

The Importance of the Humanities to the Climate Change Debate

Alexander Elliott and James Cullis

The humanities disciplines have historically played an important role in the various debates on environment, climate and society. The past two decades have seen a resurfacing of environmental concerns across humanity disciplines in the wake of what has been termed ‘climate change’. The function of humanities within universities, and how they are viewed in society, has also been the focus of much debate. A degree of pessimism has begun to pervade, one in which the usefulness of a humanities education has been brought under increasing examination. Understood as the study of human experience and the ways in which people have expressed their experiences, the humanities, we argue, should be more confident and vocal in addressing the climate change debate. At their best the disciplines of history, philosophy, literature, language, religion, art and music are fluid, multifarious, critical, complex and non-conformist. We

A. Elliott (✉)

Department of Social and Political Thought, University of Sussex, Brighton,
UK

e-mail: elliottalex64@gmail.com

J. Cullis

Centre for World Environmental History and the Centre for Intellectual History,
University of Sussex, Brighton, UK

argue in this chapter that they are historically rigorous as well as contemporarily significant, and that the absence of such disciplines' knowledge, expertise and critical awareness will seriously limit our chances of combating climate change and the associated environmental crises that should be considered the greatest threat humanity has had to face. A historically nuanced understanding about the meaning, consequences and actions with regard to climate change is vital to our common future. Realisation of this need has stimulated a growth in attempts to integrate approaches from wide-ranging disciplines. A well-known project in this arena is IHOPE that began life in 2003. It has been hugely influential in reframing environmental and climate change issues from a historical foundation. The IHOPE project has successfully integrated ideas and knowledge from biophysics, social sciences and the humanities.¹ Taking a long-term view of how the climate and the environment have been understood reveals the need for a re-evaluation of the way that climate change as a crisis is currently being discussed. The growing acceptance that a multi-disciplinary approach is needed requires also an acceptance that the climate change debate has itself been constructed through a variety of discourses historically, scientifically, in and through society, politically and economically. It is therefore important that the humanities are included at all stages of this crucial debate. The discussion that follows is not meant to be exhaustive, but rather to introduce the main ways in which the humanities relate to climate change, and to indicate various avenues to be explored and tensions to be investigated.

It seems reasonable to suggest that human beings have always been interested in their climate, and it is well documented that concern about the impact of humans on the climate has a long and colourful history.² Climate change was not discovered in 1975,^{3,4} it did not first involve international co-ordination in 1988 when the IPCC was formed, and it was not brought to the masses through Al Gore. The connection with capitalism was not first made by Naomi Klein. Governments didn't realise the importance of the climate in Kyoto and climate change is not something that will only happen to future generations.

Around 2,000 years ago, Theophrastus' writings had already recognised that human activities impacted the climate (*c.*371–*c.*287 BC) and Ptolemy had already attempted to conceptualise the climate (*c.*AD 100–*c.*170). These are both very early examples of two of the most important ways that climate is thought about even today^{5,6}; namely, the role that humans play in altering climate and the desire to understand how climate

works. These two concerns were later brought together, most notably by Edmund Halley in the seventeenth century. Halley sought to challenge the models of Ptolemy to explain micro-climatic events; this linked with his concern for the environmental impact the East India Company was having on its island acquisitions.⁷ His concerns were symptomatic of the colonial administration, which quickly realised the efficacy that knowledge of climate and environmental conditions could have on their ability to turn a profit. Great lengths were gone to by colonial officers to acquire the requisite information, often relying heavily on the knowledge of the indigenous population. Transnational networks were created for transmitting research back and forth between Britain, Europe and the tropics.⁸ The importance that meteorological research, in particular, played in the developing economies of Europe is under-represented in both the history of industrialisation and climate change debates. Equally the significance of indigenous knowledge has been ignored until very recently. The reality is that the climate and the environment have for a long time been addressed in plural ways, scientifically, historically, culturally and economically.

The eighteenth century saw the emergence of an understanding of the climate as a factor that could determine human society and action. The climatic determinism of the eighteenth century was represented by Montesquieu, who famously hypothesised a link between different climates and the relative character of different people. His idea that you could deduce the character (or morality) of a group of people from knowledge of their climate, and therefore explain the relative success of a given society compared with another, was based on climatic differences.⁹ This idea of environmental determinism became widespread during the eighteenth century and remained largely unchallenged throughout the nineteenth.¹⁰ Although heavily critiqued during the twentieth century by both humanities scholars and scientists, this theory has proved remarkably resilient and can still be seen to influence today's understanding of the relationship between human society and climate.¹¹ This is discussed in greater detail below, in relation to population and scarcity.

The long nineteenth century also introduced the notion of what would later be called sustainable growth or carrying capacity¹²; the idea that nature is a finite resource, one that can only sustain a certain quota of human life. In 1798, Thomas Malthus suggested that nature limits population growth and can only provide resources for a given number of people. This gained major traction throughout the nineteenth century

and is often cited as an illustration of an environmental idea having direct influence on state policy; in relation to poor relief reform, and socio-culturally with the advent of family planning.¹³ Despite Malthus's equation being widely disproved in the twentieth century (in part simply through the massive increase in population), his demographic theories have seen a renaissance in the past few decades.¹⁴ Intrinsic to the Malthus formulation is the characterisation of nature having a limit in its capacity to support human life. This idea has become a dominant strand of the current climate change conversation: that the climate must remain within a certain range for humans to continue flourishing, if not for life to continue at all.¹⁵ Until the end of the nineteenth century the climate was understood tangentially through the above discourses and it is not until the twentieth century that the scientific view became the dominant lens through which the climate would be viewed.

The end of the nineteenth century and the early twentieth century witnessed in European and North American theories of the climate a move towards a global or world understanding of the climate. Fears around climatic events in Africa for instance reinforced ideas about extinction of both people and other large mammals. This was coupled with growing anxiety of the effects of environmental and climate-human interactions, rooted in colonial writings of the 1930s. The consequence of this was that climate was now studied on a grand scale and with grand narratives encompassing more and more the entire globe¹⁶.

The specialisation of academic disciplines that occurred in the twentieth century can in part be explained by this. There became increasingly more division in the approach to the climate as geographers, anthropologists, archaeologists and ecologists vied with historians and natural scientist to claim the climate as their object of study. One approach above all others that stands out from the early twentieth century up until the present is the drive to model the climate. Modelling the climate moved from a fairly rudimentary sub-field of science to a highly sophisticated focus of the scientific community.¹⁷ Through advances, particularly in the areas of computer modelling and predication, climatology came to dominate the way in which climate change was perceived. Climate as an epistemological object is framed in ever increasing ways through an understanding of the natural world as that of the domain of the scientist.¹⁸ The explanatory power of science to present an objective view of the climate sees it raised exponentially above other forms of climatic understandings¹⁹; most notably, the falling away of the perceived

relevance of humanities and of the value of indigenous knowledge to inform public and political debate.²⁰ This is made all the more striking when even the most cursory glance at these two areas reveals a continuous, rigorous and incisive contribution.

The presumption that there are separated spheres of investigation in academia has a long and complicated history. It was certainly already well established when C.P. Snow took to the lectern to deliver his now famous Rede Lecture in 1959, in which he set out clearly a binary understanding of the humanities and the sciences. For Snow the chasm between the two branches of knowledge was not only intellectual, but had its basis in social and cultural circumstances. The contention for Snow was that there was an atmosphere of hostility between the two camps with neither wishing to give ground to the other.²¹ Explaining how Snow was able to make such a convincing description of his intellectual environment also helps to explain the divergence in climate epistemology between disciplines. Earl Gammon, an intellectual historian, places the beginning of the separation as early as the start of the nineteenth century, interestingly before the advent of the modern university. Gammon's argument centres on the way that natural theology is challenged and then supplanted.

Natural theology sought, through the observation of nature, the underlying laws of nature and through that a greater understanding of God's laws. The reduction in this period of the centrality of religion, Gammon claims, shifted the way that nature was thought about from one that aided the development of humans to one that threatened it.²² This altered status required a new approach; one that wished to pacify, control and ultimately exploit nature. Obviously, this does not consider the range of world religions, in particular Buddhism and Hinduism with their in-depth and complex relationship with nature. However, it is the hegemonic dominance of European systems of knowledge that are most relevant to this account. Gammon's measured argument can explain persuasively the decline of natural theory and how nature comes to be something to be feared. This was the period of geologist Charles Lyell's discoveries that showed the real age of the earth, and with that the spectre of human extinction.²³ It was the time of Lord Tennyson's poetry, in many ways a dramatisation of Lyell's work, presenting a personified nature that was frightening in its indifference to human life. It is easy to see how a once benevolent nature could become a vector for individual and societal fears, and ultimately a questioning of religious teleology that

placed human development above all else.^{24,25} Scientific discovery challenged the Christian worldview in Europe as did the industrialisation that occurred in certain places in Northern Europe, most notably in Britain.²⁶ Several individuals, including Halley and other East India Company officials, had seen links between economic exploitation of the natural world and possible environmental impacts in the context of the explorations of the East India Company in the eighteenth century, which as Grove notes saw the beginnings of environmentalism.

However it is really in the nineteenth century that the discourse of mastery over nature is constituted in its fullest sense. Nature, as the holistic whole of God's creation, comes to be seen as fragmented, quantifiable, malleable and as having calculable economic value. None of these aspects was entirely new; humans had always altered their environments and bought and sold elements of nature for a price. However, what *were* new were the power available to transform nature and a new economic-scientific language to describe it.²⁷ A marriage was formed in the first half of the nineteenth century between economic commercialisation and scientific invention. The technological advances that enabled economic gain through the exploitation of nature were made possible through a symbiotic relationship with science.²⁸ The Industrial Revolution has had considerable long-lasting consequences, not just for where it began in Europe but also globally. It stands as a model for societal and economic growth and development that has been exported and imitated across the world. Much can be said about the long-reach of the European industrial model; however, for our purposes, its relevance lies in its direct impact on changing the climate materially and how it created a narrow lens through which the 'natural world' came to be viewed from at least the mid-nineteenth century onwards.

It is no coincidence that most scientists date the beginning of the Anthropocene from this period (*c.*1750-to present). This is the name that has been given to our current geological era, having left the stable Holocene epoch of the past 10,000–12,000 years. The Anthropocene is unique, as it is understood to be an era in which humans have become geological agents, capable of shaping in more and more profound ways, the very geology of the earth. The naming of the Anthropocene (by Crutzen and Stoermer in 2000) and its dating continue to be debated, but most scientists indicate that it began in the late eighteenth century, the time of European industrialisation, and then experienced an acceleration period around 1950 which continues to our present day.²⁹ Most

scientists link the entering of this new era to the advent of increasing fossil fuel consumption, an important component of industrialisation. Thus, the state of the planet since at least the late eighteenth century has been correlated to the activities of human beings.³⁰ How the natural world was encountered, conceptualised and utilised does have important consequences for understanding climate change as an object of enquiry and the ways it can be understood through Snow's two cultures thesis.

Science came to replace more and more the critical understanding of the natural world by the nineteenth century. Nature was seen as a threat to human survival; however, it was also seen as something that could be overcome using technical and scientific invention. The mechanisation of agriculture for instance helped to stave off the spectre of food shortages that had led to so much social unrest in the eighteenth and early nineteenth centuries. The industrialising societies in Europe at this time witnessed unparalleled population growth, and it was to science and technological innovation that society turned to support the growing numbers. The vast demographic shift that occurred in the nineteenth century is hotly debated amongst historians.³¹ Throughout the nineteenth century, the idea that nature could be made to provide more and more (through the scientific advances of the newly founded disciplines of chemistry and geology in particular) was always coupled with the Malthusian principle that there must be a limit imposed by nature itself to population growth. Therefore, the debate today is about the power of fossil fuels to provide technological advantages, whilst at the same time there is a residual fear over the capacity to cater for ever increasing numbers of people.

Science has come to symbolise knowledge that can be used in the world. Scientists can be seen to be epitomising a utilitarian function; the knowledge that they are developing can be quantified, exploited and monetised.³² The humanities by contrast are seen as occupying esoteric occupations concerned with non-practical knowledge, entertainment or as social and political criticism. Progress was easier to measure in the sciences than the humanities and this is how it comes to be viewed in the public imagination.³³ This separation was not just built on technical, epistemic barriers as is clear today, it was also built on an implicit division of labour; the natural world was for the scientist to explain and manipulate, the human social world was for the humanities to investigate.³⁴ This can be seen most clearly in the scientisation of nature. Nature at the turn of the twentieth century is redefined as a life-sustaining environment

or ecosystem. Nature, in its reconstituted form, takes on a functionalist character, one that is seen primarily as fundamental to humans' continued survival.³⁵ The double movement that makes nature the environment and the human a species can be seen to become the dominant way in which discussions around the climate evolved in the twentieth century. The idea of the human as a species has a long intellectual history stemming from Marxist notions of species-being, the idea has seen a resurgence in attention in anthropological writing, with the most well-known being the multi-species arguments put forward by Anna Tsing.³⁶ Although, not acknowledged as such, it is clear that a species model of the human is in the background to debates around resources, consumption and population fears. The primary mode to understanding this alteration is to combine what has already been mentioned; de-mystification of the natural world in the early nineteenth century, the role of industrialisation and the commercialisation of science and concern for counteracting a threatening nature with the addition of a subtler factor, the way that knowledge of the world is regulated. What counts as knowledge undergoes a dramatic shift in relation to this phenomenon.

Much has been made of the influence of the Enlightenment on scientific advances, social, political and philosophical thought, and art. What has received slightly less attention is the way in which key Enlightenment thinkers redefined what could count as knowledge. Reaction to a strain of scepticism that emanated from the Renaissance philosophers such as Descartes sought to give knowledge the possibility of certainty. In pursuing this end, Descartes unwittingly placed a very high burden of proof on what could count as knowledge.³⁷ The reduction in what could be knowable, to what could be universally applicable at all times and all places and the need for a measurable quality to support abstract knowledge became the benchmark for epistemic legitimacy. Science was able to lend itself to these new criteria as it could demonstrate the laws or indubitable truths about the world, something which the humanities were either unable or unwilling to provide. This goes some way to explain why it was the scientists, by the end of the nineteenth century, who took the lead on the big problems that affected human society.³⁸

Discussing the divide in academia between the sciences and the humanities reveals some of the fundamental shifts in understanding the world. However, the story is more complicated than a simple binary distinction. Even Snow as the populariser of the idea would admit that the two cultures do not fit so easily into discrete blocks. The latter part of

the nineteenth century saw the emergence of new disciplines that were neither science in the traditional sense or part of the humanities; these can broadly be labelled the social sciences. They aimed to combine scientific methods with social questions. Sociology, for example, gained a footing in universities in the last decade of the nineteenth century, propelled most notably by Emile Durkheim.³⁹ Ethnography, anthropology and political sciences were also beginning to emerge. It can be seen that these new disciplines required for themselves a territory of enquiry that was distinct from pre-existing dominant forms, such as history and philosophy.⁴⁰ In marking out their intellectual boundaries, acute divergences occurred between academics who were ostensibly looking at the same questions and objects. What is significant for our account of climate change research is that as the disciplines divided, they also came to investigate nature, the environment and climate change in their own ways. The twentieth century therefore followed a diverse path in terms of engagement with climate change. The sciences, as described above, came to dominate the discourse; however other non-scientific disciplines began to produce work that has only very recently been recognised as part of the debate.⁴¹

The relegation of this work speaks to an important element of how the climate change debate has been conducted in the twentieth century. The use of science as a unifying principle that can act as a lingua franca between different groups is shown most clearly in the formation of international organisations and treaty arrangements since 1870. The scientisation of the natural world and its transformation into a 'law like physical system providing basic life support to *Homo sapiens*' lends itself to a structural apparatus for 'international discourse and activity concerning the environment'.⁴² The last hundred years have seen a huge rise in the number of international agreements, organisations and co-ordination. The international character of these arrangements was both made possible through a hegemonic scientific viewpoint that was shared by the actors involved, and perpetuated by it, through the realisation of the planet as a total system. Science then became the mechanism through which international political conversations were conducted and where politicians would turn for a grounding in the discussions. Although there have been some small steps since around the year 2000 to include a larger plurality of voices at the international level, it is still very much dominated by the sciences.⁴³ Having one dominant depiction of nature, the one that science puts forward, is in pragmatic terms very useful for

discourse happening between actors from different cultural, linguistic and historical backgrounds. However, other depictions of nature that do not adhere to the model are ignored or immensely modulated.⁴⁴ The idea that nature could be local, or that it has cultural and religious significance in different places, or that perhaps conservationist ideas held in one place might not be applicable in another, or that one group of people may have industrialised and another not, complicates the scientific understanding of nature as a homogenous totality.

Throughout the twentieth century there have been many significant works produced by those that come from the humanities. Grove and Damodaran, have been instrumental in highlighting this work through offering an exhaustive literature review of the development of environmental history. They prove convincingly that the humanities from the turn of the twentieth century—with Sir Halford Mackinder's *Britain and the British Seas* (1902) through Ellsworth Huntington's influential variant on environmental determinism in *The Pulse of Asia* (1907) and the later engagement of Toynbee's and the Annual School's more general 'world' environmental projects in the 1940s, 1950s and 1960s—form a formidable array of material relating to climate, human history and culture.⁴⁵ The development of the field of environmental history has continued from these early advocates to become one of the fastest growing disciplines within the humanities, with the most noteworthy contributions coming from Le Roy Ladurie, Alfred Crosby, John McNeil, Jared Diamond, Richard Grove and Vinita Damodaran. They vary massively in style, methodology and sites of enquiry; however, they all are concerned ultimately with the relationship between nature, climate, history and peoples.

Elsewhere, and often not alone, usually in collaboration with the social sciences, the humanities have produced work that is challenging and important. Not dealing directly with climate change, philosophers from the 1920s to the 1950s in particular (such as Adorno, Horkheimer and Heidegger) wrote elegantly and powerfully about the restrictive way in which nature is thought about.^{46,47} Seeing that humans' relation to nature was one of control through language and technology, they began a movement later referred to as 'deep ecology'.⁴⁸ Underpinning much of the thinking was coming to terms with a position already articulated by Hegel; namely, that humans are a part of nature and yet separate from nature. This conundrum was developed, particularly by Adorno who wrestled with this idea in an attempt to explain the mechanism that

could lead to the Holocaust. Treating nature in the instrumental way as described above, the scientisation of nature narrows down dramatically what can be made comprehensible in terms of the nature–human relationship.⁴⁹ What these philosophers were able to show was that the very structures of our language and way of thinking are prescribed prior to the engagement with the world. Despite being immensely influential in a number of fields outside philosophy, their critique of the relationship with nature has not broken through into mainstream discourses on climate change. One exception to this is the recent book by Naomi Klein, who is praised for her lucid prose and bringing deeper thinking into the climate change debate, whilst simultaneously bringing it to the mass level. Her understanding of the way in which this debate is currently framed echoes very clearly the now nearly 100-year-old thought of these philosophers.⁵⁰

In a more obvious way Klein correlates the rise of capitalist consumption with climate change. The relationship between the economic needs, scientific advances and technology that flourished in the nineteenth century and became entrenched in the late capitalism of the past 30–40 years has, according to Klein, co-created a situation that cannot do anything but lead to changes in nature. Her argument, hailed by many to be an original standpoint (although not by her) has in fact a long history, some of which has already been discussed above. Adorno, who saw that capitalism could only lead to destruction given its inherently instrumental treatment of nature (as containing the human), in many ways already foreshadowed arguments such as Klein's. The link between a capitalist system, consumerism and climate change is now fairly well accepted. This is largely down to the work of the humanities, not through the increasingly sophisticated prowess of the sciences. The scientist can say how and why coal burning depletes the ozone layer, the humanities scholar can say why the coal was and continues to be kept burning. In a slightly crude analogy, guns don't kill people, people kill people.

The humanities have made other important contributions that recently have appeared as novel, but have been much discussed in the twentieth century. Creating a similar impact to Klein today, Rachel Carson's *Silent Spring* in the 1960s (although in many ways very different in content) was a catalyst for a social, cultural and historical re-imagining of human–nature relations through the gaze of science. Carson, a scientist, sought to expose the use of pesticides on crops in the USA.⁵¹ What is clear,

however, is that it was also an example of science and technology being understood as a social process. The debate that arose from the *Silent Spring* centred not just upon the use of pesticides, but more importantly ignited existing concerns about the moral ambivalence of science. Carson understood that the rapacious and inflexible attitude to nature, exemplified through her study of pesticides, ‘constituted an abnegation of moral responsibility to both the human community and the rest of the natural world’.⁵² The legacy of *Silent Spring* has been vast, and in no small way gave rise to a critical moralism that could challenge and be understood by and through engagement with science. Equally, her work can be seen to have had direct influence on state policy throughout the world.⁵³ Carson marks a high point in what is possible with regards to combining scientific rigour with equally astute social and political consideration. There are however examples that are just as important that belong within the more traditionally understood humanities.

The impact that the humanities have had, can have or should have on state/international policy arrangements is a difficult conundrum. There have been in recent years an increasing number of researchers from across many disciplines who have tried to manifest a formula for creating the best conditions to include the different fields in conversation on climate change.⁵⁴ For the most part these calls for collaboration have come from the social sciences. However, the humanities actually have (as has already been shown in the nineteenth century) over the past hundred years greatly contributed to policy concerns. The issues for ascertaining the impacts that humanities research has on policy or the public sphere more generally are difficult to identify. There are many reasons for this; however, the one most pressing in terms of what has been discussed already is that humanities output does not lend itself to the utility function as readily as scientific output; it is harder to see the results as the results are measured in a positive way. The humanities have tended towards highlighting problems and are characterised as not offering solutions with regards to climate change. This can be seen clearly through the complex development of eco-feminism or gendering the environment and its interactions with international policy forums, particularly the United Nations.⁵⁵

Gendering the environment highlights both the influence that the humanities can have, particularly at the international policy level, and how humanities can fall foul of the instrumentality of the solutions-based dominance of the sort of thinking that has been discussed. The basic

thought is as follows; men and women experience climate change in different ways. Women, particularly in the Global South, experience far greater adversity from the changes wrought by climate change than men. The reasons for this are as multifarious as they are site-specific; however, as a general trend, it has been shown that because women are more likely to be connected to the household,⁵⁶ polluted water or scarcity of fuel (firewood) impacts on them more. Likewise, generally speaking, they are less likely to own private property and so will be more reliant on common property resources. Finally, their expertise is more likely to come in the form of indigenous or traditional knowledge, a form that does not suit the current climate change discourse.⁵⁷ This is a relatively ignored aspect of climate change along with the implications that have arisen through the commencement of policies and initiatives linked with population. Mentioned earlier, fear of over-population has led to a return of Malthusian doctrine, only now it is coupled with concerns around environmental refugees and an industrialisation drive in China, India, Brazil and parts of Africa and South East Asia.

The return of the Malthusian doctrine in the last 50 years is connected to two environmental issues. The first is that over-population will lead to a scarcity of resources and the second is that over-population will cause an increase in pollution and other forms of environmental degradation.⁵⁸ There are many ways in which these two problems have been discussed, but the one that we will use as illustrative of the tension that exists between the humanities and policy decisions is concerned with family planning and with predictive migration. Influencing demographic changes is complex and wrought with contentious issues; the USA in particular has since the 1960s aimed to influence the population growth of other countries, most notably in the Global South.⁵⁹ The rhetoric has changed through time from (for example) 'birth control' to 'family planning' or 'population control' to 'population assistance', yet in practical terms little has changed. The fundamental principle is that to stop a population from increasing, you have to reduce the birth rate, and to achieve that you have to increase access to contraception.⁶⁰ This form of action is characterised by a belief that falling fertility rates are pro-poor and reduce the potential for further greenhouse emissions.⁶¹ Importantly, this is an instance where humanities scholars have written convincingly about why this kind of outside, one-size-fits-all approach has been so ineffective. The literature which has been emerging in the last few decades clearly shows the importance history, culture, gender and politics have on

attempts to artificially control population growth.⁶² Among other things, attention has been drawn to the specificity of different places, even within similar geographical areas. The demographic models drawn from developed countries have been shown to be inadequate at predicting and explaining changes in the developing world. Equally, a growing number of scholars have sought to show that poverty and its perpetuation cannot be addressed simply by reducing the birth rate, for example, by pointing out that improving access to education, healthcare and higher wages is far more effective.⁶³ The fact that these concerns voiced by humanities scholars are rarely if ever being heard at policy discussions is something that must be rectified.

The humanities do not speak with one voice, and nor should they; however, divergence of opinions in the humanities has led to some unfortunate consequences; none more so than with the question of environmental refugees. Norman Myers is perhaps most famous for his environmental refugee thesis of the early 2000s, a highly influential set of predictions that have been adopted at international policy level, particularly through the United Nations. Myers made predictions that there could be upwards of 25 million refugees propelled by environmental factors. He writes that this will 'rank as one of the foremost human crises of our times'.⁶⁴ This appears to be a logical argument; as environmental problems occur with ever increasing frequency and severity, people will seek to leave the affected areas. The consequences of such a movement of people can only be guessed at, but the assumption is that it will lead to violent conflict. This is only part of the story; scholars from different humanities disciplines have sought to debunk this theory.⁶⁵ In the main they have aimed to challenge the implicit determinism in arguments such as that put forward by Myers. An updated form of the environmental determinism already discussed makes the assumption that given a set of a particular environmental conditions a given society will react in a given way. What is false about this assumption is that it relegates human agency,⁶⁶ ignores historical precedent,⁶⁷ replicates an ethnocentric world view and fails to taken into account the social, cultural, historical and political particularity of place. The humanities are capable of expressing these complex relationships and exposing the dominant narratives to rigorous examination.

Another way in which the humanities are actively engaging with the current climate change conversation is through curatorship. For example, the website of the global research project EJOLT (which brings together science and society) demonstrates what a collaborative approach can achieve, spearheaded by harnessing key skills of the humanities.⁶⁸

The humanities have for some time produced important work that can forge links between local conflicts and wider considerations of wealth distribution, social, political and cultural history and religious and cultural overlap. The humanities have sought successfully to promote voices that are usually left out of the climate change debate, allowing them to be heard on their own terms, with their own priorities, understandings and demands. What the ejolt.org project does is combine these contributions with the potential of new digital technology. The project, led in part by the respected social economist and environmental activist Joan Martinez-Alier, seeks amongst many other things to visually map local environmental conflicts from around the globe. The maps, created through crowdsourcing knowledge, allow users to search for specific types of conflict (for example, due to water pollution), provide co-ordinated information on each instance from local sources, scientists, social scientists and humanities scholars. This is an example of the humanities having the potential to emancipate the disenfranchised communities that have been almost absent from the most prominent organisational attempts to address climate change. This project can be seen to reconnect the humanities with actual humans, without losing its identity or critical capacity.

In conclusion, understanding the climate has never been and will never be an objective science. It has always involved social, economic, cultural and linguistic elements. Understanding anything about the current climate change crisis requires that it be looked at as a constellation of interlinking parts. Each part needs to be given equal attention and the science of explaining and predicting climate change should be understood as one amongst equals. The humanities, taken as a whole, can lay claim to many of these elements and should therefore be more confident in demonstrating what they can bring to the debate. This volume will hopefully go some way to being a catalyst for this.

NOTES

1. See <http://ihopenet.org/about/> accessed 30/03/16.
2. For a fuller account see: Grove, H.R. *Green Imperialism Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism 1600–1860* (Cambridge: Cambridge University Press, 1995), in particular the Introduction.
3. This is in reference to a National Academy of Sciences report that is often referenced as one of the first mainstream presentations of climate change, see: United States Committee for the Global Atmospheric,

- Understanding Climate Change – A program for Action* (Washington: National Academy of Sciences, 1975). This is hard to find and can also be found at: <https://archive.org/stream/understandingcli00unit/#page/n7/mode/2up> (accessed 24/02/2016). For a more readable example from the time, see: Douglas, J.H. 'Climate Change: Chilling Possibilities', *Science News*, 107:9 (1975), pp. 138–140.
4. For an account of the scientific awareness of climate change before the 1970s see: Harvey, L.D. 'An overview of climate change science in 1977 marking the publication of volume 100 of *Climatic Change*', *Climatic Change*, 100 (2010), pp. 15–21.
 5. For a good summary on Theophrastus and others see: Hughes, J.D. 'Ecology in ancient Greece', *Inquiry*, 18:2 (1975), pp. 115–125.
 6. For a thorough history of climate modelling see: Edwards, P. 'History of climate modelling', *Climate Change*, 2 (2011), pp. 128–139.
 7. E. Halley 'An account of the circulation of watry vapours of the sea, and of the cause of springs', *Philosophical Transactions of the Royal Society*, 192: 17 (1694), 468–473. Cited in R.H. Grove, *Green Imperialism—Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism 1600–1860* (Cambridge: Cambridge University Press, 1995) p. 103.
 8. Williamson, F. 'Weathering the empire: meteorological research in the early British straits settlements', *The British Journal for the History of Science*, 48:178 (2015) pp. 475–476.
 9. Montesquieu, C., *De l'esprit des lois or Spirit of the Law* (Cambridge: Cambridge University Press, 1989).
 10. See also: Herder, J. G. *Reflections on the Philosophy of the History of Mankind* (Chicago: University of Chicago Press, 1968 [1784–1791]) for an overview see: Jonsson, F.A. *Enlightenment's Frontier – The Scottish Highlands and the Origins of Environmentalism* (United States of America: Yale University, 2013) for links to the present see: Blaut, M.J. 'Environmentalism and Eurocentrism', *Geographical Review*, 89:3 (1999), pp. 391–408.
 11. Judkins, G. et al. 'Determinism with Human-Environmental Research and the Rediscovery of Environmental Causation', *The Geographical Journal*, 174:1 (2008), pp. 17–29.
 12. For a thematic history of the idea see: Seidl, I and Tisdell, C.A. 'Carrying capacity reconsidered: from Malthus' population theory to cultural carrying capacity', *Ecological Economics*, 31 (1999), pp. 395–408.
 13. For an in-depth analysis of the links between population theory and state policy in the nineteenth century, see: Robinson, W.C. 'Population Policy in Early Victorian England', *European Journal of Population*, 18:2 (2002), pp. 153–173.

14. For a paradigmatic example of the return of Malthusian ideas, see: Teitelbaum, M.S. 'The Population Threat', *Foreign Affairs*, 71:5 (1992), pp. 63–78. For a more nuanced account, yet still largely in keeping with the premise of population control advanced by Malthus, see: Das Gupta, M. 'Population, Poverty, and Climate Change', *The World Bank Research Observer*, 29:1 (2014), pp. 83–108.
15. The following is perhaps the mostly widely cited example: Rockström, J. et al. 'A safe operating space for humanity', *Nature*, 461: 24 (2009), pp. 472–475.
16. Grove, R. and Damodaran, V. 'Imperialism, Intellectual Networks, and Environmental Change: Origins and Evolution of Global Environmental History, 1676–2000: Part 1', *Economic and Political Weekly*, 41:41 (2006), pp. 4347–4349.
17. Edwards, P. 'History of climate modelling', *Climate Change*, 2 (2011), pp. 128–139.
18. Pálsson, G. et al. 'Reconceptualizing the "Anthropos" in the Anthropocene: Integrating the social sciences and humanities in global environmental change research', *Environmental Science and Policy*, 28 (2013), pp. 3–13.
19. A useful example that highlights this issue can be found in: Norberg-Hodge, H. and Goering, P. 'The Future of Progress', in Ed. Norberg-Hodge, H., Goering, P. and Gorelick, S. *The Future of Progress – Reflections on Environmentalism* (Guildford: Green Books, 1992), pp. 13–30.
20. For an overview see: Collini, Stefan, *What Are Universities For?* (Penguin, 2012) and Roe S.A. 'The Life Sciences' in *The Cambridge History of Science Vol IV Eighteenth-Century Science*, (Cambridge University Press 2003) ed. Roy Porter. P. For a seminal work on the importance of indigenous knowledge see: Guha, R. and Martinez-Alier, J. *Varieties of Environmentalism: Essays North and South* (Guildford: Earth Publications Ltd, 1997).
21. Highlighting this, Snow describes how an Oxford mathematician visiting Cambridge was attempting to engage his hosts in conversation at dinner and was met by hostility, leading the President of the College to remark to one of his colleagues: 'Oh, those are mathematicians! We never talk to them'. This blatant dismissiveness of another discipline was understood by Snow as evidence of a cultural divide, with the narrative illustrating an assumption of two distinctive 'cultures' – 'scientists' and 'literary intellectuals'.
22. Gammon, E. 'Nature as adversary: the rise of modern economic conceptions of nature', *Economy and Society*, 39:2 (2010), pp. 218–246.
23. Lyell, C. *Principles of Geology* (London: Penguin Books, 1997 (originally published in three volumes 1830–1833)).

24. Lord Tennyson, A. *In Memoriam* (New York: W.W. Norton and Company, 2004 (originally published in full in 1850)).
25. A good corrective to the mythologised crises of faith: Helmstadter, R.J. and Lightman, B.V. *Victorian faith in crisis: essays on continuity and change in nineteenth century religious belief* (Basingstoke: Macmillan, 1990), also see Brooke, J.H. *Science and religion: some historical perspectives*, (Cambridge: Cambridge University Press, 2014), in particular the chapter 'Visions of the past: Religious belief and the historical sciences', pp. 226–274.
26. A very clear and insightful text on this is: Allen, R.C. *The British Industrial Revolution in Global Perspective* (Cambridge: Cambridge University Press, 2009).
27. For an alternative to the usual economic interpretation, with an emphasis on the role of the Enlightenment for knowledge and education, see: Mokyr, J. *The Enlightened Economy: Britain and the Industrial Revolution, 1700–1850* (London: Yale University Press, 2009), in particular the chapter 'Enlightenment and the Industrial Revolution', pp. 145–170.
28. The first robust example of this comes from organic chemistry in the 1830s: 'This event [mauve dye] was a milestone in 19th-century technological progress, for it marked not only the first hesitant step in the industrialization of organic chemistry but also the onset of commercialization of scientific invention.' – Travis, A.S. 'Perkin's Mauve: Ancestor of the Organic Chemical Industry', *Technology and Culture*, 31:1 (1990), pp. 51–82.
29. For an interesting discussion of the concept of the Anthropocene see: Haraway, D. et al. 'Anthropologists Are Talking – About the Anthropocene', *Ethnos*, 81:3 (2016), pp. 535–564.
30. Crutzen, J. P. and Stoermer, F. 'The 'Anthropocene'', IGBP Newsletter: Royal Swedish Academy of Sciences, Stockholm, 41 (2000), pp. 17–18. Crutzen, J. and Steffen, W. , 'How Long Have We Been In The Anthropocene Era?' *Climate Change*, 61 (2003), pp. 251–257.
31. A very well-written overview of the relationship between nature and population growth is: Bacci, M.L. Trans: Ispen, C.N. and Ispen, C. *The Population of Europe: A History* (Great Britain: Blackwell Publishers, 2000). Also see: Wrigley, E.A. 'Urban Growth In Early Modern England: Food, Fuel and Transport', *Past and Present*, 225:1 (2014), pp. 79–112.
32. Wainwright, J. 'Climate Change, Capitalism, and the Challenge of Transdisciplinarity', *Annals of the Association of American Geographers*, 100: 4 (2010), pp. 983–991. And Ed., Brock, M.G. and Curthoys, M.C. *The History of the University of Oxford Volume VI Nineteenth-Century Oxford, Part I* (Oxford: Clarendon Press, 1997), in particular Chapters 9 and 16.

33. Latour, B. 'From the World of Science to the World of Research?', *Science*, 280: 5361 (1998), pp. 208–209.
34. lövbrand, E. et al. 'Who speaks for the Future of Earth? How critical social science can extend the conversation on the Anthropocene', *Global Environmental Change*, 32 (2015), pp. 211–218.
35. Frank, D. J. 'Nature, and the Globalization of the Environment, 1870–1990', *Social Forces*, 76:2 (1997), pp. 409–435.
36. Tsing, A. 'Arts of Inclusion, or How to Love a Mushroom', *Manoa*, 22:2 (2010), pp. 191–203.
37. Melo-Martín, I. 'The Two Cultures: An introduction and assessment', *Technology in Society*, 32 (2010), pp. 5–9.
38. Bouterse, J. and Kartens, B. 'A Diversity of Divisions: Tracing the History of the Demarcation between the Sciences and the Humanities', *Isis*, 106:2 (2015), pp. 341–352.
39. The following was Durkheim's attempt to set the standard for the new discipline of sociology in 1893: Durkheim, E. Trans: Halls, W.D. *The Division of Labour in Society* (Hong Kong: Macmillan, 1984).
40. Bouterse, J. and Karstens, B. 'A Diversity of Divisions: Tracing the History of the Demarcation between the Sciences and the Humanities', *Isis*, 106:2 (2015), pp. 341–352.
41. Sabin, P. 'The Ultimate Environmental Dilemma': Making a Place for Historians in the Climate Change and Energy Debates', *Environmental History*, 16 (2010), pp. 76–93.
42. Frank, D. J. 'Nature, and the Globalization of the Environment, 1870–1990', *Social Forces*, 76:2 (1997), pp. 426 and 428.
43. Hulme, M. 'Meet the Humanities – An introduction needs to be made between the rich cultural knowledge of social studies and the natural sciences', *Nature Climate Change*, 11 (2011), p. 177.
44. Nisbet, M. C. and Mooney, C. 'Framing Science', *Science*, 316 (2007), p. 56.
45. For a comprehensive history of these authors and texts see: Grove, R. and Damodaran, V. 'Imperialism, Intellectual Networks, and Environmental Change: Origins and Evolution of Global Environmental History, 1676–2000: Part 1/2', *Economic and Political Weekly*, 41:41/42 (2006), pp. 4345–4354 and pp. 4497–4505.
46. Irwin, R. *Heidegger, Politics and Climate Change: risking it all* (London: Continuum, 2008).
47. Adorno, T. W. and Horkheimer, M. Trans: Cumming, J. *Dialectic of Enlightenment* (Sweden: Verso, 1997 (originally 1944)).
48. Buell, L. 'Ecocriticism: Some Emerging Trends', *Qui Parle: Critical Humanities and Social Sciences*, 19:2 (2011), p. 89.
49. Cook, D. *Adorno and Nature* (Durham: Acumen, 2011).

50. Klein, H. *This Changes Everything: capitalism vs. the climate* (London: Allen Lane, 2014).
51. Carson, R. *Silent Spring* (United States of America: First Mariner Books, 2002).
52. Smith, M. B. "Silence, Miss Carson!' Science, Gender, and the reception of 'Silent Spring'", *Feminist Studies*, 27:3 (2001), p. 749.
53. See for details of Carson's impact on policy changes: Pimentel, D. 'Silent Spring, the 50th anniversary of Rachel Carson's book', *BMC Ecology*, 12:20 (2012), pp. 1–2.
54. See: Castree, N. et al. 'Changing the intellectual climate', *Nature climate Change*, 4 (2014), pp. 763–768; Reid, W.V. et al. 'Earth System Science for Global Sustainability: Grand Challenges', *Science*, 330 (2010), pp. 916–917; Wainwright, J. 'Climate Change, Capitalism, and the Challenge of Transdisciplinarity', *Annals of the Association of American Geographers*, 100:4 (2010), pp. 983–991; Palsson, G. et al. 'Reconceptualizing the "Anthropos" in the Anthropocene: Integrating the social sciences and the humanities in global environmental change research', *Environmental Science and Policy*, 28 (2013), pp. 3–1; Hackmann, H. et al. 'The social heart of global environmental change', *Nature Climate Change*, 4 (2014), pp. 653–655; Holm, P. et al. 'Collaboration between the natural, social and human sciences in Global Change Research', *Environmental Sciences and Policy*, 28 (2013), pp. 25–35.
55. For a straightforward breakdown of the relationship with the United Nations see: Denton, F. 'Climate change vulnerability, impacts, and adaptation: Why does gender matter?' *Gender and Development*, 10:2 (2002), pp. 10–20.
56. This is written with the proviso that it is understood as a social construction.
57. See: Guha, Ramachandra. and Martinez-Alier, J. *Varieties of Environmentalism: Essays North and South* (Guildford: Earthscan Publications Ltd, 1997), pp. 28–29; Sultana, F. 'Gendering Climate Change: Geographical Insights', *The Professional Geographer*, 66:3 (2014), pp. 372–381; and the ground breaking: Agarwal, B. 'The Gender and Environmental Debate: Lessons from India', *Feminist Studies*, 18:1 (1992), pp. 119–158.
58. The following aims to demonstrate the links between demographic change and greenhouse gas emissions: Jiang, L. and Hardee, K. 'How do Recent Population Trends Matter to Climate Change?', *Popul Res Policy Rev*, 30 (2011), pp. 287–312. Also the following models' increases in temperature as related to potential effects on population based on IPCC's own scenarios: Aral, M.M. 'Climate Change and Human Population Dynamics', *Water Qual Expo Health*, 6 (2014), pp. 53–62.

59. The following gives a detailed description of USA's foreign policy aims and influence: Grimes, S. 'From population control to 'reproductive rights': Ideological influences in population policy', *Third World Quarterly*, 19:3 (1998), pp. 375–394.
60. There is necessarily much more to be said. The following gives a thorough account of the Cairo talks, which was a very important population and development conference held 1994: Johnson, S. *The Politics of Population: The International Conference on Population and Development Cairo 1994* (St Ives: Earthscan Publications Ltd, 1995).
61. See the following for an institutional example of the prevalence of this view: Das Gupta, M. 'Population, Poverty, and Climate Change', *The World Bank Research Observer* 29:1 (2014), pp. 83–108.
62. Sultana, F. 'Gendering Climate Change: Geographical Insights', *The Professional Geographer* 66:3 (2014), pp. 372–281.
63. Agarwal, B. 'The Gender and Environmental Debate: Lessons from India', *Feminist Studies* 18:1 (1992), pp. 119–158 and Agarwal, B. 'The Power of numbers in gender dynamics: illustrations from community forestry groups', *The Journal of Peasant Studies* 42:1 (2015), pp. 1–20; a really useful overview of the literature can be found here: Bailey, A.J. 'Population geographies and climate change', *Progress in Human Geography* 35:5 (2010), pp. 686–695.
64. Myers, N. 'Environmental Refugees: A Growing Phenomenon of the 21st Century', *Philosophical Transactions: Biological Sciences* 357:1420 (2002), p. 611; Also see: Myers, N. 'Environmental Unknowns', *Science* 269:5222 (1995), pp. 358–360.
65. Probably, the best known is: Hulme, M. 'Reducing the Future to Climate: A Story of Climate Determinism and Reductionism', *The History of Science Society* 26:1 (2011), pp. 245–266; for a full account of the history of environmental determinism from 1890 to present, see: Judkins, G. et al. 'Determinism within Human-Environmental Research and the Rediscovery of Environmental Causation', *The Geographical Journal* 174:1 (2008), pp. 17–29.
66. See the following as challenging successfully the relation of agency: Swyngedouw, E. 'Apocalypse Forever? Post-political Populism and the Spectre of Climate Change', *Theory, Culture and Society* 27:2 (2010), pp. 213–232.
67. See the following as examples that use historical accounts to challenge determinism: Brown, N. 'Climate Change and Human History – Some indications from Europe, AD 400–1400', *Environmental Pollution* 83 (1994), pp. 37–43; Orlove, B. 'Human adaption to climate change: a review of three historical cases and some general perspectives', *Environmental Science and Policy* 8 (2005), pp. 589–600.

68. See www.ejolt.org – accessed 30/03/16.

BIBLIOGRAPHY

- Adorno, T. W. and Horkheimer, M. (1997), *Dialectics of Enlightenment*, translated by Cumming, J. Verso: Sweden (originally 1944).
- Agarwal, B. (1992), 'The Gender and Environmental Debate: Lessons from India', *Feminist Studies*, vol. 18, no. 1 (spring), pp. 119–158.
- Agarwal, B. (2015), 'The power of numbers in gender dynamics: illustrations from community forestry groups', *The Journal of Peasant Studies*, 42:1, pp. 1–20.
- Allan, R., Endfield, G. and Damodaran, V. Forthcoming, *Towards integrated historical climate research: the example of ACRE (Atmospheric Circulation Reconstructions over the Earth)*, WIRES.
- Allen, R. C. (2009), *The British Industrial Revolution in Global Perspective*. Cambridge University Press: Cambridge.
- Aral, M.M. (2014), 'Climate Change and Human Population Dynamics', *Water Qual Expo Health*, 6, pp. 53–62.
- Bailey, A. J. (2010), 'Population geographies and climate change', *Progress in Human Geography*, 35(5), pp. 686–695.
- Barnes, J. et al. (2013), 'Contribution of anthropology to the study of climate change', *Climate Change*, 3, pp. 541–544.
- Belfiore, E. (2015), 'Impact', 'value' and 'bad economics': Making sense of the problem of value in the arts and humanities', *Arts and Humanities in Higher Education*, vol. 14 (1), pp. 95–110.
- Belfiore, E. and Upchurch, A. eds (2013), *Humanities in the Twenty-First Century – Beyond Utility and Markets*. Palgrave Macmillan: Basingstoke.
- Benneworth, P. (2015), 'Putting impact into context: The Janus face of the public value of arts and humanities research', *Arts and Humanities in Higher Education*, vol. 14 (1), pp. 3–8.
- Benneworth, P. (2015), 'Tracing how arts and humanities research translates, circulates and consolidates in society. How have scholars been reacting to diverse impact and public value agendas?' *Arts and Humanities in Higher Education*, vol. 14 (1), pp. 45–60.
- Blaut, J. M. (1999), 'Environmentalism and Eurocentrism', *Geographical Review*, vol. 89, no. 3, pp. 391–408.
- Bouterse, J. and Karstens, B. (2015), 'A Diversity of Divisions: Tracing the History of the Demarcation between the Sciences and the Humanities', *Isis*, 106: 2, pp. 341–352.
- Bowler, P. J. (1992), *The Eclipse of Darwinism – Anti-Darwinian Evolution Theories in the Decades around 1900*. The John Hopkins University Press: U.S.A.

- Brock, M. G. and Curthoys, M. C. eds. (1997), *The History of the University of Oxford Volume VI Nineteenth-Century Oxford, Part I*. Clarendon Press: Oxford.
- Brown, N. (1994), 'Climate Change and Human History: Some indications from Europe, AD 400–1400', *Environmental Pollution*, 83, pp. 37–43.
- Buell, L. (2011), 'Ecocriticism: Some Emerging Trends', *Qui Parle: Critical Humanities and Social Sciences*, 19: 2, pp. 87–115.
- Carson, R. (2002), *Silent Spring*. First Mariner Books: U.S.A. (originally 1962).
- Castree, N. et al. (2014), 'Changing the intellectual climate', *Climate Change*, 4, pp. 763–768.
- Chakrabarty, D. (2009), 'The Climate of History: Four Theses', *Critical Inquiry*, 35: 2, pp. 197–222.
- Collini, S. (2012), *What Are Universities For?* Penguin: U.K.
- Cook, D. (2011), *Adorno and nature*. Acumen: Durham.
- Crutzen, J. P. (2002), 'Geology of mankind', *Nature*, 415: 3, p. 23.
- Crutzen, J. P. and Stoermer, F. (2000), 'The 'Anthropocene'', *IGBP Newsletter: Royal Swedish Academy of Sciences, Stockholm*, 41, pp. 17–18.
- Crutzen, J. and Steffen, W. (2003), 'How Long Have We Been In The Anthropocene Era?', *Climate Change*, 61, pp. 251–257.
- Danny Harvey, L. D. (2010), 'An overview of climate change science in 1977 marking the publication of Volume 100 of Climatic Change', *Climatic Change*, 100, pp. 15–21.
- Das Gupta, M. (2014), 'Population, Poverty and Climate Change', *The World Bank Research Observer*, 29, no. 1, pp. 83–108.
- De Melo-Martin, I. (2010), 'The Two Cultures: An introduction and assessment', *Technology in Society*, 32, pp. 5–9.
- Denton, F. (2002), 'Climate change vulnerability, impacts and adaptation: Why does gender matter?' *Gender and Development*, 10:2, pp. 10–20.
- Donnelly, J. F. (2002), 'The 'humanist' critique of the place of science in the curriculum in the nineteenth century, and its continuing legacy', *History of Education*, 31: 6, pp. 535–555.
- Douglas, J. H. (1975), 'Climate Change: Chilling Possibilities', *Science News*, vol. 107, no. 9, pp. 138–140.
- Durkheim, E. (1984), *The Division of Labour in Society*, translated by Halls, W. D., Macmillan: Hong Kong.
- Edwards, P. (2011), 'History of climate modeling', *Climate Change*, vol. 2, pp. 128–139.
- EJOLT- Environmental Justice Organisations, Liabilities and Trade, (2011), www.ejolt.org.
- Frank, D. J. (1997), 'Nature, and the Globalization of the Environment, 1870–1990', *Social Forces*, 76: 2, pp. 409–435.
- Futureearth- research for global sustainability, (2012), www.futureearth.org.

- Gammon, E. (2010), 'Nature as adversary: the rise of modern economic conceptions of nature', *Economy and Society*, 39:2, pp. 218–246.
- Ghiselin, M. T. (1999), 'Progress and the economy of nature', *Journal of Bioeconomics*, 1, pp. 33–45.
- Grimes, S. (1998), 'From population control to 'reproductive rights': Ideological influences in population policy', *Third World Quarterly*, 19:3, pp. 375–394.
- Grove, R. H. (1995), *Green Imperialism Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism 1600–1860*. Cambridge University Press: Cambridge.
- Grove, R. and Damodaran, V. 'Imperialism, Intellectual Networks, and Environmental Change: Origins and Evolution of Global Environmental History, 1676–2000: Part 1/2', *Economic and Political Weekly*, 41:41/42 (2006), pp. 4345–4354 and pp. 4497–4505.
- Guha, R. and Martinez-Alier, J. (1997), *Varieties of Environmentalism: Essays North and South*. Earthscan Publications Ltd: Guildford.
- Hackmann, H. et al. (2014), 'The social heart of global environmental change', *Climate Change*, 4, pp. 653–655.
- Hahnel, R. and Sharpe, M. E. (2011), *Green Economics- Confronting the Ecological Crisis*. M E Sharpe: New York.
- Halley, E. (1694), 'An account of the circulation of watry vapours of the sea, and of the cause of springs', *Philosophical Transactions of the Royal Society*, 192: 17.
- Hedley Brooke, J. (2014), *Science and religion: some historical perspectives*. Cambridge University Press: Cambridge.
- Helmstadter, R. J. and Lightman, B. V. (1990), *Victorian Faith in crisis: essays on continuity and change in nineteenth-century religious belief*. Macmillan: Basingstoke.
- Herder, J. G. (1968), *Reflections on the Philosophy of the History of Mankind*. University of Chicago Press: Chicago.
- Holm, P. et al. (2013), 'Collaboration between the natural, social and human sciences in Global Change', *Environmental Science and Policy*, 28, pp. 25–35.
- Home, H. (2007), *Sketches of the History of Man Considerably enlarged by the last additions and corrections of the author*, Harris, J. A. ed., vol. 2, Liberty Fund: Indianapolis.
- Hughes, J. D. (1975), 'Ecology in Ancient Greece', *Inquiry*, 18: 2, pp. 115–125.
- Hulme, M. (2009), 'Many types of action are required to tackle climate change', *Nature*, 462: 12, p. 158.
- Hulme, M. (2011), 'Meet the humanities- An introduction needs to be made between the rich cultural knowledge of social studies and the natural sciences', *Climate Change*, 1, pp. 177–179.
- Hulme, M. (2011), 'Reducing the Future to Climate: A story of Climate Determinism and Reductionism', *The History of Science Society*, 26: 1, pp. 245–266.

- Hulme, M. (2012), 'Telling a different tale: literary, historical and meteorological readings of a Norfolk heatwave', *Climate Change*, 113: 1, pp. 5–21.
- Hulme, M. and Turnpenny, J. (2009), 'What does applying 'scientific values' mean in reality?' *Nature*, 458: 9, p. 702.
- IHOPE- Integrated History and Future of People on Earth, (2003), www.ihopenet.org.
- IPCC- Intergovernmental Panel on Climate Change, (1988), www.ipcc.ch.
- Irwin, R. (2008), *Heidegger, politics and climate change: risking it all*. Continuum: London.
- Jiang, L. and Hardee, K. (2011), 'How do Recent Population Trends Matter to Climate Change?' *Popul Res Policy Rev*, 30, pp. 287–312.
- Johnson, E. and Morehouse, H. eds (2014), 'After the Anthropocene: Politics and geographic inquiry for a new epoch', *Progress in Human Geography*, 38: 3, pp. 439–456.
- Johnson, S. (1995), *The Politics of Population: The International Conference on Population and Development Cairo 1994*. Earthscan Publications Ltd: St. Ives.
- Jonsson, F. A. (2013), *Enlightenment's Frontier – The Scottish Highlands and the Origins of Environmentalism*. Yale University Press: U.S.A.
- Judkins, G. et al. (2008), 'Determinism within Human-Environment Research and the Rediscovery of Environmental Causation', *The Geographical Journal*, 174: 1, pp. 17–29.
- Klein, N. (2014), *This changes everything: capitalism vs. the climate*. Allen Lane: London.
- Kukarenko, N. (2011), 'Climate change effects on human health in a gender perspective: some trends in Arctic research', *Global Health Action*, 4, pp. 1–6.
- Latour, B. (1998), 'From the world of Science to the World of Research?' *Science*, 280: 5361, pp. 208–209.
- Latour, B. (2000), 'When things strike back: a possible contribution of 'science studies' to the social sciences', *British Journal of Sociology*, 51: 1, pp. 107–123.
- Livi Bacci, M. (2000), *The Population of Europe: A History*, translated by De Nardi Ipsen, C. and Ipsen, C., Blackwell Publishers: Great Britain.
- Lyell, C. (1997), *Principles of Geology*. Penguin Books: London (originally 1830–1833).
- Lövbrand, E. et al (2015), 'Who speaks for the future of Earth? How critical social science can extend the conversation on the Anthropocene', *Global Environmental Change*, 32, pp. 211–218.
- Malthus, T. R. (1992), *An Essay on the Principle of Population*, Winch, D. ed. Cambridge University Press: Cambridge.
- McNeill, J. R. (2003), 'Observations on the Nature and Culture of Environmental History', *History and Theory*, vol. 42, 4, pp. 5–43.
- McNeill, J. R. (2004), 'Woods and Warfare in World History', *Environmental History*, vol. 9, July, pp. 388–410.

- Mokyr, J. (2009), *The Enlightened Economy: Britain and the Industrial Revolution, 1700–1850*, Yale University Press, London.
- Montesquieu, C. (1989), *De l'esprit des lois* or *Spirit of the Law*. Cambridge University Press: Cambridge.
- Myers, N. (2002), 'Environmental refugees: A Growing Phenomenon of the 21st Century', *Philosophical Transactions: Biological Sciences*, 357: 1420, pp. 609–613.
- Myers, N. (1995), 'Environmental Unknowns', *Science*, 269: 5222, pp. 358–360.
- Myers, N. and Kent, J. (2003), 'New consumers: The Influence of Affluence on the Environment', *Proceedings of the National Academy of Sciences of the United States of America*, 100: 8, pp. 4963–4968.
- Myers, N. et al. (1997), 'Consumption: Challenge to Sustainable Development...', *Science*, 276: 5309, pp. 53–55.
- Nisbet, C. M. and Mooney, C. (2007), 'Framing Science', *Science*, 316, p. 56.
- Nisbet, C. M. et al. (2010), 'Four cultures: new synergies for engaging society on climate change', *Frontiers in Ecology and the Environment*, 8: 6, pp. 329–331.
- Norberg-Hodge, H. and Goering, P. (1992), 'The Future of Progress' in Norberg-Hodge, H., Goering, P. and Gorelick, S. eds. *Reflections on Environmentalism and Development* Green Books: Guildford.
- O'Brien, K. (2011), 'Responding to environmental change: A new age for human geography?' *Progress in Human Geography*, 35: 4, pp. 542–549.
- Orlove, B. (2005), 'Human adaption to climate change: a review of three historical cases and some general perspectives', *Environmental Science and Policy*, 8, pp. 589–600.
- Palsson, G. et al. (2013), 'Reconceptualizing the 'Anthropos' in the Anthropocene: Integrating the social sciences and humanities in global environmental change research', *Environmental Science and Policy*, 28, pp. 3–13.
- Pimentel, D. (2012), 'Silent Spring, the 50th anniversary of Rachel Carson's book', *BMC Ecology*, 12:20, pp. 1–2.
- Reid, W. V. et al. (2010), 'Earth System Science for Global Sustainability: Grand Challenges', *Science*, 330, pp. 916–917.
- Reweny, R. (2007), 'Climate change- induced migration and violent conflict', *Political Geography*, 26, pp. 656–673.
- Robinson, W. C. (2002), 'Population Policy in Early Victorian England', *European Journal of Population*, vol. 18, no. 2, pp. 153–173.
- Rockström, J. (2010), 'Frontiers of the New Century – Planetary Boundaries', *NPQ*, pp. 72–74.
- Rockström, J. et al. (2009), 'A safe operating space for humanity', *Nature*, 461: 24, pp. 472–475.
- Roe S. A. (2003), 'The Life Sciences', *The Cambridge History of Science Vol IV Eighteenth-Century Science* Porter, R. ed. Cambridge University Press: Cambridge.

- Sabin, P. (2010), 'The Ultimate Environmental Dilemma': Making a Place for Historians in the Climate Change and Energy Debates', *Environmental History*, 15, pp. 76–93.
- Sarre, P. and Reddish, A. eds. (1996), *Environment and Society*. Hodder and Stoughton: U.K.
- Seidl, I. and Tisdell, C. A. (1999), 'Carrying capacity reconsidered: from Malthus' population theory to cultural carving capacity', *Ecological Economics*, 31, pp. 395–408.
- Shove, E. (2010), 'Social Theory and Climate Change – Questions Often, Sometimes and Not Yet asked', *Theory, Culture and Society*, 27: 2–3, pp. 277–288.
- Skinner, Q. (2002), *Visions of Politics: Volume I: Regarding Method*. Cambridge University Press: Cambridge.
- Smith, M. B. (2001), 'Silence, Miss Carson!' Science, Gender, and the Reception of 'Silent Spring', *Feminist Studies*, vol. 27, no. 3, pp. 733–752.
- Snow, C. P. (2012), *The Two Cultures*. Cambridge University Press: Cambridge.
- Sultana, F. (2014), 'Gendering Climate Change: Geographical Insights', *The Professional Geographer*, 66:3, pp. 372–381.
- Swyngedouw, E. (2010), 'Apocalypse Forever? Post-political Populism and the Spectre of Climate Change', *Theory, Culture and Society*, 27: 2–3, pp. 213–232.
- Swyngedouw, E. (2013), 'Apocalypse Now! Fear and Doomsday Pleasure', *Capitalism Nature Socialism*, 24: 1, pp. 9–18.
- Sörlin, S. (2013), 'Reconfiguring environmental expertise', *Environmental Science and Policy*, 28, pp. 14–24.
- Teitelbaum, M. S. (1992), 'The Population Threat', *Foreign Affairs*, vol. 71, no. 5, pp. 63–78.
- Tennyson, A. (2004), *In Memoriam*, W. W. Norton and Company: New York (originally 1850).
- Thorner, L. K. (2014), 'Literature, Asia, and the Anthropocene: Possibilities for Asian Studies and the Environmental Humanities', *The Journal of Asian Studies*, 73: 4, pp. 989–1000.
- Travis, A. S. (1990), 'Perkin's Mauve: Ancestor of the Organic Chemical Industry', *Technology and Culture*, vol. 31, no. 1, pp. 51–82.
- Tsing, A. 'Arts of Inclusion, or How to Love a Mushroom', *Manoa*, 22:2 (2010), pp. 191–203.
- United States Committee for the Global Atmospheric Research Program, (1975), *Understanding Climate Change- A Program for Action*, National Academy of Sciences: Washington. Available at: <https://archive.org/stream/understandingcli00unit/#page/n7/mode/2up>.
- Wainwright, J. (2010), 'Climate Change, Capitalism, and the Challenge of Transdisciplinarity', *Annals of the Association of American Geographers*, 100: 4, pp. 983–991.

- Weaver, C. P. et al. (2014), 'From global change science to action with social sciences', *Climate Change*, 4, pp. 656–659.
- Wells, H. G. (2005), *The Time Machine* Parrinder, P. ed. Penguin Classics: London.
- Williamson, F. (2015), 'Weathering the empire: meteorological research in the early British straits settlements', *The British Journal for the History of Science*, vol. 48, 178, pp. 475–492.
- Wrigley, E. A. (2014), 'Urban Growth In Early Modern England: Food, Fuel and Transport', *Past and Present*, vol. 225, 1, pp. 79–112.
- Zalasiewicz, J. et al. (2010), 'The New World of the Anthropocene', *Environmental Science and Technology*, 44: 7, pp. 2228–223.

AUTHORS' BIOGRAPHY

Alexander Elliott is a PhD candidate at the University of Sussex in the Department of Social and Political Thought. He is also a graduate associate of the Centre for World Environmental History. His research interests include climate change, epistemology and the history of philosophy. He is currently writing a philosophy of solidarity.

James Cullis is an MPhil candidate at the University of Sussex, associated with the Centre for World Environmental History and the Centre for Intellectual History. His research deals with the way environmental and physical geographic concerns arose within Scottish Enlightenment accounts of societal progress.

Climate Change and the Humanities
Historical, Philosophical and Interdisciplinary
Approaches to the Contemporary Environmental Crisis
Elliott, A.; Cullis, J.; Damodaran, V. (Eds.)
2017, XII, 271 p., Hardcover
ISBN: 978-1-137-55123-8
A product of Palgrave Macmillan UK