ONE

The Social Meanings of Climate

We are used to talking about summer heat in our poetry, but it is only when a real spell of it comes to us that we discover how rare it is. This July the whole countryside looks at the same time both strange and familiar. There is the corn, ripe as if it were the middle of August, and the dark foliage of later summer, but all our Northern landscape, unchanged in its forms and objects, is transfigured by the colours of the South. Usually, even in fine summer weather, there is a Northern coolness in our mornings and evenings; but now one is startled even in the early morning by the Southern splendour both of earth and sky (*The Times*, 26 July 1911).

The performance of the British climate over the past few months can at best be described as perfidious. After several very mild winters and two beautiful summers, including the most severe drought since records began 250 years ago, the climate has lurched to the other extreme … the period from September 1976 until last June was the wettest for a hundred years (*The Times*, 19 August 1977).

So what can Britain expect as the blanket of greenhouse gases around the planet thickens? As the temperature nudged record levels last summer, the Met Office said that we should get used to such prolonged periods of settled, dry weather. There is a significant human contribution to these heatwaves because of carbon dioxide emissions over recent decades … This is a sign of things to come … Three years ago … scientists … showed that human emissions of greenhouse gases

had more than doubled the risk of record-breaking heatwaves such as the one that is reckoned to have killed 27,000 people across Europe in 2003. By the 2040s, one summer in two is predicted to be hotter than 2003 (*Guardian*, 21 May 2007).

1.1 What is Climate?

We love our climate – and yet we fear it. As the above three interpretations of the climate of Britain reveal, we are not quite sure what to make of the idea of climate: we can celebrate its power to evoke strong emotions in us, while also bemoaning its unpredictability or fearing its future behaviour. We expect climate to perform for us; to offer us the weather around which we work and create and within which we relax and recreate. Yet we know too that climate is fickle, with a will and a mind of its own, offering us not only days of tranquillity and repose, but also the storms and dangers that our ancestors encountered over countless centuries and that continue to afflict us today.

Climate offers material benefits for all human cultures: the rain, wind, sun and warmth that waters, powers and feeds our lands and machines. Climate also offers resources for our aesthetic and spiritual imaginations: the clouds and sunsets which inspire our poetry, the seasonality around which we develop rituals. These benefits are often precarious, however, and this insecurity is a powerful driver of human innovation. New technologies, practices and systems are created to build social resilience in the face of a capricious climate. Constancy of climate is rare. Conversely, the precariousness of climate has also been invoked in explanations of the collapse of civilisations. Climatic stability has often been presumed to be a prerequisite for the stability of civilisations although, as we shall see later, the idea of climate change triggering societal collapse is itself not stable.

There may be 'good' or 'benign' climates and 'bad' or 'dangerous' climates, but only in the sense that climates acquire such moral categories through human judgements – judgements that suit our

convenience or our capabilities. We do not judge climates against any fixed or universal morality. Is a 'good' climate a stable or a varying one? Is a 'bad' climate an unpredictable climate or one that is either too hot or too cold for our predilections? If you were going to design the ideal climate, what would it look like? All climates are difficult and yield dangers, yet all climates are fruitful and inspire creativity. There are few climates on Earth where humans have not lived and survived. Humans can accommodate a much greater range of the available climatic space than the ancient Greeks and early Medievals supposed. Sophisticated human civilisations are sustained in climates as dramatically different as that of 'torrid' Saudi Arabia (mean annual temperature 24°C) and 'frigid' Iceland (2°C) (see Figure 1.1). Yet there are few climates which, equally, do not carry danger or risk.

Since we are going to spend the next 300 or so pages exploring the reasons why we disagree about climate change, it is important that we dwell for a while on this idea of climate. Climate cannot be experienced directly through our senses. Unlike the wind which we feel on our face or a raindrop that wets our hair, climate is a constructed idea

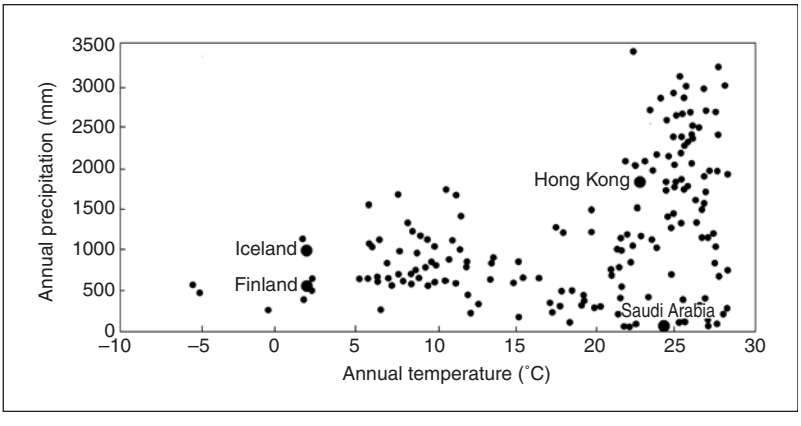

FIGURE 1.1: *The range of 'national climates' plotted according to annual average temperature (°C) and precipitation (mm) using statistics for the period 1961–90. Each dot represents the climate of one country.*

that takes these sensory encounters and builds them into something more abstract. Neither can climate be measured directly by our instruments. We can measure the temperature of a specific place at a given time, but no-one can directly measure the climate of Paris or the temperature of the planet. Climate is an idea that carries a much richer tradition of meaning than is captured by the unimaginative convention that defines climate as being 'the average course or condition of the weather at a place usually over a period of years as exhibited by temperature, wind velocity and precipitation'.[1] This chapter offers a guide to what this idea of climate means, using the insights offered by history, geography and anthropology.

Climate has both physical and cultural connotations. It has physical significance: one cannot deny that the climate of the Amazon is wetter in an absolute sense than is the climate of the Sahara. But climate also carries cultural interpretations: the climate of the Sahara means something quite different to a Bedouin than it does to a Berliner. We will explore these physical and cultural approaches to thinking about climate in Sections 1.2 and 1.3, respectively. Our ideas of climate may also carry more deliberate and entrenched meanings, being used to secure political or ideological goals. Ideas about climate are always situated in a time and in a place. As history gets rewritten and geography gets reshaped, so also change our ideas of climate. Climates can change physically, but climates can also change ideologically. Some of the ways in which the idea of climate has been a vehicle for promoting different ideologies, different ways of seeing the world, are explored in Section 1.4.

The idea of climate change, the subject of our book, is also an idea that has served many different purposes, and continues to do so. One of the most enduring of these is the way in which we have written about the human story using the language of climate change: the story of human evolution and the rise and fall of civilisations. Section 1.5 therefore offers a brief historiography of the different ways

[1] Merriam-Webster Collegiate Dictionary (1998) 10th edn.

in which we have written about climate change and human civilisation, about how we have frequently constructed antagonistic relationships between the vicissitudes of climate and the fates of nations and empires. The themes of the chapter, which reappear in various forms later in the book, are summarised in Section 1.6.

1.2 The Physical Basis of Climate

The idea of climate was first given linguistic form by the Greeks. The Greek word κλίμα, or *klima*,[2] was used as early as the sixth century BC by Pythagoras's disciple Parmenides to differentiate between five zones on the surface of the supposed spherical world. These latitudinal zones related directly to the inclination of the sun's rays on the Earth's surface, ranging from the torrid zone at the Equator to the frigid zone of the far North. These earliest attempts at climatic classification revealed the precariousness of the human relationship with climate. While the Greeks inhabited the forgiving temperate zone of the eastern Mediterranean, the frigid *klimata* of the North and the torrid *klimata* of the South were realms which gifted a legacy only of danger, or even death. Later Greeks further extended the idea of physical climates being dependent on latitude, and Ptolemy's seven *klimata* from the second century AD persisted as the conventional framework for explaining different climates well into the early Renaissance period.[3]

Attaching climate to latitude, to the inclination of the sun on the Earth's surface, lent a certain rigidity and constancy to the idea of climate which European explorers of the fifteenth and sixteenth centuries began to question. And as they did so, they raised wider questions about the authority of classical Greek science, as noted by historian

[2] Literally, 'slope' or 'incline'.

[3] Sanderson, M. (1999) The classification of climates from Pythagoras to Köppen. *Bulletin of the American Meteorological Society* 80(4), 669–73. Sanderson gives examples of world maps from the sixteenth century in which Ptolemy's seven climatic zones still offered the standard classification of known climates.

Craig Martin: 'The common experience of travellers to the New World … [showed] … that the theory of uninhabitable climatic zones was untenable and therefore [that] Aristotelian science was incomplete and fallible.'[4] Not only did Europeans survive the torrid and deathly climates of the Equator, they began to realise from far-off longitudes that latitude alone was a poor predictor of the climates they experienced. Enabled by the instrument revolution of the seventeenth and eighteenth centuries – which yielded barometers, thermometers and rain gauges – new ways emerged of understanding the physical and geographical attributes of climate.

The predominant means of capturing the physicality of climate was to be through meteorological measurement;[5] initially through individuals recording observations of the weather in private diaries and later, towards the end of the eighteenth century, through systematic and centralising networks of measurement. The application of standardised and regularised methods of observation of the natural world – one of the hallmarks of Western Enlightenment rationality – to what had previously been largely a philosophical or sensual endeavour, opened up new ways of describing climate and thinking about what it meant. Order was imposed on seemingly chaotic weather; first, by quantifying it locally at individual places and, subsequently, by constructing statistically aggregated climates from geographically dispersed sites. Climate for the first time became 'domesticated', revealing that, for example, British climate was 'generally temperate overall, but punctuated by bracing diurnal variations'.[6]

[4] p. 3 in Martin, C. (2006) Experience of the New World and Aristotelian revisions of the Earth's climates during the Renaissance. *History of Meteorology* 3, 1–16.

[5] There were other ways of capturing and describing the physical dimensions of climate: through its impacts on vegetation, phenology, ice cover, soil moisture. The Chinese had been particularly adept at recording such climatic indicators, some of them as far back as 1100 BC.

[6] p. 22 in Golinski, J. (2003) Time, talk and the weather in eighteenth century Britain, in Strauss, S. and Orlove, B. J. (eds), *Weather, climate, culture*. Berg: Oxford, pp. 17–38.

This quantification and standardisation of climate opened up new possibilities of interpretation and practical utility. Comparative climatic analysis could be undertaken, relying on numerical data rather than hearsay; an attractive prospect for nineteenth-century colonists and traders – how different was the climate of Cape Town from that of Amsterdam? And longitudinal studies of climate through time now became possible, providing a formal alternative to the reach of human memory – how stable really was climate?

As the nineteenth century began, this new way of describing climate through quantification of its physical attributes was gaining ground.[7] Standardisation of meteorological measurements was extending into the Americas and the tropical world, vigorously promoted by scientific entrepreneurs such as Alexander von Humboldt and the American meteorologist Matthew Maury, and the first systematic and quantitative large-scale climatologies were produced. In 1848, the Prussian physicist Heinrich Dove published the first global maps of monthly mean temperature, followed in 1883 by Austrian meteorologist Julius Hann's monumental *Handbüch der Klimatologie*. Its three volumes covered general, regional and local climates, and although Hann captured these climates primarily through the growing number of instrumental measurements, his third volume on local climates continued to use literary and eye-witness descriptions. The direct sensory and imaginative impacts of physical climate on the human mind were still seen as legitimate registers.

The quantitative and naturalistic approach to conceptions of climate found its ultimate expression in two of the most famous climatological products of the twentieth century. The Köppen classification

[7] For example, Clarence Glacken, in his 1967 book, *Traces on a Rhodian shore: nature and culture in Western thought from ancient times to the end of the eighteenth century*. University of California Press: Berkeley, CA, quotes (p. xv) Count Volney from his 1804 work on the climate and soil of the USA as remarking on the shift of meaning of the word 'climate', saying that 'the term climate is now synonymous with the habitual temperature of the air'.

of world climates, which Russian geographer Wladimir Köppen originated and refined between 1900 and 1936 and which is still in use today, marked the end of the transition from the original Greek classification of climate based on latitude. In Köppen's classification, the geographical complexities of regional climates are mapped by grouping together those climates whose statistical properties yield similar natural vegetation types. This leads to an infinitely more subtle arrangement of physical climates than imagined by Ptolemy.

A second icon of this physical approach to climate was first constructed only in the latter decades of the last century. The millions of individual thermometer readings taken around the world since the middle of the nineteenth century were compiled and synthesised into an index of an abstracted global climate – the globally averaged surface air temperature (Figure 1.2). This index of world climate – reconstructed back to 1850 and now routinely updated each month – both hides and reveals. It hides all of the heterogeneity of weather experienced in local

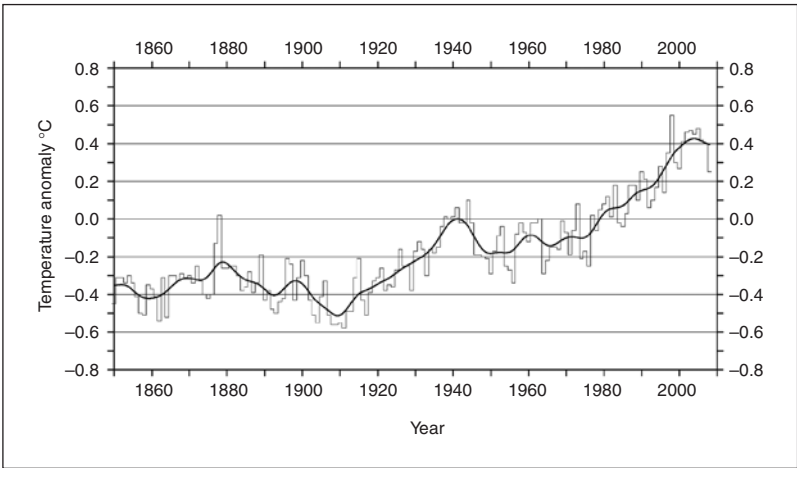

FIGURE 1.2: *Globally averaged surface air temperature for the period 1850–2008, expressed as anomalies from the 1961–90 average (°C). 2008 data are provisional.*
Source: Redrawn from Climatic Research Unit, UEA, website (accessed 9 July 2008).

places by local people and yet, by collapsing this diversity into a single numerical index, it reveals the behaviour of a large and complex global system. As we shall see later, this index has fulfilled many functions in the scientific and political discourses surrounding climate change; most importantly, perhaps, in lending simple and numerical visibility to the idea of climate (here measured as temperature) as an emergent property of an interconnected and physical global system.

The climatologists and meteorologists of the nineteenth century made the bravest attempts to reify climate, using a series of formal statistical rules to turn climate for the first time into an entity with quantitative description. This, of course, is how climate continues to be used in the physical and mathematical sciences, and opens up all sorts of possibilities for predicting future climate (in this physical sense). It is not surprising that, with its analytical roots so firmly planted in meteorology, the dominant popular understanding of climate therefore remains this numerical and statistical one. Thus the World Meteorological Organization insists that the climate of a place or region can only be robustly defined once it has been compiled from at least thirty years of meteorological measurement. Or to put it more pithily, 'Climate is what you expect, weather is what you get.'

The distinction between climate and weather remains one of the more elusive in popular discourse. While a degree of verbal ambiguity is appropriate for social intercourse, in analytical applications a more formal distinction becomes necessary. One way of visualising this distinction is shown in Figure 1.3, which uses the filter of time to demonstrate how we move between using descriptions of climate and weather depending on the relationship of the respective era to the present. The farther back in time we look, and certainly earlier than the last three or four centuries, the more our reconstructions of the past rely upon notions of climate rather than weather. Similarly, beyond the medium-range weather forecast, our descriptions of the future almost always reveal climatic categories rather than revealing weather events. On these distant past and future time-scales, the weather – the

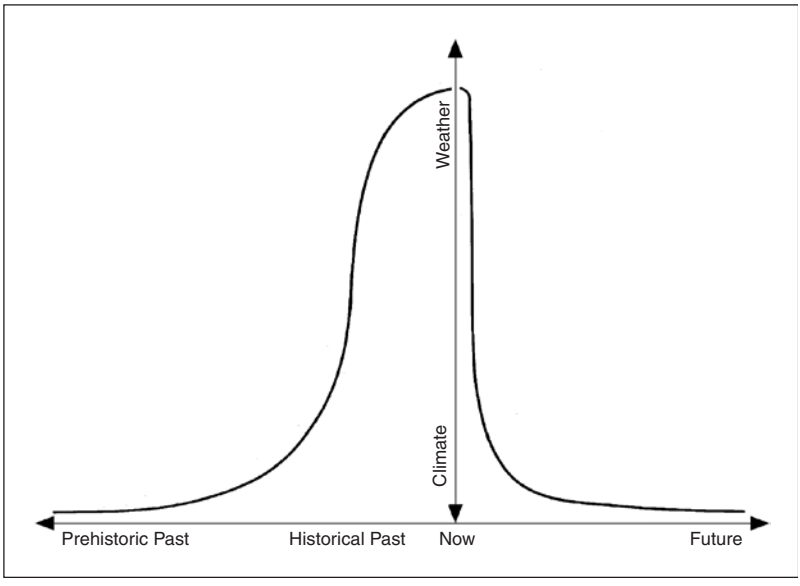

FIGURE 1.3: *Sketch diagram showing how we move between talk of 'climate' and talk of 'weather' depending on the relationship with the present. We can only access 'weather' for the next few days or for the past few centuries.*

minute-to-minute, day-to-day experience of the outcome of meteorological processes – is largely hidden from us. We inevitably adopt the convenient shorthand of allowing climate to stand in for weather.

We have discussed the idea of climate thus far in predominantly physical terms. But the etymological origins of the word 'climate', and its subsequent attachment to aggregated meteorological measurements and eventually to the predictive natural sciences, only incompletely captures the subtlety and multiplicity of meanings with which the word 'climate' has been endowed. There have been many other ways of working with the idea we call climate; ways both less formal and more symbolic than those favoured by meteorologists. Thus climate may also mean 'the prevailing attitudes, standards or environmental conditions of a group, period or place';[8] a qualitative and less tangible

[8] On-line dictionary http://dictionary.reference.com/ [accessed 9 July 2008].