"Future forecast – changeable and probably getting worse": the UK Government's Early Response to Anthropogenic Climate Change

The historiography, including the writings of scholars in fields such as political science, geography and science and technology studies that contain historical perspectives, of climate change has largely taken either long-term or overly short-term frames of analysis. Weart starts his history of the discovery of global warming with the nineteenth-century debates about ice ages and the measurement of carbon dioxide in the atmosphere.[1] James Fleming is one of a number of historians who has emphasised that "climate", viewed in the long term, is a complex, historically-contingent category, which has been interpreted in different ways, by different peoples, at different times.[2] Nevertheless, a broad picture emerges. Early modern and Enlightenment theories of a vigorous relationship between changing climate and fates of civilisations were challenged, by the mid nineteenth century, by claims, drawing particularly on data from the United States, of climatological stability.[3] Climatological determinism, the theory that climate was a predominant factor shaping societies, remained strong. 'Classical theories of climate', notes Endfield, 'were reworked to explain racial, pathological, economic, and moral characteristics and distinctions between different parts of the world' through to the early-to-mid twentieth century.[4]

From the long-term perspective, the second major shift has been the twentieth-century predominance of a definition of climate as a narrow statistical index, "climate" as an average

[1] Spencer R. Weart, *The Discovery of Global Warming* (Cambridge, MA, 2003).
[2] James R. Fleming, *Historical Perspectives on Climate Change*, (Oxford, 1998). Robert I. Rotberg and Theodore K. Rabb (eds.), *Climate and History: Studies in Interdisciplinary History*, (Princeton, 1981). T.M.L. Wigley, M.J. Ingram, and G. Farmer (eds.), *Climate and History: Studies in Past Climates and their Impact on Man*, (Cambridge, 1981).
[3] The cutting of forests in both the Classical and the New Worlds was held, for example by Jean-Baptiste Du Bos and David Hume, to be the cause of climate change. The rebuttal involved a rediscovery of Noah Webster's 1799 arguments, and Samuel Forry's analysis of US temperature records. James Rodger Fleming, 'Global environmental change and the history of science' in Mary Jo Nye (ed.), *The Cambridge History of Science. Volume 5: The Modern Physical and Mathematical Sciences* (Cambridge, 2003), 634-650.
[4] Georgina Endfield, 'Reculturing and particularizing climate discourses: weather, identity and the work of Gordon Manley', *Osiris*, 26 (2011), 142-162, 142.

patterns of weather, a 'definition…possible only in connection to an instrumental, quantitative and weather-biased understanding of the atmosphere', that became embedded as climatology itself became a distinct scientific specialty.[5] Constructing global climate indices depended crucially on piecing together data from local, regional and international scales, achievements that are inseparable from imperial and global regimes of governance.[6] In particular, the Cold War provided the necessity, the means and the reach to drive research from the depth of the oceans to the upper atmosphere, contingently gathering the data that would establish the phenomenon of anthropogenic global warming.[7]

By 1988, the carbon problem was alarming enough for the World Meteorological Organisation and the United Nations Environment Programme to establish the Intergovernmental Panel on Climate Change (IPCC), which has had the tasks of gathering scientific data about global climate, subjecting it to peer review, and to publish reports on overall conclusions. Controversies over evidence, as well as the mismatch between the IPCC's ever-firmer statements on the reality of global warming ('unequivocal' by its fourth assessment report in 2007) and the lack of international political action in response, has produced an immense literature.[8] In particular, the historiography of political responses to climate change has become overly short term. So, for example, the main historical investigation of the UK's response to climate change, a research project led by Sonja Boehmer-Christiansen, locates the start of government action in the period between 1987 and 1990, when Margaret Thatcher listened to "senior and sensible scientists", inside and outside government, as

[5] Vladimir Jankovic and James Rodger Fleming, 'Revisiting *Klima*', *Osiris*, 26 (2011), 1-16, 2.
[6] Deborah R. Coen, 'Imperial climatologies from Tyrol to Turkestan', *Osiris* 26 (2011), 45-65.
[7] Weart, *Global Warming*, 21. That the Cold War context is essential for understanding climatological and meteorological projects is further substantiated in Jon Agar, *Science in the Twentieth Century and Beyond*, (Cambridge, 2012), 397-399, 429-431.
[8] Reiner Grundmann, 'Climate change and knowledge politics', *Environmental Politics* 16 (2007), 414-432. Anthony Giddens, *The Politics of Climate Change* (Cambridge, 2009).

well as the former diplomat Crispin Tickell, and was convinced of the need for action.[9] This short-term historiography is found elsewhere in discussions of the UK government's response.[10]

In this article I reveal that there was an earlier, significant history. I argue that from the 1970s to early 1980s, officials within government gathered and assessed claims about climate change, and, eventually, made their concerns known to ministers. The story is complex, not least because the major institutional representative of climatological knowledge, the Meteorological, or Met, Office, was, for reasons that are explored, sceptical of long-term change. My account is therefore organised in three stages. After a section that orientates the reader to the main institutional players, I will, first, show how a particular confluence of contingent factors, especially a burgeoning interest in longer-term, futurological study, provided an opening within which it was possible to make climate change meaningful within Whitehall. Second, I trace the struggles over interpretation as claims about climate change were assessed. My main point here is that the Met Office's conversion to investment in massive computer modelling of future climate had more to do with maintaining its control over climatological knowledge and with providing an alternative evidence base to American claims, than with a conviction that global warming was underway. Nevertheless, in the third stage I show that, despite Met Office opposition, an official consensus on the likelihood of climatic change was ready at the time of the transition from Callaghan's to Thatcher's administration. Furthermore, the response of the Conservative government was distinctly cool.

Who's who: a guide to organisations

[9] Sonja Boehmer-Christiansen, 'Britain and the International Panel on Climate Change: the impacts of scientific advice on global warming. Part I: Integrated policy advice and the global dimension' and 'Part II: The domestic story of the British response to climate change', *Environmental Politics* 4 (1995), 1-18 and 175-196, 176-177.
[10] For example: Uttam Kumar Sinha, 'Climate change and foreign policy: the UK Case', *Strategic Analysis,* 34 (2010), 397-408. Loren R Cass, 'The indispensable awkward partner: the United Kingdom in European climate policy', in Paul G. Harris (ed.), *Europe and Global Climate Change: Politics, Foreign Policy and Regional Cooperation* (London, 2007), 63-86.

There has been a great deal of attention paid to the rise of environmental activism on a national and global scale in the 1970s by historians and theorists of the so-called 'New Social Movements'. This article, while noting how perceptions of 'public opinion' and environmental lobbying were factors in policy debates, focuses primarily on the internal processes by which climate change became a pressing policy issue and institutional priority within Whitehall.[11] The heart of this paper, therefore, concerns how civil servants and politicians responded to emerging climatological views about anthropogenic (or human-caused) climate change. When Edward Heath became Prime Minister in 1970 he instigated significant changes to the machinery of government. Two large departments were formed by merger, one of which, the Department of Environment, formed by combining the Ministry of Housing and Local Government and the Ministry of Public Building and Works, employed in-house scientific experts who assessed and advised on climate change. Second, Heath wanted a longer view. 'I had seen Cabinets which had all the time seemed to be dealing with day-to-day problems', noted Heath, 'and there was never a real opportunity to deal with strategy'.[12] A step towards deepening strategy 'capability' was the immediate establishment of the Central Policy Review Staff, which also housed the chief scientist, and is discussed below. The CPRS continued until 1983. Nevertheless, the traditional system of Cabinet committees retained their powerful coordinating role. Within this system the Cabinet Secretary – in the period covered here, Burke Trend, John Hunt and Robert Armstrong – played a vital part, intermediary between civil service machine and politicians. One particular committee, on World Trends, was also an innovation of Heath's, and opened a space for the articulation and discussion of long-term issues, not least environmental ones.

While it might have been expected that the Royal Commission on Environmental Pollution, one of the foremost mechanisms by which expert advice on environmental issues was brought to the

[11] Brian Doherty, *Ideas and Actions in the Green Movement* (London, 2002). Stuart Cotgrove and A. Duff, 'Environmentalism, middle-class radicalism and politics', *Sociological Review* 28 (1980), 333–351. Ramachandra Guha, *Environmentalism: a Global History* (London, 2014). Further research is needed on the question of the relationships between environmental NGOs and Whitehall.
[12] Heath speaking in 1972, quoted in Peter Hennessy, *Whitehall* (London, 1989), 209.

attention of government, would address carbon dioxide pollution, in fact it did not devote time to this issue until the late 1990s and 2000s.[13] The sources and channels of climatological advice must be found elsewhere. Aside from a small number of individual academics studying climate (as distinct from weather) in the 1970s, some funded and coordinated in a fairly minimal way by the Natural Environment Research Council, the two leading UK centres of climate change research were those at the University of East Anglia and the Meteorological Office. The former was academic and the latter was a branch of government. They represented different methodologies, and had different time horizons. The Climatic Research Unit had been set up in 1972, when Hubert H. Lamb , author of *Climate Present, Past and Future*, moved from the Meteorological Office, where he was due to retire, to the University of East Anglia (UEA).[14] The university only provided accommodation. Funds for research came from the Nuffield Foundation and Shell according to one source[15] and from the Wolfson, Nuffield and Rockefeller foundations according to another.[16] Financial support was certainly precarious in the early years. The Climatic Research Unit, under Lamb, who finally retired in 1977, would become the leading UK academic climatology centre. Its methodology was summarised by a NERC civil servant as a 'statistical approach' to climate, 'in which climatic conditions in the past are determined through historical records, geological evidence, tree rings, etc, and empirical relationships determined and extrapolated forward'.[17]

The Meteorological Office on the other hand was a large, venerable institution, most accustomed to serving the short-term demands for weather information from clients. It was a government body, based at Bracknell, formed in the 1850s under the Board of Trade to provide advice to shipping. It later moved into the military, first as part of the Air Ministry (1919) and then the Air Force

[13] For the work of this body, see: Susan Owens, 'Experts and the environment: the UK Royal Commission on Environmental Pollution, 1970-2011', *Journal of Environmental Law*, 24 (2012), 1-22, see p. 10 for impact on climate change policies in 2000.
[14] Hubert Horace Lamb, *Climate Present, Past and Future* (London, 1972-77).
[15] National Archives (hereafter TNA) CAB 164/1379. Braben to Cottrell, 1 March 1974.
[16] Hubert Lamb, 'Fluctuations in climate', *Nature* 251 (18 October 1974), 568.
[17] TNA CAB 164/1379. Minutes, 'World trends – climatology. Note of an informal meeting at NERC Headquarters', 24 October 1974.

Department of the Ministry of Defence. Its main task was the provision of weather forecasts. However, it also housed experts in climatology. The Met Office methodology was centred on models, empirically tested against data. The military significance of the Met Office's work enabled the Met Office to invest in ever more powerful electronic computers, while its position at the centre of a vast network of meteorological observers provided the data with which to work. In 1974, the Met Office had marked an expanding interest in climate by starting a working party on world climatology, 'with specific emphasis on climatic change', under J.S. Sawyer, the Met Office's director of research.[18]

Hearing about Climate Change

'It was not the weight of any single piece of evidence that was convincing', argues Weart about the scientific consensus around global warming, 'but the accumulation of evidence from different, independent fields'.[19] Jacob Hamblin, historian of environmental science, notes too that speculations about environmental warfare, including the effects of thermonuclear war, also raised the question of anthropogenic climate change.[20] The World Meteorological Organisation and the International Council of Scientific Union's Global Atmospheric Research Programme (GARP) had been formed in 1967, and co-ordinated substantial work in the 1970s. These included, and were well known to, the climatologists, and the director, of the Meteorological Office in the UK.[21] Informed news about climate change could reach the UK government through several different routes. One route might be public statements, such as individual views warning of climate change given a more collective

[18] TNA CAB 164/1379. 'Climatology', Smith to Warren, 1 November 1974. Sawyer had written tentatively on anthropogenic global warming in 1972: J.S. Sawyer, 'Man-made carbon dioxide and the "greenhouse" effect', *Nature* 239 (1972), 23-26.
[19] Weart, *Global Warming*, 89.
[20] Jacob Darwin Hamblin, *Arming Mother Nature: the Birth of Catastrophic Environmentalism* (Oxford, 2013).
[21] As reflected in TNA CAB 184/567. John Mason, 'A national climate programme', March 1978.

endorsement by publications as editorials in prestigious general science journals[22], or reports by academies.[23] From the 1970s, scattered individual scientists issued public warnings about human effects on climate, including cooling as well as warming, and pointing to factors such as supersonic aircraft, nuclear fallout and debris, as well as greenhouse gas emissions.[24] Such routes seem, in the UK case, ineffective in reaching central decision makers. What seems essential was the presence of persons playing a broker role, such as a route via scientific advisers to ministers. In such a case there were several steps. An adviser would have to hear about climate change, they would make a judgement about it (or seek further expert views), and they would have to choose to raise the issues (or not) at appropriate levels, which might be within departments, among leading scientific advisers, or among senior officials or ministers. The first example I have found of this route is in 1974. Dr P.T. Warren, a Cabinet Office civil servant, reported a conversation to Dr Robert Press, who was the acting chief scientific adviser between April 1974 and 1976. Warren had been at a meeting examining the forces shaping Europe over the next thirty years (Lord Kennet's Europe plus Thirty project[25]). There, he had spoken with Professor Hermann Flohn, a respectable climatologist from Bonn and one of the leading researchers into anthropogenic climate change. Flohn clearly impressed on Warren the necessity of taking the subject seriously. Warren told Press:

> His organisation has now achieved a "reasonable" model for world climate and this leads to some very worrying predictions when data are fed in on the present output of CO2 into the

[22] Alvin Weinberg, 'Global effects of man's production of energy', *Science* 186 (18 October 1974), 205. Weinberg wrote that the world might reach 'climatological limits' within 30 to 50 years. Noting the uncertainty surrounding the results so far, he called for two responses. 'First, climatologists should recognize the profound implications of this question and do the basic research in global modelling … so that, say 20 years from now, we can base our energy policy on a much sounder understanding of this limit than we now possess'; and, second, since the 'problem of global effects of energy production, like so many long-range environmental problems, is everyone's problem', an institute (or institutes) committed to '*long-term*' (my emphasis) research needed to be established.

[23] Royal Society, *Pollution in the Atmosphere* (London, 1977/1978). See also National Academy of Sciences, *Energy and Climate* (Washington DC, 1977).

[24] Weart, *Global Warming*, p. 93.

[25] Commission of the European Communities. 'Europe plus 30' press release, 1975. Available at: http://aei.pitt.edu/10241/1/10241.pdf. Lord Kennet, a Labour (later SDP) politician who had helped set up the Royal Commission on Environmental Pollution, had been asked by the EEC Commission to direct a futurological project to identify decade-scale development issues and to scope out the case for a European futurological organisation.

> atmosphere. As I understood him, and I should add that he is no over-zealous enthusiast of the doom-watch school but fully aware of all the limits to modelling, the dangers of premature judgements etc, there is a real likelihood that by the year 2100 the polar ice-caps will disappear if the increase in CO2 in the atmosphere continued at its present rate.[26]

Notice the way that Warren made clear that Flohn was not an enthusiast, who could be ignored, but rather an expert voice that should be listened to. Warren offered Press his own advice about next steps: 'in my view the UK should consider the extent and priority given to long-term forecasting of climatic change to see whether it would be wise to increase the amount of research undertaken'. Press agreed that a survey of the state of climatology would be a good start.

Robert Press, as acting chief scientific adviser, was therefore faced with the question of what to do with the concerns raised by Flohn and Warren. A potential outlet existed because the UK government had recently decided to devote more energy to forecasting the future. The new interest in futurology had been kick-started by the impact of the Club of Rome's computer simulations of future resource use and pollution, published as *Limits to Growth* in 1972, but whose conclusions and methods were under excited discussion in 1971.[27] The senior scientific experts in the UK were split: Solly Zuckerman, retired Chief Scientific Adviser, hated it ('a pity that serious men are always ready to anaesthetise themselves with nonsense words'[28]), while Alan Cottrell, Zuckerman's successor from 1971, thought the approach, if not the execution, intrinsically sound.[29] Martin Holdgate, scientific adviser in the Department of the Environment, was very enthusiastic about the

[26] TNA CAB 164/1379. Warren to Press, 14 October 1974.
[27] Futurology as a specialty was the product of a post-war transnational network of experts that can be connected, says Andersson, to 'a radicalisation of the future at a time when notions of science, politics, and world order were changing rapidly'. By the late 1960s, a crucial tool in their armoury – a Cold War tool, I would add – were 'large-scale simulations that gave rise to understandings of the world as an independent and fragile system'. Limits to Growth was only the most well-known. Jenny Andersson, 'AHR Forum: The great future debate and the struggle for the world', *American Historical Review* 117 (2012), 1411-1430, 1414, 1413. See also: Elke Seefried, 'Steering the future: the emergence of "Western" futures research and its production of expertise, 1950s to early 1970s', *European Journal of Futures Research* 15 (2013), 29-41.
[28] TNA CAB 168/291. Zuckerman to Trend. 'It seems to me that the Club of Rome should be regarded as an aspect of the permissive society, as it applies to adults', Zuckerman said, after consulting the provost of MIT, Jerome Wiesner.
[29] TNA CAB 168/291. Cottrell to Heath, 28 June 1971.

opportunity to look forward half a century or more.[30] The Cabinet Office thought it could adopt the Club of Rome's method – very-long range study and simulation - but do it better. It also provided a bureaucratic niche for this new enthusiasm for futurology: the establishment of an Official Committee on Future World Trends.

In February 1972, Peter Walker, the Environment Secretary, wrote to Edward Heath 'about the problems said to be in store on a world scale as a result of conflicts between present trends in population and economic growth requiring greater and greater amounts of energy and natural resources'.[31] 'While much of the argument … is extreme, apocalyptic and naïve', argued Walker, citing both the *Limits to Growth* and *A Blueprint for Survival*, the influential green manifesto written by Edward Goldsmith and which had been published in *The Ecologist* the month before, 'I do not think we can be complacent about the issues it raises'. After summarising a 'creditable list' of environmental policies, Walker nevertheless stressed that the

> dangers, if they occur, are sufficiently great that in my view a case has been established to justify the UK Government in taking part … in further work to broaden the existing analysis both in width and depth.
>
> The immediate need would seem to be to decide on the most appropriate way, within Government, of handling the further work that is required… What seems necessary is a central capability, built round a Research Group, within Government … [to] work on the techniques on lines complementary to those being pursued by MIT and elsewhere.

[30] TNA CAB 168/291. Holdgate to Cottrell, 1 July 1971. 'I feel that Whitehall as a whole is good at tactics and short-term strategy, but grand strategy over the whole field and on a time scale of half a century eludes us at present'.

[31] TNA CAB 164/1182. Walker to Heath, 16 February 1972. This important letter was copied to Alec Douglas-Home, Tony Barber, Willie Whitelaw, George Jellicoe, John Davies, Jim Prior, William Armstrong, Burke Trend and Lord Rothschild.

Heath asked his chief scientific adviser, Cottrell, to discuss what to do. Cottrell supported the proposal to broaden analysis in 'width and depth'.[32] In particular, the capacity to look forward in time, scanning world trends in the intersecting issues of 'population, economic growth and ecology', and to do so in a manner useful to domestic political interests.[33] The decision to set up the Official Committee on Future World Trends would also handily be available to be announced at the United Nations Conference on the Human Environment at Stockholm in June 1972 as Britain's contribution to finding environmental solutions.[34]

Future World Trends first met in July 1972, when the chair, Cottrell, explained that 'much of the work in this [futurological] field had until now been done by groups of strongly-motivated enthusiasts, and some conclusions had been based on inadequate evidence'[35], whereas government needed, and was well placed to generate, 'reliable information and balanced views on the whole range of related problems'. The World Trends committee would keep watch, hear and evaluate new views of the future, and 'coordinate research and action'. Intra-mural research was also deepened, with new Research and Policy units in the Department of the Environment. The topics of interest were food, supplies of raw materials, energy, population, and pollution; the methodology was modelling; the timescale 'several decades'.

Warren, who was one of its two secretaries, suggested putting a position paper on climatological research to the World Trends committee.[36] The Met Office provided a paper that covered climate

[32] TNA CAB 164/1182. Cottrell to Heath, 23 February 1972.
[33] The adaptation of futurology to specific national purposes is typical, if generalise from Andersson's excellent account of the analogous Swedish case: Jenny Andersson, 'Choosing futures: Alva Myrdal and the construction of Swedish futures studies, 1967-1972', *International Review of Social History* 51 (2006), 277-295.
[34] This diplomatic advantage had been Walker's suggestion, endorsed by Cottrell.
[35] TNA CAB 134/3584. Minutes, Official Committee on Future World Trends, 26 July 1972. This is probably a reference to the Club of Rome's *Limits to Growth*. Like the *Blueprint for Survival*, *Limits to Growth* was subject to an early, highly critical review by the Research Unit. The view however was that the model used by MIT had been deeply flawed but that the methodology was salvageable. That is to say, there was mileage in the concept of long-term computer modelling of world trends, so long as the data set was improved and the assumptions of the model radically changed.
[36] TNA CAB 164/1379. Warren to Press, 8 November 1974.

change for discussion in 1975.[37] The 'conclusion of the paper was that it was all very difficult and that "fundamental understanding has not reached a stage which permits a reliable computation of future climate. Moreover, natural climate time-series can give no useful indication of future trends"'.[38] There was nothing for the futurologists of world trends to say or do in the state of such blindness. Indeed, the chair, summed up discussion by saying the paper 'was a very valuable antidote to emotional and uninformed statements'. Climate change was not included in the annual report to ministers from the World Trends watchers; pollution, food and energy security all out-ranked climate as an issue.[39] At this stage, climate change could not rank highly as an issue, even if it was on the radar, because the intramural experts, the Met Office, downplayed its significance.

A second route along which informed views about climatic change reached Whitehall was from across the Atlantic. In 1974, the Central Intelligence Agency had circulated a report that drew attention 'in cautious and conditional terms, to the implications for world food-production of a long-term cooling trend in world climate', while remaining agnostic about whether such trends existed.[40] Two years later the Agency returned to the subject, and was now less concerned with approaching ice ages but rather with global warming. The new report, which was published and received media attention[41], strongly reflected (without officially endorsing) the research conducted under Reid Bryson, a scientist at the University of Wisconsin's Department of Meteorology.[42] The existence of the 1976 report was mentioned in passing at the World Trends committee, and Cabinet Office staff chased the reference up. The Cabinet Office turned to the Meteorological Office, as well as the DoE's Systems Analysis Research Unit, for advice. Specifically, to judge whether the issue needed to be taken further, the Cabinet Office wanted to know three things:

[37] TNA CAB 134/3974. Sawyer, 'Problems of assessing the future climate', WT(75)7, 4 April 1975. The paper was discussed at WT(75)2nd meeting, 22 April 1975.
[38] TNA CAB 184/567. 'The weather', Ashworth to Berrill, 23 February 1977.
[39] TNA CAB 134/3974. Report to ministers, WT(75)12, 18 July 1975.
[40] CIA, 'Potential implications of trends in world population, food production and climate', 1974. TNA CAB 164/1379. Thomas to Sawyer, 16 June 1976.
[41] For example: *Sunday Times*, 16 May 1976.
[42] CIA, 'A study of climatological research as it pertains to intelligence problems', August 1976, but in circulation in May 1976.

> a. Is the "science" right? …
>
> b. Even if the science is not "correct" is it from, or does it reflect, a respectable school? In short, is the Wisconsin School, upon which the case presented largely stands, though much of in meteorological circles? If the case is not discredited, but merely remains unproven, then politically it cannot be ignored and we may assume that both American commodity and general foreign policy will increasingly tend to reflect a recognition that the CIA report may be true, with all the economic and political implications of changing climate.
>
> c. [are we accordingly] satisfied with the scale of United Kingdom contributions to research in this field either at home or overseas?[43]

The Met Office response was unequivocal. First, the outgoing director of research, J.S. Sawyer, wrote a brief note saying that he regarded it as a 'completely misleading report which gives undue prominence to the views of a few climatologists with especially alarmist views … The evidence that a permanent climatic change of significant magnitude is in train is at best exceedingly sketchy'.[44]

His successor, K.H. Stewart, did not disagree, and added a sceptical assessment of Bryson:

> He is a reasonably good scientist but his judgement is poor and he is a man who likes publicity, no doubt as a help to getting more funds. The theories he put forward a few years ago, predicting imminent and serious global cooling as a result of increasing dust in the atmosphere, have been shown to be based on selective evidence, poorly interpreted, and are now more or less discredited.[45]

[43] TNA CAB 164/1379. Warren to Cohen, 18 June 1976.
[44] TNA CAB 164/1379. Sawyer to Thomas, 18 June 1976. For a contrasting, positive opinion of Bryson's team's interdisciplinary research, see: Weart, *Global Warming*, pp. 65-67, 71-72.
[45] TNA CAB 164/1379. Stewart to Cohen, 20 July 1976.

The Met Office took a particularly sceptical (or 'somewhat agnostic' in Whitehall language[46]) view of the claims of proponents of climate change.

Also coming across the Atlantic were the views of Crispin Tickell, a Foreign and Commonwealth Office diplomat who had spent the year 1975-1976 on sabbatical at the Harvard Centre for International Affairs studying climate change. The output was a lengthy report, 'The Climatic Dimension', which circulated in governmental and scientific circles in 1976 and was later published in 1978 as *Climatic Change and World Affairs*.[47] Tickell concluded that climate change in some direction was possible and must be watched.

The Met Office's scepticism again persuaded the Cabinet Office that no further action was needed with regards to either the CIA/Wisconsin studies or, because it was seen as covering similar ground, Tickell's tract.[48] However, as we shall see, Tickell would, over a decade later, play an important role in this story.

The CPRS and the Drought

However, as the civil servants and climatologists were travelling to work, sitting in un-air-conditioned offices, corresponding on the uncertainty of climate science, they sweltered in the hottest summer on record. The heatwave stretched between June and July 1976, becoming a news story, a political crisis (a minister for drought was briefly appointed), and, eventually, a point of reference in the public memory.[49] What the drought seems to have done is flag up climate change as

[46] TNA CAB 164/1422. Jamieson to Hunt, 14 July 1978.
[47] Crispin Tickell, *Climatic Change and World Affairs* (Cambridge, MA, 1978). Tickell sent his text to Zuckerman who later also wrote a preface.
[48] A.V. Cohen, the secretary to the World Trends committee, for example, agreed that the CIA paper was 'evidently an over-written bid for funds', TNA CAB 164/1379. Cohen to Stewart, 9 August 1976.
[49] Vanessa Taylor, Heather Chappells, Will Mead and Frank Trentmann, 'Drought in normal: the socio-technical evolution of drought and water demand in England and Wales, 1893-2006', *Journal of Historical Geography* 35 (2009), 568-591, offers a long-term, developmental account of droughts as combined political, technological and natural events, while nevertheless noting (p. 590), in the twentieth century, the exceptionality of 1976, both in terms of global geography and consumer disruption.

a phenomenon that might have political consequences in the United Kingdom (just as other global weather anomalies prompted similar connections to be made in other countries).[50] At the same time, newspapers, such as The Times, were reporting the World Meteorological Organisation's warning that global temperatures were 'likely to rise' due to 'a build-up of atmospheric carbon dioxide'.[51] As early as May 1976, the chair of World Trends asked whether, given the '2 years of abnormally mild weather', and a gathering 'pressure on Ministers to make statements about climatic change', the 1975 advice that nothing known was of concern still stood?[52] Certainly, influential, and a broader range of, bodies took an interest in climate in 1977 compared to 1975. These included the Central Policy Review Staff and the Department of Energy, as well as the Meteorological Office. The Central Policy Review Staff had a brief to act as a 'central capability unit', a bright and nimble counterweight to departmental views, to think through strategic implications, clarify priorities and political choices, and offer forward-looking and longer-term analysis.[53] The CPRS had no particular stake in climatology, but it did have a reason to understand the issue as a factor shaping its analyses, and as part of its brief to watch and coordinate the basic strategy of government, a broad role that invited longer-term vision. Furthermore, the CPRS, at the heart of the Cabinet Office, was home to the highest-ranking science advisor: John Ashworth, Chief Scientist in CPRS, was in effect (if not formally) chief scientific adviser to the government. Ashworth was a developmental biologist by training. The first head of the CPRS, Victor Rothschild, was also a scientist, but he was replaced in 1974 by Kenneth Berrill, an academic economist who had also been chief economic adviser in the Treasury.

[50] Compare, for example, the Australian case, in which an extended dry period in the early 1970s also prompted consideration of anthropogenic climate change. Ruth A. Morgan, 'Diagnosing the dry: historical case notes from Southwest Western Australia, 1945-2007', *Osiris* 26 (2011), 89-108.
[51] 'World's temperature likely to rise', *The Times*, Tuesday, 22 June, 1976.
[52] TNA CAB 134/4103. Minutes, WT(76)1st, 20 May 1976. Sawyer of the Met Office replied that WT(75)7 was indeed 'still valid'.
[53] William Plowden, 'The British Central Policy Review Staff', January 1980. Kenneth Berrill, 'The role of the Central Policy Review Staff in Whitehall', *Management Services in Government*, August 1977. Christopher Pollitt, 'The Central Policy Review Staff 1970-1974', *Public Administration* 52 (1974), 375–392.

The CPRS were drawn to climate change as a topic after the drought of 1976. Pooling and interpreting expert meteorologists' views, Ashworth sketched for Berrill a summary of what was known.[54] While the Met Office might say (as they had, several times, to the World Trends committee) that it was impossible yet to know anything reliable about future climate, Ashworth thought that three developments changed the picture. The first was what Ashworth accepted as proven Milan Milankovitch's theory relating very long-term climatic change to eccentricities in the earth's orbit. The second was an acceptance of plate tectonics. 'Putting the Milankovitch theory together with the plate tectonics geological theories', wrote Ashworth, 'provides a perfect explanation for most geological observations and is in accordance with a lot of otherwise puzzling data'. The third development was Hubert Lamb's theory of two stable modes of the upper westerly (jet stream) winds. The UEA professor believed that this pattern could be found in historical records, and was an explanation for the British drought of 1976 and the harsh US winter of 1976-1977. These advances meant, thought Ashworth, that the 'gross features of the Earth's climate' were understood, and could be further tested, especially now that space probes were revealing the comparative atmospheres of Mars and Venus. However, 'one complicating factor, which will have to be taken seriously' was carbon dioxide:

> …as a result of the increasing use of fossil fuels the atmospheric carbondioxide [sic] content has increased by 10 per cent over the last century. Increased atmospheric carbondioxide leads, via the "greenhouse" effect to an increase in temperature. However, carbondioxide production is usually associated with the production of dust (especially from coal) and particulate material in the atmosphere scatters light and thus leads to a decrease in temperature. It is possible that these two effects cancel, to a first approximation, but it is something that gives rise to a lot of debate; especially among those who wish to build nuclear power stations. Carbondioxide is, of course, soluble but it will take about 1,000 years

[54] TNA CAB 184/567. 'The weather', Ashworth to Berrill, 23 February 1977.

> for equilibrium to be reached between the atmosphere and the ocean; if the dust settles out faster than the carbondioxide dissolves there might be some interesting short-term effects.

Rounding off a review of climate change, Ashworth gave a prediction: 'Future forecast – changeable and probably getting worse'. The note is significant because it is the first, recorded instance of the UK's senior government adviser passing up the chain of command a firm view about climate change, in this case that natural climatic change was an understood fact and anthropogenic climate change a distinct possibility.

But what of the UK government's own specific experts in climatology? We have already seen the Met Office offering distinctly sceptical advice to the Official Committee on Future World Trends. This scepticism can plausibly be related to the body's interests in serving the shorter-term operational requests of clients.[55] Nevertheless, in August 1977, John Mason, director-general of the Meteorological Office, was roused to action. It is clear that the reason was not because Mason felt that the problem was urgent, but rather that too many uncoordinated and overlapping national and international projects were being started, leading to a wasting of resources. 'In an attempt to introduce some order into this situation' (he called it a 'bandwagon'), and to advise him, not least as the UK Permanent Representative with the World Meteorological Organisation, Mason suggested a committee be formed.[56]

Sir John Hunt, the Cabinet Secretary, perhaps wary of yet another committee, set off to Bracknell to find out more, part of a wider ranging mission to see how central government could help the Met Office. He caught a chilly blast of scepticism:

> His [Mason's] reaction was very much to pour cold water on alarmist United States views which he thought we would hear a good deal more about. Natural climatic change took place over very long periods indeed; and there was little reason to think that modern man's

[55] Compare with TNA CAB 184/567. 'Sir John Hunt's visit to the Meteorological Office – 7 September', undated.
[56] TNA CAB 184/567. Mason to various, 11 August 1977.

> activities would lead to a significant rise in average temperatures or that such a rise as occurred through the use of fossile [sic] fuels, etc. would have a harmful effect.[57]

Mason had only very recently (1975-1976) been an opponent of the Milankovitch theory of linking climatic change to changes in the earth's orbit.[58] This explanation would cover slowly-changing "natural" climatic change, but not anthropogenic climate change. But there is evidence that Mason's scepticism was more deeply rooted. Solly Zuckerman, who had retired as chief scientific adviser in 1971 but whose views were still revered and whose networks gave him ready access to government, contacted Hunt directly after hearing a convincing and alarming account of a likely 1-1.5 degree global warming at the International Institute for Applied Systems Analysis in Austria. 'And serious it will certainly be if it materialises', Zuckerman concluded, 'more serious for the security of the world than even the proliferation of nuclear weapons'.[59] In conversation, Hunt thanked Zuckerman but also noted that the view expressed 'did not seem to accord with the views of Dr Mason'. Zuckerman's reply is telling: 'everyone knew that Dr Mason did not believe in long term planning or indeed looking ahead at all'.[60]

However, 'having set out to debunk United States alarmist views', Mason admitted to Hunt 'that there were aspects of climatology which needed discussion'. Even then nothing may have happened if Hunt, one of the most high-ranking and powerful civil servants, had not pressed the issue in late September 1977, reminding the director-general of the Met Office that there were questions 'on which an informed balance of scientific opinion would be helpful', including the 'long-term future of

[57] TNA CAB 184/567. Hunt to Mountfield, Jones, Ashworth, Henderson, 8 September 1977.
[58] According the chief scientist of the CPRS writing to the head of the CPRS: TNA CAB 184/567. 'The weather', Ashworth to Berrill, 23 February 1977.
[59] The context was a presentation by Haefele that sketched future global energy supply and demand, arguing for a massive international programme of island-based nuclear power generation and reprocessing. Ascension Island, for example, would have become one great nuclear factory. The global warming aspect emerged in discussion, and Zuckerman did not catch the name of the 'expert climatologist' present. 'This was the first time that I had heard anyone take so serious a view of this particular issue'. TNA CAB 184/567. Zuckerman to Hunt, 10 October 1977.
[60] TNA CAB 184/567. Hunt to Berrill, Ashworth, Jones, 11 October 1977.

climatology as a subject, and the balance of resources to be devoted to it'.[61] Hunt asked for Ashworth, chief scientist of the CPRS, to be involved in Mason's *ad hoc* group, and that a paper on the issue be taken to the Official Committee on Science and Technology (a permanent secretary level official committee) 'around next summer'. Mason's calling into existence of an *ad hoc* group of departmental chief scientists began as an attempt to keep a measure of control, from a sceptical Met Office point of view, on a topic that other bodies, national and international were expanding active programmes of research. It was not an attempt to solve an issue rated by the Met Office as a priority or significant problem.[62] It was nonetheless to turn into the channel for raising the issue of anthropogenic climate change at the highest levels of government.

The first gathering of chief scientists and other government experts took place on 14 November 1977 at Bracknell.[63] The meeting recorded the widespread departmental interests in understanding and predicting climate change: general trends, extremes and their probability (essential for specifying safety margins), and the role of human activity. When the chairman of the Natural Environment Research Council (NERC) wondered whether, nevertheless, research would be justified on a strict customer-contractor principle[64], Mason, the chair, quickly framed support for computer modelling of the climate as part of a need to assess external alarmism:

> it was … necessary to develop and maintain the capacity for the numerical modelling of climate, because only in this way could we be able to respond quickly and authoritatively to the questions about climate change that were raised from time to time – often based on exaggerated and alarmist ideas …. <u>It was agreed that there was a need to maintain a</u>

[61] TNA CAB 184/567. Hunt to Mason, 28 September 1977. Mason, in his letter of invitation to chief scientists, wrote that the 'matter has now become rather urgent in that I have received a letter from Sir John Hunt, the Secretary of the Cabinet'. Mason to Ashworth et al, 6 October 1977.
[62] The damage to the ozone layer from CFCs was, for example, considered a much more serious problem by the Met Office.
[63] Mason chaired this Interdepartmental Liaison Committee on Climate Problems.
[64] In other words the headline guidance from the Rothschild report that government research (such as that conducted by the Met Office, but not necessarily NERC) should be defined by paying users. *The Organisation and Management of Government R&D* (Rothschild Report), published as an annex to Cabinet Office green paper, *A Framework for Government Research and Development* (London, November 1971).

> modelling capability of a high order to provide the basis for scientific responses to these alarms and to initiatives by international agencies and other governments.[65]

The committee decided to take to permanent secretaries a paper that summarised 'the scientific nature and status of the climatic problem' (drafted by the Met Office), assessed the 'likely impact of climatic fluctuations on different sectors of the economy' (as seen by different departments), and outline the research resources needed.

The report, 'A National Climate Programme', was ready by March 1978. After reviewing national and international research on climate change, the report contained an interesting mismatch between assessment and recommendations, a disjunction that reflects the interests of the Met Office. On the reality of climate change the report concluded:

> There is no reason to think that climatic fluctuations in the next 100 years will be any smaller than those of the last 100 years; fluctuations of this size may well have a significant impact on several sectors of the economy ….
>
> It is possible that significant changes or trends may occur in the next 100 years either through natural causes of man's activities. It is generally agreed that the greatest man-made threat is that produced by the release of carbon dioxide by the burning of fossil fuels. Assessment of this threat should be given high priority. The depletion of the ozone shield … is also of pressing importance.[66]

But the most important technique for this assessment, computer modelling of the climate, was, perhaps primarily, justified because it maintained an 'ability to check and challenge exaggerated and alarmist views such as those recently emanating from the United States and environmental lobbies'. This ability was essential to preserve the UK's prestige and autonomy in climatological affairs,

[65] TNA CAB 184/587. Minutes, Interdepartmental Liaison Committee on Climate Problems, 14 November 1977. Emphasis in the original.
[66] CAB 184/567. 'A national climate programme', report of the ad hoc committee, March 1978. Later versions were called 'A national approach to climate problems'.

although there was no suggestion here of declinism; rather, application of computing was seen as a traditional strength. Nevertheless, it was therefore necessary for the Met Office to possess the fastest (and most expensive) supercomputers: specifically a CRAY 1, or equivalent, 'if it is to stay in the forefront of climatic modelling'.[67] While this was seen as a 'pretty blatant' pitch for an expensive new computer, it was also agreed, between Berrill and Ashworth, that the United Kingdom, that the investment was essential to be able to challenge American climatological statements:

> Should there be a capacity outside the US? I think that climatological arguments will, in the next decade, become increasingly important. Worries started with the NOx problem and Concorde. The ability of the Meteorological Office to question the initial US predictions about the effects of supersonic aircraft on the ozone layer were important and very helpful. However, the real worry is now the CO_2 level in the atmosphere… There are those who argue (especially the US Nuclear Industry) that a few hundred fast breeder reactors, and the nuclear waste they produce, are far preferable - at the moment – to finding out, by experiment, what the effects of a doubling in the present atmospheric CO2 content will entail. Clearly, therefore, there must be a global modelling capacity outside the US.[68]

The report was ready for the Official Committee on Science and Technology in April 1978, but it was not until July that the machinery generated a response.[69]

[67] The Met Office's rival in terms of climatic modelling power was the National Center for Atmospheric Research, in Boulder, Colorado, had a CRAY 1. The Met Office had possessed an IBM 360/195 since 1972, which was fast for its time but was already old (the CRAY was ten times faster), and anyway could only devote 20% of its time to climate modelling. The European Weather Centre was getting a CRAY 1, but the Met Office would only be able to secure one hour a day.

[68] TNA CAB 184/567. Ashworth to Berrill, 4 April 1978. Berrill has asked why the UK should provide the main global modelling capacity when it was no more vulnerable than other OECD countries. Ashworth went on to draw a parallel with nuclear testing: 'Certainly testing bombs on computers is better than testing them in reality. It is very unfortunate that the weather and nuclear explosions obey the same mathematical laws. Is this why the Meteorological Office has never had any difficulty getting its computers from the Ministry of Defence?'
The observation that this was a 'pretty blatant' pitch for a new computer was handwritten on this document.

[69] TNA CAB 164/1422. Jamieson to Hunt, 14 July 1978. TNA CAB 134/4416. Minutes, STP(79) 1st, 3 May 1979.

The Interdepartmental Group on Climatology (IGC) first met on 4 October 1978. Its task was to specify a research programme that might answer long-term questions about climate change, while keeping national programmes co-ordinated with the rapidly expanding international projects, such as those of the EEC and the WMO as well as research in the United States. Kenneth Berrill, an economist not a climatologist, chaired.[70] The IGC gathered the different departmental views on the proposed national climatological programme. Indeed a significant fact of the IGC was that it was the occasion when departments began to ask what the consequences would be for degrees of global warming. As John Ashworth wrote, what he hoped was that 'departments will give some estimate of tolerances', for example: '1°/5% change means no problem but a 2°/10% change may be and a 3°/15% change is definitely a problem'.[71] By November discussion on IGC rated a 'rise in average global temperature of 1°C to 3°C', probably towards the lower end, as 'likely'.[72] But also, in the chair's summing up, that this was consistent with the claim that 'there had been no suggestion that major climatic changes were likely'.[73] What was important was identifying sectors, mostly within industry or agriculture, that were 'particularly sensitive'. One way pursued of getting a handle on possible agricultural consequences, for example, was by examining the costs of the 1976 summer.[74]

Having reviewed the national climatology research underway funded by research councils and the Met Office, surveyed international initiatives, listened to departmental interests, and discussed the

[70] Hermann Bondi (who did not like committees), was an alternative, as was Martin Holdgate. Holdgate, Mason's "bête noire", despite being the '"obvious" choice', was seen as a likely beneficiary, because of possible research funding choices. TNA CAB 164/1422. Thompson to Hunt, 25 July 1978. CLIM reported to STP, the official committee on science and technology. For "bête noire", see: TNA CAB 184/567. Hunt to Berrill, 26 July 1978.

[71] TNA CAB 164/1422. Ashworth's handwritten notes on Courtney to Ashworth, 20 November 1978.

[72] 1°C to 3°C was the prediction to come from Princeton/NOAA scientists Syukuro Manabe and Richard T. Wetherald's increasingly sophisticated General Circulation Model work published at this time. Syukuro Manabe and Richard T. Wetherald, 'The effects of doubling the CO_2 concentration on the climate of a General Circulation Model', *Journal of Atmospheric Sciences* 32 (1975), 3-15.

[73] TNA CAB 134/4192. Minutes, IGC, 14 November 1978.

[74] TNA CAB 134/4192. Minutes, IGC, 6 April 1979. This general strategy of estimating the costs of extreme conditions by considering the impact of the 1976 drought (and recent severe winter) was confirmed at the permanent secretary level on STP. TNA CAB 134/4416. Minutes, STP(79) 1st meeting, 3 May 1979.

effects of possible climatic fluctuations on the energy sector[75], agriculture[76], industry[77] and the economy[78], the IGC felt ready to publish a statement about global warming and its impact in the United Kingdom. However, the change of government in May 1979, from Callaghan's Labour to Thatcher's Conservative administration, nearly derailed the publication; the ensuing dispute sheds light on locations of scepticism among politicians.

Climate change and the new Conservative Thatcher government

At the meeting of the Official Committee on Science and Technology, held the day before the general election, Berrill had concluded of the work of the Interdepartmental Group on Climatology:

> There was no evidence to indicate that major changes in average climatic conditions were likely, but a small change in mean temperature would nevertheless increase the frequency with which extreme conditions were experienced.[79]

In other words, this was a modest but significant recognition that climatic change was possible, with impact (under extreme conditions) but not on a 'major' scale. It was essentially the Met Office's "agnostic" view.[80] The senior civil servants agreed that it was desirable to publish the report: 'Not only would it be consistent with the principle of open government, but the report contained

[75] TNA CAB 134/4192. 'IGC. The impact of climatic fluctuations on the United Kingdom energy sector', November 1978.
[76] TNA CAB 134/4192. 'IGC. The impact of climatic change on the UK agricultural industry', October 1978. Following the Met Office guidance, MAFF was guided by the assumption that 'there is little evidence of major climatic shifts over periods of 10-30 years and that any shifts in longer period mean values appear to be small and agriculturally insignificant'. The mean temperature guide was ± 1°C. See also: MAFF, 'Agriculture and climatic trends', April 1978.
[77] TNA CAB 134/4192. Mason, 'IGC. Some investigations of the influence of weather/climatic factors on industry', 8 November.
[78] TNA CAB 134/4192. CPRS, 'Economic effects of climatic change', 29 November 1978. Met Office, 'The economic impact of climatic fluctuations in the UK', 23 March 1979.
[79] TNA CAB 134/4416. Minutes, STP(79) 1st meeting, 3 May 1979.
[80] The report of IGC placed before STP officials made it clear that the assessment of the likelihood and scale of climate change were made on Met Office advice, rather than being, say, a group view or an external view. TNA CAB 134/4416. 'Report on the Interdepartmental Group on Climatology', 25 April 1979. Berrill's memorandum that prefaced the report stressed the uncertainties involved, but also the progress being made in modelling, which promised more certain estimates soon. TNA CAB 134/4416. Berrill, 'Climatology', 25 April 1979.

information of wide interest and would help counter alarmist opinion'. This was despite Hermann Bondi's worry – he was chief scientist for the Department of Energy – that public notice would draw fire. Berrill's consolation is interesting, as a possible positive spin to global warming:

> …you are clearly concerned that clear evidence of a rise in mean global temperature would lead immediately to demands for drastic cuts in energy use coupled with a switch from fossil fuels. No doubt you came to this view from experience of the various pressure groups in the energy and environmental fields. But I do wonder whether such demands need necessarily follow if, as John Mason thinks, the probable rise in temperature is quite modest. It would, of course, depend very much on how the matter is handled but on balance a small increase in mean global temperature could be economically advantageous to us and could be presented in a positive light.[81]

Within the Cabinet Office it was rather airily suggested that 'Ministers should at least be aware of what is proposed' in terms of publication and consequences.[82] But when the ministers found out there was anger. The Postmaster-General, Angus Maude, an elder statesman figure who had played a crucial role in Thatcher succeeding Heath as leader of the Conservative Party, wrote to Keith Joseph, guardian of the Thatcherite ideology, that he saw 'no reason why the report should be published: it says very little and has no presentational advantage'.[83] Maude objected, for example, to a paragraph (drawn in fact from the conclusions of the World Climate Conference), that climate had to be distinguished carefully from weather. Such a line would provoke, he thought, 'hilarity' in the press. The draft was also criticised by those within government who were convinced the threat of global warming was real and required action. Martin Holdgate, director general of research at the

[81] TNA CAB 184/567. Berrill to Bondi, 30 January 1979. Bondi's view was also that Mason had been parochial (since developing countries would be hit rather than industrialised countries) and that given that 'climatic drifts … are small compared with the random fluctuations that we experience year by year…[they] are therefore essentially unimportant' for the UK. Nevertheless, he went on, 'We must…be cautious because any statement will be used by environmentalist pressure groups… I think therefore that the actual unimportance in the local scene [ie the UK] of changes might be emphasised'. Bondi to Berrill, 9 February 1979.
[82] TNA CAB 164/1472. Courtney to Vile, 16 July 1979.
[83] TNA CAB 184/567. Maude to Joseph, 27 July 1979.

Department of the Environment, argued that loose talk in the foreword of "corrective action – if it is shown to be necessary" would also meet derision: 'How, pray, does one stop the developing countries cutting down forests and oxidising topsoil – or even reverse the developed countries' proposals for coal burning on an expanding scale?'[84] So the publication of the report was delayed. Maude 'grudgingly' relented and approved publication, accepting an argument that 'it would provide an answer to the environmental and ecological lobby by showing that the Government was taking seriously the possibility of irreversible long-term changes in the climate, particularly those which might conceivably be brought about by man's intervention'.[85] There was also the opportunity to boost nuclear energy options, at least in the public's mind. As John Ashworth wrote, his personal view was

> that the nuclear waste problem is manageable whilst the CO_2 problem is not and therefore that a risk averse society might prefer nuclear power generation to fossil fuel burning if it were offered the choice. A rational risk averse society, of course, might prefer energy conservation to either…[86]

Publication of the report, *Climatic Change*, did not happen until February 1980.[87] The delay, and the discussions around it, was symptomatic of dissipating momentum within government to address the issue, even as research into the problem was approved. The Interdepartmental Group on Climatology (CLIM), for example, was cast into limbo. The reason for the shift seems to have signalled from the top. Tantalising evidence of this signal survives in the National Archives. As one official wrote:

[84] TNA CAB 184/567. Holdgate to Ashworth, 30 October 1979.
[85] TNA CAB 184/567. Thompson to Mountfield, 7 August 1979.
[86] TNA CAB 184/567. Ashworth to Robert Armstrong, 16 April 1980. Armstrong replied that the idea of inducing the public to go along with nuclear energy by frightening it with global warming 'would need much thought'. Armstrong to Ashworth, 21 April 1980.
[87] Cabinet Office, *Climatic Change: its Potential Effects on the United Kingdom at the Implications for Research*, (London, 1980).

> Whether a meeting will … be needed I do not know – I rather doubt it. Mr Ibbs will wish to consider whether CLIM should continue since he is presumably now Chairman. But given Ministerial (and especially Prime Ministerial) coolness towards 'Climatic Change', I wonder what it will have to do.[88]

The timing of this sighting of Margaret Thatcher's scepticism towards climate change is highly significant. It comes a week after Crispin Tickell presented on the carbon dioxide problem at a preparatory meeting for the Venice G7 summit.

The reason this is significant is that the received story is that Thatcher, primed to be able to understand a science-based issue because of her background as a trained chemist, was convinced by Tickell's arguments later in the 1980s that anthropogenic climate change was a real and alarming phenomenon, and promptly acted, most famously in her September 1988 speech to the Royal Society.[89] Instead we have the suggestion that, first, Thatcher was earlier a "sceptic" (to use a slightly anachronistic term) – and an inevitably overwhelmingly influential one given her position as prime minister as well as her chosen role as unofficial minister for science, and, second, that exposure to Tickell's arguments, which we have seen were in circulation from the late 1970s, alone are not the explanation for the change of heart.

Thatcher's biographers, including herself, do not tell us much about why her attitudes to global warming shifted so abruptly. Hugo Young, in the first serious political biography, says nothing.[90] John Campbell attempts to make a case that Thatcher 'deserves much of the credit' for putting the environment on the political agenda; yet he also records in 1980 Thatcher asking John Ashworth 'incredulously, "Are you telling me I should worry about the weather?"'[91] For Campbell, 1988, and the encounter with Tickell, is the turning-point, moving the prime minister on this issue from being a

[88] TNA CAB 184/567. Courtney to Ashworth, 21 April 1980.
[89] The speech at the Royal Society in September 1988, after reminding the audience of the prime minister's scientific ancestry and the UK's (and her) achievements, explicitly identified three phenomena as in need of action: the ozone hole, global warming and acid rain.
[90] Hugo Young, *One of Us: a Biography of Margaret Thatcher* (London, 1993).
[91] John Campbell, *Margaret Thatcher. Vol. 2: The Iron Lady* (London, 2003), 642-643.

natural opponent of 'naïve sentimentalists' and "green socialists" to becoming the decisive politician, ready to believe and support the science of climate change. She 'anticipated', he says, by a few months, for example, the June 1990 conclusions of the IPCC, by opening the Hadley Centre for Climate Prediction and Research and announcing a target to stabilise UK emissions of carbon dioxide by 2005.[92] Charles Moore, in his authorised biography, adds little in his account up to 1982, merely confirming, this time via interview, Ashworth's anecdote about the weather.[93] Finally, Thatcher's autobiography, while telling us that she 'always drew a clear distinction between [other] "environmental" concerns and the quite proper question of atmospheric pollution', and describing "Global warming" as an 'atmospheric threat', one less certain than CFCs and the ozone hole, which nevertheless 'required the application of hard-headed scientific principles', reveals nothing about the timing or factors for her change in convictions.[94] She turns the 1988 moment into a sermon on science as the product and tool of the open society.

However, Thatcher's speech at the Royal Society certainly did have two major effects. First, it has bracketed the beginning of the short-term historiography of the UK government's response to climate change. Second, it did give a considerable impetus and urgency to expanding climate research, especially modelling. The Royal Society's British National Committee for the World Climate Research Programme, which convened to 'discuss the scientific community's response to the speech' and was chaired by John Mason, took a coordinating role.[95] The new director general of the Met Office, John Houghton, pitched to the Department of the Environment an ambitious national plan for climate change, built around a new centre to be formed at Exeter. The Centre would house the Met Office's existing 'core work in climate', 'additions…specifically aimed at improving our knowledge of climate change as a result of man's activities', 'work on ocean modelling', and 'work by

[92] Campbell, op. cit., p. 647.
[93] Charles Moore, *Margaret Thatcher: the Authorized Biography*. *Vol. 1: Not for Turning* (London, 2013), 426.
[94] Margaret Thatcher, *The Downing Street Years* (London, 2011), 639-640.
[95] TNA AT 33/77. Royal Society, minutes of British National Committee for the World Climate Programme, 7 November 1988.

university personnel on climate modelling' (both the latter mostly funded by NERC).[96] A new supercomputer (in first instance, an ETA-10 or a CRAY Y-MP, either of which would be eight times faster than its Cyber 205) would run coupled models (of atmosphere and ocean), with each run leading to improving fine-grained predictions of future climate change. The centre would liaise with other groups in universities (such as UEA, Reading and Southampton) and institutes (such as the Scott Polar Research Institute and the Institute of Hydrology).[97] The early name suggested was the Harold Jeffreys Centre for Climate Prediction, after the eminent geophysicist and Plumian Professor of Astronomy at Cambridge, who had died in March 1989. However, by the time Margaret Thatcher announced the new centre, in a speech to the United Nations General Assembly in November 1989, Jeffreys' name had been dropped.[98] When it was opened in 1990, it was named after George Hadley, a fairly obscure eighteenth-century natural philosopher. Nevertheless, the Hadley Centre, one of the world's most important sites for powerful computer modelling, marked the Met Office's full embrace of the need to understand the likelihood of climate change.

Conclusion

In his history of the discovery and response to anthropogenic global warming Spencer Weart remarks that in the 'long perspective, it was an extraordinary novelty that such a thing became a political question at all'.[99] His thinking is that an 'invisible' phenomenon with consequences that might only appear decades from the present, with predictions 'based on complex reasoning and data that only a scientist can understand', would struggle to be comprehensible to politicians. That it did at all, Weart credits to the accumulation of knowledge, an increasingly educated public, relative political and economic stability, and increased average lifespans.

[96] TNA AT 33/77. Houghton to Fisk, 13 January 1989.
[97] TNA AT 33/77. P.W. White, 'A national centre for climate modelling. A strategy document', March 1989.
[98] TNA AT 33/77. Press release, 'Chris Patten backs new UK Centre for Climate Change Predictions', 8 November 1989.
[99] Weart, *Global Warming*, 156.

These factors may have been behind the willingness, noticeable in institutions, national and international, to attempt a longer-term view of global change in the 1970s. Even then it is worth reminding ourselves of the typical timescales of governmental processes. An administration (say a prime ministerial reign) might last 5-7 years, a business cycle is about 10 years, a civil servant's working life is, say, 30 years (and the institutional memory little longer), and a demographic generation is about the same. The modern civil service is perhaps 160 years old (if we take the Victorian Northcote-Trevelyan reforms as the origin), and the state is just shy of a millennium (if we start from the Norman invasion). Punctuating these time spans were issues – the coal question in the 1860s, very long-term economic planning in the 1960s, oil supply in the 1970s, to take just three examples - that occasionally focused attention on the need for organised foresight.[100] For climate change to be seen, and addressed, as a reality on these longer timescales there had to be invented the political apparatus to see and think on such long terms. This invention was not inevitable.

It is probably typical that short-term political contingency (over what Heath should say on green matters in February 1972) should spawn a long-term answer: the Cabinet Office's Committee on World Trends. At its first gathering the 'time-period to which [they] should direct its attention was discussed', and a decision was taken that while '100 years was probably an over-estimate', a 50 year timescale should be adopted for 'planning purposes'.[101] Scientists were already arguing that the long-term character of climate change meant that new institutions were needed. Alvin Weinberg in *Science*, urged that not only that 'climatologists should recognize the profound implications … and do the basic research', but also that

> the problem of global effects of energy production, like so many long-range environmental problems, is everyone's problem, and therefore no one's problem. I propose therefore, that

[100] For the Treasury's experiment with a Very Long-Term Planning exercise in 1962, see: Glen O'Hara, *Governing Post-War Britain: The Paradoxes of Progress, 1951-1973* (London, 2012), 126. Also: Geoffrey K. Fry, 'Policy-planning units in British central government departments', *Public Administration* 50 (1972), 139–155.
[101] TNA CAB 184/587. Minutes, Interdepartmental Liaison Committee on Climate Problems, 14 November 1977.

> an institute (or even institutes) of climatology be set up with a long-term commitment to establishing the global effect of man's production of energy. Such an institute should be assured long-term stability, since the question is a long-range one that simply will not go away.[102]

While the World Trends committee provided the space within which a half-century distant problem might be seen, there was still no guarantee that it would be addressed. As I have shown, a key factor was the Met Office's scepticism about long-term change, found among leaders of research, not least the director, John Mason. As Zuckerman noted, 'everyone knew that Dr Mason did not believe in long term planning or indeed looking ahead at all'.[103]

Mason was a sceptic yet ended up chairing the committees that called for funding, as well as confirming through official channels the necessity of keeping watch on climate change. It is clear that there was an institutional and national interests at stake: Mason feared others would control this research agenda (within which the Met Office had a substantial stake), and there was a desire to possess an independent, national check on others' views, to be able to assess and to dismiss what they saw as alarmism. In particular the Met Office's National Climate Programme was justified because it offered modelling as a check on claims emanating from the United States, regarded as alarmist and a product of a nuclear lobby. This attitude of meteorologists is consistent with other historians' findings. Hamblin argues that professional meteorologists had hardened their position on the likelihood of human action affecting climate through countering the over-enthusiastic claims of rain-seeders and rainmakers in the 1950s. They 'had some experience defending' the view that 'far-reaching regional – to say nothing of global – effects of human actions were highly improbable'.[104]

So it was through the efforts of experts, within and without government, outside the Met Office, that climate change was put on the agenda. It is plausible that the drought of the summer of 1976

[102] Alvin Weinberg, 'Global effects of man's production of energy', editorial, *Science* 186 (18 October 1974), 205.
[103] See above for full quotation and reference.
[104] Hamblin, *Arming Mother Nature*, 116.

was a prompt for thinking that something systemic had changed in patterns of weather. Certainly the drought gave departments direct administrative and practical experience against which future testing of governing in a warmer world might be tested. (So, for example, one of the first exercises in understanding the finer details of the consequences of climate change was to ask departments to estimate the costs of handling drought emergency measures as a surrogate for future action.)

The episode also illustrates how tensions between competing time horizons of different bodies in government could be of consequence. So, for example, permanent officials had the institutional ability, perhaps one of the defining functions of the civil service, to look beyond the time frame of a single administration. Some of the organisational innovations that played a critical role in the above account, such as the Official Committee on World Trends and the Central Policy Review Staff, were explicitly devised to deepen analysis in ways that included lengthening foresight. While the politicians – such as Heath in 1972, or Maude and Thatcher in 1979-1980 – might have had half an eye on short-term presentational advantage, the UK system of government, in which permanent officials brief temporary politicians, meant that tensions between the two time scales were productively resolved. Likewise, different time horizons moulded the interests of producers and analysts of climatological research. The Met Office, charged with the overriding demand for the production of short-term weather reports, conflicted with others who saw longer-term trends being both calculable and important.

I have shown that, also contingently, the issue rose to the level requiring ministerial action just as the Thatcher administration replaced Labour's Callaghan one. I have evidence that not only were Conservative ministers generally hostile, but there is testimony that Margaret Thatcher, who had asserted a special remit over science and science-related matters, was particularly cool towards climatic change. It is known that Thatcher accepted reality and the danger of climate change quite suddenly in 1988. But the accounts of this moment are conflicting. Later, Thatcher's speech to the Royal Society would be remembered as a ' true epiphany, the blinding discovery of a conviction

politician, which overnight turned the environment from being a minority to a mainstream concern'[105], but Campbell, one of her biographers, also observes that the response at the time, despite the effort put in by Thatcher, was muted.[106] It is perhaps a case of the retrospective revaluing, finding an appropriate response that is scaled to later senses of importance. Indeed Thatcher's conversion in 1988 was itself short-lived: by the 2000s, out of power, she turned back to scepticism.[107] Plans for the deepening of climatology in the UK, manifest in the Hadley Centre of the 1990s, were prepared, for other reasons, well before Thatcher's 1988 speech provided a spur to carry them out. Institutions, social entities that carry values over time, can be born from, and outlive, political contingency.

[105] *The Independent*, 25 October 2000.
[106] Campbell, op. cit., p. 645
[107] Campbell, op. cit., p. 652.