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## Earth: Our Lifeboat or Our Death-boat?

Richard G. Hodgson  
*Dordt College*

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## The Earth: Our Lifeboat or Our Death-boat?

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by Richard G. Hodgson

### Introduction:

#### Two Scenarios to Ponder

The Titanic Lifeboat Scenario. On the night of April 14-15, 1912, the passengers and crew of a large ocean liner south of the Grand Banks were presented with a difficult ethical dilemma. Their ship—their home for many miles—had struck a large iceberg on that calm moonless night. With its many water-tight compartments it was a marvel of technology, proclaimed as unsinkable. Indeed, on the dock as they had been departing from South Hampton one passenger had been told by a company employee, “God Himself could not sink this ship!”

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*Rev. Hodgson is Associate Professor of Planetary Sciences at Dordt College.*

Now those compartments were filling with icy seawater; the *Titanic* was sinking. The number of lifeboats available was insufficient for the occasion. It was not a case of “women and children first,” but “women and children, period.” Such was the chivalry of the time. No one argued for equal rights for men.

But the ethical question was this: *How many people do you put into a lifeboat?* There was of course the designed capacity number, but the night was calm. Could you crowd a few extras in? Should you row back to those crying for help as they swam in the icy dark waters near the sinking ship? Or would there be too many to rescue? Would they overwhelm your boat, and turn the lifeboat into a death-boat? Then no one would be saved.

*It is never easy to judge carrying capacity.* If the calm gives way to storm, if there are not enough provisions and rescue is long delayed, any lifeboat can become a death-boat.

*The Earth is our lifeboat and it must be managed in a sustainable way.* A decade ago human population, rising exponentially, was increasing by 194,000 people a day; now it is increasing at a rate of 257,500 a day.<sup>1</sup> This is the present surplus of births over deaths each day. There is some good news—annual population growth has declined from 2.0 percent to 1.7 percent a year between 1965 and 1993. Since, however, global population has risen in that period from 3.2 billion to 5.5 billion, it is as the environmental writer G. Tyler Miller says: “This 15 percent drop in growth rate is akin to learning that a truck heading straight at you has slowed from 100 km/hr to 85 km/hr while its weight has increased 72 percent.”<sup>2</sup>

One question has become extremely serious in the past decade. Where do you put the new people today that you didn't put them last week? Will there be any quality to their lives if they are being crammed into vast, squalid mega-cities, especially in the Third World?

Long ago God blessed us and told us and His other creatures to be fruitful and multiply (Gen. 1:22, 28, 8:17, 9:1). Uniquely in this case, both believer and unbeliever have followed His advice. We must remember the context in which this was said: we were all then endangered species. We human beings are expected as His image-bearers to exercise brain and good sense to judge when the lifeboat is full, not only for humankind, but for the other species as well over which we have been given stewardly care. *The lifeboat must be managed in a sustainable way.*

The gunwales of lifeboat Earth are rapidly lowering in the water; the life-supporting ecosystems are straining and some are breaking down. If a storm of adversity comes upon the Earth, the remaining support systems may well fail. *The lifeboat may become a death-boat on a massive scale.*

This scenario is not far-fetched. Don't tell us that, aided by technology, it is unsinkable!

A second scenario, the "Boiled Frog Syndrome." If you take a frog and plop him into a pan of hot water he will immediately jump out. But if you place him into a pan of water at room temperature, he will probably stay there, especially if you decorate the edges with greenery to make it look like a tiny pond. Now turn on the heat under the pan, very gently at first, then gradually increasing the temperature. As the water slowly heats to a boil the frog will *not* jump out because there is no decisive moment in the rising temperature that triggers a saving response. The frog dies because focusing upon the tiny moment by moment temperature changes he does not sense the larger picture of what is happening.

*People can be like boiled frogs too.* We would probably not stay in the pan like the frog, but if you make it a bit more complex with a few small ups and downs, we may be so focused upon the short run fluctuations that we fail to see the larger picture. For example, some people buy and hold on to stocks in losing companies because with day-to-day fluctuations in the stock market, there always seems to be hope the stock may recover. They want to hold on until they can get all their money out.

In the end their stock certificates may be good only for wallpaper.

Now we are involved in an enhanced Greenhouse Effect upon Earth. The laws of physics and chemistry are clear: humanly-caused increases of "Greenhouse gases" (gases that trap heat, like carbon dioxide and methane) in our atmosphere will bring higher global temperatures in coming decades and centuries. Significant climate changes will happen. Doubtless there are and will be many frogs who think there is no cause for concern or alarm.

### **The Three Horns of the Environmental Problem**

The global environmental crisis has three dimensions:

(1) An exponentially increasing human population in the world, with global human population now increasing more than 257,500 a day. *And the increase is increasing.*

(2) The use of energy and physical resources is also increasing exponentially, and at an even faster rate than the population (since recycling is still often neglected).

(3) Because we have yet to master effective recycling and reuse of materials, we have rapidly mounting waste disposal problems. "Mount Trashmore" is not confined to bad dreams. Landfills are filling up and being closed, putting more strain on those remaining. The Third World doesn't want our solid wastes any more. It is wake-up time!

These realities are now threatening our supporting ecosystems around the Earth.

While there are many dimensions to our environmental problems, I will focus briefly upon two things: (1) the enhanced Greenhouse Effect and (2) the decline of stratospheric ozone. It is imperative we understand what is involved, and what actions we should take to avert a major environmental disaster.

### **The Enhanced Greenhouse Effect**

*We are conducting a very dangerous experiment on a global scale today.* We are filling the Earth's atmosphere with billions of tons of carbon dioxide and other gases that are beginning to impact global temperatures, bringing about climate changes that may become irreversible.<sup>3</sup> This is not an experiment conducted in the confines of a test tube, or

even safely behind the walls of some vault, or far away on the surface of a distant planet. *We are doing this experiment in our own world, the only truly habitable planet we know.* Our future and that of our grandchildren is riding upon the results of an experiment of unknown consequences. We are gambling. We are betting every farm and every city in the world, risking a major tragedy.

We do not understand well how God's real world works ecologically—how all creatures are knit together into a community in which energy (largely solar) flows and materials must recycle. We think we can throw things away, but there is no "away." Our failure to deal with our waste problem can be our undoing. That includes the waste gases of our modern industrial civilization. We do not yet understand how all things are connected on this Earth—how we and the other species of this planet are bound together in the web of life.<sup>4</sup> But we are connected.

Our Western European civilization, driven by ignorance, arrogance, and greed, has a poor record of land and resource stewardship. We have made much of absolute ownership of land and resources by individuals, without recognizing that God is the true owner of all things as their Creator (Ps. 24:1, Ps. 50:9-12), and that we are called to be His stewards on Earth. We have allowed selfish exploitation of natural resources while the Church largely looked the other way! This must change. Christians must witness against this tradition by adopting a *simpler* lifestyle!<sup>5</sup>

### **The Greenhouse Effect Explained**

Some gases have a large heat-trapping capacity, hindering the re-radiation of heat in the infra-red wavelengths back into space, similar to the way glass windows in a greenhouse or car cause heat build-up on a sunny day. These "Greenhouse gases," notably carbon dioxide, methane, and CFC's (chlorofluorocarbons), raise global temperatures by blocking heat loss. Carbon dioxide is the most important, accounting for about half of the temperature change. Some Greenhouse Effect is helpful: traditionally before our industrial age it made Earth's mean temperature 30 degrees Celsius warmer than otherwise would have been the case. Without the effect our Earth would be largely frozen. Our concern here is not with the earlier

levels of these gases in our atmosphere centuries ago, but with the large humanly-caused increases in Greenhouse gases since 1860, and especially in the last 35 years. In the past 160,000 years (based on the study of Antarctic ice cores) carbon dioxide in our atmosphere never exceeded 280 ppm until the beginning of the Industrial Revolution.<sup>6</sup> In the early 20th century that limit was exceeded. Methane levels also began to rise. After a lag, global temperatures have also begun to rise. The laws of physics and chemistry, which reflect the nature of God's creation, will be obeyed! *All atmospheric physicists and climatologists are agreed that in coming decades and centuries global temperatures will*

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*rise. The only debate among them is by how much and how soon. (Don't be deceived by glib, uninformed "Talk Show" hosts who pretend otherwise. Remember the "Boiled Frogs!")*

The exact extent to which increased Greenhouse gases in our atmosphere have caused our rising global temperatures is yet unclear, but there has been a strong correlation between carbon dioxide and temperature levels over the past 120,000 years.<sup>7</sup> *This century has been as warm as any time in the last 160,000 years.* By 1958, when precise measures of atmospheric composition began to be recorded as part of a constant monitoring program, the carbon dioxide level had increased to 315 ppm because of the human use of fossil fuels, the clearing and burning of forests, and industrial activities. It is now accelerating, and reached 355 ppm in mid-1990.<sup>8</sup> *Unless human beings make major changes in energy and mineral resource use, the CO<sub>2</sub> will probably double from its 1900 level to about 600 ppm by the year 2050.*

Carbon dioxide is not the only greenhouse gas. Methane, a much smaller component in the atmosphere than CO<sub>2</sub>, is 20 to 30 times more effective in trapping heat, molecule for molecule. Methane in our atmosphere has already doubled, and is now increasing at a rate of 1 percent a year. It now accounts for about 15 to 20 percent of the human impact upon the atmosphere.<sup>9</sup> Methane will become a greater factor in future temperature rises.<sup>10</sup>

Another group of greenhouse gases are the chlorofluorocarbons, or "CFC's" for short, a humanly manufactured, not a natural chemical product. Used since the 1930s to refrigerate, air condition, and insulate, CFC's, when released into the atmosphere, are 16,000 times more effective than carbon dioxide in trapping heat, molecule for molecule. They also damage the ozone layer which shields the Earth's surface from dangerous ultraviolet radiation from the sun. CFC's now constitute about 20 percent of the anthropogenic contributions to the Greenhouse Effect.<sup>11</sup>

A fourth greenhouse gas is nitrous oxide (N<sub>2</sub>O) or laughing gas, which has increased in our atmosphere due to use of chemical fertilizers, deforestation, and fossil fuel use. Nitrous oxide is 200 times more effective than carbon dioxide in trapping heat, molecule for molecule. It now constitutes about 5 percent of the human addition to the Greenhouse Effect.<sup>12</sup>

*The global temperatures of the past century have been extremely mild compared with those of the past 160,000 years.*<sup>13</sup> Global temperature has risen 0.5°C. (about 1°F.) since 1900. This change is now accelerating! *Temperature increases are now frequent: the six hottest years globally in the past 100 years have all occurred in the 1980's and 1990, and compared with the last few thousand years this past century has been one of the warmest.* We are now entering new high-temperature territory when it comes to temperature records. The eight hottest years in the past 135 years for which we have precise records are, in order of decreasing temperature, 1990, 1988, 1987, 1983, 1981, 1989, 1980, and 1986.<sup>14</sup> New global record high temperatures have not been set since 1990, probably because the major eruption of Mt. Pinatubo in the Phillippine Islands has put a lot dust into the high atmosphere, deflecting some solar energy from reaching the lower atmosphere. Most of that dust is now settling. In the absence of more major eruptions, we should see new record highs in the late 1990s.

The prediction has been made that, given the present trends, carbon dioxide in our atmosphere will reach about 600 ppm by about A.D. 2050. At that time global surface temperatures are expected to be 2 to 5 degrees Kelvin higher (3.6 to 9 degrees Fahrenheit) in high and mid-latitudes; a lesser increase is expected near the equator.

Reports in *Nature* by Tony Slingo of NCAR, and by J.F.B. Mitchell *et al.* of the Meteorological Office in the United Kingdom<sup>15</sup> suggest that wetter clouds than most climate models have taken into account may reduce the increase in temperature predicted to only 1.9°K. In other words, the temperature rise may not be quite as swift as others have suggested. As we have said, scientists are unsure how much and how quickly temperatures will respond to the increased greenhouse gases, but *all agree higher temperatures are coming.* We need to remember there are imperfections in our current climate modelling—there is much we don't know! We are conducting a reckless experiment with our atmosphere! Remember that even a 1.9°K (or °C.) rise is about 3.5 degrees Fahrenheit, a considerable amount—enough to bring about a lot of climate changes!

Further evidence of the temperature change can be seen in a *steady increase in surface water temperatures of the world ocean* as extensively monitored by space satellites. An enormous amount of data, from every part of the world ocean (except above 60° latitudes) and for every month of the year, indicates a temperature increase of 0.12 degree Celsius/year. If the rise continues at this rate (which is likely if fossil fuel use and deforestation continue at present rates), this means a change of about 1.2°C. (about 2°F.) in a decade, and a change of about 5°C. (9°F.) in 50 years.<sup>16</sup> This amount of change might seem small, but it would be fully equal to the temperature change since the coldest part of the last ice age to the beginning of this century.

### **Implications of the Enhanced Greenhouse Effect**

(1) To make a climate change such as the one just described, in only a few decades, will produce a severe shock to vegetation and ecosystems around the world, and force major changes in agricultural practice in many areas.<sup>17</sup>

(2) Since oceans cover 71 percent of the Earth's surface, hotter oceans will mean hotter land temperatures (although the land is probably warming for similar reasons anyway). Hotter oceans will mean more hurricanes being triggered, and hurricanes that are more severe.<sup>18</sup> In the Indian Ocean, monsoon and rain patterns also appear to be changing.<sup>19</sup>

(3) Most models of the anticipated climate change, based upon highly sophisticated computer analyses, suggest a hotter and drier climate for the upper Midwest in the U.S.A., including Iowa, but such regional prediction is very difficult. In any case, there will be hotter temperatures in the next century.

(4) Ocean Level Prediction: Climate change due to the enhanced greenhouse effect will mean that a lot of glaciers in the high Arctic will partially melt, raising ocean levels as much as 20 to 30 cm in the next 60 years.<sup>20</sup> Oceans would continue to rise steadily in the following centuries if human atmospheric pollution practices are not changed. Recently reported evidence indicates that even now the world ocean is rising by  $2.4 \pm 0.90$  mm a year, and with the coming of higher temperatures, that annual value will increase.<sup>21</sup> This is very bad news for coastal lowlands like Florida, Louisiana, the Netherlands, and Bangladesh, to name a few places.<sup>22</sup> Indeed, the flooding of the coastlands, even by a modest rise, will drive billions of people from their land since about 70 percent of the world's population lives within 50 miles (80 km) of a sea coast.<sup>23</sup> In spite of the uncertainties in the current projections, this is sobering information. Most of the changes will not be good.

### **The Decline of Stratospheric Ozone**

Waste materials in the atmosphere are also producing a sharp decline in the ozone layer in Earth's stratosphere. The ozone layer provides protection against ultraviolet radiation from the Sun. During the spring of 1993 in Antarctica, the hole in the ozone layer was very large (over 23,300,000 km<sup>2</sup>, three times the size of the United States omitting Alaska), and *distinctly the thinnest ever observed*. Two measurements of the thickness of the ozone layer taken on October 6, 1993 indicate values of 90 and 88 Dobson units (D.U.), down from what had been previously record lows of 105 DU in 1992 and 125 DU in 1990.<sup>24</sup> Thus the 1993 measurements are down 16 percent from 1992, and down 30 percent since 1990! Normal values 20 years ago were about 275 DU! *Be aware that serious declines are also occurring in the ozone layer in the northern hemisphere; cases of skin cancer are rapidly rising.*

### **Practical Recommendations for Action**

Particularly helpful in reducing the greenhouse effect would be reducing use of fossil fuels as soon

as possible and adopting a simpler lifestyle, the latter in line with New Testament precedent. We must also promptly eliminate use of products that are harmful to the stratospheric ozone layer. I wish to conclude with a few, practical recommendations.

A major issue in meeting the environmental challenge is one of life-style. The truly good life is one lived in holy contentment, helping our neighbor, and praising God for the work of His hands and all His good gifts. It is a life lived in close family relationships. It does not require a lot of material possessions for its accomplishment; indeed, they may get in the way. In this connection the book

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of Ecclesiastes has much to say (see for example, Ecclesiastes 2:24ff). Daniel 1 indicates the merit of a simple diet (largely vegetables) over against the rich diet of a king.

In the New Testament the Apostle Paul, among others, has much to say about life-style. Consider Phillippians 4:11-13 and 1 Timothy 6:6-12. The value and sanity of a humble, holy contentment, when founded upon true joy in the Lord, and producing a generous and hospitable spirit, needs to be appreciated in our age.

Life in our civilization has become more and more frantic; increasingly people are focused upon money and material goods. "Labor-saving" devices, including computers, simply make larger work loads possible. The family is scattered by multiple jobs. Should not the people of God present a clear witness against the madness of our age? Should we not by our example be encouraging sensitive use of natural resources, and the need to tread lightly upon our planet? We need to conserve fossil fuels, driving only when necessary, and finding better ways to heat our homes. We need to plant trees and water them, planting more than we cut. We need to eat lower on the food chain—it makes less demand upon Earth's ecosystems. We must try to recycle things, avoiding a "throw-away" mentality, and repair rather than discard if we can. We need to enjoy the

beauty of a small family—human population cannot continue to soar on Earth as it has in recent decades without grave consequences for our descendants. Finally, we need to encourage our legislators to pass laws that encourage and reward environmental stewardship on the part of the general public.

Remember that our world belongs to God (Psalm 24:1, Psalm 50:9-12). We have not so much inherited the Earth from our parents as we have borrowed it from our great grandchildren. What sort of world will we leave for them? Our reputation as stewards is on the line. Our God is watching us. Pray for God's wisdom as we seek to live in simplicity as His stewards on this, His planet Earth, for His glory!

#### END NOTES

- 1 Cp. G. Tyler Miller, *Living in the Environment*, 3rd edition (1982) and 8th edition (1994) 204.
- 2 *Ibid.*, 204f.
- 3 Beware of the laissez-faire capitalists who seek their own profits without accepting responsibility for what they do. Several "Talk Show" hosts allege that measure volcanoes put carbon dioxide into the atmosphere, we can be excused if we do the same. Not true. We humans have put *far more* of the greenhouse gases into the atmosphere since 1860 than any Holocene volcanoes.
- 4 Reflect on the truth of *Ecclesiastes 3:19, 20*: "For the fate of the sons of men and the fate of beasts is the same. As one dies so dies the other; indeed, they all have the same breath and there is no advantage for man over beast, for all is vanity. All go to the same place. All came from the dust and all return to the dust."
- 5 This does not mean going back to a primitive hunter-gatherer lifestyle, of course—there are too many people on Earth for that. It does mean that active efforts promoting resource conservation, appreciation of the virtues of small families, and simpler diet and living styles must be part of our future. Simplicity can have its beauty!
- 6 Recently reported less direct evidence than ice coring suggests the carbon dioxide level may have been higher than now during the Cretaceous and Jurassic Periods, and much higher very early in the Earth's long history. But *doubling the amount in less than 200 years* would be an unprecedented, profound climate-change shock to Earth's ecosystems and species.
- 7 James Hanson, a leading climatologist, is 99% certain that our higher temperatures in the 1980's are due to the increase in greenhouse gases. All scholars agree that the increase in these gases can, and probably will cause higher temperatures (it is an established fact of physics and physical chemistry), but some feel that Hanson is being premature in making this judgment about the 1980's—they want to wait until the damage has really piled up to be sure. In a case like this I agree with Hansen. If we are going to bet every farm and city in the world (which we are!), it is better to cry "Wolf!" early. For discussion of Hansen and his critics, see "Hansen vs. the World on the Greenhouse Threat," in *Science*, 2 June 1989: 1041-1043.
- 8 Samuel W. Matthews, in *National Geographic*, October, 1990: 72. Matthew's article is "must" reading for all.
- 9 *Ibid.*, 78-79. An excellent article on the Greenhouse Effect by Richard A. Houghton and George M. Woodwell, "Global Climatic Change," in *Scientific American*, April 1989, 36-44, provides valuable information. It deserves a wide reading.
- 10 While some of the methane increase is due to human agricultural practice, much of it is natural, due to decay of vegetation in bogs and wetlands. As temperatures rise due to increased carbon dioxide, however, the decay rate in wetlands increases, producing more methane, and leading to further temperature rises and still more rapid decay rates. This could be a dangerous spiral, making a reversal of the rising temperature trend much more difficult.
- 11 Matthews, 78-79.
- 12 *Ibid.*
- 13 The global temperatures in this century are the warmest of the past 160,000 years except for two brief interludes about 132,000 and 117,000 years ago, both prior to the last ice age. Cf. *Scientific American*, September 1989: 74.
- 14 *Scientific American*, April 1989: 38, and *Science*, 2 February 1990: 521. Regarding 1990, which broke the record for global temperature by 0.05° C. over 1988, see discussion in *Nature*, 17 January 1991: 186, and in *Science*, 18 January 1991: 274.
- 15 *Nature*, 14 September 1989: 104 and 132-134 respectively.
- 16 Cf. A.E. Strong in *Nature*, 20 April 1989: 642. Of course in 50 years our oil and natural gas will probably be largely depleted, easing the problem—if the world doesn't switch to coal! It is dangerous also to make linear extrapolation into the future about the oceans. They may serve as a heat sink to slow and/or delay the temperature rise somewhat.
- 17 For a projection of impact on Des Moines, Iowa, see *The Des Moines Register*, March 2, 1990: 1A. Des Moines is expected to be as hot as Salina, Kansas by A.D. 2050. Drought will then probably be serious and frequent for central Iowa.
- 18 Consider the cases of Hurricane Gilbert (1988), which sustained winds of 200 miles per hour, and Hurricane Hugo (1989) with its 140 m.p.h. winds. (Gusts were higher!) They may just be a fluke, of course. There have been super hurricanes in the past. At present, sustained winds of 200 m.p.h. are considered about the maximum possible with ocean surface water temperatures of 80 to 84 degrees Fahrenheit. Kerry Emanuel, Meteorology Department, Massachusetts Institute of Technology (reported in *The Des Moines Register*, Sept. 23, 1989: 1A) has found evidence this speed limit may not be fixed: he calculates a water temperature rise of 4° F. could result in maximum sustained winds to 240 m.p.h. We should be aware that much higher wind velocities are known on the giant planets.
- 19 It might be well to note that hurricanes are classified into five groups by wind speed and other factors. Category I, the least violent, involve sustained winds of 74 to 95 m.p.h.; Category II involves winds of 96 to 110 m.p.h.; Category III, 111 to 130 m.p.h.; Category IV, 131 to 155 m.p.h.; and Category V, the most violent, have sustained winds of 156 m.p.h. and more. Brief gusts, of course, are higher. There is discussion of adding a Category VI to deal with super-

- hurricanes like Gilbert. If our climate changes, we may have to add a VII and VIII.
- 20 The large range in this figure is due to the fact that there are many factors that we do not yet understand very well. The mathematics of really good climate models becomes extraordinarily complex. The uncertainty is a scary thing.
- 21 Cf. W.R. Peltier and A.M. Tushingham, "Global Sea Level Rise and the Greenhouse Effect: Might They Be Connected?" in *Science*, 19 May 1989: 806-810.
- 22 For maps showing the effects of coastal flooding effects in Florida and along the Potomac River in Washington D.C. see

- Richard A. Houghton and George M. Woodwell, "Global Climatic Change," in *Scientific American*, April 1989: 42-43.
- 23 See also the 1989 September special issue of *Scientific American* on "Managing Planet Earth." This issue includes many important articles, including those of Thomas E. Graedel and Paul J. Crutzen, "The Changing Atmosphere" (58-68), and of Stephen H. Schneider, "The Changing Climate" (70-79).
- 24 Reported in *Nature*, 365, 683 (21 October, 1993). This is a 68% decline in less than 20 years. It probably involves a positive feedback loop reinforcing the decline.