disaster

The Climate Change Narrative

The Intergovernmental Panel on Climate Change has released its 2600 pages of new documentation as of March 31, 2014, entitled: "IPCC, 2013: Summary for Policymakers." In an immediate response, Secretary of State John F. Kerry declared that "Unless we act dramatically and quickly, science tells us our climate and our way of life are literally in jeopardy."

That is a polite understatement. This near final draft material was made available to the public in scores of PDF files that elegantly detailed trends and definitions pertaining to levels of risk, certainty, and confidence in the findings which derive from over 300 scientists and some 50,000+ comments.

The "Summary For Policy Makers" makes for a rapid overview (as distinct from the 375 MB Full Report) of every major ecosystem on the planet, taking into account crucial examples of change in the global biogeochemical cycles, the "drivers of climate change," and in-depth descriptions of recent, as well as likely future regional and global transformations throughout every major biome.

Whilst most people throughout the world now speak matter-of-factly of climate change and global warming—the story of Noah's Ark and the cumulative weariness of natural and unnatural catastrophes reverberating throughout the human psyche—there is the incontrovertible reality of a frenetic and accelerated risk-factor bearing down on every front.

What separates this peril from any previous historic challenges to the human condition is the combined weight of a fully unpredictable cascade effect of biological holocausts resulting from the sheer spill-over of so many simultaneous ecological stressors wreaking both obvious and not-so-obvious havocs across the Earth. The calculus of syncretistic effects is largely unpredictable, but common sense urges that humanity err on the side of restraint and preparedness for the worst.

The fall-outs occurring in every planetary biome, most likely in every minute portion of the atmospheric, terrestrial and aquatic Earth have been rightly termed the continuing Quaternary Megafaunal Extinction ("QME"). It represents the most

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astonishing fact of our presence as a species on Earth; the post-Clovis Culture ecological Anthropocene proliferation we now understand our collective infliction on the biosphere to be.

The earliest premonitions of the QME were clear by 1798 when biologist Georges Cuvier, 3 years into his work at the National Museum in Paris, published a paper suggesting the notion of *extinction*. Twenty-six years later, French mathematician Joseph Fourier systematically considered the causes and consequences of a planet-wide warming effect. And 40 years after that, Irish physicist John Tyndall put forth data pertaining to the absorption of infrared radiation across a range of gases. He singled out CO_2 (carbon dioxide) and CH_4 (methane). No one, however, had yet connected the dots: biology, evolution, chemistry, human behavior and extinctions. Many humans are still vague or in denial about these relationships.

By the late nineteenth century, with work by numerous interdisciplinary zoologists, paleontologists, and comparative anatomists such as Ernst Haeckel, Thomas Huxley, Charles Lyell and Charles Darwin, continuing work in more and more specializations had fronted a renaissance in every conceivable trench of the natural sciences with increasing confidence about bio-chemical causes and consequences, rates of evolutionary change, selective processes, genetics, adaptation, nature and nurture, socio-biology and the many increasingly obvious human assaults on Earth.

What complicates the scope of our presence is the reality that nearly every advancement in our biological well-being has equated with destruction of other species; progress and human fertility rates translating into the continuing isolation of our one species from all others. Every technological innovation—vaccines, enhanced agricultural yields, greater efficiencies, conveniences and perceived increasing standards of living; each Revolution, or political breakthrough regarding human rights and fairness—have all cumulatively engendered a solipsistic marvel of denial. We continue, by and large, to refuse the accommodation of any other species, save for our pampered pets.

This has occasioned a long-standing legal chaos that encinctures the many frameworks for addressing all anthropogenic influences upon the Earth, including climate change. Combative opinions of every persuasion have resulted in watered-down perception, and a pronounced inability to generate consensus mechanisms within and between nation states, all underscoring what the late University of California at Santa Barbara ecologist Garret Hardin, in 1968, first termed "the tragedy of the commons."

For no lack of engaged voters or enthusiastic youths, as well as tens-of-thousands of environmental NGOs, faith-based denials, economic blind-spots, a seemingly hard-wired abnegation of psychological or moral change, a blizzard of data, and the easier embrace of an all-out repudiation of solid science by special interest groups and those preferring the status quo has only placed in stark relief, and in absolute terms, the peril of humanity's twenty-first century crossroad.

Definitions regarding human economic development have dominated each and every international forum that has attempted to see past nationalism, fear and inertia. Now, humanity is up against the wall in ways that require thinking outside the "climate change" paradigm. Our societal flirtations with ecological Apocalypse

represent a psychological predilection that is much bigger than climate change; vastly more paradoxical than the crisis afflicting our one species.

A Biological Bottom-Line Context

We co-habit a planet that may host as many as 100 million species. Each species (save for the current critically endangered ones), in turn, harbors several million individuals, on average (taking into account both vertebrate and invertebrate, but with no attempt to sample or divine quantitative averages for the range of known microbial, viral and other microscopic and sub-microscopic life-forms, which could easily add tens-of-millions of additional species to the mix. Discerning varieties of biology is much like the search for other planets in the universe: we are realizing that life defies conventional notions of finite horizons or mathematical formulae for delineating different types of exponential, logistic and hyperbolic growth, as well as enzyme kinetics and queuing theories.

Biological research has provided ample indication of just how vast the gaps in our knowledge of bio-quanta actually are. Recent large-scale rapid assessments include BirdLife International, Alliance for Zero Extinction, Conservation International "hotspot" and numerous international mega-marine surveys—all revealing huge gaps in our knowledge base, while intimating quite clearly the richness of life on this planet. In addition, vast arrays of yet-to-be-discovered life forms have been implied within distinct methodologies at key genetic matrices like Ecuador's Yasuní National Park, with its 60,000-to-100,000 species of invertebrates per estimated hectare; and long-term monitoring of plots, such as those along Chesapeake Bay (the Smithsonian Environmental Research Center), the decades-old studies at Barro Colorado Island in Panama's man-made Gatun Lake, at the University of Eduardo Mondlane on Inhaca Island in Mozambique, or above Crested Butte Colorado, at the Rocky Mountain Biological Laboratory.

Our understanding of life in the oceans is in its infancy. Between 2002 and 2005, for example, three German Polarstern Expeditions throughout Antarctica's Weddell Sea yielded as many as 40,000 animals per liter of mud or water, many belonging to previously undiscovered species.

On land, we do not even know, for example, whether there are 3 or 10 billion individual *Quelea quelea*, the African Red billed quelea, a member of the sub-Saharan passerine (perching) weaver family Ploceidae. If researchers at Mozambique's Gorongosa National Park succeed in an attempt to qualify every single discernible life-form in that park, it will be a first.

All of these individual creatures—billions and billions of them—are typically located in a population that is as vulnerable to extinction as are entire species. Indeed, data now indicates we are seeing the extinction of more than 16 million populations annually, or over 44,000 populations per day. A shoal of fish. A flock of birds. By such attritions we can predict the loss of whole Genera, and Families.

Our species has zero experience with real extinction level events. Hence, the importance of recognizing what nearly every major human spiritual and ethical tradition has long enshrined: the notion of critical ancestral relations, similitudes, reciprocities, commensalism, symbiosis and co-dependencies amongst all sentient beings. In Jain tradition this is described as *Parasparopagraho Jivanam*, or, "All life is bound together by mutual support and interdependence."

These co-dependent and progressive relationships spanning all of life should compel us to re-focus our complete concentration upon the biological bottom-line as the key to transforming political deadlock into real traction at the upcoming United Nations summit in Paris in the late Fall of 2015.

Paris

From November 30 to December 11, 2015, representatives from the majority of the world's nations will convene at Le Bourget, in greater metropolitan Paris, France, in an effort to finally achieve meaningful embrace of global climate change solutions; a compulsory Treaty that would impede all further increases in global temperatures from exceeding 2 °C (3.6 °F) over their current levels. This collective volition rightly presumes anthropogenic temperature interventions that have prompted serious biochemical negative feedbacks, vast megacity heat islands, carbon and methane release from previously functioning sinks—like the oceans—and fatal tipping points in ecosystems including the world's coral reefs, the Amazon, and the boreal forests.

United Nations climate change negotiators have failed to achieve any binding and wide-reaching treaty on climate for more than 20 years. The current U.N. Secretary-General, Ban Ki-moon has publically declared that he is committed to making COP21—the Conference of the Parties on Climate Change (Paris 2015)—the defining moment in the history of climate change legislation.

But the very procedural minutia of that context for negotiations between wealthy and economically-marginalized nations pivots upon the willingness of parties to engage in the same language of ethics; to rise to the occasion of catastrophe. That means that delegates must understand and acknowledge what's at stake; unlimited future generations; gene banks whose biodiversity means everything to the present and the future.

Ethical consensus regarding the importance of biodiversity, and the future, has never been achieved. A moral compass shared by one and all has never been remotely ascribed to. Categorical imperatives have never surfaced with any functionality probably because human diversity is so robust, our craving for individualism so ingrained. Incremental compromise has always prevailed, at best, and this may well be an insufficient standard operating procedure for achieving global antidotes to human self-destruction.

A Legal Morass

Endeavoring to grasp the legal mechanisms by which a global consensus of nations on climate change might be achieved requires a leap of the legal imagination, given past precedents. Mainstream public attention has been thwarted and distracted by what appears to most people as a veritable maze of U.N.-speak acronyms: UNFCCC —United Nations Framework Convention on Climate Change, COP (Conference of the Parties, the 11th one being the famed Kyoto Protocol), IPCC (the Intergovernmental Panel on Climate Change, rendered into fodder for climate deniers because of a single paragraph published in error by the IPCC, out of many hundreds of pages of peer-reviewed documentation back in 2007); efforts by the U.N.'s Secretariat for the UNFCCC, UNCED (United Nations Conference on Environment and Development, the first of which is famously referred to as the 1992 Rio Summit, wherein the UN Framework Convention on Climate Change came into being), GHG (greenhouse gases), which—under Article 2 of the Convention—must be stabilized at sustainable levels such that human food production continues, economies continue, and ecosystems can "naturally" cope with human-induced rising levels of GHGs which, in turn, are causing the planetary escalation of average temperatures and protracted weather extremes.

The four primary GHGs referred to in the climate change morass of cumulative human economic exploitation and expansion are CO_2 (carbon dioxide), CH_4 (methane), N_2O (nitrous oxide) and the halocarbons comprising gases that contain bromine, chlorine and/or fluorine.

Further complicating this web is the so-called "precautionary principle" under Article 3.3 of the Framework Convention on Climate Change. This extremely important concept declares that even in the absence of scientific proof, humanity must assume the worst case scenarios and act meaningfully to prevent their occurrence. The problem is, we don't.

At various COPs—from the first one in Berlin in 1995, to COP3, 1997, Kyoto—calling upon industrialized nations to cap their carbon emissions—to ten others including contentious meetings at Bali, Doha, Copenhagen, Cancún, Durban, and Warsaw (Lima later this year, and then Paris)—part of the ever-growing late night acrimonious soul searching has stemmed from the sheer proliferation of conflicting political definitions of "anthropogenic" and sustainable human economic development. Delegates have increasingly called for more "fluid" strategies that bypass the bureaucracy inherent to the United Nations rubrics.

The Parties to the Convention include a cumbersome hierarchical conception of Who's Who: "Annex I" parties refers to the industrialized nations as well as those in transition (the entire European Union being one of these Annex I parties); Annex II are the OECD (Organization for Economic Co-operation and Development); Annex B parties are those who are said to be in adherence to Kyoto "second-round" targets which were established with no clearly enforceable provisions.

In addition, there are the Least Developed Country members; Non-Annex members; Subsidiary Board implementers, as well as Subsidiary Board Scientific and

Technical Advisors; "Temporary" "Ad Hoc Working Group members, both for long-term cooperative approaches, as well as Annex 1 Party commitment strategies".

All of this maze can make for enormous confusion and frustration, certainly where public stakeholders are involved.

The Challenge

We are at the decisive juncture in global civilization that will either save billions of lives, or condemn then to premature death. Climate change, and all of the upcoming negotiations that will occur in Paris 2015, are but a sub-set of this far more perilous bio-chemical, genetic and evolutionary context.

Historians, like the late Arnold Toynbee, cite at least 22 civilizations that have previously vanished as a result of their ignorance of, and/or failure to heed the warning signs of their societies having notoriously overshot their finite resource bases. In each case, societies, kingdoms, regional fiefdoms found themselves over time trapped by ecological denial. Such stubborn refusal to acknowledge reality coincided typically with economic hubris, the keeping of slaves, and a warring mentality that ensured increasing isolationism, inordinate defense expenditures and ultimate implosion.

Preventing such human-assisted collapse of entire cultures and the ecosystems we all rely upon for survival has gripped the world for decades now like no other cause-and-effect anxiety in human history. Every nation finds itself confronted by not one pandemic or war, but, rather, a vast and accelerating rash of biological extinctions sweeping the entire planet.

It is far easier to point the finger at a stock-pile of chemical weapons, or to identify belligerents, than it is to draw a red line around the weather.

But the most troubling of all differences between our current global ecological crisis and all other human tumults is the fact that climate change is only one of the key stressors influencing the increasing deterioration of the life-support systems upon which millions of species depend. The human consumption of animals is an even larger culprit, accounting for the deliberate annihilation of hundreds-of-billions of cold and warm blooded vertebrates.

Combined, these two massive depletions of sentience—climate change related, and direct as well as indirect human consumption—amount to nothing less than an extinction level event for which we are utterly ill-prepared, as that bio-depletion increasingly shadows our own kind.

The Scope of Biological Crisis

An enormous repertoire of research has fueled the International Union for Conservation of Nature ("IUCN") Red Book Data, taking in some 77,000 species. The results indicate that more than a third of them are at risk of extinction. In fact, the

collective scientific opinion now holds that between 40 and 50% of all vertebrates on Earth will—if human business continues as usual—go extinct by the end of this century. There is no algorithm for acquitting us of our collaboration in this slippery slope that gets steeper by the day. As aforementioned, there is not even sufficient data to calculate how vast a swath of devastation is likely to affect invertebrates.

The other tens-of-millions of species we believe co-habit the planet, particularly those in the Earth's marine biomes, as yet have not even been studied with sufficient oversight to provide sufficient data for even forming preliminary conclusions as to the extinctions occurring day by day. We do know that thousands of fish species, and entire fisheries, are disappearing, along with most of the world's coral reefs. Dead zones throughout the oceans and seas are rapidly expanding, whilst terrestrial fragmentation by human "progress" has usurped over 42% of the planet's NPP, or Net Primary Production. In other words, our one species has commandeered the energy opportunities of nearly half of the Sun's photosynthetic output (recognizing that most plants use no more than 10% of that output to begin with).

The result of this attrition will vastly undermine seed sources, pollination, virtually every free service provided by nature (e.g., drinking water, nutrient turnover in the soils) and humanity's ability to feed itself. We cannot prevent eruptive famines by simply "hoping" or praying that our social networking and profitability by corporate stewards and all their stakeholders can avert this ecological cul-de-sac.

We need much more than faith, good will and education. We must act. We must together form the scientific, re-engineering, ethical, political and legal suasion capable of eliciting the best of human nature in each of us. During our fleeting lifespans we must conjoin radically improved environmental practices, judicious safeguards and precautions, our collective scientific imagination and a moral compass that does not shirk from its responsibilities to this and future generations of genes and personages, in every biological guise, human and otherwise.

Short of this unprecedented transformation and communion of values and hope in the future, our volunteerism, non-compulsory signatory treaties, and misplaced assumption that somebody else will take care of it, will lead us rapidly to our demise, and to the devastation of millions of other species. Such a vast devastation of biodiversity will kill us. There will be no biographer left standing. Our human epitaph will read as the shortest one for so large a vertebrate in biological history—by a long margin.

A Desperate Demography

Our human consumptive appetites continue with appreciable escalation, both of goods, services and expectations, whilst more than 150 children are born every minute, 150 million per year, of which some 82 million survive childbirth and into their first year and typically beyond the age of five. We are adding a Los Angeles to the planet every three weeks or so. That teeming megacity of aspiring high-end western-style consumers, and all of their subsequent descendants, spell

grave biological challenges in every demographic scenario. China, by herself, is likely to see roughly one billion urban denizens in coming decades. The greatest burden from such rural-to-urban migrations will be the number of household footprints and the loss of a balanced geographical distribution of those goods and services.

While urban green corridors and green architecture will surely increase with every new good idea and rooftop garden getting the religion and solace of shade, pure soils, organic food and clean drinking water, these important efforts will not compensate for the loss of surrounding habitat, let alone, of pristine wilderness.

The planet's mainstream biological regenerative systems are being compromised, one by one, hour by hour, as we muddle through issues of market regulation, affordable health care for our species, abortion debates, GDP and our own personal ideals, without recourse to what is best for others. Biological altruism on the part of *Homo sapiens* is a mixed affair. Sample people on the street and most will not be able to name the names of their own great-great grandparents, let alone the species names of others all about.

Quantifying pain, or turning fragmentation into biodiversity solutions—as demonstrated in persuasive case studies from Costa Rica to Haiti—has never been our species' forté. And even if it were the case, a planet ruled by 10 or 13 billion bipedal largely carnivorous hominids is a world beyond our grasp.

A Cartography of "Pain Points"

We seek to identify the coordinates of this anguished-looking future by sorting out the current cartography of biological attrition and human cruelty, using one key ID code, namely, "the pain points," as we term it.

These are the equivalent of biological "hotspots"; the largest aggregates of pain. Not surprisingly, they accord with United Nations Food and Agriculture data pertaining to animal consumption, and agriculture devoted to feeing animals who will, in turn, be consumed by humans. The "pain points" represent a cartographic translation of marine and terrestrial factory farms, leather goods, tens-of-thousands of human consumer products needlessly stripping the life force from hundreds-of-billions of fellow denizens of Earth.

This is where we can, each of us, get a handle on formulating simple, meaningful everyday solutions that will perforce add up to something monumental in addressing climate change and the future survival of life on this planet.

In absence of this global standard of biological fellowship, all of the approximately $ 70-to-$ 100 billion annual mitigative costs associated with and/or projected for climate change adaptation; the very data that are fueling the upcoming COP21, are, in our estimation, far too little and too late.

The Counter-Argument

Indeed, there is a strong argument suggesting that it would be more cost-efficient to embrace a laissez-faire attitude to climate change, to essentially continue the status quo; burn all the fossil fuels as if there were no tomorrow, ignore meteorology and bring on whatever disasters may await us, reacting as we will, but having lived for today, without the stress, anxiety or political complexity of doing anything about the time horizons. Save ourselves from debate, fear or expenditures. Go on living selfishly and fully in step with that compelling motto of the doomed Roman Empire: "Live for today for yesterday's gone and tomorrow may never come -Vive hodie quod heri iam non est et cras nunquam venire potest."

Think about it: those many civilizations that have already gone extinct represent a zero monetary charge to future generations. We are financially and psychologically free of their troubles. While this may pose a tempting truism, the fact remains that unless we are willing with even more resolve to face up to the cruel fallacies inherent to our continued belief in our superiority over the rest of Nature, the looming costs—both in real dollars, emotional and psychological terms—will be unaffordable. Our species will go extinct.

All of the climate change concerns as translated into the many local, regional and political fine-tuning, with associated dollar costs—from green corridors to the more efficient use of energy, water and soil, to any number of calculated techno-fixes—are doomed to further isolate humanity from the rest of the biological world if we continue to assume that our genetic manipulations and consumption of other species is key to our survival, and a necessary corollary of our future.

Our collective willpower is a form of egotism when it props up its assumptions on the death of other species, which is what we have done for tens-of-thousands of years, with few community exceptions.

So Why Paris?

A revolution in Paris once dreamt of liberty, equality and fraternity for all. Of course, the tripartite motto—Liberté, égalité, fraternité—would not truly ever take hold in France. The convolutions surrounding Eugene Delacroix's painting, "Liberty Leading the People" commemorating the July 1830 revolution that toppled the Constitutional Monarchy of Charles X and the entire Bourbon legacy, intimates the ephemeral nature of human politics; of the twenty-minute king, Louis Antoine, Duke of Angoulême, and the two-second King, his nephew.

Today, we understand that those freedoms are impossible in a world that—by our collective hands—is ecologically fading away. Indeed, those ideals have morphed into much transmogrified postures: "freedom" to kill and consume; "liberty" to deplete and render moribund all other sentience. Paris 2015 offers the rare opportunity to change all that.

The Urgent Steps Needed

COP21 must acknowledge our species' biological debt to the rest of life. If it is not up to that task, it will fail.

More important than ever are No-Kill Corridors of enormous size, scope and with ethical clarity that comport with every Golden Rule humanity as ever devised, under the rubric, "Thou Shall Not Kill." We cannot as a species continue to allow for mass killing of other species; for mass destruction of the biomes all around us—whether primary growth forests, mangroves, estuaries, coral reefs, rich sea grass habitats, tall and short-grass prairies, and all of the diverse cryogenic ecosystems, to name but a few key biological nurseries. There are tens-of-thousands of ecosystem types. Not one has been spared the heavy hand of humanity.

The impact of climate change is less clear than the far more immediate impact—and obvious steps needed to reverse it—of killing other animals.

This is our most fitting and urgent opportunity for sparing the future.

A First Major Step

A first permanent and lasting step towards reversing the current global extinction event would be to institute, in the United States, a breathtaking legal precedent that should sound the clarion call to all other nations. By this we would suggest a 28th Amendment to the U.S. Constitution that succinctly addresses biological calamity and provides compulsory remedies for it, in sync with the Right of Americans to be Free of Human-Induced Global Warming and, similarly, a Freedom from Forced Collaboration in the "Slaughter of Innocents," of Any and All Other Species.

Considering that the twenty-seventh Amendment to the U.S. Constitution, in May 1992, focused on the extraordinarily trivial matter of congressional salaries, and their continuity, it should seem desperately obvious that Americans can ill-afford to ignore the price that is paid through the extermination of most other life forms; and that the Constitution is one of our abiding mandates that seems to infuse at least a modicum of sense into the Commonweal, while setting a legal precedent for democracies elsewhere in the world.

While special interest groups and corporations currently endowed with legally-enshrined personhood, their corporate hundreds-of-trillions of dollars tantamount to free speech, in the current climate of the Supreme Court, this sinister deliberate distraction from what is essential, is a deception that cannot, must not stand. No government can continue to legitimize constituencies that freely and wantonly kill; usurping the underpinnings of biology and the genetic future of life on Earth.

The true inequality gaps among people are not merely economic. Rather, they stem far more fundamentally from that artificial wall, those veils of perception, we have erected separating the human species from all others. Until we can wrap our minds and hearts around this ineluctable truth, we will fail to combat climate

change, or curb the myriad signs of clear self-destruction our species has embarked upon.

The Time to Act is Now

World leaders and national leaders must act. The determined voices of the world's people must insist that each nation take effective action to help resolve this cascade of unprecedented global environmental dilemmas, joining together to make a sustainable world for all species our one and only priority.

This "landing of a man on the moon" in reality, is the landing of our species back on Earth, with dignity, unconditional love, and the moral wherewithal to insist upon restraint, non-violence, and a future for our children and those of all other species.

A Dream Bigger than One Person

When early twentieth century photographer Edward Sheriff Curtis realized that Native Americans were vanishing, he—with the help of President Teddy Roosevelt and one of the wealthiest men in the world, J. P. Morgan—set out to document the plight of North American Indians.

Said Curtis, "It's such a big dream, I can't see it all."

We, too, cannot see it all. But we surely recognize that this generation has one duty: a responsibility to mend the world. To see as clearly as possible. To listen to other species and thereby to give voice to the voiceless and know that the safeguarding of precious, vulnerable biodiversity is the single-most important endeavor this generation is entrusted with; an embrace greater than any one of us; a compact that is borne of virtue, trust and faith that is the only true focus for ecological remediation.

Paris, 2015, provides a crucial avenue for a new and revivified beginning. Our children and all of their companion animals, species, friends, and whole habitats, expect and deserve nothing less.

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