BE SKEPTICAL OF *SKEPTIC'S* SKEPTICISM OF SKEPTICS

by Christopher Monckton of Brenchley

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Be skeptical, be very skeptical, of *Skeptic* magazine's skepticism of climate skeptics. The latest issue has, as its cover story, a *Climate Change Q&A*, revealingly subtitled *Climate Deniers' Arguments & Climate Scientists' Answers*.

The article, written by Dr. Donald Prothero, a geology professor at Occidental College, opens with the bold heading *How We Know Global Warming is Real and Human-Caused*.

Anyone who starts out by using the hate-speech term "Climate Deniers" – laden with political overtones of Holocaust denial – cannot expect to be taken seriously as an objective scientist.

Despite this promise of "Climate Scientists' Answers", only four peer-reviewed papers by climate scientists are cited among the 41 references at the end of the article.

And the implicit notion that "Climate Deniers" are non-scientists while true-believers are "Climate Scientists" is also unreasonable. Many eminent climate scientists are skeptical of the more extremist claims made by the UN's climate panel, the IPCC. We shall cite some of their work in this response to the Professor's unscientific article.

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DODGING AND DUCKING THE REAL QUESTIONS SKEPTICS RAISE

It is at once clear that the author is approaching the question from a political and not a scientific standpoint, for he is carefully failing to ask the right questions. A genuine "seeker after truth" (al-Haytham's beautiful phrase for the scientist) would surely have started by asking and attempting to answer the three pertinent questions that are at the core of the skeptical case he is attacking:

It is at once clear that the author is approaching the question from a political and not a scientific standpoint.

1. **Is "global warming" occurring at anything like the predicted rate?**

No, it isn't, say the skeptics. Predictions of doom have failed. Envisat data show sea level rising in the eight years 2004-2012 at a rate equivalent to 3 cm/century. Growth in Antarctic sea-ice extent almost matches the decline in the Arctic over the past 30 years.

Greenland's land-based ice grew by a net 18 inches in thickness from 1993-2008. Antarctica has cooled for 30 years, and has gained land ice. Northern- hemisphere snow cover reached a 30-year maximum in 2010/11. Tropical-cyclone activity worldwide was at a 30-year low over the past two years.

Above all, in the generation since 1990, the observed warming rate has turned out below the least estimate projected by the IPCC in that year. The models agreed with one another, but events have proven the consensus wrong.

Despite rapidly-increasing CO_2 concentration, there has been no statistically- significant warming for a decade and a half. The post-1950 warming rate, as the least-squares trend on the Hadley/CRU surface temperature series (HadCRUt3, 2011), is just 1.2 K/century.

Yet IPCC (2007, table SPM.3, taken with fig. 10.26) implicitly predicts as the mean of all six emissions scenarios that Man's influence, including an increase in CO_2 concentration from 368 ppmv in 2000 to 713 ppmv by 2100, will cause 2.8 K warming by 2100 – 0.6 K previously committed, 1.5 K from CO_2 emitted in this century, and 0.7 K from other greenhouse gases.

Predictions of doom have failed.

Despite rapidly-increasing CO_2 concentration, there has been no statistically-significant warming for a decade and a half.

This predicted (though unalarming) more-than-doubling of the post-1950 warming rate depends upon at least three implausible assumptions: that other gases augment CO_2's contribution to warming by as much as 43%; that as much as half of the warming caused by our past sins of emission has not yet come through the pipeline; and, above all, that unmeasured and unmeasurable temperature feedbacks will near-triple the small direct warming from greenhouse gases: thus, two-thirds of predicted consensus warming is guesswork.

The first assumption lacks credibility now that methane, the most significant non-CO_2 greenhouse gas we emit, has stabilized: its concentration grew by only 20 parts by billion over the past decade. The second and third assumptions will be considered below.

2. Is there any legitimate scientific reason why "global warming" should ever occur at anything like the predicted rate?

No, there isn't, say the skeptics. The warming to be expected in response to a CO_2 doubling is the product of three parameters:

The CO_2 radiative forcing, whose value was cut by 15% in the IPCC's 2001 *Third Assessment Report*, and may still be overstated. It is not "settled science".

The Planck parameter, whose value, as applied to the Moon, had been overstated by 35%, as the Lunar Diviner mission has recently revealed: so, once again, it is not "settled science"; and, above all,

The feedback factor, which provides the pretext for multiplying any direct warming such as that from CO_2 by about 3.

Even if the first two parameters have not been overstated (and they probably have been), their product, which is the CO_2-induced warming where temperature feedbacks are absent or net-zero, is little more than a harmless 1 Celsius degree.

It is the temperature feedbacks, not one of which can be distinguished empirically from the others or from the forcings that triggered them, and not one of which can be measured by any method, that mark the real divide between skeptical scientists and true-believers. Revealingly, Dr. Prothero does not mention them once.

The value and even the sign of feedback multiplier are mere guesswork. Without a strongly-positive net feedback sum, there is no conceivable cause for alarm.

The second and third of the assumptions on which the case for an alarming anthropogenic effect on global temperature imply a volatility in surface temperatures that is belied by the paleoclimate record, which – allowing for great uncertainties – indicates that absolute temperature has not fluctuated by more than 3% or 8 K either side of the mean in the past 64 million years (Scotese, 1999; Zachos *et al.,* 2001).

That is enough to cause an ice age at one era and a hothouse Earth at another: but it is far too small to permit the closed-loop feedback gains of as much as 0.64[0.42, 0.74] that are implicit in the projected warming of 3.26[2, 4.5] K per CO_2 doubling (IPCC, 2007, p. 798, box 10.2).

In process engineering, where the mathematics of feedbacks adopted by climate science has its origins (see Bode, 1945; Roe, 2009), electronic circuits intended to be stable are designed to permit closed-loop gains of no more than 0.1.

Given the Earth's formidable temperature stability, the IPCC's implicit interval of loop gains is far too close to the singularity in the feedback- amplification equation to be credible. For across that singularity, at a loop gain of 1, strongly net-positive feedback becomes as strongly net-negative: yet the inferred paleo-temperature record shows no such pattern of violent oscillation.

Empirical evidence (e.g. Lindzen and Choi, 2009, 2011; Spencer and Braswell, 2010, 2011), though hotly contested (e.g. Trenberth *et al.,* 2010; Dessler *et al.,*2010, 2011), indeed suggests what process-engineering theory would lead us to expect: that feedbacks in the temperature-stable climate system, like those in a well-designed circuit, are at most barely net-positive and are more likely to be somewhat net-negative, consistent with a harmless continuance of the observed warming rate of the past 60 years but inconsistent with the substantially greater (though not necessarily harmful) warming rate predicted by the IPCC.

3. Even if "global warming" were to occur at the predicted rate, would mitigation now be more cost-effective than adaptation later?

No, it wouldn't. To take a single topical and typical example, carbon trading in Australia will cost $10.1 bn/year, plus $1.6 bn/year for administration (Wong, 2010, p. 5), plus $1.2 bn/year for renewables and other costs, a total of $13 bn/year, rising at 5%/year, or $130 bn over ten years at n.p.v., to abate 5% of current emissions, which represent 1.2% of world emissions (derived from Boden *et al.,* 2010ab).

Thus the Australian policy, if it succeeded as fully as its promoters intend, could not abate more than 0.06% of global emissions over its ten-year term, during which CO_2 concentration would fall from a business-as-usual 410 ppmv to 409.988. Forcing abated would be minuscule, at just 0.0002 Wm^{-2}; warming consequently abated would be correspondingly negligible, at 0.00006 Celsius degrees; mitigation cost-effectiveness, which is the cost of abating 1 K global warming by measures no less cost-effective than the policy, would be $2,000 trillion per Celsius degree.

On the same basis, the cost of abating all projected warming over the ten-year life of the policy would be $300 trillion, or $44,000/head, or 58% of global GDP over the period. The cost of mitigation by such measures would exceed the cost of climate-related damage consequent upon inaction by a factor of approximately 50.

That is a typical action/inaction cost ratio. The very high costs of CO_2 mitigation policies and the undetectable returns in warming abated imply that focused

adaptation to any adverse consequences of such warming as may occur will be far more cost-effective than attempted mitigation today.

CO_2 mitigation strategies inexpensive enough to be affordable will be ineffective: strategies costly enough to be effective will be unaffordable. The question arises whether CO_2 mitigation should any longer be attempted at all.

One would have thought that a professor of science, in an article devoted to addressing the arguments of the climate skeptics, would have stated what the skeptics' central arguments actually are: that it ain't happenin', it ain't gonna happen, and that even if it were gonna happen it would be a whole lot cheaper to adapt later than to abate now.

But no. Not a whisper of these three key skeptical arguments: and, therefore, not the slightest attempt to rebut any of the three.

BLAMING NATURAL CHANGE ON MAN

Instead of addressing the real arguments that the skeptics advance, the Professor prays in aid a tedious and serially inaccurate litany of imagined (and imaginary) climatic disasters to suggest that there are "converging lines of evidence" that "global warming is real and primarily human-caused".

In a rational world, it would be necessary only to point out that the fact of phenomena caused by warming tell us nothing about how much of the warming was caused by Man and how much by Nature.

To attribute most or all of the recent warming to Man without offering any evidence for the attribution, as the Professor does, is to perpetrate the ancient logical fallacy of argument from ignorance.

These days, alas, professors of science do not start – as once they all did – by studying logic, so they too often fall into elementary logical errors of this kind. Nevertheless, let us examine each of the Professor's articles of faith or "lines of evidence".

The "hockey stick": Astonishingly, Dr. Prothero's first article of faith is the infamous and now utterly discredited "hockey-stick" graph of Mann *et al.*, recycled six times in large scale and in full color by the IPCC in its 2001 report and even adopted by it as its logo until McIntyre and McKitrick (2003, 2005) showed it to be a fabrication.

Now, an honest Professor, even if per impossibile he genuinely believed Mann's ludicrous graph, would at least have informed his readers that the graph had been – to put it mildly – challenged.

Now, an honest Professor, even if *per impossibile* he genuinely believed Mann's ludicrous graph, would at least have informed his readers that the graph had been – to put it mildly – challenged, and that it is regarded by scientists as having a validation skill vanishingly different from zero (see, for instance, the National Academy of Sciences' report, which found the data before 1600 inadequate to support Mann's conclusion, or the Wegman statisticians' report of 2006 for the US House of Representatives, which upheld McIntyre and McKitrick at all points).

An honest Professor would at least have mentioned the papers by more than 1000 scientists in more than 400 institutions in more than 40 countries over the past 25 years that provide – to use his phrase – "converging lines of evidence" (at www.co2science.org, for instance) establishing that the medieval warm period was real, was global, and was warmer than the present.

For graphical illustrations of some of the data establishing the existence, extent, and magnitude of the medieval warming, see e.g. Bjorck *et al.* (2006); Chu *et al.* (2002); Dahl-Jensen (1998); Grinsted *et al.* (2006); Gupta *et al.* (2005); Hallett *et al.* (2003); Holzhauser *et al.* (2005); Khim *et al.* (2002); Mangini *et al.* (2005); Noon *et al.* (2003); Pla *et al.* (2005); Qiang *et al.* (2005); Rein *et al.* (2004, 2005); Seppa and Birks. (2002); Tyson *et al.* (2000); Williams *et al.* (2004); Wilson *et al.* (1979).

But no. The Professor gives only one side of the story. He says there were "minor warming events during the Climatic Optimum about 7000 years ago [in fact, the Holocene Climate Optimum endured for 4000 years, and for most of that time the temperature was 2-3 Celsius degrees above today's], the medieval warm period, and the slight cooling of the Little Ice Age in the 1700s and 1800s: but the magnitude and rapidity of the warming represented by the last 200 years is simply unmatched in all of human history".

The Professor gives only one side of the story.

Most of the past 11,400 years since the end of the last Ice Age were warmer than the present, sometimes considerably so.

Rubbish. Most of the past 11,400 years since the end of the last Ice Age were warmer than the present, sometimes considerably so: and, when that Ice Age ended, temperatures in Antarctica, as reconstructed from the ratios of two distinct isotopes of oxygen in air trapped in layers of ice there, rose by 5 Celsius degrees in just three years.

For comparison, the warming of the entire 20th century was 0.74 Celsius degrees, and there has been no warming in the 21st. Nothing in the recent temperature record is in any way beyond the natural variability of the climate.

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Melting ice caps: The Professor says, "The polar icecaps are thinning and breaking up at an alarming rate." He says that in 2000 there was no ice at the North Pole for the first time.

Nonsense. In 1959, for instance, the USS submarine *Skate* surfaced at the North Pole and took a photograph showing the submarine surrounded by open water as far as the lens could see.

"Leads" – open areas of water in pack-ice – are a well-known and frequent phenomenon. Yes, the sea-ice extent in the Arctic summer has declined considerably since 1979, when the satellites were first able to measure it reliably: but the satellites began their measurements at a time when sea-ice extent was unusually high.

From earlier maps of ice extent around Greenland, for instance, it is not unreasonable to infer that Arctic sea-ice extent may have been less in the 1920s and 1930s than it is today. Our records are simply too short to provide a legitimate scientific foundation for the alarming conclusion favored by the Professor.

Culpably, the Professor finds it politically inexpedient to mention the scientific fact that sea-ice extent in the Antarctic has grown throughout the satellite era because the continent has been cooling (Doran *et al.,* 2002; University of Illinois Antarctic sea- ice extent, 1979-2012).

Global sea-ice extent, therefore, has barely changed throughout most of the past 30 years, though there has been a small decline in the past few years. Instead, the Professor finds it politically expedient to mention the disappearance of the Larsen B ice shelf in the Antarctic Peninsula, where the climate is different from the rest of Antarctica, and he is carefully silent about the fact that Larsen B was not there in the medieval warm period (Pudsey *et al.,* 2006).

He suggests that polar bears, seals and walruses will come to harm if the ice melts: but they somehow managed to survive the past 11,400 years, during most of which the weather was warmer and the ice extent probably less for much of the time than it is today.

Melting glaciers: The Professor says: "Glaciers are all retreating at the highest rates ever documented." No, they're not. In Greenland, for instance, some glaciers are receding, but others are advancing.

In the Alps, recent glacial recession has revealed mountain passes, forests, and even an entire medieval silver mine that were covered in advancing ice as the medieval warm period ended.

In the Himalayas, the IPCC has had to retract its claim that all the glaciers would be gone in 25 years, and a recent paper has confirmed the opinion of Prof. Bhat of the Indian Geological Survey that there is no systemic change in glacial ice.

In the Cordillera de Merida in the tropical Andes, all but the highest peaks were ice- free throughout the past 11,400 years: there is more ice there now than usual (Polissar *et al.,* 2006).

Snow cover: The Professor also says not only snow-melt but also the glaciers "provide most of the freshwater that the populations below the mountains depend on". No, they don't.

It's the snow-melt alone that provides very nearly all the fresh water that comes down the glacial rivers: and, though the Professor fails to say so, the extent of snow cover in the Northern Hemisphere not only shows no decline at all: it reached a record high just two years ago (Rutgers' University Snow & Ice Lab northern-hemisphere snow-cover extent, 1979-2011).

Heat-waves: The Professor mentions "record heat-waves over and over again, killing thousands of people, as each year joins the list of the hottest years on record".

However, he is silent about the hundreds of cold-weather records broken in the US and Canada in the most recent winter, which also saw unprecedented Arctic conditions across most of eastern Europe, with temperatures of –40 Celsius or Fahrenheit in some places ; or, in 2010, the second-coldest December since records began in Britain in 1659; or the fact that cold snaps kill far more people than heat-waves.

In Britain alone there are some 200 micro-climate zones. In each zone, a dozen extreme-weather events may occur. Accordingly, one would expect thousand-year weather events to occur quite frequently somewhere in Britain and, *a fortiori,* worldwide.

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Our data are simply inadequate to tell us whether the pattern or frequency of extreme weather around the world is in any way unusual.

The mere fact of extreme weather tells us nothing about its cause: and our data are simply inadequate to tell us whether the pattern or frequency of extreme weather around the world is in any way unusual.

Sea-level rise: The Professor' section on sea level rise is a series of outright falsehoods:

"At present, the sea level is rising about 3.4 mm per year … Geological data show that the sea level was virtually unchanged over the past 10,000 years since the present interglacial began … most scientists predict sea levels will rise 80-130 cm in just the next century. A sea level rise of 1.3 mm (almost 4 feet) would drown many of the world's low-elevation cities … and low-lying countries. A number of tiny island nations such as Vanuatu and the Maldives, which barely poke out above the ocean now, are already vanishing beneath the waves. … If all the glacial ice caps melted completely … sea level would rise by 65 m (215 ft)."

Every word of this section is nonsense. According to the Envisat satellite, during its eight-year life (just ended), sea level rose at a rate equivalent to just 3 cm (1.3 inches) *per century,* not the 34 cm (1 ft) per century that the Professor implies is the current rate. Sea level last year was actually lower than in any of the previous seven years.

Geological data indicate that sea level has risen by 130 meters (400 feet) since the end of the last Ice Age, giving the lie to the Professor's statement that "sea level was virtually unchanged over the past 10,000 years".

The IPCC predicts a sea level rise of 6 inches to 2 feet, with a central estimate of around 1 foot, for the whole of the next 100 years, not the 3-4 feet suggested by the Professor.

Also, a sea-level rise of 4 feet would not drown low-elevation cities: given the very slow rate of rise (8 inches over the 20th century, and perhaps about the same this century), cities will have plenty of time to build sea walls if necessary.

Contrary to what the Professor says, Pacific atolls are the last places on Earth that will suffer from sea-level rise, because they are made of coral, which grows towards the light whenever seawater covers it. That is why, after 11,400 years of sea level rise, all of the atolls are at or just above sea level. That is how they would remain even if there were several feet of further sea-level rise.

A recent paper has shown the atolls growing as sea level rises: but on most of the atolls there has been no sea-level rise in the past half century and more.

And – again contrary to the Professor's unscientifically doom-laden article – there is no danger of all the glacial ice melting completely. On the high plateaux of central Greenland and East Antarctica, which between them account for very nearly all of the world's land-based ice, temperatures are too low to allow substantial melting.

IPCC (2007) says that (subject only to "dynamical ice flow" for which there is no empirical evidence) it would take several millennia of temperatures at least 2-5 Celsius degrees above today's before even half of the Greenland and West Antarctic ice sheets might melt. Even then, the bulk of the world's ice, on the high plateau of East Antarctica, would be almost entirely unaffected.

Dr. Niklas Mörner, who has written some 550 scientific papers over his 40-year career studying sea level, predicts that sea level this century will probably be below the 8 inches we saw in the last century (see, e.g., Mörner, 2011).

SETTING UP AND KNOCKING DOWN STRAW MEN

Next, the Professor resorts to another wearily familiar tactic: he sets up and knocks down a series of straw men in place of the real arguments that climate skeptics actually present.

This technique, the unfailing hallmark of a lesser mind, is an instance of the shop- worn and fundamental logical fallacy of *ignoratio elenchi,* the introduction of red herrings that have nothing whatever to do with the matter under discussion.

"It's just natural climatic variability": The Professor accuses skeptics of arguing that all of the warming at present arises from the natural variability of the climate.

Skeptics certainly argue that the rate of warming we have seen over the past century falls well within the natural variability of the climate. However, at the same time, they acknowledge that, since Tyndall's experiment at the Royal Institution in London in 1859, the warming effect of CO_2 and other greenhouse gases has been empirically established.

Some of the warming of the past century may indeed be attributable to CO_2: but the central point made by skeptics is that even if all of that warming were manmade the rate of warming over the past 60 years has been only one-third to one-half of the IPCC's central projection for the present century.

Nor is there any legitimate scientific reason to suppose that there will be much acceleration of that long-run warming rate, because each additional CO_2 molecule we release back into the atmosphere has less of a warming effect than its predecessors.

Diminishing returns have set in, so that it is not scientifically credible to predict the very rapid acceleration in the warming rate that is implicit in the IPCC's central projection of global warming. That is the skeptics' case: but that is not the case the Professor addresses.

"It's just another warming episode, like the medieval warm period or the Holocene climate optimum or the end of the little ice age": Again, this is an artful misstatement of the true skeptical position.

Skeptics consider, along with the National Academy of Sciences' critique of the "hockey stick" graph, that the temperature proxy data are simply inadequate to tell us at what rate most previous warmings occurred (though the ice cores do tell us that the warming at the end of the Younger Dryas cooling event 11,400 years ago was many times greater than anything that is likely to have occurred since).

What we can say with reasonable confidence, however, is that most of the last 11,400 years were warmer than the present, indicating that absolute temperature today is very far from unprecedented and, therefore, very unlikely to cause real harm.

The Professor gives a highly partisan account of the medieval warm period, unfairly omitting to state that the vast majority of the published literature on that period finds that the weather was warmer then, not just in the North Atlantic and in Europe but worldwide.

It is chiefly the model-based, rather than observation-based, papers that try to tell us that the medieval warm period was not warmer than the present. History, archaeology, and hundreds of reconstructions by proxy of pre-instrumental temperatures say the medieval warm period was just that.

"It's just the sun, or cosmic rays, or volcanic activity, or methane": No, the skeptics do not believe that Nature alone can cause warming. Man is capable of having an influence. The skeptical position is that there is no good scientific evidence that Man's influence has been or ever will be anything like as great as the once- official projections have suggested.

It is a truism that very nearly all of the heat that reaches Earth comes from the Sun. It is also becoming well established that increases in solar output are capable of displacing cosmic rays that would otherwise enter the Earth's atmosphere and assist in the nucleation of water droplets to form clouds, so that during the near-maximum of solar output over the past 11,400 years, which occurred from 1925-1995 and peaked in 1960, the warming influence of the Sun was greater than the very small change in incoming solar radiation would have led us to expect.

Volcanic activity has a small and temporary effect. Methane concentration has not risen by more than 20 parts per *billion* by volume over the past decade, suggesting that it is a very small contributor – indeed, even smaller than the IPCC has tried to suggest.

On balance, therefore, the skeptics consider that Man may have had some influence on temperatures over the past 60 years, but that even if our influence had accounted for all the

warming, the rate of warming caused by us has been and will continue to be too slow to cause unavoidable harm.

"We had record snows in the winter of 2009-2010, and also in 2010-2011": Skeptics will indeed draw attention to cold-weather records, but only in the context of pointing out that it is unreasonable for supporters of the once-official position to single out only the hot-weather events, as the Professor himself does.

The IPCC, for once, is right when it says that individual extreme-weather events cannot safely be attributed to exclusively to manmade "global warming": and, by the same token, skeptics are prepared to accept that they cannot safely be attributed exclusively to Nature either.

"The climate records since 1995 (or 1998) show cooling": Once again, though skeptics will rightly agree with Prof. Jones of the University of East Anglia that there has been no statistically-significant warming since 1995, the significance they attribute to this stasis of more than a decade and a half in global temperatures is not that there is no such thing as "global warming", nor that Man cannot exercise any influence of the climate.

Instead, the recent stasis in the global temperature trend implies that the long-run rate of warming a) is not accelerating as the IPCC had mendaciously tried to suggest; and b) will prove to be considerably lower than the IPCC's projections.

In the global instrumental temperature record, periods of a decade or so without warming are frequent. They do not indicate that there is no such thing as a long-run warming trend, because the data establish quite clearly that there is.

However, they do indicate that the long-run warming trend is unlikely to be very substantial, and – thus far, at any rate – the actual temperature data bear this out.

The warming rate over the past 62 years is equivalent to little more than 1 Celsius degree per century. A very considerable and frankly implausible increase in that warming rate would be required before any real climatic harm could be expected: and even then it would be at least an order of magnitude more cost-effective to adapt to the warming the day after tomorrow than to try to abate it today.

"Carbon dioxide is good for plants, so the world will be better off": Well, yes, CO_2 is good for plants, and skeptics say so: but they do not, as the Professor implies, say that it is so good for plants that no consideration should be given to the potentially harmful effects of the warmer weather it may cause.

One of these supposedly harmful effects, according to the Professor, is heat and drought in the Great Plains of the US. He should perhaps read *The Grapes of Wrath,* which

gives a fascinating account of life in the great droughts of the first half of the 20th century in the Great Plains: droughts of which the like has not been seen in the warmer second half of the 20th century. This is just one example of the failure of computer models to predict either global or regional trends correctly.

A proper balance between costs and benefits, advantages and disadvantages, must be struck: and, since there is no legitimate reason to suppose that the warming rate will accelerate much beyond what we have observed over the past 62 years, skeptics consider that the benefits of CO_2 fertilization are very likely to outweigh the disadvantages (if any) of slightly warmer weather [*The Many Benefits of Atmospheric CO_2 Enrichment: http://sppiblog.org/news/book-review-of-sppi-book-co2-benefits*].

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Skeptics consider that the benefits of CO_2 fertilization are very likely to outweigh the disadvantages (if any) of slightly warmer weather.

The Professor then mentions that the additional CO_2 in the atmosphere is making the oceans "more acidic". That is bad science. The oceans are pronouncedly alkaline. Adding CO_2 to the atmosphere may make the sea very slightly less alkaline, but it cannot make it acidic.

Besides, the effect is offset to some degree by warmer weather and consequent outgassing of CO_2 from the oceans.

It is worth putting some quantities into the argument (for the Professor very seldom uses quantities, though they are the vocabulary of true scientific discourse). The pH of the oceans is thought to be 7.8-8.1, where 7 is neutral. By comparison, rainwater, with a pH of 5.4, is pronouncedly acid.

There is no sufficiently detailed global measurement of ocean pH to establish a reliable worldwide trend. However, experiments have demonstrated that, even at atmospheric CO_2 concentrations of up to 6000 ppmv (compared with today's 393), shell-forming or calcifying organisms thrive. Like the "global warming" scare, the "ocean acidification" scare has probably been more than somewhat exaggerated.

"I agree that climate is changing, but I'm skeptical that humans are the main cause, so we shouldn't do anything." Yet again, this straw man is an inadequate and disfiguring caricature of the skeptical position, which is that even if humans are the sole cause of the warming that has occurred since 1950 it is still at least an order

of magnitude (i.e. 10 times) more cost-effective to adapt later than to abate the warming by CO_2 mitigation measures today.

Some scientists who live on taxpayers' money seem to think that our generosity is infinite, so that their every whim can be indulged regardless of the cost to others. Those days are now over.

Almost everywhere in the West, governments are bankrupt. Indulging fantasies such as "global warming" makes very little sense given the very large holes in the scientific argument, and makes no sense at all given that the cost of the insurance premium exceeds the cost of the damage that might arise from the risk insured. Since the cost of the premium exceeds the cost of the risk, don't insure. That is a precautionary principle worthy of the name.

Some scientists who live on taxpayers' money seem to think that our generosity is infinite.

The Professor ends the "straw-men" section by saying: "We can rule out any other suspects: solar heat is decreasing since 1940 [actually, since 1960], and not increasing, and there are no measurable increases in cosmic rays, methane, volcanic gases, or any other potential cause. Face it – it's our problem."

In any previous generation, such intellectual vapidity would have been laughed at.

And that is a splendidly clear instance of the *argumentum ad ignorantiam* – the decrepit logical fallacy of argument from ignorance. We do not know what is causing the far from exceptional warming that stopped in the late 1990s: so, says the Professor, let us blame it on Man. In any previous generation, such intellectual vapidity would have been laughed at.

"Why Do People Continue To Question the Reality of Climate Change?"

The Professor's central reason why people ought not, in his opinion, to question "the reality of climate change" is that "as in the evolution/creationism debate, the scientific community is virtually unanimous on what the data demonstrate about anthropogenic global warming." This is yet another tired logical fallacy: that of the *argumentum ad populum* – argument from mere head-count.

The Professor, as is his wont, selects only one side of the story to present to his readers. He cites a paper by Naomi Oreskes, who, he says, "surveyed all peer-reviewed papers on climate change published between 1993 and 2003 in the world's leading scientific

journal, *Science,* and found there were 980 supporting the idea of human-induced global warming and none opposing it".

What he is careful not to say is that Oreskes is not a scientist, let alone a climate scientist; that she surveyed not "all peer-reviewed papers" but all peer-reviewed papers containing the phrase "global climate change", and was compelled to publish a belated corrigendum to make this clear; that her criteria were not as he states them to be; and that, in any event, skeptical scientists accept that Man's emissions of CO_2 can cause "global warming", but they do not consider it dangerous.

The Professor is also careful not to mention the survey by Dr. Klaus-Martin Schulte (a scientist, though not a climate scientist), who carried Oreskes' research forward a few years from her closing date of 2003 and found that not one of 539 further papers containing the same search phrase provided any evidence that manmade "global warming" would do any harm at all.

The Professor also, inevitably, trots out the results of two "surveys" of climate scientists, but carefully fails to mention that one of the surveys was an unscientific, self-selected sample of just 79 scientists, of whom 77 agreed (as skeptical scientists would agree) that the weather has been getting warmer and that Man is at least partly responsible, and that the other survey – in fact, not a survey at all, but a compilation of names of scientists who had signed various petitions and had otherwise indicated a political preference on the issue - claimed that 97-98% of the most prolific climate researchers believed that "anthropogenic greenhouse gases have been responsible for most of the unequivocal warming of the Earth's average global temperature over the 20th century." This "survey" was evidentially valueless, because no scientist was actually asked for his or her opinion. Opinions were imputed to them by the compilers of the "survey". Again, many skeptical scientists would agree that the world warmed in the 20th century, and would accept that at least some of that warming (if not necessarily most of it) was caused by us.

But the fact of manmade warming is not at issue. The real question is whether the rate of warming caused by us is likely to prove catastrophic. Yet neither of these much-quoted surveys asked whether the "unequivocal" warming would eventually prove catastrophic: for the assent to any such proposition would be likely to be well below 98%.

But the fact of manmade warming is not at issue. The real question is whether the rate of warming caused by us is likely to prove catastrophic.

The Professor goes on to say: "Every major scientific organization in the world has endorsed the conclusion of anthropogenic climate change as well." Three problems with

that. It is the logical fallacy of argument from consensus; it is the logical fallacy of the argument from appeal to authority; and it is not true.

Members of the Japanese Academy of Sciences have described the true-believers' position as being no better than a belief in astrology; the Russian Academy under Dr. Illarionov, having heard both sides, rejected the alarmist position as politically motivated; the former director of the Dutch Meteorological Institute has rejected the alarmist view of "global warming"; the Royal Society, having relieved itself of the Marxist president under which its original and embarrassingly absurd statement on "global warming" had been published, has rewritten it from top to bottom to take out nearly all of the extremist nonsense to which the Professor appears uncritically to subscribe; and a Norwegian expert group has recently issued a report saying that proper attention must now be paid to determining the influence of natural variability on recent climatic change.

The Professor then speculates - politically, rather than scientifically – about the supposed evils of what he calls the "right-wing institutes", Exxon Mobil, etc.

He cites a bogus memorandum publicized by Peter Gleick, the now-discredited head of scientific "ethics" at the Pacific Institute, alleging that the Heartland Institute was "trying to influence science education, suppress the work of scientists, and had paid off many prominent climate deniers, such as Anthony Watts, all in an attempt to circumvent the scientific consensus by doing an 'end run' of PR and political pressure. Other leaks have shown 9 out of 10 major climate deniers are paid by Exxon Mobil." [For the record, the author of the present paper is not paid by anyone.]

Culpably, the Professor does not make it clear that the memorandum he cites was bogus or that the Heartland Institute has repudiated it. Here as elsewhere, he carefully fails to give both sides of the argument.

His attack on the "right-wing institutes" is a shoddy instance of the logical fallacy of the *argumentum ad hominem* – of attacking the arguer rather than arguing against his argument. The *argumentum ad hominem* has no place in scientific discourse, and any scientist who resorts to it disqualifies himself from being taken seriously.

The rest of this section is an extended rant – *ad hominem* throughout – which compares "climate deniers" or "denialists" with those who believe, on the basis of Bishop Ussher's amiably barmy calculations of the generations from Adam to Jesus as described in the Bible, that the world was created one Thursday afternoon in April of 4004 BC. It is not worthy of the Professor; it is not worthy of science; and it is not worthy of a detailed reply.

"SCIENCE AND ANTI-SCIENCE"

The final section of the Professor's unscientific – indeed, anti-scientific – article is amusingly entitled "Science and anti-science". He says: "The conclusion is clear: there's science, and then there's the anti-science of global warming denial." He repeats the

logically-fallacious argument from consensus, and the *ad-hominem* attacks on "deniers" as be no better than "creationists".

He cites various corporations (such as insurance companies) as supporting his position, but is careful not to point out that, though they have no qualifications to do so, that they do have a direct and substantial financial vested interest.

He even prays the Pentagon in aid, saying that the National Defense University has been "making contingency plans for how to fight wars in an era of global climate change".

The Pentagon, too, has a direct financial vested interest in trying to get a share of the lavish climate cake from the US Government, but the Professor somehow ascribes motives of financial vested interest only to those with whom he disagrees.

CONCLUSION

When historians of science come to discuss the bizarre intellectual aberration that is the belief in catastrophic manmade "global warming", Professor Prothero will not merit so much as a footnote.

Most of his own footnotes are references are to tendentious, politicized websites such as "skeptical"-science, "real"-climate or Exxon-"secrets". Only four of them are to peer-reviewed papers by climate scientists.

Perhaps the most interesting question that historians will address, when looking back on the "global warming" scare, is how it came about that a tiny handful of determined skeptics, with little or no funding and no official backing, defeated the lavishly-funded Governments, scientific academies, news media, environmental groups, universities, schoolteachers, corporations and "global-warming" profiteers such as Al Gore.

The only remarkable thing about the much-recycled arguments from the far-out Left that he so turgidly regurgitates is that any news medium would still be ignorant enough, uncritical enough, prejudiced enough and unashamed enough to print them.

Unless and until climate scientists learn to leave hard-Left politics at home and start to discuss the scientific arguments of skeptics scientifically, they will remain unheeded.

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How did this tiny band succeed in convincing the population that – as repeated opinion polls now demonstrate – catastrophic manmade climate change is the very least of the environmental concerns they should worry about?

One answer to that interesting question is surely this. The climate-extremists have the money, the power and the glory, but the skeptics have the truth.

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