State, Science and the Skies

Governmentalities of the British Atmosphere

Mark Whitehead

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For Anwen Mair Whitehead (born 12th November 2008)

Contents

Figures and Tables

FIGURES

TABLES

Series Editors' Preface

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RGS-IBG Book Series Editors

Preface

My interest in atmospheric government was kindled in 2003 when I came across the British government's *Air Quality Archive*. The *Air Quality Archive* is partly overseen by the Department for the Environment, Food and Rural Affairs (Defra) and provides an online, real-time record of air pollution for urban and rural Britain. Three things in particular struck me about this fascinating fragment of cyberspace. First, was the very notion of an *archive* of the air. Throughout much of modern history, archives, of many different kinds, have provided key ordering devices for scientists and bureaucrats intent on recording different aspects of the natural and social worlds. Yet there was something incongruous about the notion of an air archive: juxtaposing as it does the rigid ordering technologies of the modern world with that most dynamic, fleeting and perpetually mobile of compounds. Was it an attempt to order an unorderable? The second aspect of this air archive was that it was based upon approximately four and half million readings of the air every year. I subsequently discovered that this plethora of atmospheric measurements was the product of thousands of sampling devices and stations that have been established throughout Britain since the early decades of the twentieth century. This phenomenal level of air surveillance appeared to me to mirror an interesting expression of what Michel Foucault has described as *analytical responsibility*. The untiring work that fed the archive seemed to reflect an analytical responsibility towards atmospheric affairs on the part of the British State. I was left wondering where this level of analytical responsibility had come from, and why it was seen as a duty of the State. Third, and finally, my discovery of this atmospheric archive left me wondering what the implications of such an activity could be for my own and others' atmospheric conduct. Until this point I had remained blissfully ignorant of such an extensive record of air pollution, but now I found my transcendental indifference towards daily fluctuations in air pollution levels shattered. I had

the power to know the quality of the air I would be breathing in different locations, and the precise composition of the chemical cocktails that it contained. I felt compelled to consider how my own actions were contributing to the mesmerising complexity of air pollution in Britain.

Soon after my discovery of this digital record of the air I began the slow, but always fascinating, study of this governmental archive. I soon realised that the tale behind this archive was a long one, stretching back over 150 years. I also discovered that this was a story that involved the mixing of science and government throughout a variety of geographical locations in Britain. The research required to develop this story has taken me to the municipal records of large urban corporations such as London, Birmingham and Glasgow; the archives of a range of national government departments including the Meteorological Office, Department of Scientific and Industrial Research; the Department of the Environment; and the records of various scientific laboratories. This research project also involved studying the personal records of coal officers, nuisance inspectors, inventors, medical officers, doctors, police officers and smoke abatement societies, who had all assiduously contributed to the formation of a record of British air pollution.

Three intellectual traditions have consistently helped me to interpret the varied and voluminous nature of available archival material on the relationship between science, government and air pollution in Britain. First, the writings of Michel Foucault on the history of government, and the relationships between government and personal forms of conduct, have provided a rich methodological and theoretical terrain for my work. Second, the collective writings of scholars analysing different aspects of the sociology of scientific knowledge (including Vladimir Jankovic, Bruno Latour and Steven Shapin) have enabled me to understand better the connections between the State and science. Third, and finally, I have been strongly influenced by the work of contemporary geographers (including Stuart Elden, Matthew Hannah and Simon Naylor) who have exposed the critical role of space, as well as history, in shaping the construction of various forms of socio-environmental knowledge. Collectively these interconnected intellectual traditions have enabled me to understand how and why the production of atmospheric knowledge occurs at the creative intersection between government, science and space.

The story that follows will, I think, be of interest to scholars working in geography, the history of science, science and technology studies, the political sciences, and Foucault studies. I also hope that this book will have relevance for all those concerned with the political and scientific processes that shape what we know about the changing contents of the atmosphere and structure our varied relationships with the air.

Acknowledgements

During the completion of this research I have become indebted to the help of various individuals and institutions. I would like to acknowledge the support of the Department of Geography at University College London, and in particular Richard Munton, who kindly provided office space and valuable advice during the completion of early archival research. I would also like to thank the University of Wales, Aberystwyth Research Fund, which provided financial support for my research activities. I am also indebted to staff at the Statistical Division of the Department for the Environment, Food and Rural Affairs, and the Carbon Trust, who gave up their time to speak with me about atmospheric government. I would also like to thank Richard and Stephanie Rugg and Tim and Carol Cresswell for providing me with regular overnight accommodation and wonderful hospitality during my numerous trips to London. Thanks also go to Mark Goodwin and Ann Barlow for the use of their spare room on my trips to the Meteorological Office Archives in Exeter, and Jon Oldfield for facilitating a very useful research trip to Glasgow. Finally, I would like to thank the tireless efforts of staff working at Birmingham City Archives, the British Library (London), London Metropolitan Archives (Farringdon), the Meteorological Office Archives (Exeter), the Mitchell Library (Glasgow), the National Archives (Kew), the National Library of Wales (Aberystwyth), and the Royal Society Library (London), in supporting my efforts to track down the material upon which this volume is based.

Beyond the research that has supported this project, I have also been very fortunate to receive a wide range of help in the writing of this volume. I am indebted to the Arts and Humanities Research Council (Grant number AH/F003056/1) for funding the period of research leave during which large portions of this book have been written. Sections of this volume were written in a wide range of different locations. I would thus like to acknowledge

the supportive and creative environments for writing provided by the Centre for Alternative Technology (Gwynedd), The City Institute (York University, Toronto), Mary Immaculate College (Limerick), the Combined Universities of Cornwall (Penryn) and the National Library of Wales. The majority of this volume has, however, been written in two locations: in my home village of Cnwch Coch, overlooking the hills of the Magwr Valley; and in my office in the Institute of Geography and Earth Sciences (IGES, Aberystwyth University). To this end I would like to thank, respectively, my wife Sarah, and colleagues in IGES for making both locations such happy places to think and work. This book has also benefited from enormous levels of intellectual support, advice and guidance. I would like to particularly thank Simon Naylor for his consistent interest in my atmospheric work and for our late night discussions of all things geographical. My appreciation also goes out to Rhys Jones for our daily discussions on state theory and writing *inter alia*; Gareth Hoskins for his advice on museum studies and the political nature of exhibition space; Peter Merriman for his valuable guidance on archival research; and Matthew Hannah for some wonderful insights into the work of Michel Foucault. The comments offered by seminar audiences at the Geography Division of the Open University; Department of Geography at the University of Exeter; and the University of Exeter in Cornwall have also been enormously helpful in the completion of this book. I am especially indebted to contributors to the special conference sessions 'Spatial Technologies/Technological Spaces' and 'Atmospheric Geographies' convened at the Annual International Conferences of the Royal Geographical Society (with the Institute of British Geographers) in 2005 and 2007, respectively. The following people have also provided valuable insights and advice: Anna Bullen; Luke Desforges; Deborah Dixon; Kate Edwards; Ian Gulley; Roger Keil; Vladimir Jankovic; Martin Jones; Kelvin Mason; Robert Mayhew; Richard Noakes; Carol Richards; James Ryan; Heidi Scott; Ruth Stevenson; Marc Welsh; Mike Woods; and Sophie Wynne-Jones. Finally I would like to acknowledge members of the Editorial Board of the RGS-IBG Book Series and three anonymous reviewers for their comments on the manuscript; Kevin Ward for his great enthusiasm and support for this project; and Jacqueline Scott for her valued advice during the final production stages of this manuscript.

Abbreviations

ACAP	Advisory Committee on Atmospheric Pollution [Meteorological Office]
ADMN	Acid Deposition Monitoring Network
AURN	Automated Urban and Rural Network
AUN	Automated Urban Network
B.Cit.Arch	Birmingham City Archives
CEH	Centre for Ecology and Hydrology
CIAP	Committee for the Investigation of Atmospheric Pollution
CUEP	Central Unit on Environmental Pollution
Defra	Department for the Environment, Food and Rural Affairs
DoE	Department of the Environment
DSIR	Department of Scientific and Industrial Research
ECDIN	European Chemical Data Information Network
ECEP	European Community Environment Programme
EMPACT	Environmental Monitoring for Public Access and Community Tracking (EPA, USA)
G.Cit.Arch	Glasgow City Archives
HC.PP	House of Commons Parliamentary Papers
ICAPR	Interdepartmental Committee on Air Pollution Research
IPCC	Intergovernmental Panel on Climate Change
IRPTC	International Register of Potentially Toxic Chemicals
L.Met.Arch	London Metropolitan Archives
LRTAP	Convention on Long-Range Transboundary Air Pollution (Europe)
M.Off.Arch	Meteorological Office Archives
NAEI	National Atmospheric Emissions Inventory
NAPS	National Air Pollution Survey
NEGTP	National Expert Group on Transboundary Pollution

NERC	Natural Environment Research Council
NETCEN	National Environmental Technology Centre
N-MVOC	Non-Methane Volatile Organic Compounds
OUP	Ozone Umbrella Programme
OECD	Organisation for Economic Cooperation and Development
RCEP	Royal Commission on Environmental Pollution
RGAR	Review Group on Acid Rain
SCCB	Standing Conference of Cooperating Bodies
SDMN	Sulphur Dioxide Monitoring Network
SSK	Sociology of Scientific Knowledge
TNA	The National Archives (Kew, London)
UKNFC	UK National Focal Centre for Critical Loads Modelling and Mapping
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
VOC	Volatile Organic Compounds
WSL	Warren Spring Laboratory

Chapter One

Introduction: Space, History and the Governing of Air Pollution

On 700 Years of Air Government

It is the year 1307 in medieval London. Rumours are abound that one denizen of the fledgling metropolis has been subjected to a gruesome penalty for perpetrating the most novel of crimes. This unnamed individual, it was claimed, had broken the recent Royal Proclamation banning the burning of sea-coal in the city. The punishment meted out to this early atmospheric felon, or so the tale goes, was torture, hanging and ultimate decapitation![1] While it seems unlikely that such a punishment was ever actually carried out,[2] it was perhaps the nature of the crime, as much as the extreme form of the purported penalty, which would have concerned the fourteenth-century urban dweller. Before the Royal Proclamation of 1306 the idea that polluting the air could be deemed a criminal offence was simply inconceivable. The age of British atmospheric government had begun.

It is the year 2007 in post-industrial Britain. According to latest government figures, over four million readings have been made of the British atmosphere this year from a network of over 1500 government-sponsored air pollution monitoring stations.[3] This never-ending process of 24-hour air surveillance has recorded the varying concentrations of a heady chemical concoction of pollutants including ammonia, sulphur dioxide, trace metals, oxides of nitrogen, organic micro pollutants, particulate matter and various hydrocarbons *inter alia*. Only a small fraction of the incomprehensible volume of atmospheric knowledge produced by the British government in 2007 will be used to support the prosecution of air polluters. None has been utilised as a basis for summary execution!

This book explores the history of contemporary systems of air pollution government in Britain. To this end it is, in part at least, interested in what has been happening in British atmospheric government between 1307 and 2007.

It is clear that this conveniently demarcated historical epoch has been characterised by some profound changes in the ways that political authorities organise the governance of air pollution. It is also evident that a detailed study spanning such a long historical reach would be beyond the scope of a single volume. Consequently, while broadly positioned within this 700-year era, analysis is primarily concerned with the systems of air pollution government that have emerged in Britain since 1843. The year 1843 is significant in the history of British air pollution government for two primary reasons. First, it was in this year that the Parliamentary *Select Committee on Smoke Prevention* was established in order to discuss the ensuing problems of atmospheric pollution in industrial Britain.[4] Second, and as part of the operation of this Committee, 1843 witnessed the first systematic attempt made by the British government to forge close working relations with scientists in the crusade against the contamination of the air. More will be said of the 1843 Select Committee in Chapter Two, but at this point it is important to see this Committee as a crucial historical moment in the emergence of the knowledge-intensive and scientifically grounded systems of air pollution government that are now commonplace in Britain. It was the beginning of what this volume refers to as a system of atmospheric *government with science*.

The notion of atmospheric pollution is a complex and ever-changing category of analysis that has, at different times, incorporated germs, disease, dust, pollen, grit, smoke, fog, soot, sulphur dioxide, lead, radioactive materials, pesticides, chlorofluorocarbons, carbon dioxide and other visible and invisible substances (see DuPuis, 2004: 1–11). As Thorsheim observes, however, the processes that transform these various substances into pollution occur at the complex intersection between culture and nature (2006: 155; see also Douglas, 1966). Atmospheric pollution involves more than anthropogenic or environmentally produced contaminates simply entering the air. In order to become pollution, contaminates have to work with the pressure dynamics, weather patterns, thermodynamic systems and chemical exchange functions of the atmosphere, and produce culturally, biologically and politically unacceptable/intolerable air conditions. It is for these reasons that analysis will engage with the activities of meteorologists, climatologists, ecologists, chemists, medical experts, civic activists and policymakers who collectively constitute the hybrid science that frames air pollution government in Britain.

Unpacking the Politics of Air Pollution Science and Government

In many ways concern over the axis between atmospheric knowledge and systems of air government has never seemed more important. As I wrote

this book global media coverage of the quality of one city's air, and the systems of atmospheric government that are being deployed to combat associated forms of air pollution, have become almost obsessive. In August 2008 Beijing hosted the 29th Olympic Games, but alongside debates around human rights it is miniscule airborne particles (or particulate matter) that caught all of the headlines. These tiny particles were an object of concern for a phalanx of scientists and bureaucrats incorporating the International Olympic Committee, the Chinese government, the World Health Organization, the Beijing Municipal Environmental Protection Bureau and even the World Bank. Beyond the atmospheric hysteria that engulfed Beijing, there are three fundamental issues associated with the city's air quality debate that have direct relevance for the objectives of this volume. First, how and where is the quality of the air measured? Second, on what basis are standards for socially and ecological permissible levels of air pollution determined? Third, how can persistent forms of air pollution be effectively governed? The first question, concerning the scientific practices and locations of air pollution monitoring, was of particular significance in Beijing. In the build-up to the Olympic Games the regular air pollution readings taken by the Beijing Municipal Environmental Protection Bureau were joined by a host of other formal and informal monitoring devices operated by media outlets, international organisations and concerned athletes.[5] With so many different measurement devices, operating in so many different locations, and at various times of day, it was little surprise that there was so much uncertainty concerning the actual levels of air pollution in the city. In terms of setting permissible thresholds for pollution, the World Health Organisation recommended that levels of atmospheric particulates should not exceed 50 micrograms/cubic metre (World Health Organization, 2005).[6] Estimates of particulate air pollution in Beijing, made in the months before the Games, suggested that levels were in excess of 130 micrograms/cubic metre.[7] While providing useful governmental targets for air pollution abatement, as we move through this volume we will see that such thresholds of permissible atmospheric pollution are not always reliable predictors of the potential health (or environmental impacts) of pollution, and are themselves subject to much scientific deliberation. Perhaps the most significant implication of the events in Beijing for this study is the style of governmental intervention that has emerged in response to the identification of harmful air pollution levels. In answer to the air pollution problems of the city the Chinese government took the rather unusual step of closing down polluting factories and plants and, in the event of particularly severe air pollution incidents, removing up to 90% of the traffic from Beijing's roads (see Bristow, 2008).

There are important parallels between the science and government of air pollution in Beijing and the current situation in Britain. While it is important

to acknowledge that the levels of air pollution in Britain, and the associated threats posed to the environmental health of its citizens, are not as severe as the current situation in Beijing, air pollution remains a significant governmental issue. Severe air pollution events such as the London smog of 1991 (when nitrogen dioxide concentrations reached their highest recorded levels in Britain) were associated with a 10% increase in the death rate in and around the metropolis (Brown, 1994). A recent report by the Royal Commission on Environmental Pollution estimates that air pollution is, on average, responsible for 24,000 premature deaths in Britain each year, and claimed that the British State had been unsuccessful in addressing increasing levels of chemical pollutants in the atmosphere (Royal Commission on Environmental Pollution, 2007: 35–40).[8] The report also revealed that in 2005 the costs of air pollution to the British economy (in relation to the provision of medical care and lost working hours) were in excess of £9.1 billion (ibid.: 35).[9] As with the situation in China, there remains significant debate in Britain concerning what permissible levels of pollution are, how air pollution should be measured, and the role the government should take on issues of atmospheric pollution. Despite these parallels, however, a clear distinction does exist between the control and monitoring of air pollution in Britain and China: namely the styles of government deployed to address socioeconomic relations with the atmosphere. While China has been able to deploy relatively authoritarian systems of air pollution control in the short term, Britain has witnessed the emergence of very different strategies of air government that reflect a more liberal political tradition. The particular systems of atmospheric government deployed within liberal (and neo-liberal) societies, and the specific mixing of air and social power they involve, constitute a key object of enquiry within this volume.

Conceptual Parameters: Spatial Histories and Atmospheric Geographies

The development of an historical perspective on the government of air pollution in Britain is important because it helps to reveal the contingent political decisions and scientific struggles that have contributed to the establishment of a contemporary apparatus of atmospheric knowledge gathering. History, in this context, helps to assert that what we know about air pollution, and the ways in which atmosphere are governed, are not inevitable parts of closed systems of air science and government, but are legitimate objects of political contestation and potential transformation. Yet the historical perspective developed through this volume does not only seek to position air pollution government in relation to the ways it has changed and evolved through time, but also explores the material conditions under which

it has even been possible to conceive of knowing and governing something as large and complex as the atmosphere. In this context, this volume presents a spatial history of air pollution government (see Elden, 2001; Rose, 2007). The notion of spatial history is utilised to reveal that not only have the axes connecting British atmospheric knowledge and government changed over time, but that geography has played a crucial role in the constitution of air government and in shaping the production of atmospheric knowledge. This is an account of history within which space is neither 'static', nor merely a 'cross-section through time': it is rather a '[s]phere in which distinct stories coexist, meet up, affect each other, come into conflict or cooperate' (Massey, 1999: 274). Two conceptual frameworks support the spatial history developed in this volume. The first is the history of governmental reason (or *governmentality*) developed by the French philosopher Michel Foucault (see 2007 [2004]; see also Dean, 1999). Foucault's governmental histories are important because they focus explicitly on the connections between knowledge and power within liberal societies, while revealing the historical specificities of governmental modes of rationality. The second conceptual framework that informs this project is a programme of research that is known collectively as the *Sociology of Scientific Knowledge* (see Shapin, 1995). This broad body of scholarship incorporates work within the history of science and science and technology studies, and collectively draws attention to the conditions under which scientific knowledge is produced and the processes in and through which such knowledge forms circulate. While more will be said of the connections and tension between these two intellectual traditions in Chapter 2, I contend that both provide crucial contexts for the development of an integrated spatial history of air science and government pursued within this volume.

While focusing specifically on the spatial and historical dynamics of air pollution government in Britain, this volume is also indebted to a much broader intellectual re-engagement with atmospheric questions within the discipline of geography. The commitment of the geographical discipline to the development of holistic scientific perspectives on the earth's environmental systems has meant it has had a long dedication to the study of the atmosphere as a complex socio-environmental system. It is in this context that geography has long provided a supportive home to climatologists, meteorologists and atmospheric scientists of various kinds. In recent years, however, there has been a distinct increase in work by so-called 'human geographers' addressing various aspects of atmospheric study. These new atmospheric pioneers are utilising the perspectives provided by anthropology, economics, the social sciences and history in order to develop new analytical perspectives on the air. Recent work by geographers has consequently explored the economic commodification of the atmosphere (Randalls & Thorne, 2007); the historical geographies of meteorological

knowledge production (Naylor, 2006); the associations between art and the representation of air pollution (Thornes, forthcoming); and the complex relationships that exist between the climate and human history (Endfield, 2007, 2008). Crucially, and in keeping within the intentions of this volume, the development of these new atmospheric geographies has not been based upon an antagonistic relationship with the physical sciences of the atmosphere (or the establishment of an aerial front, if you like, in the science wars), but on creative dialogues and new research partnerships between human and physical geographers.[10] Through a consideration of the spatial governance of air pollution, this volume hopes to contribute to this synthetic science of atmospheric study: a scientific project that embodies the integrative ethos of the geographical discipline as a whole (see Massey, 1999).

Timeframes and Conceptual Enclosures: On the Structure of the Book

Although the issues of air pollution government, science and knowledge production weave their way throughout the different chapters of this volume, the book has been structured in order to facilitate detailed considerations of both different historical time periods and key conceptual questions. The organisation of this book has thus been deliberately designed in order to make the volume both comprehensive (in terms of the preservation of an historical narrative on modern systems of air pollution government in Britain) and comprehensible (in relation to the ways in which individual chapters conceptually interpret key themes in the history of British air government). What results is a series of chapters that simultaneously contribute to an overall historical infrastructure – revealing the development of air pollution science and government – while also facilitating a more detailed conceptual analysis of the key issues that have characterised modern atmospheric government in one State. It is in this context that the empirical chapters of this volume constitute interlocking, but not sequential, histories of air pollution government and science. To a certain extent the way in which any book is divided is an arbitrary exercise of ordering on behalf of the author. However, in order to be consistent with the historical methodology I establish within this volume, I have attempted to ensure that, while different chapters facilitate certain forms of conceptual focus and analysis, they reflect evolving historical processes of atmospheric government as opposed to an adaptation of history to suit preconceived theoretical concerns.

Chapter Two begins the historical narrative that structures this whole volume by reflecting on the 1843 Parliamentary Select Committee on Smoke Prevention. The majority of this chapter is, however, devoted to

charting the key conceptual concerns of this volume. It outlines the key conceptual and methodological contours of Michel Foucault's history of government and work within the sociology of scientific knowledge, while explaining the value of combining the insights of these two intellectual traditions within the study of air pollution science and government. Chapter Three constitutes the first main empirical chapter of this volume. It explores the origins of modern forms of air pollution government within various urban nuisance prevention and sanitary authorities and focuses on the particular challenges facing the creation of an optical regime of air science and government. Chapter Four moves on to consider the role of clean air exhibitions and associated educational initiatives in enabling emerging systems of scientific knowledge concerning the production and extent of air pollution to become referential contexts for personal systems of atmospheric reform and self-government. In the wake of the first International Smoke Abatement Conference, which was held in London in 1912, Chapter Five considers a series of attempts that were made to form the first instrument-based studies of British air pollution. Focusing on the innovative work of key scientists, such as John Switzer Owens and Sir Napier Shaw, and the Committee for the Investigation of Atmospheric Pollution, this chapter analyses the role of technological devices in the constitution of networks of government and scientific networks, and the impacts of the demands for governmental knowledge on the design and implementation of instrumental sciences of air pollution.

Building on the account of early, but highly fragmented, networks of air monitoring instruments, Chapter Six describes the process in and through which a national system of air surveillance was gradually instituted in Britain. Focusing on the development and implementation of the National Air Pollution Survey (that ran from 1961to 1971) this chapter considers the role of spatial calibration in ordering the study and government of the atmosphere. Chapter Seven describes how the emergence of automated and digital systems of air pollution monitoring transformed atmospheric knowledge production and government during the 1970s and 1980s in Britain. Drawing on notions of telemetric territoriality and digital beings, this chapter explores the impacts of real-time and online atmospheric knowledge systems, and associate simulations of air pollution, on contemporary practices of atmospheric government. In Chapter Eight attention is given to the impacts that new systems of environmental thought and ecological science have had upon the constitution of British air pollution government. Critically questioning the extent to which air pollution government has moved from a concern with human health to an ecological rationality of atmospheric government, it outlines the application of ecologically inspired techniques of pollution analysis throughout different locations in Britain. The concluding chapter provides a review of the key analytical themes that run through the

constituent chapters of this volume. In addition to reflecting on key themes, however, Chapter Nine also considers the lessons that a spatial history of air pollution government with science in Britain can provide for the systems of air government that are emerging in response to contemporary forms of climate change and associated atmospheric threats.

In his foreword to the National Smoke Abatement Society's *Smoke Abatement Exhibition Handbook and Guide* of 1936, the then British Minister for Health, Sir Kingsley Wood MP reflected,

> Provision is being made more and more to secure pure water, pure milk, and pure food. But every day we breathe a quantity of air much greater in weight than the quantity of food and drink which we consume (National Smoke Abatement Society, 1936: i).

It is clear that there is no more important, immediate or ongoing challenge to the efficacy of government than the ability to know and regulate the constituents of the air we breathe. The remainder of this volume explores the spatial narratives and entangled scientific endeavours that constitute one State's quest to address this challenge.

Chapter Two

Historical Geographies of Science and Government: Exploring the Apparatus of Atmospheric Knowledge Acquisition

'Men of Science' and the Genesis of British Atmospheric Government

In 1843 the Reverend J.E.N. Molesworth, Vicar of Rochdale and Chair of the *Manchester Association for the Prevention of Smoke*, submitted a petition to Parliament in which he called for a governmental enquiry into the smoke pollution issue (see Ashby & Anderson, 1981: 7). Molesworth's advocacy of smoke abatement, at both a national and municipal level, was marked by a dual belief system. At one level, his commitment to the cause of air pollution control was a moral crusade of social care that was clearly conditioned by his religious beliefs (Mosley, 2001: 119). It was, however, also based upon a firm commitment to the crucial role that 'men of science' would play in solving the smoke problem.[1] Molesworth's petition led to the formation, later that year, of a Parliamentary *Select Committee on Smoke Prevention* with W.A. Mackinnon MP (Molesworth's brother-in-law) as Chair.[2] Although the 1843 Select Committee was neither the first, nor the last, Parliamentary committee to be convened to discuss matters of air pollution, it is significant for two reasons. First, this Committee reflects the culmination of a long and arduous Parliamentary struggle to establish air pollution as a legitimate area of governmental responsibility.[3] Second, as the *Report of the Select Committee* indicates, it sought to unite government officials and men of science in its quest for cleaner air,

> In their endeavours to investigate the subject, Your Committee have deemed it expedient to call before them a variety of persons. They have received the evidence of the most eminent men in the science of Chemistry, of Practical Engineers of high reputation, of leading Master Manufacturers and Proprietors

> of Steam-engines, and of ingenious persons who have devised means and taken out Patents for the Prevention of Smoke.[4]

While the presence of scientific experts on a government committee may appear routine in the context of contemporary relationships between British government and science, it is important to point out the unusual nature of this union of the State and science. While the State had supported a limited number of, so-called, scientific institutions for some time (notably the Royal Observatory at Greenwich, since 1675, and the Geological Survey) prior to the nineteenth century, Rose and Rose describe a 'continuous governmental indifference to science' in Britain (1971: 17–21). In addition to the perceived threat of science to governmental power, this indifference was based upon uncertainty concerning the political and economic value of science. Furthermore, scientists of eighteenth- and early-nineteenth-century Britain struggled to gain recognised professional accreditation and a foothold in the university system (ibid.). It is against this backdrop that the Parliamentary turn to science in the fight against air pollution was so significant.

It is not that the 1843 Parliamentary Select Committee marked the beginning of British governmental concern or action towards matters of air pollution. Following the issuing of the Royal Proclamation banning the burning of sea-coal in 1306 (and the subsequent sovereign actions of King Richard III and Henry V to control air pollution) a series of local initiatives emerged in Britain to regulate the quality of the air. Concerns over the localised odours and smells that were generated from tanneries, brewers, butchers and poor drainage and sanitation systems (what Mieck (1990) collectively refers to as incidences of *pollution artisanale*) were addressed and resolved through the courts leet systems (see Brimblecombe, 2004: 16). Established through Royal Franchise, courts leet were responsible for prosecuting small offences in locally designated territories.[5] Beyond such local legalistic systems of air government there was little resembling the development of a comprehensive governmental strategy for air pollution government before the nineteenth century. Perhaps the nearest Britain came to a national system or air pollution government in the pre-industrial era occurred in the wake of the publication of John Evelyn's 1661 *Fumifugium; or the inconvenience of the aer and smoak of London dissipated*.[6] Evelyn's famous account of air pollution infesting the Royal Palace of Whitehall, and in so doing threatening the health of the monarch and disrupting a crucial seat of government, is a powerful metaphor for the political entanglements between air pollution and the British State that occupies this volume.[7] It was Evelyn's comprehensive vision for tackling the problems of air pollution, and improving the qualities of the metropolis' air, that won him favour with King Charles II and led to him being invited to submit a Bill addressing the air pollution in London to Parliament (Brimblecombe, 1987: 50).[8] For reasons that