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CLIMATE CHANGE: The EVIDENCE and CONSEQUENCES

Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level.

—Fourth Assessment Report, United Nations Intergovernmental Panel on Climate Change, February 2007

Overcoming Denial

In his book on global warming, *An Inconvenient Truth*, Al Gore quotes Winston Churchill: "The era of procrastination, of half measures, of soothing and baffling expedients, of delays, is coming to its close. In its place we are entering a period of consequences."[1] Churchill wrote these words in 1936 with a storm gathering in continental Europe that would have unprecedented consequences, culminating in the Jewish

Holocaust. People on both sides of the Atlantic did not want to believe it: denial was deep and broad.

We are facing another such time, one of equal if not greater danger to human beings and our planet.[2] But in the case of climate change, the evidence is even clearer than was the Nazi threat in 1936. In February 2007, the United Nations Intergovernmental Panel on Climate Change (IPCC) issued the first part of its Fourth Assessment Report: "The Physical Science Basis," with two more parts to follow on consequences and mitigation efforts.[3] In this report, the overall assessment is "unequivocal" confidence that global warming is under way, and "very high confidence" (90 percent) that human activities are the cause. The main points elaborating on this judgment are as follows:

1. The "greenhouse" gases—carbon dioxide, methane, and nitrous oxide—have increased substantially since the Industrial Revolution (1750) and now far exceed pre-industrial concentrations.
2. The global increase in carbon dioxide is due mainly to fossil fuel use.
3. The concentration of carbon dioxide in the earth's atmosphere "exceeds by far the natural carbon range" over the last 650,000 years.
4. Many long-term changes in climate change have been observed at global, continental, and regional levels, including Arctic temperatures and ice as well as ocean salinity and wind patterns, resulting in "extreme weather including droughts, heavy precipitation, heat waves, and the intensity of tropic cyclones."
5. Hotter temperatures and rises in the sea level will "continue for centuries," regardless how much humans reduce their carbon emissions, and it is "very likely" (90 percent) that heat waves, droughts, and extreme weather will become more frequent.
6. The IPCC projects a possible global temperature rise of up to 6°C by 2100, with its best estimate a 4.5°C increase during this century.

This conclusion may seem benign on the surface—4.5°C doesn't sound very significant. However, when we recall that during the last ice age the global temperature was only 5°C cooler than now, we realize the difference that a small increase or decrease in global temperature can make. Moreover, the IPCC is a conservative organization. It reports the consensus view of hundreds of scientists who study articles on

climate change published in peer-reviewed journals. It does not conduct its own research but assesses all of the science on climate change considered credible by the world's scientists. Australian scientist Tim Flannery notes in his book *The Weather Makers* that the IPCC report is "very conservative":

> The outcome is that the pronouncements of the IPCC do not represent mainstream science, nor even good science, but lowest common denominator science—and of course delivered at glacial speed. Yet in spite of its faults, the IPCC's assessment reports, which are issued every five years, carry weight with the media and government precisely because they represent a consensus view. If the IPCC says something, you had better believe it—and then allow for the likelihood that things are far worse than it says they are.[4]

It is necessary to underline this statement because climate change deniers continue to exist. To the degree that any scientific knowledge is reliable, the work on climate change is. As Al Gore notes, in a study of 928 articles on climate change appearing in peer-reviewed journals, none cast doubt on global warming.[5] However, in articles on the subject appearing in the popular press, 53 percent claimed there were "two sides" to the issue. It is understandable why many people doubt the science, given the propensity of the media to create a conflict for the sake of reader interest. However, in light of the IPCC's recent report, such skepticism is irresponsible. The first step in dealing with a major planetary crisis, as Churchill reminded us in 1936, is to overcome denial. As Donald Kennedy, editor in chief of *Science*, has said, "Consensus as strong as the one that has developed around this topic [climate change] is rare in science."[6]

Since the publication of the IPCC report, the 2007 Nobel Peace Prize has been awarded to Al Gore and the IPCC committee. This is a stunning witness to the seriousness of climate change: it is, the committee suggests, a matter of "war and peace." In the words of the award, it was given to those fighting global warming because "greater competition for the earth's resources" could result in "increased danger of violent conflicts and wars, within and between states."[7] Climate change is now an issue of human—indeed, of planetary—security. It is a more total and permanent threat to security than the so-called war

on terror. Moreover, the final Synthesis Report of the IPCC issued in November 2007, paints an even grimmer picture than did the February 2007 release, with more Arctic ice melting and greater emphasis on immediate, world-wide action. [8] Why, then, are we hesitating? What more do we need to know in order to respond as people did in World War II?

One reason for resistance may be ignorance—not ignorance that climate change is occurring, but ignorance of what its consequences will be. Future scenarios often focus on particular events in particular places on the planet—cyclones, droughts, flooding, food shortages, melting glaciers. These occurrences sound disturbing, but many people suppose either that they personally will escape the worst forecasts or that scientific know-how will save us as it has in the past. But the projected future is more ominous: it is not only particular extreme events from a gradual temperature rise, but rather a globally degraded environment for living things when temperatures reach the tipping point, the point at which the rise is irreversible. If temperatures were to rise gradually over the next century, allowing people, animals, and vegetation time to adjust, then a comparable gradual diminishment of greenhouse gases might be the appropriate action. But that is not what is happening. Already, according to the IPCC Fourth Assessment Report, the *rate* of temperature increase on our planet since the Industrial Revolution is unprecedented. Once temperature increases reach a certain level, a disturbing phenomenon occurs: positive feedback. James Lovelock describes it in these words:

> What makes global warming so serious and so urgent is that the great Earth system, Gaia, is trapped in a vicious circle of positive feedback. Extra heat, from any source, whether from greenhouse gases, the disappearance of the Arctic ice or the Amazon forest, is amplified, and its effects are more than additive. It is almost as if we lit a fire to keep warm, and failed to notice, as we piled on the fuel, that the fire was out of control and the furniture ignited. When that happens, little time is left to put out the fire. Global warming, like a fire, is accelerating and almost no time is left to act.[9]

Scientists are especially concerned that positive feedback is causing the melting of Arctic ice to accelerate at a tailspin rate, with far-reaching

effects on the climate of North America and Europe. The process works like a loop, with warmer temperatures and melting reinforcing each other. Snow and ice reflect sunlight and reduce global warming, but when ice begins to melt, more open water appears. Whereas ice reflects incoming solar radiation like a mirror, hence stabilizing temperature, the open sea absorbs heat. As the water warms up, it puts even more pressure on the edge of ice adjacent to it, hence contributing to a faster melting rate. Each year, the pace of melting quickens and will eventually reach the tipping point at which the remaining ice collapses under the explosive melt. Rapid melting of huge ice masses will cause the sea to rise several meters, flooding islands and low-lying coastal areas. A recent dramatic announcement made by the U.S. National Ice Center illustrates the seriousness of this concern: "Northwest Passage is wide open for shipping." The fabled polar shipping route was almost completely clear of ice in August 2007—an unprecedented event. As the scientists point out, this means that next year's melt season will begin with a much-reduced base of ice, thus speeding up the process toward the time when the entire polar region, including the North Pole, would be ice free in the summer. That time is now predicted to be 2030.[10]

Since the publication of the 2007 IPCC report, the news media has been full of studies suggesting that positive feedback appears to be stronger and faster than expected. For example, a recent study claims that the capacity of the earth's carbon sinks—its oceans and lands—to absorb greenhouse gases is diminishing, raising the probability that global warming will occur more rapidly and dramatically than reported by the IPCC. As the oceans and lands respond to global warming, they in turn can absorb less heat, thus contributing to greater climate forcing. As one of the researchers remarked, "It's a positive feedback whereby sinks appear to be responding to global warming in a way that increases global warming. It's not good news."[11]

But most of us do not see an out-of-control climate when we wake up each morning to start our day. In many parts of the world, things seem fine. This is because there is a built-in delay before the dire consequences of global warming become evident. The climate system of the planet is large and tough, able to take a lot; if it were not, it would be changing all the time. "Over the past two million years, even as the temperature of the earth has swung wildly, it has always remained within certain limits. The planet has often been colder than today, but rarely warmer, and then only slightly."[12] Hence, the self-reinforcing warming process that we humans have set in motion since the Industrial Revolution is a

rare and profound event, especially in its rapidity of change. However, its effects are not immediate—and thus we have difficulty seeing the urgency for action. Even if greenhouse gases were held steady at today's levels, the full effect of our emissions would not become evident for several decades. This is because the whole system, the entire planetary climate, must heat up in all its parts—warming the air and the surface of the land, melting sea ice and glaciers, and, most important, heating up the oceans—a complex and uneven process.[13] Elizabeth Kolbert makes a chilling comment on this fact: "The delay that is built into the system is, in a certain sense, fortunate. It enables us, with the help of climate models, to foresee what is coming and therefore to prepare for it. But in another sense it is clearly disastrous, because it allows us to keep adding CO_2 to the atmosphere while fobbing the impacts off on our children and grandchildren."[14]

Kolbert's remark helps to unmask the strange dilemma that global warming presents: for a long time things will be fine, but then, suddenly, perhaps within a decade or two, it will be too late.[15] Once a significant warming event has started, such as the melting of the Greenland or the West Antarctic ice sheet, it is irreversible. We are not used to such a scenario—a catastrophe, with built-in delays, that tips suddenly. It has been compared to playing in a rowboat. "You can tip it and just go back. And then you tip it and you get to the other stable state, which is upside down."[16] Since most of human history has taken place during a relatively steady-state climate, we continue to deny that immediate and profound changes in our behavior are necessary. However, the nature of this phenomenon, global warming, is such that we cannot wait until the evidence is certain. The 2007 IPCC Fourth Assessment Report is telling us that the evidence of global warming is "unequivocal." If we then understand and accept the peculiar character of global warming—that once warming begins it is self-reinforcing and inevitable—action becomes imperative.

Climate is our planet's largest, most important, and most vulnerable interlocking system: it allows for and sustains life. Destablizations have consequences; we cannot allow massive changes to take place and believe we can carry on with our lives as usual. Therefore, a sober, prudent assessment of our situation behooves us to take action now. It is not apocalyptic or radical to do so, but simply common sense. We insure our homes, our cars, and our own bodies on slighter evidence that they will meet with disaster. How then can we turn from the threat of climate change as less plausible, less important?

Climate change, quite simply, is the issue of the twenty-first century. It is not one issue among many, but, like the canary in the mine, it is warning us that the way we are living on our planet is causing us to head for disaster. We must change. All of the other issues we care about—social justice, peace, prosperity, freedom—cannot occur unless our planet is healthy. It is the unifying issue of our time; it is our "World War II," as it were: the concern that must develop into a worldwide movement for change of mind and change of action.

Internalizing Vulnerability

A radically different understanding of ourselves is necessary. Climate change is making us realize how profoundly dependent we are on the health of our planet, graphically illustrated by each breath of air we take. In a powerful description of our total dependence on the atmosphere, the great aerial ocean that regulates the planet's temperature and connects everything with everything else, Tim Flannery raises our consciousness:

> It is in our lungs that we connect to our Earth's great aerial bloodstream, and in this way the atmosphere inspires us from our first breath to our last. The time-honoured custom of slapping newborns on the bottom to elicit a drawing of breath, and the holding of a mirror to the lips of the dying are bookmarks of our existence. And it is the atmosphere's oxygen that sparks our inner fire, permitting us to move, eat and reproduce—indeed to live. Clean, fresh air gulped straight from the great aerial ocean is not just an old-fashioned tonic for human health, it is life itself, and 13.5 kilograms of it are required by every adult, every day of their lives.[17]

We should tack a copy of this quotation to our bathroom mirrors, to be read slowly every morning.

In order to begin to act differently, we must submerge ourselves in a different view of who we are. We can begin to do this by noticing our own breath, the taking in of life-giving oxygen second by second

by second as we traverse the time, whether short or long, between our birth and our death. What we do during our lives, who we become and what we accomplish—all of this depends on the simple, continuous act of breathing. We must begin to reflect upon ourselves from the perspective of the basics, not in terms of our "additions." We must consider what allows us to exist in the first place, not what we can accomplish. This exercise is similar to what alcoholics realize when they "bottom out," acknowledging that they have no control over their lives and must "let go and let God" (in Twelve Step parlance). In a related move, we addicts of the high-consumption lifestyle that is changing the very composition of the air we breathe must let go of our greedy, controlling practices and respect the real basis of our existence, earth's atmosphere.

Once we make this fundamental move, we open ourselves to understanding our dilemma in a new way. We begin to see how the interlocking systems of our planet are changing under the weight of the human population and its desired lifestyle. Our minds become available to accept an interpretation of our world that is dramatically different from the modern, individualistic picture of human beings as superior to—possessing and controlling—the rest of nature.

A few examples of our strange new weather can serve as wake-up calls for moving to a different picture of ourselves. We who have become accustomed to assuming that the "weather" is a safe subject for casual conversation, with its comfortable rhythm of the seasons and the expectation of snow in winter and rain in the spring, are in for a shock. The "new weather" may be nothing like this; in fact, one of its features that we have noted is its *unpredictability*. Flannery states that "in response to heating or cooling, for example, our atmosphere can at once transform itself from one climatic state into something quite different. This allows storms, droughts, floods or wind patterns to alter on a global level, and to do so more or less at the same time.[18]

Thus, global warming can change the climate in jerks, jumping from one stable state to another, as with the rowboat example. This is one of the most shocking wake-up calls we can imagine, for it means that the system that is the unacknowledged, taken-for-granted basis of our lives in all its facets—physical, emotional, cultural, economic—cannot be counted on. The jerky, unstable, unpredictable character of the weather means that we cannot continue with "business as usual."

Another wake-up call is the earth's melting ice. The Himalayan Glaciers, among the most affected by global warming, "contain 100 times as

much ice as the Alps and provide more than half of the drinking water for 40 percent of the world's population—through seven Asian river systems that all originate on the same plateau."[19] The consequences of their melting—the serious depletion of drinking water for 40 percent of the earth's population—are staggering. Or consider the Siberian permafrost, frozen since the last ice age but now melting. This area of tundra contains seventy billion tons of stored carbon, which is becoming unstable as the permafrost melts. The carbon in these Siberian soils is ten times the amount emitted annually from human-generated sources.[20] What is projected here is an ecological landslide of mammoth proportions. We need to use our imaginations to project what dramatically different weather means in concrete cases.

These wake-up calls illustrate that we have entered a time when the world will be different from the one we have known. It is not simply that droughts, storms, heat waves, and hurricanes will become more frequent. Rather, it is that we are close to the tipping point of radical change that will have consequences for the way we eat and work, travel and conduct business, raise our children, practice medicine and law, build cities, grow our food, and so on. The radical unpredictability of earth's climate is new information to most people. The weather used to be something you could count on: there might be an unusually hot summer or an exceptionally cold winter, but these were anomalies in an otherwise trustworthy pattern. This meant that at the deepest unconscious level, we could "count on" the climate—that is, on the atmosphere that is the basis of all life. We humans may have seldom thought of the weather this way—as the ground of existence—but nonetheless that assumed confidence infiltrated our sense of security at a very basic level. If it is now possible—indeed probable—as the best science is telling us that climate unpredictability, runaway heat, uncontrolled melting, and other dire events lie in our future, how can we any longer count on "life as we have known it"? The answer is that we cannot, and this is the truth we must face up to.

The scientists are not saying that it is inevitable that we will irreparably damage the climate that nurtures life on our planet—but it is possible, and probable, if we do not take action. Our situation is similar to predictions that the Allies would lose the Second World War unless they mobilized all of their efforts toward stopping the rising fascist menace. In the case of climate change, however, the relationship between cause and effect is not as clear as it is in a war. As George Monbiot points out, the relationship "seems so improbable." "By

turning on the lights, filling the kettle, taking the children to school, driving to the shops, we are condemning other people to death. We perform these acts without passion or intent. Many of those things we have understood to be good—even morally necessary—must now be seen as bad."[21]

One of the best illustrations of this new reversal of what is "good" and "bad" is aviation travel. A single return flight between New York and London produces 1.2 tons of greenhouse gases per passenger, the equivalent of a year's allowable emissions if emissions were rationed fairly among all of the planet's human beings.[22] In discussing "the distance [we] must travel to visit friends and partners and relatives on the other side of the planet," Monbiot notes that "love miles" may be our undoing: "The world could be destroyed by love."[23] Many people who would not drive, let alone own, an SUV think nothing of flying all over the world for pleasure or business or even to attend conferences on global warming! It appears that one of the lifestyle changes that middle-class humans worldwide must make is a severe limitation on air travel. Such a cutback will, of course, drastically change life as we know it. However, "life as we know it" is a very recent phenomenon and, in any case, is available only to a small percentage of the world's population. Monbiot reminds us that the world we "know" and take for granted is only approximately fifty years old and is only for people "like us." It took a leap of imagination to conceive that people might fly long distances, that it was possible for many people to do so, and that it was possible for *you* and *me* to do so. Fifty years ago, no one thought of shopping in New York if you lived in Europe—it was not "natural" or "necessary" to do so. As Monbiot points out, since we constructed the alternative world of the twentieth century with its high-consumption travel, we also can construct another alternative world with low-consumption travel.[24]

Air travel raises another issue, a moral one: How can we be so presumptuous as to insist that simply because we privileged human beings have "grown accustomed" to unlimited plane travel, it is our "right" even if it means the degradation of earth's atmosphere so that poorer human beings and other life-forms must suffer the consequences? Aviation, for those who can afford it, now becomes a moral issue. As we begin to realize the universality, complexity, and vulnerability of the atmosphere, climate change takes on a new urgency. We must reduce the number, length, and speed of all forms of travel, using other technology, such as the Internet, to communicate globally. We must

begin to imagine how we can live in an alternative world to the one modernity has constructed. A postmodern world will be different—not necessarily a less happy one for human beings, but certainly one in which people, especially people like us, must find abundant life without consuming so much. Al Gore illustrates this point when he compares the effects of new versus old technology:

> Old habits plus old technology equals Predictable Consequences
>
> Old habits plus new technology equals Dramatically Altered Consequences[25]

Our old travel habits when confined to walking, bicycles, horses, ships, and trains resulted in considerably less carbon dioxide emissions than when linked to cars and planes. We have not changed our desire and intention to move around the world, limited only by our ability to pay; what has changed is the technology that moves us, resulting in energy expenditures at a drastically different level. We see the same pattern in warfare conducted with bows and arrows, muskets and rifles, versus contemporary weapons technology and levels, not to mention nuclear bombs. War is no longer soldiers with rifles fighting each other; now it is wholesale demolition of cities and citizens. Travel is no longer the occasional movement of people to new places with the help of legs, wind, and steam; now it is the daily commute of millions from home to work by car and the limitless use of air travel for all who desire and can pay for it. *We cannot continue to live as we have in the past in the world we have created. We have created these new conditions, and now we must learn to live within them.*

This should not be impossible to do. Think back, if you are fifty years old or older—or imagine, if you are younger—to a time when people had small houses, one bathroom, maybe a family car, minimal electronic equipment (a radio, a TV), walked to school, took the subway or train to work, and traveled by plane perhaps once a year. We will not return to such a time, nor am I suggesting we try to do so. This memory or imaginative exercise is only to illustrate that we *can* live differently and not be unhappy. A widely known statistic is that Americans have never been happier than they were in 1957—when many had the lifestyle described above (or the chance at it) and before rampant consumption became the dominant lifestyle.[26] Once we get

over the paralysis of believing that a different world is necessarily a worse one, we can free our imaginations to construct a different and perhaps a better world—one in which sustainability and the just distribution of resources for all of the earth's inhabitants will be priorities. We must accommodate our picture of the good life to fit within the earth's economy, for unless we do so, there can be no good life for any of us.

> In effect, 1986 marks the year that humans reached Earth's carrying capacity, and ever since we have been running the environmental equivalent of a deficit budget, which is only sustained by plundering our capital base. The plundering takes the form of overexploiting fisheries, overgrazing pasture until it becomes desert, destroying forests, and polluting our oceans and atmosphere, which in turn leads to the large number of environmental issues we face. In the end, though, the environmental budget is the only one that really counts.[27]

Facing Consequences

The consequences of global warming are no longer in doubt. This is the conclusion of the second section of the 2007 IPCC Fourth Assessment Report, titled "Climate Change Impacts, Adaptation and Vulnerability," which evaluates the impact of climate change on different parts of the world.[28] As British scientist Michael Perry, one of the authors, comments, "For the first time we are no longer arm-waving with models, [speculating that] this might happen. This is what you call empirical information, on the ground. We can measure it."[29] Moreover, the consequences will be unjust. North America and Western Europe have contributed two-thirds of carbon dioxide emissions, while only 3 percent has come from Africa. However, the northern, richer countries will suffer fewer adverse consequences, and they are also better able to pay for expensive adaptive measures to reduce the impact. These countries are already turning seawater into drinking water, erecting flood barriers, cultivating genetically altered drought-resistant seeds. Nothing of the sort is happening in Africa and in similar high-risk

areas. Yale economist Robert O. Mendelsohn notes in relation to the IPCC's conclusions, "The original idea was that we were all in this together, and that was an easier idea to sell. But the research is not supporting that. We're not in it together."[30] This conclusion might appear to undercut the sense that we must take unified action in order to curb greenhouse gases. A chink has now appeared in the wall, and it will be very tempting for large, industrialized countries in northern climates to focus on insulating themselves against the worst effects, at least for the next generation or so. As Rajendra Pachauri, the chairman of the IPCC, remarks, "The inequity of this whole situation is really enormous if you look at who's responsible and who's suffering as a result."[31] In even sharper words, Henry I. Miller of Stanford University adds, "Like the sinking of the Titanic, catastrophes are not democratic. A much higher fraction of passengers from the cheaper decks were lost. We'll see the same phenomenon with global warming."[32] Even China, which has recently surpassed the United States in annual carbon dioxide emissions, nonetheless has contributed to date only 8 percent since 1850, whereas 56 percent has come from the Western countries.[33] Therefore, as a growing company of developing countries and environmental lawyers insist, the first world owes a climate debt to the third world. As Pachauri comments, "It's the poorest of the poor in the world, and this includes poor people even in prosperous societies, who are going to be the worst hit. This does become a global responsibility in my view."[34]

Hence, although it may be possible for the first world to focus on adaptive measures to protect itself in the near future, it is neither just to do so nor rational in the long run since giants such as China and India are quickly becoming major emissions polluters. Thus, we Westerners must "face the consequences" not only for ourselves, but also for the others, especially the poorest and most vulnerable, who will suffer from our profligate consumerism. The climate change scenario is similar to other situations in which the rich and the poor experience vastly different life possibilities and outcomes. It is surely no accident that the same anthropology that fuels market capitalism—the insatiable desires of the individual—is emerging in climate change, the twenty-first century's most serious crisis. It is another piece of evidence that this anthropology is unjust and unsustainable. Unless we rethink our sense of humanity toward a radically communitarian view, we will once again fall into the lie of short-term individual benefit while ignoring the truth of our long-term and basic interrelationship and in-

terdependence. In this regard, climate change is *not* like the sinking of the *Titanic*, for while the rich countries may fortify themselves for the short term, there is no permanent escape from our common fate—we all must breathe the same air.

So the stakes are higher than we thought. We must now, in addition to seeing ourselves in the common lot of humanity, realize that there are vast differences among human beings in terms of responsibility for the crisis as well as those suffering its consequences. The two groups are not identical. This realization underscores the inexorable connection between ecological and justice issues. The days are long gone when people who sounded the alarm about global warming were considered "green freaks" who ought rather be concerned with human poverty. We now recognize the overarching planetary totality in which all of us live, thus bringing issues of justice and sustainability under the same roof. But we also see the split that market capitalism has made—the split between the wealthy and the poor—in stark new terms. Not only do the poor of the world enjoy fewer benefits from consumerism, but now with climate change—one of the consequences of our consumerism—their very survival is at stake. They did not create the problem, but they will reap the consequences. The fact that we wealthy nations did not "intend" these consequences is not important. We are nonetheless responsible for both cutting our emissions drastically and helping the most affected countries lessen the blow with mitigating technology.

It used to be politically incorrect to speak of adaptation to global warming, since this terminology implies adjusting to it rather than eliminating it. We now know that we cannot eliminate it; at best, with all forces mobilized, we might be able to keep the temperature increase below 2°C over the next fifty years—and then hopefully maintain that level in the future. But, in the meantime and especially for our poorer brothers and sisters who did not cause this crisis, we need to develop and share mitigating strategies against famine, drought, floods, disease, and so on. We need to work on two fronts: reducing our emissions to keep them below the tipping point of catastrophe *and* sharing mitigating funds and technology with those who will experience the worst consequences. It is hard to imagine *not* doing these things: climate change is surely the most severe test we have ever faced, not only in regard to our own survival, but equally important, in regard to our "humanity." It is for this reason that "who we think we are" becomes of critical importance.

Contemplating Action

If we have reached the point where we have overcome denial of climate change, internalized our vulnerability to its effects, and recognized our particular responsibility for its consequences, perhaps we are now ready for the big leap: taking action. In Churchill's words, "the era of procrastination, of half measures, of soothing and baffling expedients, of delays" is over. Perhaps we are ready to face the music.

But this is easier said than done. In fact, we do not even know what to do, for the problem is so all-encompassing, so global, so broad, and so deep that it invites paralysis, not action. As Flannery comments, "When we consider the fate of the planet as a whole, we must be under no illusions as to what is at stake. Earth's average temperature is around 15 degrees C., and whether we allow it to rise by a single degree, or 3 degrees C., will decide the fate of hundreds of thousands of species, and most probably billions of people."[35] Our first reaction after accepting climate change is despair: we are overwhelmed by the importance and immensity of what faces us. We are not up to it, we say. We wish we were still in denial, able to eat, sleep, and be merry, able to return to innocence and ignorance. But that is not possible. Once we have accepted and internalized the evidence of climate change, we are caught. We must act.

There are many levels at which action must take place. The third installment of the IPCC Fourth Assessment Report on climate change deals with mitigation policies for reducing and eventually stabilizing global greenhouse emissions. The good news from this study is that technology is available and the economics favorable for doing the task. That is, we know how to drastically reduce greenhouse gases, and the cost, if we were to do so immediately and globally, would be about 3 percent of the global GNP—not an outrageous figure.[36] The bad news is hidden in the qualifying phrase "if we were to do so immediately and globally." If all economic and governmental institutions worldwide were to take the necessary measures, through taxes and incentives to ensure lifestyle changes throughout all levels of the human population, the task could be accomplished. We could stabilize greenhouse gas emissions so as to keep the global temperature at approximately 2°C by the end of the century. In other words, climate change is not necessarily an apocalyptic event that will destroy human life and other life on our planet. We know what needs to be done, and we have the

technology to do it. The third section of the 2007 IPCC report lays out specific mitigation technologies and practices currently available to reduce emissions in all sectors: energy supply, transport, buildings, industry, agriculture, forestry, and waste. Moreover, it suggests policies to realize these emission goals: regulations and standards, taxes, tradable permits, financial incentives, voluntary agreements, information instruments. Of course, it will be very difficult, complex, and messy to undertake this task, but it is not impossible.

The mitigation section of the report makes it absolutely clear that all levels of all societies must participate in *lowering emissions*, not just in trading or offsetting them. Already one sees the temptation of easy solutions emerging, such as paying a small fee to "offset" one's aviation or SUV emissions. Presumably the fees would plant trees in deforested areas or build clean power sources in developing countries. Thus, we first-world, well-off people could continue our energy-rich lifestyle with only a small fee to assuage our guilt. Not only are many such offset credits worthless, but they permit us to continue our irresponsible behavior—and to do so with an easy conscience.

The task ahead of us will take all of us working together with all that we have. The goal that we must reach—a stable global temperature with an increase of no more than 2°C—is so demanding, so serious, that it will take a coordinated global effort with the first world, the major polluter as well as the source of the needed technology and funding, leading the way. While some factions favor business incentives with others insisting that government regulation is the only path, the IPCC report recommends working on all fronts. As in the case of World War II, when government and business put aside their ideologies in order to mobilize all forces to win the war, such joint effort is necessary now. Global warming is not a contest between personal, business, and governmental levels to provide the solution: all are needed. To be sure, a smart emissions tax will encourage business to use its imagination to reduce emissions, with the result being more efficient cars, buildings, and forms of travel. Regulatory standards for electricity generation and for more efficient vehicles, buildings, and transit will also reduce our greenhouse emissions. And finally, individuals can reduce emissions by what they do in their personal lives—how they work, travel, eat, and play.

Behind all of these proposals for action at all levels is the problem hidden in the qualifying phrase "if we were to do so immediately and globally." *One critical issue is the motivation to act.* We must realize that the "problem" is in our heads and hearts as much as it is in the policies

of governments and of multinational corporations. As Monbiot points out, "In fighting climate change, we must fight not only the oil companies, the airlines and the governments of the rich world; we must also fight ourselves."[37] *We* are the enemy: our beliefs about who we are and what we are entitled to are as much at fault as the institutions that control trade and make war. In fact, our beliefs and our institutions are secretly connected. As Monbiot notes, governments know that the electorate wants them to fail with regulatory measures, for otherwise we would have to change—and "we can contemplate a transformation of anyone's existence but our own."[38] It is this connection between the personal and the political that makes change so difficult, for in a democracy the basic beliefs of citizens ultimately control the actions of institutions, both business and government. A change of heart will not save the planet, but the interconnection of the personal and the political must be acknowledged. In this provocative statement by Monbiot, the connection is clear: "I am sorry to say that only regulation—that deeply unfashionable idea—can quell the destruction wrought by the god we serve, the god of our own appetites. Manmade global warming cannot be restrained unless we persuade the government to force us to change the way we live."[39] In reality, the connection is a circle: *governments must force us to change the way we live, but we must elect legislators who will create the necessary regulations.* In a curious fashion, we must acknowledge our weakness, our appetites, our greedy (sinful?) disposition to live wrongly and falsely on our planet in order to elect lawmakers who will help us to live better! Hence, the goal of climate change action is "to encourage people not only to change the way they live but also to force their governments to make such choices easier."[40] Thus, Monbiot claims, climate change "must become the world's most powerful political movement."[41]

It is between these two poles—the personal and the political—that important work needs to be done. It is not the only work that needs doing, for every activity people engage in must change—from how we grow food and make cars to how we educate our children and take vacations. But the particular passage from personal belief to corporate regulatory action is a critical one. It contains at least three steps. First, we need to analyze how we middle-class Western human beings view ourselves and our place on planet Earth. Second, we need to suggest a radically different paradigm for our place. Third, we need to incorporate this new view into our institutions. Only if our basic assumptions about human life and its place change and are embodied at the institutional

level can we make the necessary paradigm shift in our thought and action. The problem is in our hearts and minds *and* in our laws and institutions: they influence each other in a delicate dance in which first one leads and then the other.

Two illustrations come to mind: first, the 1954 *Brown v. Board of Education* case before the United States Supreme Court, outlawing segregation in public schools. Many said at the time that hearts must change before action could occur, but, in fact, the sequence was considerably more complex. The law forced students to integrate, and over the next fifty years, changes occurred: while many segregated schools still exist (and some have even resegregated), the hearts and minds of the majority of white Americans have made progress toward appreciating equality in public facilities. Another example is the Canadian public health and educational systems. Both medical care and education are basically single-track in Canada (there is no large, separate private track for either). While Canadians rage against the inadequacies of both systems, they seem to realize the necessity of one track: in order for medical and educational services to be better for themselves, they must work for improvements in the entire system. They appear to want the government to help them retain a communitarian rather than an individualistic standard for human well-being. Hearts and minds need help to be better!

Thus, the dance between personal transformation and public regulation is necessary, with each allowing the other a turn at leading. We are facing a time when serious work needs to be done on both fronts: we must take a long, hard look at our picture of the human place on the planet, and we must mobilize as if for a world war to enact real lifestyle changes. The first of these tasks—the anthropological one—will be the focus of this book. Theologians and practitioners of religion have, I believe, a special responsibility for reflecting on the most basic assumptions about ourselves. Other cultural, societal, and intellectual fields of course do as well, so this task is a shared one. It is but one piece of the planetary agenda that climate change has set for the twenty-first century. When Monbiot considers governmental reluctance to spend money on climate change but a willingness to subsidize oil, coal, and other activities that lead to environmental destruction, he asks why "governments seem to find it so easy to raise the money to wreck the biosphere and so difficult to raise the money required to save it."[42] The answer lies with us, with hearts and minds that support such wreckage, even when we "know better," and the answer lies with laws that will help us change the way we live.