Cooking up a Storm

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The concept of consensus in science seems innocuous, but it conjures up dangerous possibilities. On the one hand, there are whole swathes of our understanding of Nature that are uncontroversial and accepted by the vast majority of scientists as pretty good accounts of reality. One thinks here of the classical physics of Newton and Maxwell, the basic ideas of Darwin regarding evolution, and the genetic process of inheritance. To speak of consensus with regard to these matters is to use ordinary non-technical language in an unexceptional way. It is, nevertheless, dangerous. The meaning of consensus carries with it the implication of counting heads as assessing opinion, and science is most definitely nothing to do with that. A Law of Nature is not decided by a referendum, nor even by a committee of the Great and Good. Scientific knowledge is gained by the insight and talent of the individual scientist and discussions with his peers. In this sense, the idea of consensus in the scientific sense is an oxymoron. And here is where the danger lies: in politics, consensus is anything but an oxymoron, it confers authority. To claim the existence of a scientific consensus is for politics to sanction all kinds of action based upon scientific authority.

Nowhere, and indeed no when, has this been more evident than in the recent furore on global warming. Though now massively political, it was initiated by the religious beliefs of the environmentalists (Greenpeace, Friends of the Earth, World Wildlife Fund). Fuelled, it seemed, by the concept of original sin from an older religion, the claim was that dangerous global warming was taking place, that human activity was responsible and that the science that underpinned the claim was settled and beyond question. Their icon became the now famous 'hockey-stick' graph that depicted the time-dependence of temperature from AD 1000 as deduced from tree-ring data, supplemented by computer predictions based on the observed rise of the greenhouse gas, carbon dioxide (CO_2), in the atmosphere. Grave concerns were raised over the inevitability of the melting of the polar ice caps and the consequent huge rise in sea-level. Even worse, there was the possibility of a runaway effect in which, beyond a tipping point, global temperatures would rise uncontrollably, and Earth would become like Venus, uninhabitable. It was a brilliant campaign that convinced all but a few of the world's politicians that something had to be done to limit the emission of CO_2. Politics was thus amalgamated with religion, the politicians believing that the scientific consensus gave them authority to order wide-reaching change in the fundamental operations of our technico-industrial civilization. The New Political Science had been born. To persuade the masses, Al Gore's *film An Inconvenient Truth* spread the gospel, and David Miliband (then UK Education Minister) directed that no school should be without a copy. In 1990 the United Nations had already set up the Intergovernmental Panel on Climate Change (IPCC) which reported regularly on evidence that global warming was happening according to the alarming predictions of computer simulations. Such was 'the scientific consensus', that reports began to be heard of journals rejecting papers critical of the science that was propagated, and 'deniers' being hysterically defined, by some parts of the media, as criminals.

Inevitably, given the impossibility of a scientific consensus in such a controversy, a few ripples of protest eventually became a tsunami of criticism. An objective statistical analysis of the data that went into the hockey-stick graph showed that the science that produced it was flawed and, some thought, fraudulent. Much of the science publicised in Al Gore's *An Inconvenient Truth* was shown incontrovertibly to be simply wrong. And then, in 2009, emails associated with the Climate Research Unit at the University of East Anglia revealed unequivocal evidence of data manipulation to support the official global-warming message. After this revelation, dubbed by the media

Climategate, the game was up. That this was so was underlined by the failure of the 2009 Copenhagen Conference on Climate Change to agree any global consensus, thanks to the scepticism of China, India and Brazil. The fact of these being developing economies served to focus the mind wonderfully, something that still has to happen in the West, in spite of the efforts of the Czech President Vaclav Klaus and the English former Chancellor, Nigel Lawson.

It has been a scandalous episode for science. The authoritative consensus that global warming existed, and that it was man-made, never existed. Scientific academies everywhere, including the Royal Society, should have been at the forefront to refute the idea of a consensus, but they weren't; and they should have unambiguously broadcast the actual controversial nature of the science, but they didn't. On the one hand there were meteorologists, such as members of the UK Meteorological Office, whose predictions of alarming global warming were based on computer simulations of climate. They were naturally sincere in what they predicted, but their faith in their computer programs to handle the vastly complicated, non-linear, chaos-prone equations that describe the physics and chemistry of the oceans and atmosphere seems to some of us nai've in the extreme. (Perhaps some of us have too much experience of the garbage in, garbage out, type of computing.) On the other hand, there were climatologists who had made a deep study of climate in the past, who wrote books attempting to put global warming into its historical context. *(Heaven and Earth* by Ian Plimer; *Climate: the Counter Consensus* by Robert Carter; both Australians.) They accept that a modest global warming does exist as a result of the globe's recovery from the Little Ice Age (AD 1500-1900), but they argued that it is highly unlikely that it has anything to do with man's activities. More alarmingly, they remark that presently we live in an Interglacial Warm Period and that these periods last typically for around 10,000 years. They also remark that the last Ice Age was about 10,000 years ago. (Do I hear you say come back global warming, all is forgiven?)

After 20 years of politicised scientific hype, it is now possible for a rational debate on climate change to happen, and the first thing to note is that the climate is always changing. Unfortunately, to be realistic, change cannot be forecast reliably. The Met Office found this out recently when they predicted a 'barbecue summer' last year followed by a warm winter. Last summer was anything but a 'barbecue summer' and this winter has been unusually cold, so red faces at the Met. As a result, they have given up seasonal forecasts for the UK. It has been gently cooling since 1998, as opposed to the computer prediction of warming. The complexity of climatic processes — the role of that most powerful greenhouse gas, water vapour, its associated clouds, atmospheric and oceanic circulations, sunspot activity, volcanic eruptions, planetary and galactic variations — is overwhelming. Given this complexity, it is arguably the case that a computer, no matter how powerful, cannot hope to make reliable predictions of climate change a decade or so into the future. An alternative is to look at the statistical behaviour of the climate during the recent Interglacial Warm Period, which reveals oscillations in temperature with multi-decadal regularity (nothing to do with CO_2 emissions), and to use this to predict the future. This carries the assumption that there is zero man-made global warming. This, perhaps, is as good as anything, provided we don't plunge into an unforecastable Ice Age.

There are now hopeful signs that, far from there being a consensus, a good red-blooded scientific debate is under way. Warmists now readily admit the real difficulties in computer modelling the climate, but they, nevertheless, point to the back-of-the-envelope physics that clearly shows that more CO_2 means higher temperatures. Critics note that it is not linear but logarithmic, meaning that the relation is one of diminishing returns — a smaller rise in temperature per unit increase in CO_2 concentration. And, in any case, a modest warming and more CO_2 is a good thing for plant growth. Possibly, but not for marine life, which needs a gently alkaline ocean and dissolved CO_2 pushes the balance towards acidity. These issues and a myriad others including measurement techniques, past and future, will continue to be argued over by the scientists involved. It is to be hoped that the age of caveatless statements about global warming, those tailored for politicians and the media, is past. But I wouldn't count on it. Maybe, once the media and our politicians realise that the famously-claimed scientific consensus on global warming doesn't exist and never has existed, we can look forward to the demise of the New Political Science. Maybe then our governments, released from being besotted by global carbon footprints, might begin focussing on real science issues bearing on local climate change. But, again, I wouldn't count on it, riddled with environmentalists as the members of government are. One thing is scientifically sure about the climate — it changes. The record shows that a serious change of climate needs no help from mankind, and, what's alarming, is that it is largely unpredictable.

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