Leadership for Climate Change Times Three, notes for a paper presented to the Resources Management Law Association Conference, Wellington, Saturday 3 October 2009

Introduction

The challenges already being presented by the certainty of climate change and the need to limit the amount of such change is perhaps the greatest leadership challenge the world has faced.

Adjustment to climate change will be needed at the same time that emissions reductions are required to prevent more climate change. Most frightening is the prospect that, at any point in time in the foreseeable future, the oceans will store fifty years of climate change impacts resulting from the emissions that have already occurred.

Preventing and coping with climate change will require social and political leadership of the highest calibre. The need for such leadership will not subsist for 5 or 6 years, the period of the last world war. It will not subsist for a decade, the approximate period of the worst years of the Great Depression. The need will subsist for at least 50 years, perhaps, double that.

The leadership which is needed is not leadership which creates a false crisis and then responds to it. It is not leadership just at the political level. It will be needed in all aspects of our society, in government, in educational institutions, in industry, and in the organisations that constitute civil society.

We, who are used to pusillanimous leadership from our politicians, will be tempted to despair at such a great need and wonder from where such leadership may come.

The purpose of this paper is to look for role models. To what sort of person, I ask, should we look to respond to our society's needs in this prolonged period of challenge? What should we demand from the leaders that we have? Who from the past and present can provide the inspiration that might allow each of us to provide some of the leadership our societies need to restrict and cope with the threat of climate change.

The three people discussed in this paper provide some of the qualities needed to provide the inspiration we require.

We need to imagine the sort of people that we need to get a response to the challenge of climate change going. This paper is a tiny step along the path of that imagining.

Measuring the Truth: Dave Keeling

On 20 June 2005, Charles David Keeling died at his Montana home of a heart attack. In a speech marking Dave Keeling's passing and honouring his scientific work, the Director of his Institute compared Keeling's measurements of background levels of carbon

dioxide in the atmosphere to Tycho Brahe's measurement of the planets and Albert Michelson's measurements of the speed of light.[1]

It was Dave Keeling's love of the outdoors and the environment that led him to the field in which he made his great scientific contribution. As a post doctoral student at the California Institute of Technology in the mid-1950s, Dave was committed to his work as a chemist but he spent as much time as he could find travelling mountains and woodland rivers. He chose research projects that would keep him in direct contact with wild nature. Measuring the level of carbon dioxide in the open air was a pretty good decision in that regard.[2]

Previous attempts at measuring CO2 concentrations in the atmosphere had produced widely fluctuating readings such that Carl-Gustav Rossby, a leading commentator, had described the task as "almost hopeless".[3]

In tackling the task, Dave Keeling had to create his own tools. No instrument available to purchase had the necessary accuracy to make the kind of fine measurement that was necessary. Months of hard work and ingenuity, therefore, went into solving that initial problem.[4] While still based at Caltech, Keeling used his newly made instrument to measure levels of carbon dioxide in pristine locations around California including at Big Sur, an area that is both mountainous and coastal. He began to get the same reading from a number of locations and on different days. Having achieved a degree of stability in his measurements, when fluctuations occurred, he was able to track down the source of the interfering concentrations. He was scrupulous and tireless in this pursuit. At last, he knew that measuring the background level of carbon dioxide in the atmosphere was possible. But this was only the beginning.

Newly ensconced at the Scripps Institute of Oceanography, Dave lobbied hard to get the funding necessary to construct the new generation of precision instruments necessary to achieve the level of accuracy that would make his readings useful to science. He succeeded and, in September1957, had one such instrument set up in Antarctica and, in March 1958, another set up atop the volcanic peak of Mauna Loa in Hawaii. Even in such pristine locations, sources of error were lying in wait: petrol driven machinery in Antarctica and vents in the side of the volcano on Mauna Loa. But they were no match for Dave Keeling who chased them down.

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1 The speaker was the director of the Scripps Institute of Oceanography at the University of California, San Diego, Charles Kennel. For a report of the speech, see http://scrippsnews.ucsd.edu/Releases/?releaseID=687 (accessed 23 June 2008).

2 Spencer R Weart, *The Discovery of Global Warming*, Harvard University Press, 2003, page 20.

3 Rossby was a giant in the the development of meteorology. See his biography at http://www.bookrags.com/biography/carl-gustaf-rossby-wsd/. His face on the cover of *Time* magazine of 17 December 1956 can be seen at http://www.time.com/time/covers/0,16641,19561217,00.html. His *Wikipedia* entry is at http://en.wikipedia.org/wiki/Carl-Gustaf_Rossby.

4 Weart, op. cit., page 25.

Thus was born the famous Keeling curve, showing extensive seasonal variations but a steady increase in the base level. With a short break in 1964 when the funding ran out briefly, the Scripps Observatory has maintained the Mauna Loa readings to this day. They show that the steady increase has taken the level from 315 ppm in 1958 to over 380 ppm, today.[5] Dave Keeling's dedication to measuring CO2 levels and getting it right has produced the most uncompromising evidence of all that our addiction to burning fossil fuels is changing, fundamentally, the thin layer of gases on which life on earth depends.

Telling the Truth: Jim Hansen

Mark Bowen's book about Jim Hansen and the attempts to silence him begins as follows:

> "One sweltering June afternoon in 1988, an understated Iowan named Jim Hansen turned global warming into an international issue with one sentence. He told a group of reporters in a hearing room, just after testifying to a Senate committee, it's time to stop waffling … and say that the greenhouse effect is here and affecting our climate now."[6]

Jim Hansen's approach to life is reflected in his approach to science. It is about the relationship between the truth, the evidence and what we would like the evidence to be. He attributes his approach to a quote from the famous, Nobel Prize winning physicist, Richard Feynman, as follows:

> "The only way to have real success in science … is to describe the evidence very carefully without regard to the way you feel it should be. If you have a theory, you must try to explain what's good about it and what's bad about it equally. In science you learn a kind of standard integrity and honesty".[7]

Jim Hansen commenced employment as a post doc at NASA's Goddard Institute for Space Studies ("GISS") in New York in January 1967.[8] He is still there and has been the director of GISS since 1981. His early work at GISS involved using the light scattering effects of particles in the atmosphere to identify aspects of the atmosphere of Venus.[9] This equipped Jim to work on the heating of earth's atmosphere by sunlight as part of GISS's work in developing a computerised weather model.[10]

Jim Hansen suggested that GISS develop a Global Climate Model in 1975. Funding was not available until the following year.[11] This was a massively difficult undertaking. The world's climate system is extremely complex. A large number of factors impact on the system producing complex and dynamic interactions.[12] Each of those factors was only

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5 Scripps Institution of Oceanography: *Scripps CO2 Program: Home of the Keeling Curve at* http://scrippsco2.ucsd.edu/home/index.php (accessed 24 June 2008).

6 Mark Bowen, *Censoring Science*, Dutton, 2008, page 1.

7 Bowen, op. cit., page 53.

8 Bowen, op. cit., page 191.

9 Bowen, op. cit., page 198.

10 Bowen, op. cit., page 198.

11 Bowen, op. cit., page 200-201.

12 GISS has published a discussion of Global Climate Modelling at http://www.giss.nasa.gov/research/modeling/gcms.html . The article contains references to the technical papers discussing various versions of the models.

able to be effectively incorporated into the model by a painstaking combination of measurement; analysis using the principles of theoretical physics and chemistry; and meticulous checking of the model results against climate in the real world.[13]

Jim Hansen is best known for his courage in speaking out about climate change and for alerting Congress, the United States; and the world about the dangers of continued use of fossil fuels. His ability to speak out, however, is the product of his scientific contribution to the study of the subject. By 1988, the GCM developed by Jim's team at GISS was retroactively able to predict temperature changes by applying what was now thirty years of data from Dave Keeling's Mauna Loa facility. The departures from straight line changes, associated with the cooling caused by volcanic interruptions, allowed calibration and confirmation of the accuracy of the modelling. Part of Jim Hansen's genius was to make use of some advanced mathematics developed by Akio Arakawa so as to achieve results without dependence on extreme levels of computer power. This also provided protection against the years of restricted funding.[14]

Despite all this, as I mentioned, it is not for his science but his willingness to speak the truth about the results of science to legislators and the public for which Jim Hansen is famous.

It wasn't the first time that Jim Hansen had given evidence to a Congressional Committee. However, June 23, 1988, twenty years and two weeks ago, was a very hot day in a very hot and dry year in the northern United States and across northern Europe and Asia. It was on that day that Jim Hansen told the sweating crowd in the Senate Committee room that he was 99% sure that humans were already heating the planet. He said: "The greenhouse effect has been detected and it is changing our climate now".[15]

The comments caused a sensation.[16] They were widely reported. Almost single-handedly, Jim Hansen had made "global warming" a term that we could all recognise and understand.

Seventeen and a half years after his 1988 Senate testimony, Jim Hansen decided it was time again to take up the cudgels in public. On 6 December 2005, at a meeting the American Geophysical Union ("the AGU") in San Francisco, he delivered a speech. Fittingly, he had been invited by the AGU to give a speech in memory of Dave Keeling, the first of our three subjects for today's talk.

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13 Weart, op. cit., passim.

14 An abstract of the Hansen et al. 1988 paper which made predictions based on three different future scenarios may be found at http://pubs.giss.nasa.gov/abstracts/1988/Hansen_etal.html (accessed 30 June 2008). The link provides a further link to a PDF file of the 1988 paper.

15 Andrew C Revkin, *Years Later, Climatologist Renews his Call for Action*, New York Times, 23 June 2008 at http://www.nytimes.com/2008/06/23/science/earth/23climate.html?em&ex=1214452800&en=21575e6ee46489ed&ei=5087%0A (accessed 26 June 2008).

16 For a contemporary report, see http://query.nytimes.com/gst/fullpage.html?res=940DE7DF133AF937A15755C0A96E948260 (accessed 28 June 2008).

In his Keeling speech, Jim Hansen said:

> "… Earth's climate is nearing, but has not passed a tipping point, beyond which it will be impossible to avoid climate change with far ranging consequences. … The Earth's history suggests that with warming of 2-3degrees C … sea level will [rise about] 25 metres. … Real world data suggest substantial ice sheet and sea level change in centuries, not millennia." [17]

This new period of speaking out by Jim Hansen has not ceased. He spoke out and exposed the censorship that was being carried out by the George Bush political appointees in various agencies in order to prevent scientists from speaking to the public about their discoveries. He has written personal letters warning of the dangers of climate change to world leaders including to Barack Obama[18] and Australian Prime Minister, Kevin Rudd.[19] He has attended demonstrations and been arrested.[20] He has travelled to Maidstone Crown Court in the United Kingdom to give evidence on behalf of 6 Greenpeace protestors charged with criminally damaging a coal fired power station.[21]

And through it all, Jim Hansen has continued to communicate to the public the reality that his work, the work of his team, and the work of climate scientists around the world has revealed: the great danger that global warming presents and the steps which must be taken now to avert at least some of the danger.

Aubrey Meyer:

Aubrey Meyer is a former concert viola player. He was born in Bingley, Yorkshire in 1947 but, from the age of five, he grew up in Cape Town, South Africa. Until 1988, he was a successful composer and player with the Scottish Theatre Ballet, the Sadlers Wells Royal Ballet and the London Philharmonic Orchestra. It was in researching the story of Chico Mendez and his assassination in the Amazon rainforest that Aubrey Meyer came upon the issues raised by climate change.[22] The issues raised by the Mendez story "diverted him from music to the UK Green Party". Here he co-founded the Global Commons Institute ("the GCI") and started to develop a program based on the premise

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17 Bowen, op. cit., page 4.

18 The letter may be found at http://www.columbia.edu/~jeh1/mailings/20081229_DearMichelleAndBarack.pdf.

19 Mr. Rudd's letter may be found at http://www.columbia.edu/~jeh1/mailings/2008/20080401_DearPrimeMinisterRudd.pdf.

20 A recent excellent profile of Jim Hansen by Elizabeth Kolbert in the *New Yorker* may be read here: http://thingsbreak.files.wordpress.com/2009/06/hansennewyorker.pdf. The intro, at least, to the arrest story is at http://www.newyorker.com/online/blogs/newsdesk/2009/06/elizabeth-kolbert-james-hansen-the-arrested-scientist.html.

21 See the report in the *Independent* at http://www.independent.co.uk/environment/climate-change/nasa-scientist-appears-in-court-to-fan-the-flames-of-coal-power-station-row-918057.html.

22 These details are taken from a curriculum vitae at http://www.gci.org.uk/AubreyMeyer/CV_Aubrey_Meyer_1.pdf.

Equity and Survival. It is this emphasis on the simple proposition that equity is at the core of any solution to climate change which makes Aubrey Meyer stand out.

In 1996, Meyer and GCI came up with the idea of *Contraction and Convergence* as the method by which the world must equitably reduce its greenhouse emissions. The idea is explained in a review of the book of the same name by Mayer Hillman.[23] Hillman describes the concept in the following terms:

> "It requires the reduction to be completed within a timetable determined by scientific evidence whilst at the same time programming the reduction towards an end-state of equal per capita emissions. He argues convincingly that this is the only way of avoiding ecological catastrophe.'

George Monbiot, writer and independent activist, in his 2006 book, *Heat*,[24] uses Meyer's idea as the corner stone of his analysis in which he looks at ways in which the United Kingdom, using existing technology, can reduce its emissions by 2030 in accord with the contraction and convergence concept. Monbiot elaborates upon the idea as a ration of carbon emissions. The amount of the ration is calculated by first determining an acceptable level of emissions by a certain date in the future. Monbiot chose 2030 as the latest reasonable date to make radical changes. One then estimates the likely world population in 2030. One divides the total allowable (in 2030) emissions by the expected population to obtain a per capita ration of carbon emissions. Each country is then allocated the personal ration multiplied by its 2030 population.[25]

Monbiot also describes how the idea has been further developed by the previously mentioned book reviewer, Mayer Hillman,[26] and another independent thinker, David Fleming.[27] Both Hillman and Fleming have developed schemes by which the country's allocation is divided between a personal allocation to cover electricity, gas and personal transport requirements and the other half is allocated (sold) to businesses needing to use carbon to operate.

The result of the contraction and convergence plan is that first world countries like Australia and the United States would have to reduce their carbon usage by more than 90%. Other countries like Ethiopia can massively expand their carbon usage by four or five hundred per cent[28]

My point in choosing Aubrey Meyer is that climate change leadership will require a very high moral component. Much of what has been said, pre-Copenhagen, has been designed to disguise and hide the tough moral decisions that the future holds. Talk about

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23 The review, originally published in *Town and Country Planning*, is available on the GCI website at http://www.gci.org.uk/ccbook.html.

24 Published by Penguin under their Allan Lane imprint.

25 See George Monbiot, *Heat*, Penguin, 2006 (April 2007 edition), at pages 44-45.

26 Described in his 2001 book review as Senior Fellow Emeritus, Policy Studies Institute.

27 David Franklin is founder director of an organisation called the *Lean Economy Connection*. See http://www.theleaneconomyconnection.net/about.html.

28 Monbiot, op. cit., pages 45-49.

technology transfer from the developed countries is just a way of avoiding the issue. The demands by countries like India and China not to be frozen out of a western standard of living only makes sense if those countries are also prepared to say how much of a western life style is enough for them. The individual carbon ration, in whatever form it is delivered, is the only way in which climate change can be faced on an equitable basis.

Game theory explains why equity is very important to solving climate change. Solving the problem is a game where any one player can wreck the game for others. If China will not play, the rest of us will go under the waters with China. It is only when everyone is satisfied that the rules of the game are fair that the game can effectively be played. It is only when leaders approach the question on the basis of equity that climate change will have any hope of being controlled.

The Qualities of Leaders

Some of the qualities we will need from our leaders are shown by the three people whose work I have briefly described. Each of Dave Keeling, Jim Hansen and Aubrey Meyer has shown great persistence.

Jim Hansen, I think, has shown enormous courage as well as persistence. He has been and will continue to be vilified for speaking out and talking to the public in the way that he has. Each of the three has shown great creativity. We will need our leaders to come up with ideas at each stage of the difficult process of combating climate change.

Aubrey Meyer has shown a particular form of leadership: the ability to see through the dilemma to the moral answer. He has understood a particular moral truth, namely, that when everybody is being asked to change their way of life, the easy shortcuts are no longer available to anybody.

As I mentioned at the beginning, my discussion is not premised on the assumption that we will only be looking for these qualities in our formal leaders, particularly, those at the political level. As this discussion has perhaps shown, climate change is too important to be left to politicians. Each of us will need to be prepared to show the same qualities of leadership if progress in combating the future is to be made.

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