

# Testimony of The Viscount Monckton of Brenchley

## Before Congress, 6 May 2010

The Select Committee, in its letter inviting testimony for the present hearing, cites various scientific bodies as having concluded that –

1. The global climate has warmed;
2. Human activities account for most of the warming since the mid-20<sup>th</sup> century;
3. Climate change is already causing a broad range of impacts in the United States;
4. The impacts of climate change are expected to grow in the coming decades.

The first statement requires heavy qualification and, since the second is wrong, the third and fourth are without foundation and must fall.

The Select Committee has requested answers to the following questions:

### **1. What are the observed changes to the climate system?**

**Carbon dioxide concentration:** In the Neoproterozoic Era, ~750 million years ago, dolomitic rocks, containing ~40% CO<sub>2</sub> bonded not only with calcium ions but also with magnesium, were precipitated from the oceans worldwide by a reaction that could not have occurred unless the atmospheric concentration of CO<sub>2</sub> had been ~300,000 parts per million by volume. Yet in that era equatorial glaciers came and went twice at sea level.

Today, the concentration is ~773 times less, at ~388 ppmv: yet there are no equatorial glaciers at sea level. If the warming effect of CO<sub>2</sub> were anything like as great as the vested-interest groups now seek to maintain, then, even after allowing for greater surface albedo and 5% less solar radiation, those glaciers could not possibly have existed (personal communication from Professor Ian Plimer, confirmed by on-site inspection of dolomitic and tillite deposits at Arkaroola Northern Flinders Ranges, South Australia).

In the Cambrian Era, ~550 million years ago, limestones, containing some 44% CO<sub>2</sub> bonded with calcium ions, were precipitated from the oceans. At that time, atmospheric CO<sub>2</sub> concentration was ~7000 ppmv, or ~18 times today's (IPCC, 2001): yet it was at that time that the calcite corals first achieved algal symbiosis. In the Jurassic era, ~175 million years ago, atmospheric CO<sub>2</sub> concentration was ~6000 ppmv, or ~15 times today's (IPCC, 2001): yet it was then that the delicate aragonite corals came into being.

Therefore, today's CO<sub>2</sub> concentration, though perhaps the highest in 20 million years, is by no means exceptional or damaging. Indeed, it has been argued that trees and plants have been part-starved of CO<sub>2</sub> throughout that period (Senate testimony of Professor Will Happer, Princeton University, 2009). It is also known that a doubling of today's CO<sub>2</sub> concentration, projected to occur later this century (IPCC, 2007), would increase the yield of some staple crops by up to 40% (lecture by Dr. Leighton Steward, Parliament Chamber, Copenhagen, December 2009).

**Global mean surface temperature:** Throughout most of the past 550 million years, global temperatures were  $\sim 7$  K (13 F $^\circ$ ) warmer than the present. In each of the past four interglacial warm periods over the past 650,000 years, temperatures were warmer than the present by several degrees (A.A. Gore, *An Inconvenient Truth*, 2006).

In the current or Holocene warm period, which began 11,400 years ago at the abrupt termination of the Younger Dryas cooling event, some 7500 years were warmer than the present (Cuffey & Clow, 1997), and, in particular, the medieval, Roman, Minoan, and Holocene Climate Optima were warmer than the present (Cuffey & Clow, 1997).

The “global warming” that ceased late in 2001 (since when there has been a global cooling trend for eight full years) had begun in 1695, towards the end of the Maunder Minimum, a period of 70 years from 1645-1715 when the Sun was less active than at any time in the past 11,400 years (Hathaway, 2004). Solar activity increased with a rapidity unprecedented in the Holocene, reaching a Grand Solar Maximum during a period of 70 years from 1925-1995 when the Sun was very nearly as active as it had been at any time in the past 11,400 years (Hathaway, 2004; Usoskin, 2003; Solanki, 2005).

The first instrumental record of global temperatures was kept in Central England from 1659. From 1695-1735, a period of 40 years preceding the onset of the Industrial Revolution in 1750, temperatures in central England, which are a respectable proxy for global temperatures, rose by 2.2 K (4 F $^\circ$ ). Yet global temperatures have risen by only 0.65 K (1.2 F $^\circ$ ) since 1950, and 0.7 K (1.3 F $^\circ$ ) in the whole of the 20<sup>th</sup> century. Throughout the 21<sup>st</sup> century, global temperatures have followed a declining trend. Accordingly, neither global mean surface temperature nor its rates of change in recent decades have been exceptional, unusual, inexplicable, or unprecedented.

**Ocean “acidification”:** It has been suggested that the oceans have “acidified” – or, more correctly, become less alkaline – by 0.1 acid-base units in recent decades. However, the fact of a movement towards neutrality in ocean chemistry, if such a movement has occurred, tells us nothing of the cause, which cannot be attributed to increases in CO<sub>2</sub> concentration. There is 70 times as much CO<sub>2</sub> dissolved in the oceans as there is in the atmosphere, and some 30% of any CO<sub>2</sub> we add to the atmosphere will eventually dissolve into the oceans. Accordingly, a doubling of CO<sub>2</sub> concentration, expected later this century, would raise the oceanic partial pressure of CO<sub>2</sub> by 30% of one-seventieth of what is already there. And that is an increase of 0.4% at most. Even this minuscule and chemically-irrelevant perturbation is probably overstated, since any “global warming” that resulted from the doubling of CO<sub>2</sub> concentration would warm the oceans and cause them to outgas CO<sub>2</sub>, reducing the oceanic partial pressure.

Seawater is a highly buffered solution – it can take up a huge amount of dissolved inorganic carbon without significant effect on pH. There is not the slightest possibility that the oceans could approach the neutral pH of pure water (pH 7.0), even if all the fossil fuel reserves in the world were burned. A change in pH of 0.2 units this century, from its present 8.2 to 8.0, even if it were possible, would leave the sea containing no more than 10% of the “acidic” positively-charged hydrogen ions that occur in pure water. If ocean “acidification” is happening, then CO<sub>2</sub> is not and will not be the culprit.

## **2. What evidence provides attribution of these changes to human activities?**

In the global instrumental record, which commenced in 1850, the three supradecadal periods of most rapid warming were 1860-1880, 1910-1940, and 1975-2001. Warming rates in all three periods were identical at  $\sim 0.16$  K ( $0.3$  F $^\circ$ ) per decade.

During the first two of these three periods, observations were insufficient to establish the causes of the warming: however, the principal cause cannot have been atmospheric CO<sub>2</sub> enrichment, because, on any view, mankind's emissions of CO<sub>2</sub> had not increased enough to cause any measurable warming on a global scale during those short periods.

In fact, the third period of rapid global warming, 1975-2001, was the only period of warming since 1950. From 1950-1975, and again from 2001-2010, global temperatures fell slightly (HadCRUTv3, cited in IPCC, 2007).

What, then, caused the third period of warming? Most of that third and most recent period of rapid warming fell within the satellite era, and the satellites confirmed measurements from ground stations showing a considerable, and naturally-occurring, global brightening from 1983-2001 (Pinker *et al.*, 2005).

Allowing for the fact that Dr. Pinker's result depended in part on the datasets of outgoing radiative flux from the ERBE satellite that had not been corrected at that time for orbital decay, it is possible to infer a net increase in surface radiative flux amounting to  $0.106$  W m<sup>-2</sup> year<sup>-1</sup> over the period, compared with the  $0.16$  W m<sup>-2</sup> year<sup>-1</sup> found by Dr. Pinker.

Elementary radiative-transfer calculations demonstrate that a natural surface global brightening amounting to  $\sim 1.9$  W m<sup>-2</sup> over the 18-year period of study would be expected – using the IPCC's own methodology – to have caused a transient warming of 1 K (1.8 F $^\circ$ ). To put this naturally-occurring global brightening into perspective, the IPCC's estimated total of all the anthropogenic influences on climate combined in the 256 years 1750-2005 is only  $1.6$  W m<sup>-2</sup>.

Taking into account a further projected warming, using IPCC methods, of  $\sim 0.5$  K ( $0.9$  F $^\circ$ ) from CO<sub>2</sub> and other anthropogenic sources, projected warming of 1.5 K (2.7 F $^\circ$ ) should have occurred.

However, only a quarter of this projected warming was observed, suggesting the possibility that the IPCC may have overestimated the warming effect of greenhouse gases fourfold. This result is in line with similar result obtained by other methods: for instance, Lindzen & Choi (2009, 2010 submitted) find that the warming rate to be expected as a result of anthropogenic activities is one-quarter to one-fifth of the IPCC's central estimate.

There is no consensus on how much warming a given increase in CO<sub>2</sub> will cause.

### 3. Assuming *ad argumentum* that the IPCC's projections of future warming are correct, what policy measures should be taken?

Warming at the very much reduced rate that measured (as opposed to merely modeled) results suggest would be 0.7-0.8 K (1.3-1.4 F°) at CO<sub>2</sub> doubling. That would be harmless and beneficial – a doubling of CO<sub>2</sub> concentration would increase yields of some staple crops by 40%. Therefore, one need not anticipate any significant adverse impact from CO<sub>2</sub>-induced “global warming”. “Global warming” is a non-problem, and the correct policy response to a non-problem is to have the courage to do nothing.

However, *ad argumentum*, let us assume that the IPCC is correct in finding that a warming of  $3.26 \pm 0.69$  K ( $5.9 \pm 1.2$  F°: IPCC, 2007, ch.10, box 10.2) might occur at CO<sub>2</sub> doubling. We generalize this central prediction, deriving a simple equation to tell us how much warming the IPCC would predict for any given change in CO<sub>2</sub> concentration –

$$\Delta T_s \approx (8.5 \pm 1.8) \ln(C/C_0) \text{ F}^\circ$$

Thus, the change in surface temperature in Fahrenheit degrees, as predicted by the IPCC, would be 6.7 to 10.3 (with a central estimate of 8.5) times the logarithm of the proportionate increase in CO<sub>2</sub> concentration. We check the equation by using it to work out the warming the IPCC would predict at CO<sub>2</sub> doubling:  $8.5 \ln 2 \approx 5.9$  F°.

Using this equation, we can determine just how much “global warming” would be forestalled if the entire world were to shut down its economies and emit no carbon dioxide at all for an entire year. The atmospheric concentration of CO<sub>2</sub> is 388 parts per million by volume. Our emissions of 30 bn tons of CO<sub>2</sub> a year are causing this concentration to rise at 2 ppmv/year, and this ratio of 15 bn tons of emissions to each additional ppmv of CO<sub>2</sub> concentration has remained constant for 30 years.

Then the “global warming” that we might forestall if we shut down the entire global carbon economy for a full year would be  $8.5 \ln[(388+2)/388] = 0.044$  F°. At that rate, almost a quarter of a century of global zero-carbon activity would be needed in order to forestall just one Fahrenheit degree of “global warming”.

Two conclusions ineluctably follow. First, it would be orders of magnitude more cost-effective to adapt to any “global warming” that might occur than to try to prevent it from occurring by trying to tax or regulate emissions of carbon dioxide in any way.

Secondly, there is no hurry. Even after 23 years doing nothing to address the imagined problem, and even if the IPCC has not exaggerated CO<sub>2</sub>'s warming effect fourfold, the world will be just 1 F° warmer than it is today. If the IPCC has exaggerated fourfold, the world can do nothing for almost a century before global temperature rises by 1 F°.

There are many urgent priorities that need the attention of Congress, and it is not for me as an invited guest in your country to say what they are. Yet I can say this much: on any view, “global warming” is not one of them.