

# **The Winners of the Blue Planet Prize**

**1999**



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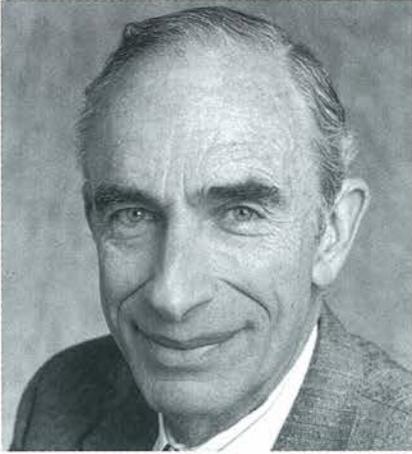
## Blue Planet Prize

**Dr. Paul R. Ehrlich  
(U.S.A.)**

Director of the Center of Conservation  
Biology, Stanford University

**Professor Qu Geping  
(P.R.C.)**

Chairman of the Environmental Protection  
and Resources Conservation Committee of  
the National People's Congress of China



The opening images for the 1999 Blue Planet Prize Awards Ceremony captured the essence of the theme "Earth, the planet brimming with color." It portrays a fresh view of the significance of the planet being blue in color and the notion that the Earth's "color" is derived from the vitality and diversity of the life it shelters.



His Imperial Highness Prince Akishino congratulates the laureates.



Their Imperial Highnesses Prince and Princess Akishino toast the laureates at the Congratulatory Party.



Dr. Jiro Kondo, chairman of the Selection Committee, explains the rationale for the determination of the year's winners.



Thomas S. Foley, Ambassador of the United States to Japan (left), and Chen Jian, Ambassador of the People's Republic of China to Japan (right), congratulate the laureates.



Dr. Paul R. Ehrlich accepts the 1999 Blue Planet Prize from Foundation Chairman Jiro Furumoto.



Prof. Qu Geping accepting the 1999 Blue Planet Prize.

## Profile

# Dr. Paul R. Ehrlich

Director of the Center of Conservation Biology, Stanford University

### Education and Academic and Professional Activities

- 1932 Born in May in the United States.
- 1953 B.A., University of Pennsylvania.
- 1955 M.Sc., University of Kansas.
- 1957 Ph.D., University of Kansas.
- 1957-1959 Research Associate, NIH Project—Genetics and Behavior of Parasitic Mites (Chicago Academy of Sciences and Department of Entomology, University of Kansas).
- 1959-1962 Assistant Professor, Biological Sciences, Stanford University.
- 1962-1966 Associate Professor, Biological Sciences, Stanford University.
- 1966— Professor, Biological Sciences, Stanford University.
- 1966-1976 Director, Graduate Studies Biological Sciences, Stanford University.
- 1977— Bing Professor of Population Studies, Stanford University.
- 1982 Fellow, American Academy of Arts and Sciences.
- 1984— Director, Center for Conservation Biology, Stanford University.
- 1985 Member, National Academy of Sciences.
- 1987 Gold Medal, WWF International.
- 1989 UNEP Global 500 Roll of Honour.
- 1989-1990 President, American Institute of Biological Sciences.
- 1990 Crafoord Prize, Royal Swedish Academy of Sciences.
- 1991 MacArthur Prize Fellowship.
- 1992 Member, European Academy of Sciences and Arts.
- 1995 Sasakawa Prize (with Anne Ehrlich), United Nations Environment Programme.
- 1998 Tyler Prize for Environmental Achievement (with Anne Ehrlich).

Dr. Paul R. Ehrlich closely observed populations of butterflies over a 35-year period and analyzed the relationship of environmental factors to boom and bust cycles in the populations. This study led him to co-found the new field of conservation biology. He also co-authored the theory of co-evolution, which attempts to explain the mutual effects of multiple species on survival and breeding. He came to understand that since humankind was just one of many interdependent species evolved in a process of co-evolution, maintenance of the current ecology, which sustained a great diversity of species, was essential to the continued survival of the human race.

He concluded that the current and ongoing explosion of growth in the human popula-

tion was a major cause of habitat destruction and published his belief in his 1968 book, *The Population Bomb*. Well in advance of the Club of Rome's pronouncement of the "Limits to Growth," he pointed out that there were limits to human resource consumption. More than 3-million copies of this book sold around the world, which helped to spur the first intergovernmental conference on population. In recent years, he has advocated that women's education and emancipation is one of the most important strategies for controlling population.

In his 1981 book, *Extinction*, he raised the general public's awareness of the dangers of the disappearance of species. He also played an important role in 1983 in warning about the environmental dangers of nuclear war and predicting the destructive impact on the ecosystem.

With his colleagues and wife, Anne, who is also a biologist and a constant companion, Dr. Ehrlich is active in advocating policies and advancing research that promote the global conservation of biodiversity.

## Our Environmental Future

Dr. Paul R. Ehrlich

July 2001

The biggest question about our future—the one to which present and future generations must pay much more attention—is the same one I outlined when I received the Blue Planet Prize several years ago. It is a question of especial importance to today's young people, who will be living with the environmental consequences of human activities today. The question is whether *Homo sapiens* can successfully find a way to change from exhausting its natural capital, while fighting over what remains, to establishing a sustainable society. Such a society would be one living peacefully on the income stream from its capital while taking effective measures to increase equity within and between groups and nations, to suppress war and other forms of violence, and to avoid public health disasters. That means humanity must find a way of successfully dealing with the "human predicament." That is, learning both how to live within the constraints set by Earth's life-support systems, and how to live with each other in unprecedentedly large and technically sophisticated societies. We must especially strive to avoid great losses of biodiversity, the most important part of our natural capital—the living parts of the ecosystems that support our lives. Biodiversity loss and/or rapid climate change could lead to a disastrous ecological collapse and social breakdown. And if current trends continue, that is precisely where society is headed. Sadly, in the short time that has elapsed since I was honored, the leadership in my nation has moved in exactly the wrong direction.

Three major factors are multiplying together to produce the crucial ecological dimension of the predicament; the destruction of natural ecosystems. The first is vast overpopulation. Earth now has more than 6 billion human beings—on the order of three times the number that might be considered "optimal" given current patterns of consumption and behavior. Those patterns are involved in the second factor, runaway consumption among the rich. It is not just the numbers of people that cause environmental degradation, but also how those people behave. And the rich, with their addiction to such things as commuting to work by automobile, large air-conditioned homes filled with electric appliances, and large-scale consumption of meat and seafood, are putting enormous stress on ecosystems. Additionally, the poor are trying to "catch up" and adopt the patterns of overconsumption now in place in Japan and the West.

The third factor is the use of faulty technologies and unfortunate socio-economic and political arrangements to service that consumption. Today's reckless dependence on fossil fuels is a case of the use of faulty technologies. That dependence is leading society into a cul-de-sac since it will take many decades for large-scale deployment of alternative, more environmentally benign technologies. A prime example is employing gas-guzzling sport utility

vehicles to commute. A better solution to getting to and from work would be using the small, energy efficient gas-electric hybrid vehicles that have been pioneered by Japanese firms. Still better would be installing comprehensive and safe mass transit systems in every large city. And best of all would be redesigning cities to minimize the need to commute, allowing many people to work "electronically" from home and most of the rest to get to offices and factories by walking or bicycling. But here again the poor are striving to emulate the behavior of the rich and going through their own version of the Victorian industrial revolution, including taking up the developed world's addiction to automobiles, rather than advancing to more sensible and efficient ways of meeting human needs.

And, of course, all this behavior is encouraged by political systems that are incapable of taking the long view. Economic systems that promote consumption, and gross inequities that give huge numbers of people little or no say in the kinds of lives they lead. Today, some two-billion people live in awful poverty. That's more people than existed a century ago. Is it progress?

These three factors are combining to destroy Earth's ecosystems—communities of plants, animals and microorganisms interacting with each other and their physical environments. Society depends on those ecosystems for an array of indispensable services and goods. The services include amelioration of climate, provision of freshwater, flood control, creation and maintenance of the fertile soil that is essential to agriculture and forestry, recycling of nutrients and pollination of crops. The serious deterioration of one service alone—the control of potential pests of crops—could bring about the collapse of civilization. Ecosystem goods include fish from the sea and bodies of freshwater (which supply a crucial protein supplement to the diets of many poor people), timber and a large portion of the medicines used by all societies.

In addition to the degradation of ecosystems, another key element to the human predicament is the decay of the human epidemiological environment. Overpopulation, poverty and misallocation of public health efforts are increasing our vulnerability to lethal epidemics. Many diseases cannot persist in small populations. For example, measles requires societies of hundreds of thousands of people to maintain itself. Humanity is now pushing large groups of people into close contact with the animal reservoirs of infectious disease, and many of those people are malnourished and thus immune-compromised. This creates near-ideal conditions for novel diseases to transfer into the human population and cause vast epidemics. AIDS is likely to be only the first such transfer in recent times. A similar problem is created by patterns of agriculture, such as the Chinese pig-duck system in which swine, fowl and people are brought into close contact, making the emergence of killer flu strains all the more likely. The deterioration of the epidemiological environment is also a result of insanely stupid patterns of antibiotic overuse, which has guaranteed the huge problems now being created by antibiotic resistance in bacteria. In addition, rapid transport systems now make it possible for epidemics and "super-bacteria" to be disseminated worldwide very rapidly.

Solving humanity's interrelated dilemmas of ecological collapse—a degraded epidemiological environment, gross economic inequity, violence, including a substantial but little-recognized residual threat of large-scale nuclear war, and cultural homogenization among

the rich accompanied by ethnic fragmentation among the poor—will be very difficult. That is due to the failure of cultural evolution in social organization and ethics to keep pace with cultural evolution in technological development. The situation has not been helped by most people's lack of understanding that the economy is a wholly-owned subsidiary of the environment. We will need economic strength and ever more clever technologies to help us make a transition to a sustainable society. But they alone can't accomplish the task. Reducing human numbers humanely and curbing consumption among the rich while increasing it among the poor, among other things, will also be necessary. And in order to do that, people must find ways to speed and direct human cultural evolution without a concomitant loss of human freedom.

That job is made all the more difficult because the seriousness of the human predicament is still unknown to the vast majority of the general public and decision-makers worldwide. Although environmental scientists understand the general directions in which humanity should be moving to solve its environmental problems, the policy response of society remains pathetic. As a result, real progress in solving environmental problems requires not just greater efforts from the ecological and physical sciences, but a major commitment from the behavioral sciences, which have the potential to help develop ways to improve that response.

The behavioral sciences can give humanity a much better understanding of the ways in which culture—humanity's vast store of non-genetic information—evolves. Culture determines most interesting human behavior. And a crucial aspect of that behavior is humanity's treatment of its life-support systems. With the discovery that there are only some 26,000–38,000 genes in the human genome, it has become even more obvious that gene shortage has put the final nail in the coffin of "evolutionary psychology." That discipline has been long on psychology, but based on a distorted view of evolutionary theory. But beyond the weak evolutionary underpinnings of evolutionary psychology, gene shortage shows that we cannot look to our genes to either explain or modify most of our behavior. The unitary, unchanging "human nature," once thought to be invented by gods and later assumed to be a product of genetic evolution, is non-existent. Comprehending how cultural evolution produces the vast diversity of "human natures" may help us to discover how to reconfigure social, political and economic incentives and cut through barriers of ignorance and denial to allow society to turn onto a path to sustainability. It may show us how to change the course of cultural evolution in beneficial ways.

Some of the most important products of human cultural evolution are ethical concerns, including concerns for non-human organisms and the environment in general. Fortunately, cultures already have been evolving in the direction of broader environmental ethics. Social scientists need to look carefully at that evolution, both within the scientific community and in society as a whole. They must pay special attention to the extinction crisis, the related erosion of natural capital and the flows of services that capital provides. Ways must be found to accelerate the evolution of environmental ethics, as well of course, as the ethics that govern how human beings treat one another.

The problem of generating concern and appropriate actions will involve a much heavier participation in public debate than most scientists are accustomed to, but which has been shown to be possible by the success of the "nuclear winter" efforts of the early 1980s. The cur-

rent activities of the Intergovernmental Panel on Climate Change (IPCC) could serve as a partial model of a basic mechanism to expose society to the full range of population-environment-resource issues and their ethical implications. The IPCC involves hundreds of scientists from diverse disciplines in a continuing evaluation of the global warming situation. The goal is to reach consensus on the technical issues related to that contentious topic and give society and decision-makers advice on how to ameliorate its probable worst negative effects.

A start toward creating a broadly focused mechanism for mitigating impacts on ecosystems has been made by a group of environmental scientists attempting to organize an Intergovernmental Panel on Ecosystem Change (IPEC). Like the IPCC, it would be a process that is transparent to all participants as well as to the general public and decision-makers. IPEC will also strive to involve very broad participation from non-scientists, ranging from ethicists to representatives of the public, even more than was done in the nuclear winter and IPCC examples. We certainly now have tools—satellite TV, the Internet, fax machines, conference calls—that would make wide communication, debate and consensus building feasible.

Many of the necessary ideas have already been generated, the tools for spreading new ideas now abound, and environmental leadership is increasingly appearing inside and outside the scientific community. The needed changes in ethics are under way, and with focused effort, scientists may learn how to accelerate them. But the political will has not been generated, and the fate of humanity still rests too much in the hands of politicians and other decision-makers who are utterly ignorant of how the world works. Our challenge, and that of young people today, is to educate them or remove them from positions of power. The task is daunting, but the benefits of success would be immense. As I have often pointed out, it is highly unlikely that human beings will ever create a utopia, but collectively we could create a much better future than the one to which we're headed toward today.

## Lecture

# Keeping the Blue Planet Habitable: A Multidisciplinary Challenge

Dr. Paul R. Ehrlich

Humanity now faces the most daunting challenge of the few hundred thousand years since our species first appeared. *Homo sapiens* has become a global force and is altering Earth's biosphere at an accelerating pace, creating what has become known as the "human predicament." The scale of the human enterprise, as measured by energy use, has increased some twenty-three-fold since 1850.<sup>1</sup> Ironically, humanity's very successes, as demonstrated by a sixfold increase in population size during those 150 years, dazzling technological achievements, and an explosively expanding appropriation of resources, are undermining the sustainability of civilization. Most of the planet's land areas have been altered almost beyond recognition to fulfill human needs; not even the ocean depths and polar extremes remain untouched. Most, if not all, of society's observed and measurable impacts on its life support systems are now negative, indicating an overshoot of Earth's human carrying capacity. The enormous challenge now facing us is to harness that brilliant technology and all the wisdom we can summon to reverse the negative trends and create a sustainable future.

### Driving Forces

The factors that are driving the environmental impact (I) of the scale of human activities can be viewed in terms of the  $I = PAT$  identity, where "P" is the size of the population, "A" is affluence (measured as consumption per capita), and "T" measures the environmental impacts of technologies and the economic, social and political arrangements involved in servicing that consumption.<sup>2</sup> Because the "A" and "T" factors are very difficult to sort out from available statistics, it is customary to substitute per-capita energy use for "A x T" in the identity.

The good news is that population growth has substantially slowed, especially in the last decade. Growth is now estimated to be about 1.35 percent per year, having fallen from over 2 percent in the 1960s. Nevertheless, the momentum of past growth ensures further growth for several generations, expanding the population from 6 billion today to 8 to 10 billion before growth can end and be reversed. Putting this in context, estimates by environmental scientists of a human population size that can be supported in the *long term*, given relatively generous assumptions about living standards, technologies and equity (A x T), are in the vicinity of 2 billion.<sup>3</sup>

Although the recent slowdown in population growth is cheering, consumption in most nations continues to grow rapidly, much of it in developed nations reasonably classed as over-consumption compared to the material goods available to the vast majority of human beings. The most serious environmental impacts are generated in the United States, the world's third

most populous nation. The U.S. population is growing by about 1 percent per year and has an extremely high level of consumption per person: roughly ten to thirty times that of people in developing nations.<sup>4</sup> Japan's per-capita consumption is about two-thirds that of the U.S. Thus, each person added to the American or Japanese population is a far greater threat to world sustainability than a birth in Kenya or Bangladesh.

Most developing nations have recognized the problems of rapid population growth and are dealing with them. But in the rich sectors of otherwise poor economies, consumption patterns are converging on those of the developed nations.<sup>5</sup> Indeed, the pressures generated by rapidly rising consumption levels in China alone could soon exceed those of the West and Japan. The spread of Western-style consumerism is a global threat, and the prospect of ever greater disparities in living standards between or within nations bodes ill for the environment, which in most circumstances benefits from increased equity.<sup>6</sup>

With developing societies following the industrial world's consumptive model, humanity is using Earth's finite inventory of accessible nonrenewable resources with remarkable profligacy.<sup>7</sup> Yet production of petroleum, on which modern industrial societies so much depend, is nearing its maximum and soon will begin declining. Larger reserves of coal, and less well-known but limited quantities of natural gas, may prolong fossil-fuel dependence, but at a high cost.

Fossil-fuel use is an example of an environmentally malign technology, which is compounded by inefficient use: designing cities to be dependent on automobile transport, for instance, rather than on walking, bicycling, or efficient, convenient mass transport. Burning fossil fuels causes serious (and familiar) pollution problems, but even more serious is their emissions' dominant contribution to global warming. That humanity will soon have to find more benign substitutes for fossil fuels is clear; the transition will be forced either by the environmental consequences of their use, or by the rising costs and diminishing returns of extracting and refining them, or some combination of the two.

Another example of malign technology is the overuse or careless disposal of toxic substances, such as pesticides and countless industrial chemicals that have been released to the environment. Economic and institutional systems have evolved to disregard negative environmental externalities—social costs not captured in the market prices of environmentally damaging products—so precautions and prevention of damage have too seldom been undertaken. But cleaning up afterward is not only much more costly, it sometimes is impossible.

### **Carrying Capacity**

The number of people Earth can support *in the long term* without degrading the environment, given existing socioeconomic systems, consumption patterns, and technological capabilities, is called the *human carrying capacity* of the planet at that time.<sup>8</sup> Carrying capacity can be exceeded without causing immediate effects that are obvious to the untutored observer. Many local or regional overshoots<sup>9</sup> and subsequent crashes of human populations have occurred in the past, but today history is being repeated on a global scale. Humanity has already overshoot Earth's carrying capacity by a simple measure: no nation is supporting its present population on *income*: the sustainable flow of renewable resources. Instead, key renewable resources, the

*natural capital* of humanity, are being used so rapidly that they have effectively become non-renewable.<sup>10</sup> *Homo sapiens* collectively acts like a person who cheerfully writes ever larger checks without considering the impact on the account's balance.<sup>11</sup>

Warning signs that the human enterprise is nearing the end of rapid growth in population and consumption include declines in the amount or availability of productive land,<sup>12</sup> soil,<sup>13</sup> fresh water,<sup>14</sup> and biodiversity,<sup>15</sup> all of which are crucial elements of natural capital essential for sustaining civilization and especially agricultural production.<sup>16</sup>

### **Impacts on the Biosphere**

The most critical aspect of the human predicament is the degree to which human activities are modifying the biosphere and increasingly disrupting the functioning of ecosystems.<sup>17</sup> The result is a progressive loss of crucial ecosystem services that sustain civilization. The loss of populations and species of other organisms that are involved in supplying these services has been accelerating as human activities alter or demolish more and more natural habitats and overharvest living resources. Tropical forest destruction continues throughout much of the developing world.<sup>18</sup> The annihilation of oceanic fisheries has come to public attention as stock after stock has been overfished<sup>19</sup> and much of the physical/biological infrastructure that supports the fisheries is destroyed. People are now using over half of the reasonably accessible freshwater runoff,<sup>20</sup> and some 43 percent of Earth's vegetated land surface has lost some portion of its capacity to supply humanity with benefits—causing overall about a 10-percent reduction in potential productivity.<sup>21</sup>

Human activities are even interfering significantly with the global cycles of physical elements. They have approximately doubled the natural rate by which nitrogen is added to the terrestrial nitrogen cycle, potentially impairing soil fertility, accelerating losses of biodiversity, contributing to acid deposition, and enhancing the greenhouse effect.<sup>22</sup> A fundamental but indirect indicator of humanity's impacts is that it is already consuming, coopting or has destroyed more than 40 percent of terrestrial net primary production—the food supply of all animals, not just people.<sup>23</sup> Most disturbing, ecosystem services that are essential for maintaining agricultural production, such as replenishing soil fertility, pollination and natural pest control,<sup>24</sup> are faltering in many areas.

Lagging food production is probably the most significant symptom of ecosystem deterioration. Following a spectacular rise in production before 1980, the global grain harvest has failed since 1984 to keep pace with population growth. The green revolution, along with opening of some new land, a dramatic expansion of irrigation and other favorable factors, boosted grain production by more than 73 percent from 1960 to 1980, while the population expanded by 46 percent. But from 1980 to 1998, grain production increases barely equaled the population's growth of 32 percent. In 1984, grain production reached its per-capita peak, and since then has fluctuated below that level.

Cereal grains comprise the human feeding base and, by weight, amount to roughly half of all foodstuffs produced by agriculture. Grain harvests thus are the best indicator of food supplies and availability, although economic factors and changes in eating habits are also significant. Since about 40 percent of the world grain harvest is used for feeding livestock, shortages

can be partly offset by reducing the use of cereals as feed. Similarly, reduced demand for animal products can lower pressures on grain stocks. Although such shifts have occurred in recent years, averting serious shortages and price rises, the overall trend in food production has been increasingly problematic.

The reasons are many and vary from area to area, but among those of rising importance is land degradation. Rich agricultural soils, normally formed at rates of centimeters per century, are being eroded away in many areas at rates of tens of centimeters per decade.<sup>25</sup> Faulty irrigation has often led to serious degradation as soils accumulate salts or become waterlogged. Little suitable land remains to open for farming, while increasing amounts are taken out of production because of productivity losses and urban sprawl.

The rising dependence on irrigation coincides with diminishing new sources of water. Chronic or episodic shortages of water supplies exist in many areas of the world, including the Middle East, northern China and India, and such shortages seem bound to become more acute as populations expand. In many regions, "fossil" freshwater deposits, accumulated underground over thousands of years during glacial periods, are being "mined." Aquifers are being drained at rates many times higher than they can be recharged, often compromising their freshwater holding capacity in the process. Becoming dependent on such largely irreplaceable sources of water, especially for such nonessential purposes as irrigating low-value forage crops in arid regions, is both shortsighted and risky.<sup>26</sup>

Fisheries yields tell an even more dismal story. Some two-thirds of the world's major fisheries are being maximally harvested today or are in decline.<sup>27</sup> While overall yields have continued to increase slightly, on a per-capita basis the fisheries harvest reached a peak in 1988 and has remained below that level since then. The chief cause of the declines in major fish stocks is overharvesting, although more systemic environmental damage has played a role through pollution and modification of estuaries and coral reefs as well as destruction of mangrove fringes and coastal wetlands. Anadromous fish such as salmon have suffered from dammed rivers and oversilting from bank erosion. Aquaculture (fish farming) harvests have largely offset declines in traditional fisheries, but at the cost of displacing natural fish populations and causing serious environmental problems. Fish farming also increasingly depends on feed grains and other agricultural products to support production, thus competing, along with livestock, with food production for human beings.

Perhaps the most serious environmental problem is depletion of biological capital. Microorganisms, plants, and other animals are being exterminated at a rate unprecedented in 65-million years—roughly 10,000 times faster than the stock can be replaced.<sup>28</sup> Much of Earth's natural habitat has disappeared under cities, towns, highways, railways, crop fields, pastures and tree plantations. Habitat alteration—which, along with overexploitation of economically valuable species, is the engine driving the current surge of extinctions—can take place in subtle, easily overlooked ways, much less obvious than paving over or plowing under natural ecosystems. Logging, grazing, introducing exotic species, using pesticides and exterminating particular species each can have profound effects on an ecosystem, even though it may superficially appear unchanged.

Those vanishing organisms are working parts of our life-support systems. If we destroy

them, the price will be a catastrophic decline in the carrying capacity of Earth for human beings. Natural ecosystems provide vital life-support functions of cleansing, recycling and renewal, upon which the economy is utterly dependent. These essential ecosystem services include amelioration of climate and weather, generation and maintenance of soil structure and fertility, recycling of nutrients, moderation of the hydrological cycle that supplies rainfall and surface water, pollination of crops, disposal of wastes and toxins, control of more than 95 percent of potential crop pests, and maintaining a vast natural library of biodiversity. That library is the source of ecosystem goods<sup>29</sup> such as timber and food from the sea; the harvesting and trading of both are familiar and important components of the human economy. It also provides innumerable other potential and actual ecosystem goods ranging from medicines to the genetic material essential for developing crop varieties that are resistant to pests and diseases and able to cope with varying conditions, such as climate change and soil salinity.

In the past decade or so, perhaps the most dramatic evidence that humanity is disrupting the biosphere is anthropogenic climate change. The 1995 report of the scientific committee of the Intergovernmental Panel on Climate Change (IPCC) cautiously stated that the warming measured over the last century "is unlikely to be entirely natural in origin... the balance of evidence suggests that there is a discernable human influence on global climate."<sup>30</sup> Despite a determined campaign of denial by certain elements of industry and a handful of dissident scientists,<sup>31</sup> it has become increasingly clear that the IPCC was correct. Top atmospheric scientists wrote: "warming trends of both the surface and troposphere are now sufficiently clear that the issue should no longer be whether global warming is occurring, but what is the rate of warming."<sup>32</sup> Many suspicious signs of rapid change in the climate have emerged, from an increased frequency of extreme weather events in North America<sup>33</sup> and South Asia to a seeming meltdown in Alaska where glaciers are in rapid retreat. There, in addition, long-standing permafrost is dissolving and widespread forest death is occurring, caused by interacting stresses from permafrost soils being converted to swamps and newly abundant insect pests attacking already weakened trees.<sup>34</sup> Parallel changes have been seen in other northern polar regions and Antarctica.

### **Toxification of Earth**

When global toxification (including releases of persistent organochlorine compounds such as DDT and long-lived radioactive fallout from nuclear weapons tests) is considered, every square inch of Earth's surface, land and sea, has been "significantly altered."<sup>35</sup> Toxic substances are generally viewed as threats to individuals, not to societies. They have not ordinarily been seen as posing the same sort of threat to the future as do essentially irreversible environmental impacts, such as land degradation, the loss of biodiversity and climate change. While cancer deaths and disabilities from toxic exposures surely are tragedies for individuals and families, collapses of agricultural and natural ecosystems could be tragic for entire societies. Nonetheless, globally distributed toxins (for instance, some chlorinated hydrocarbons such as DDT breakdown products, endosulfan and PCBs)<sup>36</sup> unquestionably can kill or injure many kinds of wildlife and seriously disrupt the functioning of natural ecosystems.<sup>37</sup>

Now evidence is mounting of serious effects on wildlife and human health from the

release of hormone-mimicking synthetic organic chemicals, although demonstrating the causal links is difficult.<sup>38</sup> Some synthetic chemicals have molecular structures similar to naturally occurring hormones, and in ways both subtle and insidious, may affect normal development in both animals and human beings.<sup>39</sup> These hormone-mimicking chemicals may pose a major threat to humanity, both directly and indirectly. Directly, they may be causing or exacerbating reproductive disorders, including infertility, and triggering behavioral changes in some people, potentially causing a variety of social problems. The indirect threats arise from the disruptive effects of these chemicals on wildlife and ecosystems.

### **Social Vulnerability**

Any and all of the foregoing negative trends can induce social disruption or be exacerbated by it. For example, many changes associated with economic development and global change potentially could reduce health security. The human epidemiological environment is affected by population growth, increased mobility, settlement of new areas and nutritional status. Modernization and loss of indigenous medicinal knowledge, microbial evolution of antibiotic resistance, land conversion and biodiversity loss, agricultural intensification, stratospheric ozone depletion, and climate change are all trends that may enhance human vulnerability to major epidemics of infectious diseases. The potential for a serious pandemic to destabilize social and political arrangements should be obvious. A case in point is AIDS. Although its acute stages are delayed, its victims are usually people in their prime productive and reproductive years. The result can be a population dependent on aging adults struggling to support their orphaned grandchildren. Rapidly lethal diseases such as those caused by Marburg, Ebola or Hanta viruses could wreak havoc in vulnerable populations, especially those lacking good medical facilities. And the resurgence of dreaded diseases, such as tuberculosis and malaria as pathogens increasingly develop resistance to chemicals deployed against them, is a real cause for worry.

Land degradation itself, combined with poverty and inequity, can lead to social problems as large portions of rural populations are forced off the land, sometimes generating major migrations. Hunger and extreme poverty are well-known destabilizing factors. Deforestation and desertification increase people's vulnerability to extreme weather events, as witness the tragic consequences of hurricane Mitch. No one knows how much of Mitch's intensity can be ascribed to global warming, although it may well have been significant. But there is no doubt that previous deforestation and marginalization of much of the population had left them highly vulnerable to disaster.

Rapid population growth itself can significantly hinder the processes of modernization and economic development, just as poverty and illiteracy are known to hinder the adoption of family planning practices. And gross inequities, as well as resource scarcities, surely undermine social stability within and between societies, as witness the role of freshwater scarcity in generating tensions in the Middle East. Water management issues also are producing problems in China, as the Three Forks Dam construction forces millions of people to be relocated.

## Seeking Answers

Given the enormous scale and continuing expansion of the human enterprise today, all three factors—population growth, consumption and technology (including socioeconomic and political arrangements)—must be altered if civilization is to become sustainable. The key issue in judging overpopulation is not how many people can fit in any given space, but whether the population's requirements for food, water, materials, energy and ecosystem services can be met on a sustainable basis. Most of the land perceived by urbanized individuals as "empty" either grows the food essential to peoples' well-being, or supplies forestry products, or, lacking water, good soil, and a suitable climate, cannot directly contribute much to the support of civilization. Thus, the Netherlands, Singapore, Japan and England *can be affluent and crowded with people only because the rest of the world is not*. The Netherlands, for example, imports large amounts of food<sup>40</sup> and extracts from other parts of the world much of the energy and virtually all of the materials it requires. It uses an estimated 17 times more land for food and energy than exists within its borders.<sup>41</sup>

Through ingenuity and invention, it is possible to enlarge Earth's human carrying capacity, as indeed has happened in the past—the agricultural and industrial revolutions were changes that led to quantum jumps in carrying capacity. Tomorrow, widespread behavioral changes, such as shifts to more vegetable-based diets, conservation of resources and restoration of natural ecosystems, could enlarge Earth's carrying capacity for human beings in a short time as well. Assuming full cooperation in the needed changes, it might be possible to support today's population of 6 billion in reasonable comfort for some time (that is, assuming no further population growth). But most people in today's rich nations are unlikely to embrace spontaneously a lifestyle of "voluntary simplicity" just to increase global carrying capacity. How many Japanese or Americans would choose to adjust their lifestyles radically to live, say, like today's Chinese, so that more Africans, South Asians or South Americans could be adequately supported? How many Chinese would give up their dreams of American-style affluence for the same reason? It certainly seems unlikely, since the current trend among those who can afford it is toward increased affluence and consumption, which tends to *decrease* carrying capacity and intensify the degree of overpopulation.

## Finding Answers

Thirty years ago, finding ways to slow population growth was near the top of the environmental science community's agenda. It is now realized that finding ways to curb runaway consumption may be even more difficult. Economic, political and institutional constraints make it very difficult to establish desirable changes in the mix of technologies used to supply the consumption. Obviously, keeping global warming to tolerable levels, as well as reducing other problems arising from air pollution, will require a major shift away from dependence on fossil fuels as energy sources in modern economies. Yet this is strongly resisted by economically powerful corporations that supply the fuels and others whose products, such as automobiles, are designed to use them. Similarly, chemical and plastics manufacturers and users actively resist efforts to reduce human exposure to hormone-mimicking synthetic organic chemicals.<sup>42</sup>

Indeed, the only major global success in the technological arena in the last decade or so

has been implementation of the 1987 Montreal Ozone Protocol to phase out chlorofluorocarbons because of depletion of the stratospheric ozone shield. Achieving that was relatively simple since a "smoking gun" appeared in the form of the Antarctic ozone hole and the relatively few corporations involved could make even bigger profits manufacturing substitutes. Limiting the flux of greenhouse gases from energy consumption, deforestation and agriculture will be more difficult by orders of magnitude.

Still, one heartening change has been the rapidly growing cooperation of economists and ecologists in efforts to find policy instruments to help preserve humanity's natural capital.<sup>43</sup> While the trend can be traced back to early efforts by economist Herman Daly, the last decade has seen an explosion of activity. At Stanford University, regular seminars now bring together economists, ecologists, engineers, professors of law and business, and others to discuss the environmental dimensions of the human predicament. The Beijer Institute of Ecological Economics has conducted an active program of discussion and research in this area and produced a series of important publications bringing the two disciplines together.<sup>44</sup>

A result has been a growing realization among natural and social scientists that we cannot depend on working with governments alone to solve the growing environmental crisis. Instead, the emphasis is shifting to recruiting the business community into the struggle to achieve a sustainable society. Although the process has just begun, encouraging signs have appeared, such as the Natural Step program, begun by Dr. Karl-Henrick Robert in Sweden, and the writings of businessmen Paul Hawken and Stephan Schmidheiny.<sup>45</sup> Some businesses have already demonstrated that it is possible to make more money operating in a manner that is ecologically sound than by ignoring environmental impacts. One outstanding example is *Interface*, a company that (under the leadership of CEO Ray Anderson) supplies commercial carpeting on a rental basis. When the carpet is worn, *Interface* replaces it and completely recycles the old material rather than stuffing it into a landfill. The company is enormously successful, grossing more than \$1 billion annually. Through such examples, other corporations may learn that they can do well while doing good.

Converting business to a powerful force for environmental quality is a huge task, but even that cannot solve our predicament as long as the scale of the human enterprise continues to grow. People must become involved in solving local and regional environmental problems and in encouraging their governments to cooperate more in seeking ways to reduce the size of the enterprise. Business leaders have both heavy responsibilities and great opportunities in these areas—and they have a great deal of expertise in putting theory into practice. They and their children and grandchildren are fully as dependent for their lives on the services provided by natural ecosystems as everyone else. And perhaps more than anyone else, they are experts in the critical area of consumption and able to find ways to curb the growth of society's energy use and material throughput.

Technological change, such as substituting electronic communication for travel and environmentally more benign energy sources for the dominant fossil-fuel technologies of today, can help. But changes in family sizes, infrastructural arrangements, lifestyle, and human aspirations and attitudes are also needed. The human predicament cannot be solved without the cooperation of a substantial portion of the human population. To gain that cooperation, more

equity is desperately needed; solving the problems of racism, sexism, religious prejudice and gross economic inequity are part and parcel of solving the predicament. The business community has the political power to lead the transition to a sustainable global society; one with a smaller population supplied with both necessities and some luxuries. I urge businessmen everywhere to learn about the current environmental situation and then accept the challenge. And scientists, politicians and ordinary citizens should do the same. Nothing less is at stake than the fate of human civilization.

The most important take-home messages of this talk are:

- The environmental crisis is increasingly severe, and there may not be much time left to prevent a disastrous end to it.
- Population growth must be reversed, overconsumption must be constrained, and more environmentally benign technologies must be deployed.
- Greater efforts must be made to improve the epidemiological environment.
- Much more attention must be paid to developing and deploying sustainable agriculture and restoring oceanic fisheries.
- To accomplish the needed tasks, more attention should be paid to issues that lie within the purview of the social sciences. Natural scientists already know in what directions society must go. But developing the critical social, political and institutional reforms to move society to sustainability will require innovation on the part of economists, political scientists, legal scholars and others.
- People must not only change their behaviour toward the environment in order to solve the human predicament, they must change their behaviour toward one another.

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## Profile

# Professor Qu Geping

Chairman of the Environmental Protection and Resources Conservation Committee of the National People's Congress of China

### Education and Academic and Professional Activities

- 1930 Born in June in China.
- 1952 B.A., Shandong University.
- 1957-1961 Director, Baoding Film Factory.
- 1962-1968 Division Chief, Ministry of Chemical Industry.
- 1968-1974 Division Chief, State Planning Commission/Planning Group of the State Council.
- 1972 Member, Chinese Delegation to United Nations Conference on the Human Environment .
- 1975-1976 Chinese Representative, United Nations Environment Programme.
- 1976-1982 Deputy Director, Office of Environmental Protection Leading Group of the State Council.
- 1982-1993 Administrator, National Environmental Protection Agency.
- 1984— Part-Time Professor, Beijing University.
- 1985— Part-Time Professor, Qinghua University.
- 1987 Gold Medal, UNEP.
- 1988 First National Prize for Scientific and Technical Advancement.
- 1989— Part-Time Professor, People's University of China.
- 1990-1996 President, China Environment and Science Association.
- 1992 Deputy Director, Chinese Delegation to the Rio Earth Summit.
- 1992 UNEP Sasakawa Prize.
- 1993— Chairman, Environmental Protection and Resources Conservation Committee, National People's Congress of China; Member, Standing Committee, NPC.
- 1993— President, Environmental Protection Industry Association.
- 1993— President, China Environmental Protection Foundation.

Following his participation in the 1972 UN Conference on the Human Environment in Stockholm as a member of the Chinese delegation, Professor Qu Geping enthusiastically aided the cause of environmental protection in China. At his initiative, China adopted its first national environmental protection policies based on the three principles of "prevention," "the polluter bears responsibility," and "stronger environmental regulation."

He personally supervised the scientific surveys required to gather up-to-date data on the problems and their solutions to provide a solid basis for regulations. He also promoted the scientific and technological resolution of problems by establishing research institutions to mon-

itor pollution, develop new technologies and teach environmentalism.

China's large population has been a major cause of adverse environmental impacts. He has devoted special attention to the environmental impact and pressure of population growth in his published articles and books. In this way, he contributed to the establishment of successful Chinese family planning programs.

He has used methods to raise the general public's environmental awareness that are unique among socialist nations. For example, he started in 1993 with national environmental press campaigns in which journalists were requested to report the full extent of domestic environmental problems, which had a huge effect on the citizenry.

China faces many environmental issues. Professor Qu, however, asserts that "the environment will improve without fail if we apply these laws and policies effectively. Blue skies and clean water will once again be ours." This is the belief on which he continues to press forward with his conservation activities.

## Essay

# Let Nature Guide Man and Create a New Civilization for Mankind

Professor Qu Geping

June 2001

Ladies and gentlemen, during the current Mansfield Pacific Retreat successfully hosted by the Maureen & Mike Mansfield Center in cooperation with the Chinese People's Association for Friendship with Foreign Countries, we have had profound and enlightening discussions on the environmental issues from many perspectives, ranging from technology, law and policy to management. Now I would like to share with you some of my views on the future of human civilization in the new century from a cultural perspective.

Standing at the threshold of the new century, what can we say about the future? I cannot predict it for I am neither a futurist scholar, nor a prophet. However, as a veteran fighter for environmental protection, I believe that we will be able to create a better future if mankind works together and reaches a common understanding.

The twentieth century is characterized by industrial civilization. We are living in the civilization and enjoying all the benefits and convenience it has brought us. Information dissemination has become so much better than before that inter-personal communication and understanding of each other are a lot easier. We are surrounded by civilization both physically and mentally. Our thinking as well as our languages all bear its mark. But we have also realized with pain that the industrial civilization has estranged us from nature, from other people and from ourselves. We have even forgotten who we are.

It is high time for us to wake up. Mankind cannot but be alert to where the industrial civilization is leading us. Are we going to build on the planet a lifeless and apathetic world of machines? Will our homes inevitably slip into the bog of pollution? I reckon our children and our children's children, future masters of our planet, would not allow us to do so, and would hate to see such a prospect. In the new century, we and our future generations should rely on our wisdom to create a new civilization and a new homeland on the planet.

What would the new civilization look like? What shall we call it? We may call it "green civilization," "eco-civilization" or something else. Its main features, however, should remain the same: a new alliance between man and nature and between men themselves, and man's recovery of his lost self.

I am not able to give you a full picture of the new civilization here. But I understand that the crux of the value of the civilization would lie in a perfect integration of the ancient and modern civilizations, and of the Eastern and Western civilizations. This would be a brand new

and attractive form of civilization.

The new civilization should readjust three relationships: the relationship between man and nature, between men, and that of man to himself. It is precisely on this point that the new civilization would bring to us an entirely new concept of value, distinguishable from the old industrial civilization.

Now I will try to describe the crux of the value of the new civilization.

Under the new civilization, what would the three relationships of most interest to mankind be like?

Under the new civilization, man's attitude towards nature should be: "Let nature guide man (*Shi Fa Ziran*)," as Lao-Tzu, an ancient Chinese philosopher, taught us in his *Tao Te Ching*. You must know the name Lao-Tzu, who enjoyed the same reputation as Confucius, as one of the founders of Chinese civilization. His simple dialectic thinking has been accepted by the world. For example, the design of the national flag of the Republic of Korea embodies his idea "Yin plus yang means *Tao* (the Way)."

To follow the law of nature does not mean that we should become slaves of nature like our early ancestors, who felt awed and prostrated themselves before the strange phenomena of nature as they knew very little, if not nothing, about its secrets.

Nor does it mean that we should follow in the footsteps of the founders of industrial civilization, who used science and technology to exploit nature for benefits and set their mind on conquering nature and becoming its masters.

Rather than becoming slaves or masters of nature, we should be its friends. To follow the law of nature means to acquire the wisdom of living harmoniously with nature, the most important wisdom to all mankind.

Environmental problems often result from our ignorance or insufficient knowledge of nature. Their ultimate solution does not lie exclusively in science and technology. In fact, we can often find their solution in natural ecosystems.

The ancient Chinese thought has an important concept, which calls for "integration of man and nature (*Tian Ren He Yi*)." It pursues perfect harmony between man and nature. In the eyes of the ancestors of the Chinese people, forests are our hair, rivers our blood, mountains our heads and the earth our chests. Every natural being should be respected for its form of life. The same concept was found in many peoples' early history, such as that of the American Indians and the Mayan people. We should not think it outdated today. It is, on the contrary, what should be valued and carried on. When we come in touch with nature, we should feel grateful to it for our lives and all the happiness that comes with them.

The twenty-first century would be a century to see man forming an alliance with nature. He would find the value and truth of life in nature; and to follow the law of nature and integrate with nature would become the highest principle of mankind in the next century.

The second relationship that the new civilization should readjust is the relationship between men. The attitude of men towards each other should be "to befriend others." The great ancient Chinese philosopher Confucius said "It is harmony that is prized (*He Wei Gui*)," which means that peace and friendship are most important and that hatred and hostility should be discarded. We should not shift our own troubles onto others, nor seclude ourselves from oth-

ers and refuse to communicate. Instead, we should respect, try to understand, learn from and help each other.

Since ancient times, our planet has witnessed countless wars. Whatever the cause, their results have been the same: devastating disasters to both mankind and the environment. Many civilizations even declined as a result of eco-system collapse caused by wars. The Mayan civilization is a typical case in point.

In the next century, should another war break out, there would be no winners but losers. It would be an unprecedented disaster to mankind. Man must learn to handle differences and conflicts between peoples and between states in a rational way. "Burying the hatchet and turning swords into plowshares," seeking common ground while reserving differences through dialogue and consultation, and going for peaceful coexistence should become important concepts of the new civilization in the new century. "Others are not hell." Instead, they are our teachers and helpful friends. Confucius said "Even when walking in a party of no more than three, I can always be certain of learning from those I am with." This is quite true.

The third relationship that the new civilization must readjust is man's attitude toward himself. The attitude should be "to restrain desires and demands." The ancient Greek philosopher Socrates' admonition "to understand yourself" is still applicable today.

What does man need and how much does he need? I remember a Russian fable, which goes like this: One day, a landlord said to his farm hands: "Is it true that you all want land? All right, you start to run from the east to the west when the sun rises tomorrow morning, and return to where you start by sunset. All the land you have covered by then will be yours." The next morning, the farmers started running at sunrise. The fastest runner returned to the original place at sunset and should have expected the largest piece of land. However, he died of exhaustion. The landlord, after burying him in a hole, asked the remaining men: "How much land do you think a man really needs? You have all seen what he needs is only a small piece of no more than two meters long and one meter wide." This is thought-provoking.

If we do not control our desires and demands, I do not think our planet would be able to support the six-billion people today and the nine-billion in the next century. We must find a new point of balance between man's desires and the earth's bearing capacity.

At the age of 70 and as a veteran fighter for environmental protection, I feel that although I'm getting old, my will remains strong. Together with all friends present here today, I am willing to work as an architect for the new civilization, and to contribute all my wisdom and energy to mankind's new homeland.

## Lecture

# My Dreams and Expectations

## —30 Years of Involvement with Environmental Protection

### Professor Qu Geping

Ladies and Gentlemen, it is a great privilege and honor to receive the Blue Planet Prize today in the beautiful city of Tokyo. I am fully aware that this is not only an honor for myself, but also a symbol of the Japanese people's profound friendship and a demonstration of their warm support for China's environmental protection.

Thirty-seven years ago when the planet we inhabited was covered with dark clouds of pollution, a physically weak but spiritually strong woman called for environmental protection with all her wisdom, enthusiasm and courage. Her words shook the world. Cherishing a great love for Mother Earth, this "daughter of nature" wrote an immortal book entitled "Silent Spring," which turned out to be her life's magnum opus. Her call awakened the United States, as well as all other countries, to the fragility of the world in which we live. The seeds of environmental protection sown by her have now taken root among the public. The woman's name was Rachel Carson. Let us remember her here today.

In 1972, the United Nations, conforming to the historical trends of the times, convened an international conference on the human environment in Stockholm. That conference was the first joint action by the global community to express concern for the planet's welfare. It was like a powerful lighthouse, illuminating a path for world environmental protection efforts. I was fortunate to have attended the conference as a member of the Chinese delegation. Although I was deeply worried by the existing situation and the future of the earth described in the conference proceedings, I was greatly encouraged by the awakening of and actions by fellow men and women. As a bright torch, the conference became my beacon of hope for a promising future. It was at that time that I made up my mind to devote my whole life to China's environmental protection efforts.

Come to think of it, almost thirty years have passed since then. In the long historical river, thirty years are merely drops of water. However, it is a very long span of experiences for a man. Confucius, one of China's ancient philosophers, said "At 40, I was no longer perplexed" and "At 70, I follow all my desires and none of them is against the norms." What he meant is that people will feel very clear about what they want when reaching 40 and that they can follow their will at the age of 70. I joined the environmental protection movement at the age of being "no longer perplexed" and am now reaching the age of "following all my desires" with none of them against the norms. I feel especially lucky that my past 30 years of life are closely interwoven with China's environmental protection efforts and that I have made my humble contributions to the noble cause.

These 30 years have seen three stages of development in China's environmental pro-

tection: an embryonic stage between 1970 and 1978, a foundation-laying and growing stage between 1979 and 1991, and a monumental development stage from 1992 to the present.

### **1. The Embryonic Stages of China's Environmental Protection Activities**

Between 1970 and 1972, China weathered the dramatic storm of the "Cultural Revolution," the national economy was on the verge of falling apart and the country was in a state of total chaos. Surprisingly enough, environmental protection, just a tiny seedling at the time, sprouted miraculously from such adverse circumstances. It was Mr. Zhou Enlai, the Chinese premier at the time, who cultivated that seedling.

Mr. Zhou Enlai was the pioneer and leader of China's environmental protection movement. With his unique vision and sensitivity as a politician, he accurately pointed out that environmental problems could turn out to be very difficult to surmount on China's future development path. At that time, a number of pollution accidents in Japan had alarmed him. He felt that China would also face similar problems arising from industrialization and that "preparation should be made before it rains" to provide against possible trouble. He authorized the Plan-Drafting Group of the State Council to take charge of pollution prevention and control. It so happened that I was involved in that group. Thanks to my assignment to coordinate with the fuel and chemical industrial departments, which were contributing greatly to pollution, I was given the job to look after work concerning environmental protection. It never occurred to me at that time that this temporary labor assignment would develop into my life-long cause.

Joining environmental protection efforts was a bit accidental. But this fortuitous event was an unexpected "fruit" that arose from seeds planted earlier. I was born in a small village at the foot of Mount Tai in Shandong Province. The village sat next door to the Beishan Mountain, on which a huge fortified mountain village was situated. On top of the mountain and located in the center of the village was a temple for sacrifices to supernatural beings. It seemed as high as the sky and was decorated with curly foggy clouds all year round. Further down the mountain was a Confucian temple named the "Book Airing Temple." The legend goes that Confucius got his books wet while crossing a nearby stream and laid out his books on the mountain stones to dry. Later generations built the temple to commemorate this event. I remember that lots of thousand-year old pines and cypresses clustered around the temple, luxuriously green and astonishingly magnificent. Below the temple was a clear little stream, combing through the area unhurriedly like a jade belt twining around the ancient building. Green mountains, clear water, pines and cypresses, together with the temple, presented a wonderful picture in which human culture and the natural world existed in perfect harmony. Such was my childhood world. This environment stimulated a nascent love for nature in my young heart.

I have always loved literature and this love continues whether I am studying or working. From the Book of Songs 2,600 years ago to the poetry of Chu, the prose of the Han Dynasty, and even to the poems of the later Tang and Song Dynasties, praising nature was an enduring topic. Chinese painting also focuses on natural scenery to express feelings. The beauty of the Chinese art of gardening exists in the combination of buildings and the natural world. When I am immersed in the world of Chinese literature and art, I can not help but feel

that nature is both a treasured wealth and a source of man's aesthetic sensibilities and artistic activities. China's long and splendid culture that regards nature as its basis provides the richest soil for the growth of our efforts to protect the environment.

However, germination of green seedlings requires a suitable climate. This climate finally asserted itself in 1972 when the late Premier Zhou Enlai decided to send a delegation to the United Nation's Conference on the Human Environment in Stockholm in order to let the Chinese whose "eyes were shut and ears blocked" to go out and see the world. Although our minds were still bound by the Cultural Revolution, the Stockholm Conference was no doubt of far-reaching and enlightening significance, which made us realize for the first time our own persistent environmental problems.

In 1973, China took an essential step toward environmental protection. Under Zhou Enlai's personal care, we convened China's First National Conference on Environmental Protection—the prelude to China's entire environmental protection campaign.

Understanding guides actions. Without sufficient understanding, actions will not manifest. When China was busy with its Cultural Revolution, people were close-minded, unwilling and perhaps not daring to admit that socialist China had pollution—such despoilment was only an incurable disease of Western capitalist countries. He who admitted the existence of pollution in China was no different from a man who plastered unfavorable marks on socialism. How ridiculous was the logic. But at that time no one had the courage to doubt that belief. Under such circumstances, environmental protection was not a topic of conversation.

The wisdom of Zhou Enlai lay in the fact that he never let go of the issue until people understood and recognized it. The First National Conference on Environmental Protection was obviously a key to environmental protection. Chinese people had begun to realize that their country was faced with serious pollution problems. It was only after the conference that China's environmental protection efforts started in spite of all difficulties.

However, when other undertakings languished, it was very difficult to sustain these early efforts. The active guidance and involvement of Zhou Enlai enhanced my understanding and confidence in environmental protection. My colleagues and I were not daunted. Guided by a sense of responsibility and strong belief, we moved forward despite the atmosphere of adversity.

At that time, our job was like that of a fire brigade. Wherever there was a big fire, we responded. We organized our efforts on control and management of a number of the most complained-about problems. Our more significant and effective responses included water pollution management in the Guanting Reservoir of Beijing, the Bai Yangdian Lake of Hebei Province and the Lijiang River of Guilin, and air pollution management in Shenyang and other cities.

I believe that some of the ladies and gentlemen present have been to Guilin for sight-seeing. Its hills and waters are like a painting of intoxicating beauty. There is a widespread saying in China, "the mountains and waters of Guilin are the finest under heaven." We feel proud of having such scenery. But Guilin's Lijiang River suffered from severe pollution in the 1970s. A large number of major polluting factories were built on both sides of the river, and industrial sewage turned the originally clear water to a disgusting dark color. Mr. Deng Xiaoping, who

had just resumed his position at that time, commented that our errors would outweigh our achievements if the pollution of the Lijiang River were not controlled. We carried out resolute management activities: closing down 27 factories that contributed to serious pollution within two years and making the river clear again. Imagine the determination it took to close down so many factories in a small- to medium-sized city at a time when our national economy was lagging behind those of the rest of the world.

The pollution and treatment of the Lijiang River provided us with a useful lesson and experience. We realized that economic development must coordinate with environmental protection and that growth should never be pursued at the expense of the environment. This experience was later used for the management of the Huaihe River Valley and a few other valleys in the 1990s.

Everything is hard in the beginning. Whenever we look back at the pioneering period, I feel some sadness but also happiness. As the great Russian poet Aleksandr Pushkin said in one of his poems, "Everything happens in a twinkling and all is to pass. But what is passed will become fond memories."

## **2. Growth Springing from the Foundation**

China greeted bright sunny days in 1979 when the country began to reform and open to the outside world, and its economy started to rapidly develop. It was also in 1979 that China's environmental protection swept away a dark winter and entered a beautiful spring. The Environmental Protection Law, the first legislation of its kind in Chinese history, was formally promulgated, marking a transitional development from general policy to legislation for environmental protection.

The second period of environmental protection spanned from 1979 to 1991 when theories, policies, legislation and management systems were developed with great achievements, gradually shaping and completing a policy system with Chinese characteristics. At the same time, we conducted large-scale pollution control and management for industries and urban areas, preventing a dramatic worsening of the environment and laying a solid foundation for the future.

As administrator of the National Environmental Protection Agency during that period, I was involved in a series of changes. It was most gratifying to see that environmental protection was made a basic state policy and was gradually known to the whole of society. The fact that China prioritized environmental protection to such an extent when it had just started its modernization demonstrated the far-sightedness of the Chinese government and also reflected the unique situation in the country.

First, China's huge population of 1.2 billion presents great pressure on the environment. All environmental problems, those concerning natural ecology in particular, are direct or indirect results of this pressure. This is different from many other countries in the world. Therefore, we have had to promote family planning policy to reduce pressure on the environment. Secondly, China's environmental pollution and ecological destruction are already outstanding. Without attention to the environment in the process of modernization, serious results would have occurred and modernization would have been greatly hindered.

It is upon such understanding that we proposed that China should not follow the traditional "pollution first and management second" path of developed countries. Instead, we should coordinate economic development and environmental protection. We should develop an economy that facilitates environmental protection and protect the environment to promote the economy. Towards these ends, we started to map out a set of policies and institutional and legislative systems to facilitate the implementation of the basic state policy of environmental protection.

There are three major thoughts behind China's environmental policies. The first is to make "prevention first" the basic starting point for policies. Environmental protection measures should be carried out together with economic and urban construction, instead of taking remedial actions after construction. The second is to make those who cause pollution take responsibility for the pollution and pay for management. The third is to intensify management, which means formulating plans and necessary policies and regulations and establishing powerful institutions for monitoring and management. These thoughts arise from the consideration that China's pollution is mainly a result of mismanagement and that limited economic capacity makes it impossible to allocate sufficient financial resources for pollution prevention and control. We must rely on powerful management to prevent the situation from further worsening. These three thoughts behind our policies represent the crystallization of our long-standing practice in the field.

During this time, China also formulated eight regimes. These were the Environmental Impact Assessment Regime, the "Three Synchronizations" Regime (i.e. design, construction and operation of measures for pollution prevention should be carried out at the same time as the major engineering part of the project), the Pollution Fee Regime, the Environmental Objective Responsibility Regime, the Comprehensive Quota Examination Regime for Urban Environmental Management, the Permit Regime, the Time-Limit Management Regime and the Pollution Concentration Control regime. Meanwhile, we also worked out a number of concrete regulations and measures to go with these regimes. All of this formed a relatively complete framework, which changed management from qualitative to quantitative and from fragmented administrative orders to a binding system, laying a solid foundation for our efforts in the field.

During this period, our legislative drafting efforts also made great headway. We successively formulated four laws on pollution control, including the Law on Environmental Protection, the Law on Atmospheric Pollution Prevention and Control, the Law on Water Pollution Prevention and Control, and the Law on Marine Environmental Protection. This number rises to 13 if we include laws on the conservation of natural resources. At the same time, we issued several hundred administrative and local regulations to implement these laws. A preliminary legislative framework for environmental protection had taken shape.

There is an old saying in China: "there won't be any bounds if there are no rules." Thanks to the rules which we established gradually in the 1980s, we now have principles to follow and laws to observe, a solid step in exploring the bounds of our path to environmental protection with Chinese characteristics.

In the opening and reforming years of the 1980s, we set up comparatively effective

management institutions in the central and local governments and carried out efficient management in accordance with laws, policies and plans. Under the circumstances of doubled economic growth, environmental problems did not worsen at the same speed and environmental quality remained roughly at the level existing at the beginning of the decade. Certain areas even improved their environment. This shows that China has adopted correct and effective environmental policies, which suit the country's unique conditions.

International friends often ask me about the meaning of "environmental protection with Chinese characteristics." My answer is: to rely solely on developed countries' "Western medicines" would not be able to cure China's persistent environmental ailments. We need to take into consideration the real situation and find out practical and functional "Chinese medicines" to deal with our problems. The three major environmental policies and accompanying management regimes set up in the past 10 years or so have proved to be effective remedies for environmental problems.

### **3. The Development and Expansion of Environmental Protection Activities**

China determined to practice a socialist market economy in 1992. This was another qualitative jump in terms of reform and "open door" policies. It was also in the same year that the United Nations held the Conference on Environment and Development in Rio de Janeiro, Brazil ("UNCED"), beginning a new era in environmental protection. Similarly, China's environmental protection entered a new phase of development.

Twenty years ago, there was almost no environmental protection to speak of in the country. Twenty years later, reform and open-door policies have brought about significant changes. China has opened its eyes to see the world and, likewise, the world community has come to know China. After braving wind and rain in the past 20 years, the seedling of environmental protection in China has finally matured, tall and strong.

In 1992, China sent a large delegation to UNCED, and I attended as deputy-head of the delegation. Before the conference, and in order to coordinate the positions of developing countries, we invited ministers from 41 countries for a Beijing Conference. The resulting document, the "Beijing Manifesto" expounded these countries' positions and viewpoints toward the world environment and development and had an extensive influence. At the Rio meeting, China worked closely with the Group of 77 developing countries (Group 77), and we jointly put forward position documents and draft resolutions in the name of Group 77+1, which became foundation documents for North-South negotiations. When debates stalled and negotiation stopped, China, at the request of various sides, played the role of mediator and promoter. As a large developing country, China made important contributions to the success of UNCED.

UNCED was also of unusual significance to myself, because I was honored with the Sasakawa Award (i.e. the UN Environmental Award) at the conference. I knew very well that this was not only a commendation to myself, but also confirmation from the world community of the value of China's efforts in creating a path of environmental protection with Chinese characteristics during its reform and opening period. My colleagues were especially encouraged by the event. The results of their many years of hard work finally won the recognition of

the world community.

I drafted a policy report entitled "China's Ten-Point Policy for Environment and Development" right after the conference. In the report, I made it explicitly clear that it was necessary that China follow a sustainable development strategy in its modernization process, which was well accepted by the top leaders of the government. The Party Central Committee and the State Council soon transmitted the report throughout the country. Immediately afterward, a sustainable development strategy became a long-term guiding principle in China's Agenda 21, which was compiled by concerned departments under the State Council. Later in 1994, at the Third Plenary Session of the 14th Congress of the Chinese Communist Party, the concept was further confirmed as the strategy to follow in China's future development.

Since 1992, environmental protection in the country has moved from pure pollution control to comprehensive management and ecological construction. In terms of pollution control and management, we have prioritized control and management of big rivers and lakes, such as the Huaihe River, Haihe River, Liaohe River, Taihu Lake, Dianchi Lake and Chaohu Lake, and initiated air-pollution control in Beijing city and marine-pollution control in Bohai Bay. Altogether more than 60,000 enterprises with serious pollution were closed down across the country. Moreover, environmental investment increased to 1% of GDP in 1998, which was unprecedented in China and close to the level of developed countries.

In terms of ecological construction, we have practiced policies such as closing hillsides to facilitate reforestation, returning farmland to forests and returning farmland to lakes and grasslands. We have undertaken natural forest conservation projects and retrained over a million lumbermen to be tree planters. We have carried out enthusiastic soil conservation at the upper Yangtze River and Yellow River valleys. We have fostered protective forest belts in the ecologically fragile northern part of China, building a magnificent green Great Wall that stretches over half of our territory.

In terms of the conservation of natural resources, we have implemented strict protective measures for farmland and followed the policy that whoever uses farmland will need to compensate for the use to guarantee a total land balance. In offshore areas, we have practiced a general rehabilitation system to protect fishery resources. In terms of the conservation of mineral resources, we have closed down a large number of small mines equipped with outdated machines that cause huge damage to resources, and have engaged in effective efforts to comprehensively use solid wastes and recover wastes and worn-out materials.

The ecological environment in China is experiencing a transitional "destruction to recovery" period. We are confident that as long as we work consistently, the environment will change for the better in 20- or 30-year's time.

In 1993, my job changed from that of a government official to that of a congressman, and I became chairman of the Committee for Environmental Protection and Natural Resources Conservation of the National People's Congress. Although my role is different from before, my responsibility for the environment remains the same, and I am still working hard for the cause.

Protecting the environment in China depends on management and control. On what does management depend? It depends on legislation. On what does legislation depend? It

depends on science and technology and appropriate investment.

To facilitate legislation has been my most important task since I joined the National People's Congress. Our work over the past few years has predominantly consisted of three things. Firstly, we design and build legislative systems for environmental protection and natural resource conservation. As for pollution control, we have revised and formulated laws on air, water, solid wastes and noise. As for natural resource conservation, we have participated in revising or formulating laws on mineral, water, forest, land and energy resources. Encompassing the Grassland Law, Wildlife Protection Law, Fisheries Law, and Water and Soil Conservation Law, we have generally crafted a legislative framework for the environment and resources. As an enhancement to this framework, there is a provision in our amended Criminal Law addressing the "destruction of environmental resources," which is the first time we have criminalized pollution and resource destruction. This was put into practice without delay, effectively deterring environmental criminals.

Secondly, we monitor law enforcement and implementation. Whether legislation plays any role depends on enforcement and implementation. However nice legislation may be, without enforcement, laws are nothing but mere scraps of paper. Ever since 1993, and in order to encourage implementation of related laws, we have organized law enforcement inspections in 29 provinces, municipalities and autonomous regions, and examined hundreds of cities and a huge number of factories. To a certain extent, we have changed the situation in which laws are not respected, enforcement is not strict and violation is not dealt with, thus laying the foundation for the rule of law in the protection of the environment and natural resources.

Thirdly, we mobilize public opinion to enhance environmental monitoring. In today's modern society where information is highly developed, the role of the media regarding social behavior is more obvious than ever before. Therefore, media monitoring is of great importance. Since 1993, we have mobilized hundreds of mass media institutions for a campaign called "China's Environmental Protection Activities for the Century." We use newspapers, radio and television to commend organizations upon their good enforcement and to expose and criticize others for weak efforts or destruction of the environment in order to create favorable and powerful public opinion for environmental protection at large in society. For seven years, this activity has covered every corner of the country, attracting over 6,000 reporters who have published nearly 50,000 news articles and reports, touching off strong social responses and meeting with warm public reception. For example, newspaper reports on the serious pollution of the Huaihe River drew the immediate attention of the central government, which lost no time in implementing a river control and management project. The project has by now achieved preliminary results. The coastal area campaign of last year brought an overall inspection of the coast of the country, and provided us with additional ideas on marine pollution control. The theme of this year's campaign is "Love our Yellow River." More than 50 reporters took part in the activity and drove from the source of the river to where it met the sea, covering a distance of 20,000 kilometers. They commended whoever cared for the river and exposed whoever damaged it, achieving great success. Cradle of the Chinese nation, the Yellow River has always been our mother river, which we can never do without. As regards the pollution of the river, we have no other alternatives but setting out for control and management. "China's

Environmental Protection Activities for the Century” has turned out to be an effective media monitoring method for law enforcement.

#### **4. My Dreams and Expectations**

There are such words in the Analects of Confucius: “Confucius said while standing by a river that water was running past day and night, and so quickly.” Even Confucius felt that time flew by quickly just like the passing of water in a river. How true it is. Before I knew it, thirty years passed. Although environmental protection in China has endured many hardships, the cause, which is like a ship, has after all broken solid ice, cleared away clouds on its way, hoisted the sails and set out on a journey in fair weather.

Now, we are just about to enter a new century. Every one of us is concerned with the future of our environment in the next century. At this moment, I feel so much and have many dreams and expectations.

I wish that one day my grandchildren will enjoy themselves happily in the clear stream of our hometown, just as I did in my childhood. I wish that green mountains and rivers will decorate their dreams and that golden fields will be full of hopes.

I wish that the sky will always be blue and marked with white clouds, rivers will always be clear with fish playing contentedly, vigorous eagles will always soar to great heights, birds will always be singing happily on top of trees, the polluted habitat will never be polluted any more, and the silent spring will never be silent again.

I wish that one day barren hills will be covered with green vegetation, dry land will be blessed with sweet rains, wild floods will no longer roar with rage and burning hot waves will never wreak havoc.

I wish that one day every valley will blossom with flowers of hope, every brook will dance joyful dances, all wasteland will turn green and all lives will receive concern and love from heaven and kind treatment from mankind.

I like the following words: “today’s sun is different from that of yesterday and the sun tomorrow will be even better than today.” I am confident that as long as we work concertedly, these dreams will finally come true. In conclusion, I would like to put forth for consideration the following advice from a veteran environmental worker to the people of the Earth Village:

“Those who destroy their homeland surrender their future.”

“Those who protect the environment are tomorrow’s champions.”

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### Professor Qu Geping

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