**The Architecture of Survival**

Planning the Future of Cities in the Shadow of Air War, Britain 1935-1952

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**Abstract**

The development of air power had a profound impact on perceptions of cities. Recast as targets for bombs, cities and urban infrastructure networks came to be interpreted through their vulnerability. This thesis investigates the impact of war, and the expectation of imminent aerial war, on the built environment in Britain, focussing on the period from 1935 to 1952. An investigation of how war and the expectation of future war influenced the development of cities and infrastructure, crucial aspects of modern industrialised societies, offers a novel way to discuss the broader consequences of war. This thesis challenges the argument that war has been a motor of peaceful change outside of wartime, instead highlighting the erosion of the thresholds between peace and war and the concomitant militarisation of society through an analysis of the transformation of cities into targets, and thus civilians into quasi-combatants.

This study focusses on government planning for the future of cities, drawing primarily on government archival material, and contextualises this within debates occurring simultaneously in specialist architectural and planning publications. The use of source material from national and local government alongside that of architects and town planners working outside the government is a reflection of the importance of the interactions between different groups of planners and officials concerned with cities. A crucial question for this study is how the real planning carried out by government policy makers was connected to the more discursive imagined planning articulated in architectural journals. The interaction between imagined and concrete plans is considered alongside real and imagined air attacks. This thesis argues that by planning air raids into the future of cities air war was removed from its immediate political context and cast as an inevitable feature of the modern world, and the modern conception of war.

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**Abbreviations**

AA: Architectural Association

APRR: Association for Planning and Regional Reconstruction

ARP: Air Raid Precautions

CEB: Central Electricity Board

CIAM: *Congrès Internationaux d’Architecture Moderne*

CID: Committee of Imperial Defence

IWML: Imperial War Museum London Archives

LCC: London County Council

LMA: London Metropolitan Archives

LPTB: London Passenger Transport Board

MARS: Modern Architectural Research Group

PEP: Political and Economic Planning

RIBA: Royal Institute of British Architects

RIBAA: Royal Institute of British Architects Archives at the Victoria and Albert Museum

SCAS: Southampton City Archives Service

SPRRD: School for Planning Research and Regional Development

TNA: The National Archives

TVA: Tennessee Valley Authority

UEAA: University of East Anglia Archives

UNESCO: United Nations Educational, Scientific and Cultural Organisation

**Introduction**

‘The days when war was an interval between periods of peace – even the days when peace was the interval between wars – have gone.’[[1]](#footnote-1)

(J.M. Richards, 1941)

By the summer of 1941 the old concepts of peace and war had been surpassed by the realisation of a nightmare, and the fulfilment of a policy. Before 1940, the technology of air power and the strategies of air war had fixed bombers permanently on the horizon, from where war threatened to break at any moment. The pregnant skies of the years between the wars were populated by bombers first in the imagination and then in reality. In 1938 Lewis Mumford had described the imminent war as ‘a mere bursting of a vast pus-bag of vulgar pretense and power’. The period before had not been one of ‘peace’, he wrote, but was ‘equally a state of war: the passive war of war-propaganda, war-indoctrination, war-rehearsal’. In these conditions, ‘periodic preparation for defense against an attack by air’ represented ‘the materialization of a skilfully evoked nightmare’. It was through these rehearsals, carried out extensively in literature before they were in practice, that ‘the dweller in Megalopolis dies, by anticipation, a thousand deaths’. It was by the imagination of, and then planning for, the disaster that air raids would bring, that the fear of bombing was ‘fixed into routine’ before 1939.[[2]](#footnote-2) Mumford, foreshadowing J.M. Richards’s remarks in 1941, argued that war and the fear of war had infiltrated peacetime to such an extent that the notion of a distinct temporal period of conflict was outdated. Old ideas of peace and war had been displaced by new technologies, but crucially, also by the theories of war which developed in dialogue with the new weapons. This thesis investigates the impact of war, and the expectation of imminent air war, on the built environment. As new methods and technologies of war were trained on cities and civilians, so they were transformed both in imagination and in reality.

The effect of the Second World War on twentieth century Britain has been widely discussed in a historiography dominated by analyses of social and political changes, and historians have often asked the question, ‘what difference did the war make?’[[3]](#footnote-3) Prominent themes have been consensus politics, the creation of the welfare state, gender, citizenship and identity, the experience and memory of war, social change and youth culture, and empire and foreign policy.[[4]](#footnote-4) Such social and cultural histories have highlighted how war affected people’s lives and pointed out the role war has played in ‘furthering social change’ in Britain.[[5]](#footnote-5) But, as David Edgerton has argued, the image cast by ‘British social democratic historians’ of the Second World War as ‘a powerful motor of peaceful constitutional progress’ is a problematic one.[[6]](#footnote-6) A focus on how war and the expectation of future war impacted upon the built environment, a crucial part of modern urbanised industrial societies, offers a novel way to discuss the broader consequences of war.[[7]](#footnote-7) This study analyses the impact of war on perceptions of cities and the future in order to ask how air power and modern war contributed to the dissolution of the boundaries between civilian and military. This thesis, therefore, follows Edgerton’s critique of the idea that British government planning and policy after 1945 was dominated by welfare, and builds on Jean-Louis Cohen’s work on architecture and war.[[8]](#footnote-8)

Mary Dudziak has recently highlighted the importance of the concept of ‘wartime’ when attempting to understand war and its impact on societies: it offers the temporal parentheses that delimit war and justify its privations.[[9]](#footnote-9) Dudziak’s legal history echoes the anxious expectations of Mumford and the *Review*. War in the twentieth century had become global and was no longer contained to distinct periods. As Elizabeth Bowen wrote, it ‘ran off the edges of maps; it was uncontainable’.[[10]](#footnote-10) Air power and the expectation of air raids made war a permanent threat and focused military power against civilian populations. This thesis discusses the erosion of the thresholds between peace and war and the concomitant militarisation of society through an analysis of the transformation of cities into targets, and thus civilians into quasi-combatants.

The two essential elements in this ‘new world’ of uncontained war were the development of bombing air forces and the recasting of cities as the primary targets in a battle against a nation’s war economy and civilian morale. The conversion of cities into targets for air raids became a dominant element in military thinking after 1918.[[11]](#footnote-11) As airpower made sudden attacks on far-away cities more and more possible, it is wrong to say that it necessarily made them more and more likely, or even inevitable. In order to challenge the designation of cities as targets for bombs, this thesis analyses the influence of air power and the expectation of aerial attacks on the way the British government imagined and planned cities, before, during and after the Second World War.

By examining discourses of aerial war in planning, this thesis will tackle the themes of the militarisation of society, the identification of civilian and urban areas as targets for bombs, and the obscurating of the agency behind political decisions about war. Thus it sharpens our understanding of the nature of the impact of the experience and imagination of war on the British government and refines our understanding of warfare in the twentieth century, which goes beyond the problematic category of ‘total war’ and deepens Edgerton’s argument about the British ‘warfare state’.[[12]](#footnote-12) It extends the analysis of the ‘warfare state’ to the civilian space of cities, and highlights the militarisation of urban areas in governmental thought and planning. Throughout the thesis, militarisation will be discussed under a rubric of the collapse of some of the boundaries between civilian and military science. More precisely, it asks to what extent military and civilian planning for the future of cities can be seen as distinct and independent from one another.

Planning attempts to come to terms with an uncertain future, or as Michel Foucault wrote: ‘a good town plan takes into account precisely what might happen’.[[13]](#footnote-13) The uncertainty inherent in planning in a military context was remarked upon by Clausewitz in *On War*. He wrote, ‘the great uncertainty of all data in War is a peculiar difficulty, because all action must, to a certain extent, be carefully planned in a mere twilight’.[[14]](#footnote-14) In both of these examples, planning is carried out in a condition of unpredictability, which it aims to overcome by presenting visions of an imagined future. By discussing the imagination and planning of the future in cities and infrastructure, this thesis aims to highlight how the rationalities of the ‘warfare state’ were projected forward, and thus uncritically fixed into governmental thought. To do this, it analyses how planners attempted to deal with uncertainties and how planning as a discipline, but across disciplinary boundaries, requires an active obscuration of distinct historical and political contexts. As Kiran Patel has argued, it is important to take account of the significant continuities within government planning through the ‘many ruptures’ of the twentieth century.[[15]](#footnote-15) Patel’s assertion that the consistent expectations and modes of governmental planning that developed from the 1870s onwards in Germany suggests that belief in the importance of planning was, to a degree, insulated from political change.

This thesis seeks to identify the nature of the continuities and ruptures of planning across conventional political caesuras. The time period covered is from 1935 to 1952. London, as the capital and the most politically and culturally important city in Britain, is the focus of this study. Developments in London run throughout, but are supplemented by discussions of other cities and areas. In 1935 the Air Raid Precautions Department was set up in the Home Office, which represented both a significant increase in planning for aerial war and a shift towards domestic rather than imperial defence. During the Second World War fears of aerial war became reality, and the threat of air attacks continued into the early years of the Cold War, by which time nuclear weapons had entirely changed the destructive potential of air power. The successful explosion of a British nuclear device in 1952 represented the culmination of a long-standing policy of deterrence.[[16]](#footnote-16) In the intervening years, however, debates about protection from nuclear weapons reflected the anxiety and ambiguity provoked by air power. Shortly after Britain’s 1952 test, the United States exploded the first hydrogen bomb, which quickly undermined received knowledge about the scope of any future nuclear war.

A history of planning for the future of cities can analyse the ways in which the bombing of cities and civilians became embedded into British governmental thought and, to an extent, architectural and planning cultures – cultures which are necessarily concerned with picturing the shape of the world to come. This is not just a question for histories of war and violence, but has an impact upon notions of urbanity and the understanding of cities as sites of modernity and development, as places where the future will be made. The deliberate bombing of civilians was depoliticised and dehistoricised, removed from its political and historical contexts, in part, by its incorporation into everyday discussions about the future of cities. This study thus draws on Reinhart Koselleck’s argument that the separation of morality from politics ‘hides the decisive political question from the society’.[[17]](#footnote-17) The political question was whether societies consented to the suggestion that in modern war cities and civilians were to be the primary targets of air raids. By bringing air raids into urban planning, the morality of air war and the political decision to bomb cities, deliberately targeting civilians became lost. During the Second World War, bombing cities and their civilian inhabitants became not just acceptable, but routine. A focus on central government debates about the maintenance and provision of urban infrastructure and the development of cities, will illustrate how civilian infrastructure technologies were incorporated into war thinking and war preparations, and how this concealed the political agency behind war policies and strategies. The extraordinary nature of air raids against cities and civilians was obscured by its rendering onto the most ordinary material cultures of urban areas. As Donald MacKenzie has argued in his work on nuclear weapons guidance systems, it is necessary to highlight the social processes behind the creation of the ‘nuclear world’, in order to envisage ‘the possibility of intervening in them, of reshaping the world’.[[18]](#footnote-18)

This study demonstrates how urban planning was increasingly understood in terms of survival. It does this by approaching cities and infrastructure through an analysis of what is conceptualised as the architecture of survival. This formulation reflects the importance attached to survival in discussions about cities in this period and discusses militarisation in this context. It thus engages with questions about the utopian nature of planning, and draws on the argument by C. Wright Mills in 1958 that, as a consequence of the development of air power, what was previously understood as utopian came to be seen as merely the ‘condition of human survival’.[[19]](#footnote-19) Infrastructure technologies are of particular importance as they were the material networks of life in cities that served as symbols for broader concerns about how to survive future aerial war. The focus on the architecture of survival demonstrates how the expectations and experience of aerial warfare impacted upon the built environment, as cities were transformed into a physical manifestation of a dialectic of destruction and survival. An examination of urban infrastructure reveals processes of building the expectation of aerial warfare into cities across the period, while offering a novel way to address the question of how important the idea of vulnerability was within governmental thought. Conceptually, a discussion of the role of government planning in the process of building the Cold War in a real and material sense across a longer period of time, highlights the interactions between state infrastructure, town planning and the expert, and demonstrates a fundamental interdependence of culture and politics.

Intense speculation about the future was fuelled by rapid advances in technology in the early twentieth century and reactions against the social and material consequences of nineteenth century industrialisation in Britain. Modernisation and mechanisation were at once liberating, awe-inspiring and deeply troubling. These ambiguities were clearly articulated in responses to the development of air power. [[20]](#footnote-20) The years before the Second World War were a period during which the fear and expectation of a devastating future war was reiterated in a variety of media and contexts.[[21]](#footnote-21) The years following Hitler’s rise to power in Germany formed a period in British history rich with anxious predictions for the future, in which the imagined power of aerial war dominated the popular apocalyptic imaginings of H.G. Wells and his contemporaries.[[22]](#footnote-22) The key factor in these imaginations of war was the new significance of air power, which was reflected in the preoccupation in inter-war Europe with building bombing capacity.[[23]](#footnote-23) In these visions, air power and aerial war not only meant swift destruction with no hope of defence, but they specifically implied urban destruction and mass civilian deaths. The trenches of the First World War would be replaced by burning cities choked with poison gasses and whole populations wiped out in moments. Enthusiastic advocates of air power celebrated the end to the bloody stalemate of trench warfare, while some claimed the ‘democratisation’ of war.[[24]](#footnote-24) Stanley Baldwin warned in the House of Commons that ‘the bomber will always get through’ and writers and artists drew vivid images of cities destroyed from the sky.[[25]](#footnote-25)

Most experiments with aerial bombing after the First World War were conducted by European countries above their colonies as an efficient and almost indirect method of colonial policing.[[26]](#footnote-26) The destruction moved from the periphery to mainland Europe when the power of Hitler’s air force was seen at Guernica, in Spain.[[27]](#footnote-27) British official belief in the importance of air power contributed to popular anxiety about air raids in Britain, and the expectation that when war was declared, British cities would be attacked instantaneously. It was not until the ‘Blitz’ began in September 1940 that the fears of aerial bombing were realised in British cities. Aerial war became a reality for the British government and a part of the everyday lives of people in cities across the country.

The development of air war, contextualised within the history of twentieth-century warfare, presents questions about what war was in this period, thus requiring a historicisation of the term. Technology, and particularly air power, allowed warfare to become disconnected from the face-to-face interaction of earlier periods. The crucial element in air war was that the mere expectation of attacks had serious repercussions before any actual air raids occurred. In this sense, the development of air war historicises the Cold War, which, in Europe, was not waged through attacks on people’s minds, but attacks on people’s imaginations. It was an ‘imaginary war’ that gained its reality precisely for the discussions about its consequences.[[28]](#footnote-28) Cold War debates were foreshadowed by those about air power before 1940.

Methodological contributions formulated during the Cold War offer a valuable approach to an examination of cold warfare and its historical development, as they problematised the relationship between the nuclear arms race and images of fear and destruction in a way which is highly significant for the earlier development of air power. By discussing the historical development of the military strategies which placed cities beneath the bomber’s crosshairs, this study attempts the ‘deliberate *un*numbing’ that nuclear criticism proposed in the 1980s.[[29]](#footnote-29)

**Methodology**

Nuclear criticism, a mode of cultural criticism which, in Ken Ruthven’s words, ‘seeks to understand the ways in which the discovery and control of nuclear energy have been represented’, provides important conceptual insights for examining the Cold War, nuclear culture, and air power more broadly.[[30]](#footnote-30) A crucial insight from nuclear criticism is the rejection of what Ruthven described as the ‘dichotomising of “science” and “culture”’ and ‘the false polarisation of the real and the imagined’.[[31]](#footnote-31) In particular, this thesis seeks to make use of insights from Jacques Derrida and Paul Virilio to analyse the relevance of governmental responses to the questions of urban and infrastructural security posed by aerial warfare. In a special issue of *Diacritics* in 1984 that dealt with nuclear criticism, Derrida wrote that ‘no single instant, no atom of our life (of our relation to the world and to being) is not marked today, directly or indirectly’ by the Cold War.[[32]](#footnote-32) Derrida highlights the difficult questions of analysing the Cold War by considering it as consisting of two interdependent elements: the nuclear age, and nuclear war. For Derrida the nuclear age is real and the nuclear war a fable: ‘for the moment, a nuclear war has not taken place: one can only talk and write about it’.[[33]](#footnote-33) He cites the imperative of nuclear criticism as being to ‘distinguish between this “reality” of the nuclear age and the fiction of war’, and interpret the distinction. The ubiquitous reality of the nuclear age was constructed on the imagining of nuclear war, ‘an event of which one can only speak, an event whose advent remains an invention by men’.[[34]](#footnote-34) The invention of nuclear war had come to structure ‘the whole of human *socius* today’.[[35]](#footnote-35) The terrible balance of an imagined nuclear war and the very real prospect of a war which ‘leaves nothing left over, no remainder’ is at the heart of the problems of addressing the Cold War.[[36]](#footnote-36) By drawing on Derrida’s examination of the interdependence of imagined and actual war, this study extends a Cold War analysis to the broader historical development of air power, and the bombing of cities.

Paul Virilio, in a book published in the same year as Derrida’s essay, situates the spectre of total destruction within a history of the industrialised warfare of the twentieth century.[[37]](#footnote-37) Virilio analyses the development of technologies of war and technologies of cinema and photography to highlight the importance of representation and perception in warfare. Virilio begins with the First World War where, ‘On board an aeroplane, the camera’s peep-hole served as an indirect sighting device complementing those attached to the weapons of mass destruction. It thus prefigured a symptomatic shift in target-location and a growing derealization of military engagement.’[[38]](#footnote-38) Technologically-enabled changes in warfare in the twentieth century made fighting a war seem less real. When Virilio argues that ‘the doctrine and delirium of production have gradually replaced the doctrine of battlefield use’, it recalls E.P. Thompson’s argument in 1980 that the Cold War had passed ‘long ago, into a self-generating condition of Cold War-ism (exterminism), in which the originating drives, reactions and intentions are still at play, but within a general inertial condition’.[[39]](#footnote-39) The process of embedding this condition of inertia, predicated and structured by a perpetual war-dream played out in battles of perception and representation, is a key question for research on the Cold War. This thesis interrogates Thompson’s argument that government had ‘become so habituated to this mode that they know no other way to govern’ by examining the historical development of governmental thought in relation to vulnerability to, and planning for, a future aerial war in cities. [[40]](#footnote-40) Rather than being systematically applied throughout, these theoretical discussions will serve as the conceptual backdrop to the thesis, only brought into the analysis directly at certain key points. This study will thus attempt a critical conversation with the conceptualisations of Derrida and Virilio, using the insights of Thompson which went beyond these discursive analyses and centred agency and politics.

At the heart of the approach of this thesis is the necessity of going further than literary or critical theory, while not neglecting or denying the importance of theoretical contributions. In order to do this, it utilises the theoretical insights of nuclear criticism, which offer a crucial conceptualisation of the unreality and strangeness of imagined nuclear war, but avoids reiterating that unreality by collapsing the analysis into abstraction.[[41]](#footnote-41) As Christopher Norris argued, nuclear criticism at its best ‘offered a focus (albeit, at times, an oddly angled focus) for exposing the sheer illogicality of deterrence theory and alternative strategic doctrines’.[[42]](#footnote-42) But as Norris and Ruthven have both discussed in reflections on nuclear criticism, there is a danger that texts like Derrida’s risk ‘indulging a form of runaway doomsday paranoia which itself partakes of that pseudo-logic, that escalating language of crisis and terminal catastrophe whose effects they purport to analyse’.[[43]](#footnote-43) By considering the work of Derrida and Virilio alongside that by Thompson, this study acknowledges the limits of any purely theoretical approach.[[44]](#footnote-44)

The methodological basis for this thesis maintains that while analysing the impact of imaginary scenarios, the reality of the bombs and missiles should never be abstracted or obscured.[[45]](#footnote-45) The ‘warlike character’ of the Cold War should not be reduced to metaphor or be fixed to and read as concomitant to a mode of literary criticism, in this case, deconstruction.[[46]](#footnote-46) The idea of a culture of Cold War and specifically of nuclear annihilation as having penetrated the thoughts of government and the lives of ordinary people is a crucial component of this project and the growing field of research into the multifaceted impacts of the Cold War.[[47]](#footnote-47) The development of air power has been marked by the intersection of the real and the imagined destruction and survival, and it is how this has been projected onto visions of urban apocalypse and the future of cities that this thesis seeks to analyse. As Chris Otter has pointed out, it is a characteristic of cities that the material and immaterial appear at once opposed and intertwined.[[48]](#footnote-48)

Recent work by Peter Galison has emphasised how theoretical discussions about ‘de-centring’ in the post-war world risks obscuring the influence of real fear of aerial war on the development of urban regions, and industrial dispersion in the USA after the Second World War.[[49]](#footnote-49) Galison’s analysis offers an approach to the Cold War that recognises Derrida’s argument of the duality of the real nuclear age and the imagined nuclear war, and importantly sees infrastructure as central to how the nuclear age was embedded in everyday life. Galison argues that there was ‘a state of vigilance both proximately apocalyptic (at any moment the “all-out” cloud could come) and yet full of the banalities of everyday business’ in the USA. This thesis will build on Galison’s observation of how ‘an atomic imaginary’ was projected onto the ordinary and mundane material elements of urban environments.[[50]](#footnote-50)

A study of developments in Britain with this methodology illustrates how important the expectation of air war was in everyday governmental policy making. The centralised nature of the British political system meant that government control over planning was particularly strong. War, fear of war, and the demands of reconstruction increased central control. As such, this thesis draws predominantly on central government papers held at the National Archives in London, supplemented by local government material for short case studies. As well as government sources, this thesis draws on a range of writing by architects and planners in this period, particularly in professional journals, but also in personal papers of key figures and organisations.

The use of source material from national and local government alongside that of architects and town planners working outside the government is a reflection of the importance of the interactions between different groups of planners and officials concerned with cities. A crucial question for this study is how the real planning carried out by government policy makers was connected to the more discursive imagined planning articulated in architectural journals. This thesis does not attempt to establish direct causal links, though it does highlight specific examples of cooperation, but rather asks how both official and unofficial planners were influenced by the experience and expectation of war. It thus investigates the militarisation of architecture and town planning by analysing the pervasiveness and penetration of war-thinking amongst experts operating outside the government.

**Historiography**

This thesis is concerned with perceptions of cities, and as such it draws on architectural history. The most prominent approach in British architectural history, which became a distinct field of academic study around the middle of the twentieth century, has been largely concerned with aesthetics and style. [[51]](#footnote-51) The desire to situate architectural styles and features within their historical origins grew in the nineteenth century and, as Andrew Leach points out, should be considered as an element of the ‘nineteenth century’s larger cultural projects of knowing the world in its entirety […] and constructing taxonomies of all things’.[[52]](#footnote-52) Such approaches, together with those that deal with architecture biographically, geographically and typologically, rely on ‘a historical continuity that can be constructed as internal to architecture’.[[53]](#footnote-53) An additional approach, which has been associated with Foucault and discourse analysis, has addressed ‘the history of technique *within* architecture, and of architecture *as* a technique’.[[54]](#footnote-54) Such an approach regards architectural technique as a product of discourse and encourages architecture to be situated in social and political contexts. The twentieth century saw a flowering of architectural theory that sought to interrogate architecture through its intersections with other themes and disciplines, such as gender, language, consumption and many others.[[55]](#footnote-55)

When examining visions of the city in this period one must, therefore, acknowledge the importance of prominent architectural conceptions of urban planning and design, and situate them within their historical context. As Elizabeth Darling observes, writing about modernism in art and architecture in Britain has tended to discuss modernism in terms of an aesthetic style of blank concrete boxes. Darling argues for an approach that attempts to locate work and ideas historically, expanding ideas of modernism from a reductive classification of ‘style’, to discuss those works which ‘emerged from a desire to grapple with the phenomenon of modernity’.[[56]](#footnote-56) By contextualising architecture it is possible to discuss aesthetic style as part of a historical and political framework rather than as an isolated story within the history of architecture.

The historiography written in the last decades of the twentieth century was produced in the context of the later stages of the Cold War when the meanings of cities were influenced by the threat of nuclear attack and the legacy of post-war reconstruction. In Britain, most work concerning modernist architecture after 1945 focusses on its achievements and failures, the growth of suburbia, and the decline of the urban core.[[57]](#footnote-57) Much of the work on post-war cities is informed by the arguments of postmodernism that globalisation and the growth of communications technology have fractured the urban centre and rendered it dead space.[[58]](#footnote-58) This approach is reflected in texts that deal with anxiety and modernity in post-war architectural cultures.[[59]](#footnote-59) What has been discussed less frequently is the explicit role the Cold War had on how cities and regions developed, as well as the technologies that developed dialogically. The importance of highlighting the historical contexts of architectural style has been shown in the recent work on material cultures of the Cold War, which has illustrated the competing ideas of the future, while allowing material culture to address consumerism within the context of the politicised design of the Cold War period.[[60]](#footnote-60) As there was a shift in architectural discourse and practice that saw plans for large areas rather than individual buildings, the idea of place, and space, became increasingly influential.[[61]](#footnote-61) The extension of the architectural unit from a single building to a city plan is an important element in the shifting of the focus of technologies of power from the individual subject to population.[[62]](#footnote-62) Urban history has attempted to analyse the development of urbanisation to address questions about the nature and cultures of societies and structures.

Approaches to the city in history and political science have often referred back to the nineteenth century as the period during which an urban consciousness developed in Britain.[[63]](#footnote-63) The revival of interest in urban history since the 1990s has brought theoretically informed and inter-disciplinary approaches to the study of cities.[[64]](#footnote-64) The Victorian city has been the subject of much of this work by historians, with more recent periods neglected. Work by Patrick Joyce and Chris Otter (informed by governmentality approaches) on Victorian Britain, has analysed legislation and practices that aimed to rationalise, improve and sanitise the city.[[65]](#footnote-65) Joyce and Otter have highlighted the importance of self-government and technology in the nineteenth-century, particularly in processes of mapping and sanitising the city. The use of the technology of hygiene through toilets and sewers was central to how the habits of people were changed and self-government was instilled with notions of freedom.[[66]](#footnote-66) The concept of circulation in cities had been central in approaches to a hygienic city since the mid-nineteenth century. As Martin Daunton has argued, these ideas ‘implied a particular vision of urban life. Arteries should be kept free of blockages or the city – like an individual – would suffer apoplexy’.[[67]](#footnote-67)

Infrastructure networks were a crucial technology that ensured the required circulation for the health of a city and its population, and to enable government control over urban environments. Frank Trentmann and Vanessa Taylor have discussed the importance of infrastructure in the making and functioning of urban environments and the politics of everyday life through their work on water.[[68]](#footnote-68) Studies of infrastructure have, however, been underrepresented in urban history and understandings of what constitutes a city, especially for the period since the end of the First World War and, even more pronouncedly, for the period after 1945. The development of infrastructure networks was a vital, and contested, element in the process of government taking hold of cities and regulating the everyday lives of subjects. If, as Robert Millward writes, ‘the growth of the urban infrastructure was the most dynamic element in the British economy from the 1870s to the 1930s’, it is important to situate this in the context of planning for aerial war.[[69]](#footnote-69) In visions of the city under threat from aerial war, infrastructure planning represented a central element in building the architecture of survival of a city. The importance of networks of infrastructure only increased as decentralisation became a more important technique to build cities that could survive attack.

Infrastructure networks have been discussed in geographical and sociological studies of the period after the Second World War. Stephen Graham and Simon Marvin have analysed the dispersal of cities and the rise of networks of communication, transport and utilities in the second half of the twentieth century. [[70]](#footnote-70) Graham has argued that the increasing fortification of privatised space that operates by exclusion, which he links to discourses of the ‘war on terror’, is related to private network cultures.[[71]](#footnote-71) This thesis aims to show how these ideas developed historically in an earlier period during which there was perceived to be a condition of always imminent war, or ongoing pre-war. It asks how perceptions of the city were influenced by imagined urban destruction, and how these in turn played a part in the shift from local to regional and even global approaches to planning and development. The influence of aerial warfare on the material structures of society has not been sufficiently recognised in the history of infrastructure networks and planning.

Governmental planning for war in the twentieth century offers a new way to analyse the development of urban areas. There have been a number of recent texts concerned with the Cold War in the USA that discuss the Cold War’s impact on civilian populations, while raising questions as to its legacy in a post-Cold War era. [[72]](#footnote-72) This work offers an interesting approach to aerial war in the twentieth century more broadly. Building on work on the subject of architecture, planning and aerial warfare by Peter Galison, Anthony Vidler, Tom Vanderbilt, and often prompted by W.G. Sebald, this thesis will trace the influence of aerial war on the planning of cities and within governmental thought in Britain before the Cold War.[[73]](#footnote-73) It will also assert the importance of the nascent Cold War in the immediate post-war history of Britain.

Peter Hennessy argues that, from the earliest days of the Cold War, ‘British war planners’ believed Britain would be ‘a prime target for Soviet bloc assault in the opening phase of a global war’.[[74]](#footnote-74) Hennessy’s work, and that of Matthew Grant on civil defence in Cold War Britain, offer valuable insights into why the Cold War must be seen as ‘a dominant backdrop to British history after 1945’.[[75]](#footnote-75) Grant and Hennessy address the discussions and planning for what would happen if nuclear war were to break out. Rather than addressing plans for what would happen in event of a nuclear emergency, this thesis will examine how that imagined emergency was reduced to a variable in government planning for cities and infrastructure.

**Structure**

The first two chapters of this thesis analyse Britain before the bombs began to fall in 1940. The shorter first chapter discusses the development of air power, and air power theories, following the First World War. Earlier perceptions of cities as places of danger and degeneration contextualise and historicise the planners’ perception of cities in the twentieth century. The role of infrastructure in the future of cities is introduced as well as the early associations with air war and survival. The second chapter discusses the years following the establishment of the Air Raid Precautions department within the Home Office in 1935 to the start of the ‘Blitz’ in 1940. This chapter investigates the increasing domesticisation of air raid precautions and the inter-relatedness of planning debates about congested cities and their vulnerability to air attack.

The third chapter focusses on the central period when imagined bombing became an everyday reality in British cities. It considers how cities were materially refigured by bombing during the Second World War, and the techniques employed to keep cities functioning under the threat of air raids. As bombing became more and more routine the topography of the city was transformed into an architecture of destruction and survival, and infrastructure into networks of life.

The final two chapters analyse the visions for reconstruction after the Second World War. The fourth chapter discusses reconstruction planning in Britain during and after the Second World War. It considers how plans for the future were overlain with pictures of imagined destruction in a future nuclear war, arguing that cities and landscapes continued to be envisaged through a militarised optic in the post-war period. The debates about how to develop Britain after 1945 were closely related to the prospect of future war. The fifth chapter moves away from Britain, and discusses ideas of planners, the government and military scientists about the possible dispersal of population across the Commonwealth. It highlights the connections between these debates and the expectation that in a nuclear war Britain would be indefensible. These discussions and plans are contextualised within the turn to empire and the Commonwealth after 1945, the rise of modernisation theory and the Cold War. Town planning, infrastructure projects and the development of nuclear weapons were inter-related.

Finally, the conclusion draws together the arguments and suggests that cities have been remade into sites of war. It will argue that a crucial part of understanding the impact of the expectation and experience of air war is highlighting how government and architectural perceptions of cities were transformed.

**CHAPTER ONE**

**In the Next War**

The Future of Cities and the Future of War

‘[I]t has been borne in upon us that in the next war it may well be the nation, whose people can endure aerial bombardment the longer and with the greater stoicism, will ultimately prove victorious’.[[76]](#footnote-76)

(Committee of Imperial Defence, Sub-committee on Air Raid Precautions, 1925)

In January 1915, German zeppelins dropped bombs on Britain for the first time. The initial reaction to the arrival of air war was one of shock at the apparent barbarism of an enemy willing to resort to such methods of war. By June of the same year, insurance firms were selling special air raid policies and British newspapers were offering financial assistance to readers who suffered damage from the air raids.[[77]](#footnote-77) Aerial warfare quickly became a part of the everyday lives of urban citizens, and had a profound impact on perceptions of cities, and crucially, on the *future* of cities. This chapter discusses the development of air power after the First World War and considers how governmental debates about cities and the everyday lives of urban civilians were reframed by concerns about survival developed against a backdrop of predictions and imaginings of future aerial war.

Susan Grayzel argues that the First World War saw the ‘beginnings of a cultural shift’ which viewed air raids as ‘genuine experiences of war akin to what soldiers faced on the front line’. The bombing in the First World War brought the domestic sphere and civilian life into the national war effort, and transformed the relationship between the home, the city, and the state.[[78]](#footnote-78) Britain’s vulnerability to aerial attacks had been exposed. Fear and expectation of war provoked sustained public anxiety in the 1920s and 1930s, with the spectre of the next war never far below the surface of public discourse. [[79]](#footnote-79) The fear of war became above all a fear of aerial war.

Covering the period from the First World War to the transfer of the Air Raid Precautions Sub-Committee into the Home Office in 1935, this chapter draws together military, planning and architectural visions of urban areas to elucidate the relationship between aerial warfare, the urban environment and survival. First, it illustrates the development of military theories of strategic bombing and then draws links to characterisations of urban environments and their inhabitants, which were central to architectural and planning debates about the future of the city. The argument that urban workers were more susceptible to fear than soldiers was an important element of the strategy of aerial war. This argument is then contextualised within architectural and planning discourse about the problems of urban decay and the dangers of disorder and revolt among ‘slum dwellers’. The transformative effect of the fear of air war on perceptions of cities is discussed in relation to what David Matless has called the ‘planner-preservationist’ movement in Britain between the wars.[[80]](#footnote-80) In this way, this chapter demonstrates the inter-relatedness of ideas about aerial war and the future of cities between the wars and builds on Frank Mort’s argument that the ‘cultural origins and effects of programs for the redevelopment of the city’ need to be highlighted.[[81]](#footnote-81) The discursive interactions between air power theories and architectural and planning debates, was a crucial element in the process by which air raids were assimilated into broader perceptions of the future of cities. The association of cities with destruction in architectural and planning writing further demonstrates how cities and air raids were drawn together before the Second World War.

This chapter moves beyond the cultural imaginings of cities and air raids to the material environment of the cities themselves, focussing in on the infrastructure which kept cities alive. A section on governmental debates about the future of the electricity industry in the 1920s foreshadows subsequent discussions, and reflects the role of expected air war in infrastructure planning between the wars. Based more on secondary material than the subsequent chapters, this shorter chapter provides a historiographical backdrop and introduction to the main period covered in this thesis. It is important to look at how discourses of aerial war and cities developed before the Second World War, and themes of town and country were coloured by concerns about potential future bombing of urban areas.

**Air Power in Military Theory and Practice before 1935**

In the winter of 1918 the British military sent investigators to review the effects of the Allied air offensive against Germany. The British survey built upon two wartime assessments carried out earlier in 1918.[[82]](#footnote-82) From the outset the evaluation of the bombing was split into two categories, the material damage, and the ‘moral effect’ of the air raids. The investigators analysed the effects of the bombing of German industrial production through the physical destruction of industrial buildings, machinery and infrastructure, and the ‘moral effect’ on the civilian workers in the targeted areas.[[83]](#footnote-83) The separation of the effects of bombing into two distinct categories of analysis had a profound impact on how strategic bombing was viewed for decades subsequently. As Tami Biddle has argued, the limited physical damage of bombing in the First World War was superseded in the minds of the Air Staff by the supposed impact on morale. The Air Staff bombing reports from 1918, 1919 and 1920 all concluded that the material damage of the bombing to the German war economy had been small, but that the ‘moral effect’ had been ‘considerable’.[[84]](#footnote-84) The vague wording in the reports illustrated the generally speculative way in which ‘moral effect’ was measured and communicated.

Hugh Trenchard, who had been the Officer Commanding the Royal Flying Corps in the First World War and was appointed to the new position of Chief of Air Staff at the start of 1918, was the greatest exponent of the theory of the ‘moral effect’.[[85]](#footnote-85) The First World War bombing surveys often referred to projections about what would have happened if the war had continued, and technology improved, as evidence of efficacy. The report published in the spring of 1919 asserted that ‘with the progress in air science that seems likely to continue, it will be possible in a few years… for a powerful military nation… to obliterate cities in a night and produce the stunning moral effect necessary to victory.’[[86]](#footnote-86) Public pronouncements on the effectiveness of air power were coloured by inter-service battles, and the desire for an independent air arm. When Trenchard wrote in the *London Gazette* in 1919 that the ‘moral effect’ of bombing ‘stands undoubtedly to the material effect in a proportion of 20 to 1’, he not only made a case for investment in the air arm, but highlighted and contributed to public and political fear of air power.[[87]](#footnote-87)

The First World War bombing surveys informed the theories about strategic bombing in which an exaggerated ‘moral effect’ was given prominence over the material damage inflicted. The established strategic doctrine of the Air Staff had a strong influence on the policies of the British government. Uri Bialer argues that the fear of aerial war, and specifically of the possibility of a ‘knock-out blow’, ‘largely impelled the British Government’s constant and continuous search for an international air disarmament agreement throughout the 1930s’.[[88]](#footnote-88) It is wrong to suggest, however, that this fear impelled a pacifist or disarmament policy in Britain.[[89]](#footnote-89) The fear of air power also manifested itself in British military commitment to developing a strong air arm.[[90]](#footnote-90) Trenchard was Chief of the Air Staff for the decade before the Geneva conferences in the early thirties and his advocacy of the theory of the ‘moral effect’ and the need for offensive tactics in aerial warfare was reflected in British policy. In the 1920s British experiments with aerial bombing continued in different contexts, but the established discourses of bombing, which were articulated in the First World War reports, were reiterated both inside and outside government. [[91]](#footnote-91)

1919 saw the bombing of Afghanistan, followed in 1922 by a campaign over British controlled Iraq.[[92]](#footnote-92) Priya Satia has argued that it was in Iraq in this period that Britain most fully practiced the technology of aerial bombardment and ‘air control’, and attempted to theorise ‘the value of airpower as an independent arm of the military.’ The assumptions at the end of the First World War about what bombing could achieve in the future were tested in the colonial periphery. Satia’s argument that ‘the activities of the modern state are shaped by the cultural imagination’ has a broader application.[[93]](#footnote-93) The idea that the ‘moral effect’ of aerial bombing was influenced by cultural imaginations of the characteristics of the race or class of a person is equally relevant to the principles of strategic bombing subsequently practiced by Britain in Europe. As Michael Sherry has argued, broad currents of racism, concomitant with faith in progress, were also central in imaginations of aerial warfare before First World War outside Britain.[[94]](#footnote-94) When Trenchard argued that air power would be the decisive factor in modern war, he necessarily had to assert that the British people would be less susceptible to panic and fear than their enemies. For British military and government planners, the ability of the British urban poor to endure hardships without disorder, or even revolution, was essential to the nation’s ability to wage and win air war.

In his review of legalities and historical precedents of bombardment, James M. Spaight, writer, lawyer, air power advocate and influential civil servant in the Air Ministry, argued that mechanised warfare had transformed war into a battle of material rather than personnel, of ‘machine-power’ not ‘man-power’.[[95]](#footnote-95) Spaight presented what he called ‘the machines behind the machines’ as the most crucial component in a nation’s warring ability.[[96]](#footnote-96) The production of munitions and other war material rendered the civilian workers in such factories legitimate targets for attack, but only when at their work. The position of civilian munitions factory workers was considered as analogous to soldiers in that both were ‘subject to homicidal attack only so long as they are actively taking part in or preparing the means of warlike resistance.’[[97]](#footnote-97) Spaight’s analysis led to him to conclude that in fact the ‘person who makes the killing machine is more dangerous than the soldier or sailor who uses it’.[[98]](#footnote-98) Soldiers and factory workers may have been seen as analogous in their position as legitimate targets, but their expected responses to being under fire were not.

Literature on air power and future war, both official and unofficial, had already articulated expectations about the ‘moral effect’ of bombing on civilian populations before the First World War.[[99]](#footnote-99) Often the official analysis and popular fiction of the period were very closely related.[[100]](#footnote-100) Martin Ceadel has argued that popular fiction in the period often dramatized ‘ideas that were being currently put forward by Britain’s leading military theorists’.[[101]](#footnote-101) The bomber was built in the imagination before it was built in reality.[[102]](#footnote-102) H.G. Wells, one of the key voices in literature, stressed that future war would be mass war with entire populations pitched against one another.[[103]](#footnote-103) Wells’s influence, and the resonance of cultural understandings of aerial warfare in this period, was illustrated by a discussion at a 1931 meeting about evacuation plans, in which Major Tomlin of the Metropolitan Police suggested that Wells be consulted for his opinion about the conditions in future air raids.[[104]](#footnote-104) Wells made his assertion that air war meant ‘complete social destruction instead of victory at the end of the war’ in a context where the military strategy for bombing was designed to disable social life.[[105]](#footnote-105) Similarly, a speculative paper produced by the Air Staff in January 1921 warned that the destruction of national life from the air could result in surrender before any surface actions were fought.[[106]](#footnote-106) In his influential 1925 book, *Paris, or the Future of War*, Captain Basil Liddell Hart put forward the view that air power’s ability to render surface action unnecessary could result in ‘not only a war without bloodshed, but war without hostilities’.[[107]](#footnote-107)

The supposedly pacifying effect of air power was perhaps the key recurrent aspect of discourses of air war, and as Sherry argues, in this respect aeroplanes could be historically situated amongst ‘a host of other weapons invented or imaged in the nineteenth-century and celebrated for, their capacity to “diminish the evils of war”’.[[108]](#footnote-108) Air power advocates set the supposed speed with which an air war could be fought and won against the bloody stasis of the First World War. But in doing so, they turned the bombs onto cities and civilians. There was little doubt that a strong air force could deliver a swift and crippling blow, but in the context of the 1920s these assertions were coupled with an urge that the government invest in the air arm to provide the capacity to perform such attacks. The lack of attention paid to defence from air raids reflected the fact that government and military planners considered air power to be irresistible. Liddell Hart put forward the common view that an air arm of sufficient strength could carry out air raids as powerful and destructive as those imaged in air war novels. With the necessary technological developments and generous government funding air power seemed to offer the ability to paralyse the nerve system of a country within days, or even hours, of the start of hostilities.[[109]](#footnote-109)

The belief among the Air Staff that a continuous offensive with mass bomb loads could cripple the enemy by targeting the weakest points, the cities, was reflected back on their perception of Britain’s vulnerability to attack. By identifying cities abroad as soft targets attention to the susceptibility of British cities was also heightened. As Liddell Hart wrote, there would be no need for ‘total extermination’ as a ‘highly organized state is only as strong as its weakest link’.[[110]](#footnote-110) The identification of cities as weak links was built on negative assumptions about urban populations. The importance of imagined attacks and literary visions on the development of air power strategies was again reflected here. The popular literary depictions of lower class urban inhabitants, as the greatest threat to the survival of civilisation in the event of war, were reiterated in discussions by military theorists.[[111]](#footnote-111) As well as fictional disturbances, the 1926 General Strike served as a potent reminder of the potential for unrest in cities and subsequent discussions of civil defence during air raids drew on this experience.[[112]](#footnote-112) At the same time, variations on the characterisations of people in Iraq were reiterated in military concerns about British urban civilians under fire. The established military views on discipline were that it came either through breeding for the officer class, or was drilled into the enlisted ranks through training. As Tami Biddle points out, in the eyes of the military class, the urban poor had neither breeding nor training.[[113]](#footnote-113) Spaight stressed the common military view in 1930 when he stated that:

Nothing even remotely approaching the casualties necessary to destroy the morale of an army should be required to demoralise the undisciplined civilian workers, of all ages and sexes, in a war factory. In the nature of these things, their breaking-point should be low. It is not to disparage their spirit to recognise this. Obviously they cannot be compared with the steel-hardened mass into which fighting troops are forged.[[114]](#footnote-114)

Spaight argued that the fear of attack would be more damaging than attack itself: ‘The loss of output [...] will be the result of abstention from work rather than of actual destruction. The workers will be terrified rather than killed.’[[115]](#footnote-115) There is a clear contradiction here in the assumption that there was little hope of protection from air raids, but yet civilians would be merely terrified rather than killed in air war.

The Air Staff deemed air power to have a disciplinary effect over the Iraqis in the 1920s, by operating surveillance in the manner of a panopticon.[[116]](#footnote-116) The perceived disciplinary power of aerial surveillance led to the argument, and the belief in the Air Staff, that the successful use of air power was not solely based on actual bombing.[[117]](#footnote-117) The power to destroy settlements and kill civilians without cause for moral concern emboldened the RAF and contributed to the exaggeration and escalation of air power that continued into the 1930s. There was, however, a crucial difference between air control and air war: what the exigencies of war made possible in Europe, was always acceptable in the colonial periphery.[[118]](#footnote-118) The RAF established a strategy of bombing to disrupt daily life and provoke chaos and disorder among the enemy, which was reflected back on the perceived vulnerabilities of Britain to air raids. The designation of cities as targets for bombing in a variety of areas of society occurred in the context of anxiety about cities and urban decay following industrialisation in the nineteenth century. At the very centre of the theories of aerial war was the importance of attacking the weakest links in the enemy’s war economy, the cities.

**The Problem of the Cities**

In the May 1934 special number of the *Architectural Review*, architectural critic John Gloag considered how air power might influence the development of cities and regions in Britain. He wrote that ‘[w]ar under the new barbarism means air-raids’, and predicted that:

[a]nticipation of the inevitable destructiveness of war may cause residential areas to be spread out, so as to increase the chances of areas of survival, and to render the task of bombing and gassing from the air too extensive to be crushingly effective.[[119]](#footnote-119)

Gloag articulated a common fear about air power and air raids, against which, he stresses: ‘*No protection has yet been found*’.[[120]](#footnote-120) There was an explicit connection between anticipated air raids and the physical planning of towns and cities; plans for the future were marked by fears of apocalypse and hopeful remedies to enable survival. Part of the reason that anticipated destruction of the cities from the air became such a powerful and pervasive image, was because it drew on established planning discourses of urban congestion and degeneration as a source of national vulnerability and a cause for anxiety. This section discusses these ideas as an important context to the development of theories of air power.

The implications of aerial warfare for the future of the cities, in part, referred back to broader concerns in Britain during the period about mass urban settlements and their inhabitants, and a widespread anxiety about decline.[[121]](#footnote-121) The image of social breakdown in the cities as a result of slum living were similar to the visions of disorder and chaos that could erupt in cities under fire. Architects and town planners wanted to take account of the concern about urban decay through better planning and design.[[122]](#footnote-122) Town planners were concerned with constructing both a physical environment and a type of citizenship that stressed moral and physical health. Matless notes the continuing military concern about the physical health of citizens following the Boer War and the ‘wider ethos of fitness as a positive social force’.[[123]](#footnote-123) The development of air power theory reiterated ongoing concerns about urban populations in the context of feared social collapse under air raids. Military and air power theorists, who had identified urban centres and their populations as the most vulnerable part of a nation, relied on the assertion that the city’s industrial workers were susceptible to indiscipline and panic. The military concern about the fitness of civilians who would be required to endure air raids and maintain war production, rather than concerns about their ability to fight, marked a crucial turning point in the nature of modern war and the militarisation of society.

Architects and town planners writing in this period dealt directly with the problems of the urban environment, of urban slums, and urban ‘slum dwellers’. The specialist discussions of urban development provide an important historical context to the theory behind planning for strategic bombing, and the identification of cities, and their inhabitants, as targets. In the writings of architects, town planners, and military theorists, aerial warfare and cities were drawn together, with each gaining meaning from the other. In Britain in the last decades of the nineteenth century, concern over the living conditions of the ‘urban lower classes’ grew as awareness of urban poverty increased.[[124]](#footnote-124) These concerns were reflected in anxieties about the vulnerability of cities and urban populations to air raids. The fear and expectation was that mass bombing would provoke a sudden collapse in society and civilisation, which reflected contemporary fears about the rotting cities. The nineteenth century discourses on cities informed the town planning movements which developed in the twentieth century, and served as a crucial backdrop upon which theories of ‘moral effect’ and air war were reiterated.

Planners and the theory of ‘degeneration’ asserted that the conditions of the minds and bodies of those living and working in the slums were connected to their environment. The increasing medicalisation of the poor in London developed in dialogue with the changes to the material aspect of the urban centre. Part of the discussion of the physical changes to the city focussed on their deleterious effect on health and hygiene. The argument followed that poverty should be understood not as a consequence of economics or morality, but rather as environmental, biological and ecological. Gareth Stedman Jones identifies how the theory of ‘degeneration’ moved the point of enquiry from moral failings of individuals to the damaging influence of the urban environment itself.[[125]](#footnote-125) Daniel Pick’s subsequent analysis of ‘degeneration’ in Europe has argued that discourses about the threat of crowds fed into broader ideas about ‘degeneration’ in Britain.[[126]](#footnote-126) The persistence of these ideas into the twentieth century is illustrated, in part, by the continuation and growth of political support for planning, which reached a new zenith in the 1930s.

In the years between 1918 and 1939 architects and planners expressed a firm belief in the power of their professions to improve the lives of people in ways beyond their material surroundings. The assertion by planner Stanley Ramsey that ‘ugly towns [were] indicative of ugly methods of living’ referred to the slum conditions of the cities and played on the discourses of the city as unhygienic.[[127]](#footnote-127) Architects and planners envisioned themselves as experts bringing together the arts and sciences to build the Britain of the future. The most important tasks in the 1930s were the demolition of the slums, and the planned rebuilding of cities to prevent over-crowding. It was in this context that John Betjeman wrote his famous poem ‘Slough’, in which he urged ‘friendly bombs’, to ‘blow to smithereens’ that ‘mess they call a town’.[[128]](#footnote-128)

Patrick Abercrombie wrote of slum clearance in 1935 that ‘if a complete programme to carry out this two-fold objective is realised four million houses will ultimately come under consideration, either for total demolishment or radical re-conditioning and control of the number of inhabitants’, adding that ‘this will entail an unprecedented upheaval of the population’.[[129]](#footnote-129) The immensity of the task required a systematic and thorough application of scientific principles to achieve the best results. Economy and efficiency were at the forefront of plans together with the belief that improved spatial organisation would lead to a new social life.

The theories of urban redevelopment were often inflected by a broader debate about the relative merits of the countryside versus the city, and their relationship.[[130]](#footnote-130) The planning discourses required a binary discourse of order and disorder which was drawn onto images of the present condition and a possible planned future.[[131]](#footnote-131) The perceived negative connotations of dense urban centres developed parallel to theories of aerial warfare that argued for mass bombing raids against cities. There was an ongoing interaction and communication between air power theories (which drew on the idea that urban civilians were particularly weak and would be unable to endure air raids) and discourses of cities as a site of danger and decline that needed to be cleared out through a slum clearance programme.

The reclassification of the problem of ‘degeneration’ from individuals to ‘society itself – crowds, masses, cities, modernity’, contributed to concern about unrest in urban areas during air raids, and supported John Gloag’s suggestion at the start of this section, that town planning was a way to address these dangers.[[132]](#footnote-132) This was part of a shift in approach to society that moved away from the idea of the individual, and towards a perceived bio-medical population, which centred the influence of environmental and racial factors.[[133]](#footnote-133) The danger of air raids offered further motivation to plan effectively for the future of cities in such a way as to increase the chances of social survival. The optimism and rhetoric of social reform that had been evoked by the state, emboldened by its enforced interventionism in the First World War, the threat of Bolshevism, and the emergent planning profession, had, however, begun to dim as early as 1919.[[134]](#footnote-134)

After the failure to enact meaningful planning legislation and practice in the years after the First World War, architects renewed their calls for planning in the 1930s. The RIBA President, Raymond Unwin, argued that a ‘power of synthesis’ was the antidote to urban decay and the sense of pessimism among under-employed architects.[[135]](#footnote-135) The synthesis Unwin sought was of architecture and planning, which when combined, he argued, would produce the necessary aesthetics and ordered layout of urban areas. By the early 1930s new groups were forming with agendas based on the need for planning to bring about development and lasting security. The formation of the modernist Modern Architectural Research Group (MARS) of architects interested in providing modern solutions to the problems of cities was welcomed in the more conservative *Journal of the RIBA*, which acknowledged that ‘life is now so complicated that we cannot dare solutions without exhaustive preliminary research’.[[136]](#footnote-136) The MARS Group advocated the research and plan method associated with Patrick Geddes.[[137]](#footnote-137)

The MARS group stated in 1934 that their most immediate task was ‘a fresh analysis of existing sociological, economic and technical conditions’ in Britain.[[138]](#footnote-138) The short term programme centred on slum clearance, with the East London borough of Bethnal Green the case study chosen for analysis and planning.[[139]](#footnote-139) The possibility for unrest if reforms and planning were not carried out was reiterated by Political and Economic Planning (PEP), an organisation formed in 1931. PEP saw a number of groups and individuals from varying political and professional backgrounds come together around a nucleus of core members, who were united by their mutual belief in the importance of a national plan for Britain. For Arthur Marwick the influence PEP gained was illustrative of the level of political agreement in the 1930s about the need for planning and the reorganisation of Britain’s political economy. [[140]](#footnote-140)

For the Labour party, rebuilding itself after the crisis of 1931, planning became a rallying point and a central aspect to the formulation of its new programme.[[141]](#footnote-141) The promise of an efficient economy was part of the reason that support for planning could cross party boundaries. The projection of ideological imperatives onto ideas of what planning could achieve was central to its broad support. As Stephen Brooke has shown, socialist groups, who argued for a classless society and economy, and non-socialist groups who were more concerned with the ‘rehabilitation of an ailing capitalist system’, could both be considered to have supported the idea of a planned economy.[[142]](#footnote-142) PEP stressed in the resolutions of its inaugural meeting that, ‘the failure to formulate a National Plan and in due course prepare the country for its adoption will amount to a major national danger’.[[143]](#footnote-143) Advocates of planning, reform and development saw the danger coming from both aerial war and social degeneration.

The acceptance of socio-scientific analysis of social problems was a central feature of the 1930s that was at the heart of the broad agreement towards economic and social planning.[[144]](#footnote-144) The desire for planning was not only about better housing and safer roads. A PEP report on ‘Social Structure’ used evidence from the Mental Deficiency Committee of 1929, to highlight the correlation between the ‘three grades of mental defectives’ and the quality of their housing.[[145]](#footnote-145) The deprivation of the mental wellbeing of those living in poverty was read in relation to their environment, and vice versa. There was broad agreement among architects and planners that the problems in the cities had to be addressed to avert social collapse. In this sense, PEP echoed the thoughts of Liddell Hart when he wrote that for a peaceful future, the cause of war, ‘the imperfection of human nature’, must be removed.[[146]](#footnote-146) In the planning for peace by PEP, and the planning for the future of warfare by Liddell Hart, the development of the nation, its environment and society was central. The key point of interaction was that different types of planners, writing in different contexts, were above all concerned with planning as a technique to enable survival in the modern world. Planners, governments, scientists and architects had identified the urban slums as the place where human ‘imperfections’ were concentrated. The perceived imminence of aerial war heightened the fears of social unrest in the cities with the slums as the focus of concern. The relationship between the urban poor and their environment was a central element to the continuation of such ‘imperfections’ which PEP sought to address through scientific means, of which better physical planning was an important part.

The RIBA Slum Clearance Committee complained in 1934 that without more effective application of planning powers ‘no successful attack can be made on the slums’.[[147]](#footnote-147) In Sir Giles Gilbert Scott’s inaugural address as newly elected president of the RIBA in December 1934 he criticised the unchecked and unordered progression of modern life. He recounted the story of young girl’s death and related it to the tasks faced by architects.

“Life is so untidy” was an expression used in a farewell note of a young girl who, for no apparent reason, committed suicide a short time ago; it seems to me an expressive and apt description of modern life. I would cite untidiness as the most characteristic feature of our times; and architects are in a position to tidy up at least the outward material aspects of modern life.[[148]](#footnote-148)

Scott’s address illustrated the very potent fear that they were living in a period of vulnerability, in which the future was uncertain. Scott called for his fellow architects and for the government to tackle the urban decay and ‘untidiness’ that was a serious threat to the nation.[[149]](#footnote-149) The fears about the city were made more palpable by the context of a predicted aerial war that would – if the imaginations of the Air Ministry, H.G. Wells and his contemporaries were to be believed – quickly lead to social breakdown in cities.

The government viewed the concentration of industry and population in dense urban areas as a serious problem for defence, while the Air Staff stressed how such weaknesses could be exploited against Britain’s enemies in event of war by a large-scale offensive. The Air Staff argued that investment in bombing capacity would enable Britain to deliver the ‘knock-out blow’ before her enemies. Speculations on future war by the military thus recast the city as a target and a strategically vulnerable point in the national defences. Concomitant ideas of urban decay and the identification of the urban poor as potentially destabilising or even revolutionary were reiterated in the context of future aerial war.

**Cities and Destruction**

In the 1930s both modernist architects and their more mainstream colleagues were writing of the urgency of a dramatic re-planning and re-organisation of society. The frustration with existing cities was reflected in both the emphasis on building new towns on virgin soil distinct from the existing urban centres, and in a yearning for the power to demolish what was already there and replace it with something better. One of the ways in which architects and planners expressed their interest in the clearing and replanning of cities, was through references to the plans drawn up for London after the fire of 1666. For contemporary architects and planners looking back to 1666, the destruction of London represented a ‘splendid occasion’ for replanning.[[150]](#footnote-150)

The destruction wrought by the Great Fire of London in 1666 was a recurring theme in planning journal, the *Town Planning Review*, in the 1930s. The analysis of the consequences of the Great Fire and the clearing away of urban decay were repeated in the context of potential consequences of aerial warfare. Planners thus placed urban destruction through aerial bombardment alongside the Great Fire in terms of the history of London, and its ‘natural’ renewal. In this sense, urban destruction through air raids was written into part of the story of London and its development before the air raids of the Second World War. The journal argued that the 1666 reconstruction plans contained ‘echoes […] of the past and prophecies of the future’.[[151]](#footnote-151) The manner in which the 1666 plans were read in the 1930s was indicative of the sense of change and uncertainty between the wars, but also of opportunity.

In a series of articles about the 1666 plans, T. F. Reddaway asserted that, the ‘burning of London in autumn of 1666 provided English Town Planning with the most dramatic opportunity in its history’.[[152]](#footnote-152) The replanning envisioned by Reddaway in Wren’s plan was not realised, however, he noted, ‘if Wren’s plan was rejected, the idea of planning was not’.[[153]](#footnote-153) Despite the massive destruction of the Great Fire, the articles emphasised the opportunity for redevelopment: ‘Before the last refugee had found asylum, or the last embers had been extinguished, they were planning a new city to replace the old’.[[154]](#footnote-154) The erasure performed by the fire was heralded: ‘London was to rise again, purged by fire, freed from its old shortcoming, triumphantly worthy of its greatness’.[[155]](#footnote-155)

In the context of contemporary anxiety amongst planners about the condition of British cities, the 1666 plans represented a crucial historical moment in the history of planning and the history of London. It is significant that the publication of the first modern account of the rebuilding of London after the Great Fire coincided with the start of the Second World War.[[156]](#footnote-156) The destruction of the fire called for bold and grand visions to re-make London. It was the destruction of the city itself that enabled Wren and his contemporaries to draw these plans. In the 1930s planners imagined, and willed, urban destruction partly as a possibility for renewal. The fire was both the problem, and yet was the tool that enabled the solution: the thorough re-planning of the city. The fire had ‘freed’ London.

Plans were necessarily forward-looking and where the fire had ‘freed’ London in the seventeenth-century, in the twentieth-century air war would repeat the task. The interest in London’s historic destruction occurred in the context of numerous contemporary visions of the city, which called for it to be cleared and replanned.[[157]](#footnote-157) The need for a scientific approach to the material problem of the city echoed the calls for a scientific treatment of the urban population. Marjorie Pentland began a review of recent publications dealing with the housing crisis and slum clearance, with the observation that:

In any future warfare, modern prophets assure us, cities could be destroyed wholesale in a few minutes. Why not then use the swift weapon of science for improvement, and celebrate at once a spectacular wiping-out of slums? Unfortunately, war seems to be the only sufficient motive for doing things thoroughly.[[158]](#footnote-158)

The association of aviation with bombing and urban destruction was reinforced in the architectural discourses of slum clearance and planning. The ‘weapon of science’ while most dramatically heralded by the European modernists like Le Corbusier, Walter Gropius, and Filippo Tommaso Marinetti before them, was described by mainstream voices in town planning and architectural journals as the only sensible answer to the problems of modernity. The task of architects was to humanise the science and maintain some aesthetic standards rather than giving way to pure functionalism.

In the architectural press, science and technology were viewed in the context of profound change and uncertainty in society, when the future was a common topic of speculation. The most sustained analysis of broad visions of the future in the architectural press was the May 1934 special number of the *Architectural Review*, in which a number of writers evaluated the first third of the twentieth century and drew vivid images of the next third. For the *Architectural Review* the spectre of aerial warfare was a crucial factor in visions of the cities and architecture of the future.[[159]](#footnote-159) The exaggerated view of the potency of strategic bombing advocated by the Air Ministry and the fear of a ‘knock-out blow’, which had been articulated in parliament and in popular fiction, was powerfully reiterated in the analysis of architects and town planners.

In all these analyses it was air power that made contemporary fear of future war different from earlier anxieties. John Gloag wrote that, ‘People have always been imagining since the Middle Ages that civilisation was about to collapse’, before going on to assert that the present anxiety was ‘much more profound’, as he explained that ‘civilisation has learned so much more about the technique of suicide.’[[160]](#footnote-160) Expectation and fear of imminent aerial war and all-out destruction evidenced in the writing of architects, was clearly apparent at the highest levels of government in this period. Stanley Baldwin’s famous speech to the Commons in 1932 on the subject of air power set the tone for anxiety about the unknown effects of an air war.[[161]](#footnote-161) Even a moderate evaluation by a strong supporter of air power such as Spaight, concluded that in the next war, there ‘*will* be bombing from the air - but unless the unexpected happens – the result should not be the apocalyptic disaster which some people foretell.’[[162]](#footnote-162) Even in the less doom-laden analyses, and despite the efforts of pacifist groups and the Geneva disarmaments conferences, there was little optimism that cities would not be subject to aerial bombardment in future wars.[[163]](#footnote-163) In the writings of architects and planners, military theorists, novelists, and the pronouncements of political leaders, it appeared that in the next war a strategy of aerial bombardment would be built on the systematic destruction of key urban sites.

The process of defining cities as singular units was both an aesthetic principle in architecture and a strategic component in planning for aerial war. Theorists of strategic bombing used the aerial view to identify towns and zones from above, and mark them as targets. Matless identifies ‘overlaps of aerial perspective’ between the bomber pilot and the planner, who both sought an overview of the town. [[164]](#footnote-164) The success of the idea of planning was tied up with discourses of progress and the advancement of man through science, and specifically man’s ability to impose his will over nature, ordering and modifying the lay of the land.[[165]](#footnote-165) The development of aviation technologies added a new dimension to the visions of man and his power over nature.[[166]](#footnote-166) The perception, enabled by aerial photography, of what Kitty Hauser calls a ‘Neo-Romantic landscape’ revealed the extent to which approaches to the landscape were framed by war, technological and industrial development, and Britain’s ancient history. The appearance of the landscape as ‘both vulnerable and resilient’ spoke of the historical lineage that was considered under threat like never before in this period of anxiety and transformation.[[167]](#footnote-167) In this time of uncertainty town planners sought to take control of the future and assert a level of authorship. Aerial photography assisted planners by allowing them to see whole towns and cities at once, and by literally positioning their eyes high above the diverting streets.

The view from the air offered a synoptic view of the city that had never been so easily seen. Both the efficiency and purity of the technology of aviation itself, and the images of an ordered landscape it produced, contributed to the planners’ desire to build ordered and effective cities. From the air, urban areas appeared as singular objects set within, but separate to, the landscape that surrounded them. The conception of the city as a unified whole that should be contained, and from which the countryside should be insulated, was central to planning discourses. In an article in 1932 on the future of architecture, Gerald Heard quoted H.G. Wells, who in an earlier address to the RIBA had predicted that man was ‘about again to turn nomadic’. Heard argued that the ‘old idea of architecture is over not because a new style is knocking at the door, but because the door itself, the city itself, is passing away’. He questioned: ‘Can there be an architecture if its raw material, the long-settled city, begins to move off and melt away?’[[168]](#footnote-168)

The concerns among architects about the city ‘passing away’ were linked with the effects of aerial war. Photographs of the buildings of Ypres ruined during the First World War, and tanks moving through a wrecked street, were captioned in the *Architectural Review* in 1934 with the epithet: ‘Machine-made ruins, executed by experts’.[[169]](#footnote-169) The combination of air power, photography and the mass media made the urban destruction of aerial bombardment viscerally real. The proximity of destruction was also, in part, a product of the stated offensive policy of the Air Ministry in the 1920s. The idea of trading blows against cities from the sky relentlessly until the decisive strike crippled the war economy, focussed on the offensive power of bombers and on the ability of the cities to continue war production while under fire. Just as planners cited the importance of infrastructure to an ordered and efficiently functioning city, military strategists argued that the dislocation of daily life was the crucial factor in the ‘moral effect’ of air raids. Liddell Hart’s assertion that the material complexity of the modern state created a target, highly sensitive to ‘a sudden and overwhelming blow from the air’, illustrates how technological advances in aviation and infrastructure were drawn together in the context of future aerial war. Theories of air power determined that air raids would target the civilian nerve system of a nation state. Modern cities ran on built infrastructure networks.[[170]](#footnote-170)

**Infrastructure and the Future of the City**

For planners and military theorists alike, the networks of pipes, tunnel, cables and roads were essential foundations on which cities and their industries functioned. Networked infrastructure was central to images of a technologically advanced and progressive Britain. In an editorial in the March 1933 number of the *Architectural Review*, electricity in particular was celebrated. The development of the national grid was described as enabling a manufacturer to ‘set up his factory in almost any part of England he likes’.[[171]](#footnote-171) The development of infrastructure became increasingly important to both the peacetime development of cities and their vulnerability to air raids. This section discusses the importance attached to infrastructure in the development of Britain, and details how military interventions in the 1920s reframed these infrastructure technologies as key security concerns and sites of vulnerability in an era of air power. It was through these discussions, informed by imagined future war, that infrastructure came to be understood as part of an architecture of survival.

The formation of groups such as the London Passenger Transport Board in 1933 demonstrated the contemporary concern with planning infrastructure. Its Chairman, Frank Pick, addressed the Royal Society of Arts in December 1935 and emphasised the central role of transport infrastructure: ‘the first function of the metropolis to be organised and established as a unity should be its local passenger transport’, without which, he said, ‘there would be no chance of ever looking at London as a whole’.[[172]](#footnote-172) Pick described the unity sought for as ‘a pattern, or rather a series of related patterns’, and as the ‘framework upon which London must be built’.[[173]](#footnote-173) The car simultaneously threatened the coherence of town and country, and yet was a possible means to arrest this process. The urban centre could be contained with ring road boundaries. Roads could provide limits to the city and internal spatial order by dividing the city into smaller units and zones.

A.E. Richardson envisioned roads providing spatial boundaries in a future London in the *Architectural Review* in 1931. He described the contemporary problem: ‘[w]e have a complex population penned into a small city, which has burst asunder and scattered its burden anywhere, anyhow’. He called for two great boulevards, beginning with an inner ellipsis surrounding the City itself, and followed by an outer elliptical road tracing a three mile radius from the Thames. Richardson’s ring roads served the dual purpose of defining the urban area and constraining its growth, while diverting traffic from passing through the centre of the city.[[174]](#footnote-174) The transport infrastructure was heralded by planners for its importance in successful development, and by military theorists for its strategic value. Liddell Hart highlighted the ‘flow of transport along its arteries’ as an essential requirement for all major industrial nations, and simultaneously redefined transport infrastructure as an effective target.[[175]](#footnote-175) The importance attached to the ‘moral effect’ of air raids dictated that the vital points of a state were not just considered to be the factories and military installations, but the networks of infrastructure which enabled life and production in the cities to continue.

Planners recognised infrastructure networks for their ability to provide coherence in the cities, and as a means of controlling growth through the centralised control of the utilities that any new settlements would require. Charles Marriot praised electricity as a great public benefit, whose architectural expression was ‘on the whole, orderly’. Marriot described the electricity grid and the Underground as having significant social implications in an age of transition, which seemed to him to be ‘one of transition to the point of disorder.’[[176]](#footnote-176) In the dominant Trenchard school of military strategy the creation of such disorder was the primary aim of bombing. Spaight argued in 1930 that by attacking infrastructure and public utilities the ‘pressure will be brought to bear on the ordinary man’.[[177]](#footnote-177) The infrastructure of transport, water, lighting and power were recast by Spaight, and the military theorists he refers to, by their importance in maintaining everyday life in a war on civilian morale. The city and its life, ordered by infrastructure, had become a target for an idea of aerial war that sought to disrupt everyday life to the point of social collapse.

What geographer Kenneth Hewitt calls the ‘civil ecology’ was the target of bombing, in a strategy of warfare which, he argues, ‘intends the disorganisation of enemy space’ and the debilitation of the war economy by attacking its weakest point. [[178]](#footnote-178) Wing-Commander Edmonds wrote in 1924 that the disruption of life was the ultimate target in attacks on morale, and related the experiences of bombing in the colonies to the situation in a future European war.

The shocks and interruptions, the inconvenience and indignity of it all will tell in the end. The civilised nation will go through the same three phases as did the semi-civilised tribe – alarm, indifference, weariness; followed ultimately by compliance with our will. Our object is to destroy the enemy’s national *morale* – we must make him feel that life has become so impossible that he prefers to accept peace on our terms.[[179]](#footnote-179)

Air Vice-Marshall Brooke-Popham wrote in 1927 that, in order to produce such a dramatic dislocation of normal life, an attack on the centres and systems that are most essential to normal life would be required. He cited the public utilities of transport, water supply and lighting as targets with a significant potential effect on everyday life.[[180]](#footnote-180) Liddell Hart argued that the technological development of nations made ‘the dislocation or control of an enemy’s industrial centres and communications […] more effective and more easy as the means by which to subdue his will to resist.’[[181]](#footnote-181) Networked infrastructure was a vulnerable life support system that required technological solutions to protect it in the event of war. In a similar way to which major powers in the 1920s prepared for the future of military aviation through the promotion of civil aviation, images of future war and the development of infrastructure were closely related before the Second World War.[[182]](#footnote-182) According to this reading, infrastructure networks were necessary to enable industrial buildings to be sited in new areas, away from the existing industrial centres.[[183]](#footnote-183)

The theoretical interventions by the likes of Liddell Hart referred back to the First World War, and imagined the war of the future. The decentralisation of important factories and industrial sites had begun in the First World War, with workers taken to and from the factories in organised transport.[[184]](#footnote-184) The development of national grids of infrastructure was the crucial technology that enabled this form of passive defence against air strikes. Following the personal intervention of Trenchard, then Air Chief Marshal, considerations were written into the processes of planning and building electricity supply in Britain as early as the 1924. Debates in government demonstrate how the imagination and expectation of future air war had a concrete impact on planning for the built environment in the 1920s. A brief analysis of discussions about the future of the electricity industry illustrates how discursive work by theorists must be seen in context with contemporaneous planning proposals in the government.

At a meeting at the offices of the Committee of Imperial Defence in June 1924, plans for new electricity generating stations were discussed in the context of air raid precautions. The meeting, which was called by Maurice Hankey following a conversation with Trenchard, followed the first meeting of the Sub-Committee on Air Raid Precautions in May. [[185]](#footnote-185) It was agreed at the meeting that, in future, those responsible at the Electricity Commission and the Ministry of Transport would present plans for large new electricity generating stations to the three ‘Fighting Services’ prior to their acceptance. The Services would be given ‘an opportunity to examine these plans with the object of ensuring that defence measures should be given due consideration’.[[186]](#footnote-186)

Defence-related concerns were afforded a central position in the process of planning and building power stations, their geographical situation and even their design and plan. Trenchard’s assertion in the June meeting that large stations would be exposed to significant danger from attack in the event of war justified his intervention in the supply of electricity to Britain. Though Trenchard declined to argue that such large generating stations should be built entirely underground, due to costs and practicality, he did suggest that they should be planned and built with design features incorporated to limit the effect of a bomb. [[187]](#footnote-187) That such decisions were taken in 1924 when the prospects of war were low indicates both the interest of the armed forces in utility infrastructure, and the preparedness of the electricity industry to accommodate the wishes of the military.

The interests of the Air Ministry in electricity generating stations was supplemented by further discussions later in 1924 regarding the construction of the cables that would deliver the electricity. In a letter from the Air Council to the ARP department and the Electricity Commission, they suggested that the imminent construction of overhead high powered electrical cables in North London should be altered. Overhead cables represented an easy target for bombing. The Air Council instead suggested that cables should be buried to limit the potential damage from a bomb attack.[[188]](#footnote-188) The letter, signed by Secretary of the Air Ministry, Walter Nicholson, linked the issue of electrical cables directly to the earlier agreements made with regard to the generating stations, and sought the same role for the military in viewing and approving all such future projects. As in the discussion of generating stations, most concerns were centred around London, with Nicholson stressing that permission should not be granted for any new overhead power cables within 25 miles of ‘London, Thetford, Colchester and Oxford without prior consultation of the Air Ministry’. The construction of overhead cables was cautioned against not just for the vulnerability to aerial bombing, but for the difficulties that a large network of overhead cables would add to the ability to fly freely and if necessary perform ‘forced landings’. [[189]](#footnote-189) Nicholson specifically brought together the civilian and military needs of aviation. In response John Brooke cautiously welcomed the interest of the Air Ministry while he pointed out that the existence of private providers would necessarily limit their ability to influence the construction of the electricity cable network.

In the subsequent meetings and correspondence, the Air Ministry, the Ministry of Transport and the Electricity Commission agreed that during the next six months (from November 1924), the Ministry of Transport would ‘submit to the Air Ministry for their observation all proposals for the erection of overhead cables other than those providing short communications to existing lines and those which definitely follow natural obstacles’.[[190]](#footnote-190) The procedure established for Air Ministry consultation on plans for cabled electricity infrastructure followed the precedent established in the meetings of June that year, whereby plans in which the Air Ministry had an interest would be presented to them before any approval could be given.

The decisions concerning the provision and construction of electricity infrastructure, taken in secret consultation by the military and civilian parts of government, demonstrates how expectations about future aerial war informed the development of the national infrastructure. Trenchard’s views of strategic bombing in the First World War, the emphasis on a continuous offensive, the importance of the ‘moral effect’ and the disruption of civilian life through urban bombing, cast a long shadow in Britain. The implications of air power and the imagination of disaster were inscribed on to the infrastructure which was such a key part to the material culture of modern cities. Air power meant that the military had an important voice in the development of cities and their vital utilities in peacetime.

**Conclusion**

The assumption that shaped approaches to aerial warfare throughout the period was articulated in the first report of the Sub-Committee on Air Raid Precautions in 1925: the ‘moral effect’ of bombing was ‘out of all proportion greater’ to the material damage.[[191]](#footnote-191) The Air Ministry’s dominant argument was that the dislocation of daily life in the cities would result in a social breakdown and a quick and relatively bloodless war. Popular fiction and politicians contributed to the air anxiety that stretched up into the heart of government. Writers, politicians, and military theorists reimagined the cities, and above all London, in apocalyptic visions. The imagery of urban destruction was, however, both devastating and potentially rejuvenating. The dangers of the city under fire were drawn into the continuing associations of urban centres as areas of material and moral decay, which should be constrained in size and re-ordered by scientific planning. Planners and architects looked to the future of cities and saw air raids. The increasing interest of planners in how air raids would influence city design brought aerial warfare into the realm of civilian planning.

Architects and planners had identified infrastructure and utilities as crucial tools in the re-ordering of cities, and as a means of controlling future development. For planners, infrastructure was the material articulation of the circulation and communication of everyday life. New technologies meant that new networks were required in order to keep the cities running. The dominance of the strategy of the ‘moral effect’ of bombing resulted in the infrastructure networks gaining strong associations with strategies for aerial bombardment. The pervasive anxiety about air power worked to define infrastructure as both the target for bombs to be dropped by the RAF, and as a means of defence against the anticipated breakdown of society in the next war.

**CHAPTER TWO**

**Planning a ‘Militant Peace’[[192]](#footnote-192)**

Air Raid Precautions for Peace and for War

‘You couldn’t believe that it would ever break, that the bombs had to fall.’

(Patrick Hamilton, 1941)[[193]](#footnote-193)

In 1935 the British government transferred the Air Raid Precautions (ARP) Department from the Committee of Imperial Defence to the Home Office.[[194]](#footnote-194) The move signalled a change in the government’s perception of aerial bombing from a matter of distant colonial policing, to one of a real threat to British cities. The ARP department was an extension and formalisation of the sub-committee that had reported to the Committee of Imperial Defence (CID) in previous years. With the move to the Home Office, it was given a prominent role in governmental planning and preparation for a future war.[[195]](#footnote-195) The main duties of the Department were communicating to local authorities the measures they would need to take to safeguard ‘the civil population against the effects of air attack’.[[196]](#footnote-196) The previously secret commission became a government department and appeared before the eyes of the public. The work of preparing the nation’s infrastructure for aerial war continued with new emphasis. The imagination of disaster and the fearful assumption that ‘the bombs had to fall’ helped usher ARP into the mainstream of domestic politics and planning.

This chapter discusses the period from the creation of the new ARP Department in the Home Office in the spring of 1935, to 1940, when the first bombs began to fall on Britain. In these five years, war grew closer and the Air Ministry dramatically ratcheted up its official estimates of the destruction likely to be visited upon Britain from the sky.[[197]](#footnote-197) The deterioration of the international situation and the demands for re-armament in Britain occurred in a country in which anti-war sentiment was still very strong. The difficulties of preparing for war while being seen to be actively pursuing peace are the focus of this chapter. The preparations for passive defence against air raids represent a clear demonstration of the conflicts within government and the resonance fears about aerial war had on the development of utility infrastructure and the perception of cities. The protection of ‘vital services’ in this pre-war period was an expensive task. In order to justify the expenditure that the ARP Department and utility companies called for, the government explained the need for ARP measures in terms of the peacetime benefits and assurances they would provide. The government argued that the intense destructive power of air war was one of many potential disruptions to supply that should be insured against like any other.

This chapter discusses the legislation as well as the ongoing confidential discussions between government, local authorities and utility companies about how to prepare for and withstand future air raids. What actions were taken, and agreements made, about the protection of urban and industrial infrastructure in this period? What response did developments abroad provoke in planning for air raids in Britain, and when war was declared and no bombs fell, what was the reaction? It argues that the government’s approach to ARP, and its relation to planning, reflect a narrowing of the gap between peace and war, and signal the construction of a condition of permanent stand-by for air raids. The chapter begins by discussing how the government viewed the future of the electricity industry in the context of future air war. It then analyses how air raid precautions became increasingly prominent in peacetime planning, before focussing in on the Munich crisis and the government response which deepened the connections between planning for peace and planning for war, and between the government and architects.

**Electricity and National Emergencies**

The pervasive expectation of air war marked the government’s approach to the nation’s vital services. The essential utilities, which had been re-defined through their association with the maintenance of daily life and the ‘moral effect’ in future war, were dangerously exposed to air raids. Concern about air war, which had been developing for decades, was now being directly translated onto the urban environments and utility infrastructure networks of Britain. In 1935, the ARP Department’s first major public act was to issue a memorandum to local authorities on measures to be taken for ARP by central government, the local authorities, industrial and commercial employers and householders.[[198]](#footnote-198) ARP moved more firmly into the public eye as the circular was made available and in July was published in *The Times*.[[199]](#footnote-199) Passive defence (essentially non-military defence from air raids, shelters, gas masks and blackouts, as opposed to anti-aircraft guns and fighter planes to attack incoming enemy aircraft), was aimed at the protection and assistance of the population, and the maintenance of daily life.[[200]](#footnote-200) While public debates about who should fund passive defence continued, the ARP Department, the Electricity Commission, and the Ministry of Transport carried on the work they had been tentatively engaged in for a decade on how to protect the nation’s electricity supply.

Electricity was the rapidly growing technological foundation for the development of cities and the nation. The development of the electricity industry and the nation’s electrical infrastructure was carried out amidst debates about public and private ownership, the very nature of which demonstrated the importance of electricity to the life and future of Britain. This section discusses how the development of the electricity industry was associated with the expectation of future air raids. Before focussing in on the influence of imagined air war on official interpretations of a few specific events after 1935, this section briefly sketches the historical development of the electricity industry in Britain after the First World War in the context of its ongoing dialogue with nascent ARP.

The period between 1918 and the eventual nationalisation after the Second World War was one of rapid growth and technological advance, which had made electricity a key modern technology by 1945.[[201]](#footnote-201) The issue of centralised control and standardisation had been repeatedly approached, most forcefully by Herbert Morrison when Minister of Transport in 1931. Morrison’s proposals were rejected, but the question of public control was never truly cast aside.[[202]](#footnote-202) Electricity, like other essential industries, had ‘special economic and technical characteristics’, which as Leslie Hannah argues, ‘meant that some form of public supervision was considered necessary from the beginning’.[[203]](#footnote-203)

Since the establishment of the Electricity Commission in 1919, the government had been working to encourage greater co-operation and efficiency between the myriad small companies that generated and supplied electricity. In spite of significant advances after the First World War, the desire for more central control and standardisation was tempered by vested interests and the unwillingness to disrupt private enterprise. An answer came in the 1926 Act, following the report of the Weir Committee. Private companies would retain control over generation and supply, but the national public body would be responsible for the co-ordination of planning for new power stations, and their operation within ‘a newly constructed national gridiron of high-tension transmission lines’.[[204]](#footnote-204) State control of the planning of new power stations was agreed, and the National Grid conceived, in a period of heightened government and military concern with electricity supply, as demonstrated by the personal interventions of the Chief of the Air Staff. Hugh Trenchard‘s suggestion in 1924 that key electricity generating stations should incorporate features that would limit the impact of a bomb attack, was still on the agenda in a series of meetings and conferences in 1934 and 1935.

The impact of the expectation of future air war was illustrated in the governmental discussions about the Barking generating station. The station had been built in the period when the Air Staff had stressed the importance of including the dangers of air raids in the development of the electricity network in the 1920s, and was again subject to debate in 1935. At a conference in January 1935 on the protection of electric supply services against air raids, the Air Commandant, Major General H.L. Pritchard, and his colleague Wing Commander A. Steel Perkins, reported on their inspection of the Barking station.[[205]](#footnote-205) Perkins praised the Barking Station for its design and layout which was ‘such that it virtually comprised two entirely separate units’, the implication being that if one were debilitated by bombing, the other could maintain output.[[206]](#footnote-206) The echoes of the Air Ministry’s input from a decade earlier were evident in the praise its design received from the Air Commandant in 1935. Extensions to the Barking plant by the owners, the County of London Electric Supply Company, during the 1930s were carried out under scrutiny and in close co-ordination with the Electricity Commission based within the Ministry of Transport.

As part of the consultation and processes of approval for extensions, the Commissioners sent the plans for the extension of the plant to the ARP Department for approval.[[207]](#footnote-207) The ARP Department had seemingly become a normal piece of the bureaucratic machinery behind the development of public utility companies. Consent to the extensions came after Electricity Commissioner John Kennedy had received a minute from a colleague regarding the Barking extension. The minute raised just three outstanding concerns over the extension: dust; grit and smoke emission; and air raid precautions.[[208]](#footnote-208) ARP had become an ongoing concern for utility companies by the mid-1930s, but was still an uncertain science. Nevertheless, war preparations had been proceeding quietly in the majority of undertakings since 1936, and were intensified in 1938.[[209]](#footnote-209) The government’s approach to ARP was complicated by the conflicts of priorities in peace and war in a period when war was not yet considered inevitable by policy makers.

The government’s concern about how to stress the importance of ARP measures, whilst simultaneously stressing that war was not imminent, or inevitable, was reiterated in local authorities and those involved in passive defence. In the meetings that preceded the conferences in 1935, the Electricity Commission argued that the action that was being undertaken to protect electricity supply from air raids did not reflect an increased threat of war. John Kennedy circulated a memorandum in advance of the October 1934 conference.[[210]](#footnote-210) In the memo, Kennedy began by asserting that ‘the present action is wholly unconnected with the international situation, and does not imply the possibility of a breakdown of existing machinery for the preservation of peace’.[[211]](#footnote-211) The attempt to isolate the need for passive defence measures against air raids from the contemporary international political context, and include such considerations in standard practice in the electricity industry reflects how air power had transformed the idea of war. Air power meant that war could start at a moment’s notice, while air raids were of such devastating power that war could be over as quickly and as suddenly as it had begun. The Electricity Commission’s denial that the immediate international situation was influencing the need for ARP measures was echoed in the first memorandum sent by the ARP Department to local authorities in 1935. The second paragraph of the memorandum stressed that the need for ARP measures ‘in no way implies a risk of war in the near future; nor does it imply any relaxation of effort […] to ensure the promotion and maintenance of peace by all means in [the government’s] power’. The memo went on to detail how air power had changed war and it was now ‘impossible to guarantee immunity from attack’.[[212]](#footnote-212)

The government saw the threat from the air as a constant danger that existed outside the immediate political context. An important part in the changing conceptions of warfare in the twentieth century was that, as a result of air power, the danger was unpredictable, and to an extent, uncontrollable and uncontainable. The chronic uncertainty engendered by air power and the military theorists who projected it onto cities, was reflected in the ongoing, but always incomplete ARP work carried out in the electricity industry in this period. The anxiety of the 1920s continued into the 1930s as the danger from the air coloured conceptions of war and peace and contributed to the increasing difficulty of clearly demarcating one from the other. If air war could begin at any minute with no warning, and cities would be the targets, it was necessary for the authorities to act in anticipation. As the ARP memo to councils stressed, ‘preparations must be made in time of peace’. [[213]](#footnote-213)

It was, however, ambiguous for the government to prepare for war while visibly pursuing peace. ARP was viewed suspiciously by those who expressed an anti-war sentiment in Britain, and was linked with the militarisation of society and the civilian population.[[214]](#footnote-214) The development of air power and the theory of strategic bombing had, in fact, collapsed the boundaries between civilian and military by recasting cities and their inhabitants as both vital forces in war production and as primary targets for air raids. The attempts to prepare for air raids confirmed the re-designation of cities, and did not challenge the premise that modern war meant air raids against civilians. As a result of this tension, the question of responsibility for ARP locally was a particularly problematic one, and at this point the arrangements for passive defence were only ever voluntary. Paragraph 17 of the first ARP memo to local authorities encouraged them to consider ARP in as broad a range of circumstances as possible, while not actually requiring them to make any material preparations.

The Government would also invite local authorities to pay regard to the factors which have a bearing on the protection of the civil population against the effects of air attack when they are preparing schemes for town planning, for the lay-out of water and drainage systems, and for the provision of public works generally.[[215]](#footnote-215)

Air war was changing how the built environment was seen by those with responsibility for its development. The government faced increasing difficulty in publicly urging passive defence precautions while denying that war was coming. Fear of the threat from the air to the infrastructure and networks of life manifested itself in the discussions and investigations which arose following a fire at the Valley Road electricity station in Bradford in February 1936. The response to the fire reflects broader ways in which infrastructure and cities were perceived in the context of anticipated future air war.

On a late February evening a serious fire broke out at the main generating station of the Bradford Corporation. The electricity supply for the town failed with streets and buildings turned dark, trams stopping dead in the road, factory machinery halted, and cinema and theatre programmes cancelled. Local shops saw a sudden demand for candles and oil lamps as the fire, which had engulfed the crucial switchgear room halting the grid supply, burst through the roof and extended twenty feet into the sky. The Valley Road station, close to the centre of the city, was situated along the canal, with the Midland Railway station, the Theatre Royal, the Royal Infirmary and the Town Hall all within a mile radius. Immediately, those connected to the industry saw the consequences of the fire and subsequent breakdown of electricity supply as deeply troubling. The deputy city electrical engineer, Mr W. Dundas, described the incident to the *Manchester Guardian* as ‘an absolute tragedy’, the magnitude of which he believed had never been seen before in Britain. The description in the newspaper of the moments when the electricity flow stopped told of a city thrown into darkness and public transport struck motionless:

The first intimation the majority of people had of the breakdown was when trams and trackless trolley vehicles were plunged into darkness and came to a standstill. Cinema lights failed and simultaneously the lights of shops, hotels, streets, and offices were extinguished […].

The blackout extended over many miles around the city. Hotels and cafés had to use candle-light, and those shops and premises which had alternative gas supplies hastily called them into use. At most shops there was a brisk demand for candles and oil lamps. Trams and trackless trolley vehicles […] were incapacitated and vehicles were stopped at various points on the roads.

The stoppage of electricity put the city into an immediate state of emergency. By the afternoon of the day following the fire, many shops were sold out of candles, and those that were still available had increased in price by fifty per cent.[[216]](#footnote-216) Repair work was quickly undertaken and by the following evening the city centre was receiving electricity, although private houses and factories continued to be without supply. The Ministry of Transport responded quickly to the fire and immediately saw the disruption to supply and the disabling of Bradford in the context of future air raids.

The Ministry of Transport saw the sight of trams left stranded on the roads, with streets and buildings without light and factory machinery rendered redundant, as a troubling foreshadow of the disruption that could be caused by attacks on the electricity industry. The Permanent Under-Secretary of the Ministry of Transport, Cyril Hurcomb, wrote to John Snell at the Electricity Commission a few days after the Bradford fire and asserted that the reports and investigations into the fire should be ‘considered in relation to major national emergencies’.[[217]](#footnote-217) The implications of the Bradford fire were discussed in correspondence in the weeks after the fire between the Ministry of Transport and the Electricity Commissioners.[[218]](#footnote-218) The Electricity Commission appointed an investigation committee to evaluate the problems which had led to the fire and the breakdown of supply in Bradford, and consider what steps should be taken to avoid a recurrence. This committee was established with the explicit aim of situating the lessons from Bradford into the context of preparations for the protection of utility infrastructure in the event of air raids. The official response to the Bradford fire recast an accidental fire in a switchgear house as an indicator and indictment of the electricity industry’s ability to maintain supply when under the exigencies of air war.

After the immediate investigations were made into what had happened at Valley Road, which culminated in a three day hearing held in Bradford Town Hall in March and April, the Electricity Commission’s newly appointed investigation committee first met in July of that year.[[219]](#footnote-219) The meeting was held a few days after a question in parliament to Thomas Inskip, the Minister for the Co-ordination of Defence, from Eric Errington. Errington reflected the general concerns that had been evoked by the Bradford fire when he asked Inskip: ‘what steps are being taken to ensure alternative supplies of electricity in the event of destruction of supply lines and power stations by hostile action?’[[220]](#footnote-220) The work of the investigation committee was to consider the technical and structural precautions that could be taken to protect plant, machinery, cables and the workers at the stations. Some of the same questions that had occupied the Air Ministry in their discussions with the Electricity Commission over extensions to power stations in Greater London in 1924 were repeated here. The separation of switchgear houses was still the number one concern. The fact that the Bradford fire had occurred in a switchgear house which could then not be accessed reinforced the importance of this change.[[221]](#footnote-221)

The Bradford fire had starkly illustrated the many problems still faced by the electricity industry to secure and maintain supply when faced with fire or failure in a major generating station. The committee’s initial recommendations included instigating a regime of regular testing of switchgear insulation to protect against fire, the results of which should be closely maintained and observed.[[222]](#footnote-222) New standards in the maintenance of records and more regular testing of machinery were in part a response to the concerns that air raids would disable the country’s electricity supply, having a devastating impact on both civilian morale and the effective functioning of industry. The increasing central regulation of the industry occurred in the context of fear about air raids, and in the wake of the fire at Bradford. The Electricity Commission’s investigations and recommendations for fire precautions were situated within the ongoing process of building passive defence measures into the structure of the national electricity network. As Hannah argues, the previously prominent issues faced by undertakings were, as the 1930s continued, ‘dwarfed in the minds of the Government, and increasingly in the minds of the undertakings’ senior men, by the growing threat of war’.[[223]](#footnote-223) In response to the committee’s work the British Electrical and Allied Industries Research Association contacted the Commissioners to raise awareness of their own work on fire risks. The ERA had been working on developing precautions against fire from ‘internal or external sources much as air raids’.[[224]](#footnote-224) The work of various researchers and investigators both before and after the Bradford fire explicitly equated the danger of fire from faulty equipment, such as overheating switchgear, with the danger posed by air raids. The expectations of air war were such that both the private and public groups working in the electricity industry treated air raids in the same way as they treated more mundane potential incidents that could interrupt supply.

The extent to which power stations were viewed in terms of their likely role as targets for bombing was further demonstrated in the proposed closing spectacular of the 1936 RAF Hendon air show. The 1936 show would be the seventeenth annual celebration of the technology of aviation, and the skill and daring of the pilots, to be held at Hendon. In February, five months before the display was scheduled to take place, and just two days after the fire broke out in Bradford, *The Evening Standard* reported that the air show’s grand finale would be ‘a bomber attack on a modern power station’. As in previous years, models for the show would be made by the British film company, Gaumont British Picture Corporation Studios. The partnership created a conjunction of the immediate reality of the loud and urgent planes diving and spinning in the sky, and the artificial reality of cinema and set design. This show was scheduled to take place in the same year as William Cameron Menzies’ and Alexander Korda’s film based on a H.G. Wells novel, *Things to Come* was released.[[225]](#footnote-225) The spectators would witness what they had been imagining, reading about and now watching in the cinema, destruction from the sky. The science fiction of the cinema would be replicated in a live action show of bombing, and what Paul Virilio calls the ‘osmosis between industrialized warfare and cinema’ would be demonstrated in a field in Hendon.[[226]](#footnote-226)

The use of a film company to provide the sets for the show, simultaneously highlighted the unreality of the spectacle and emphasised the desire amongst the show’s planners to achieve a high level of authenticity. The *Standard’s* air correspondent, William Courtenay, quoted W. M. Murton, an art director at Gaumont British, who described how a model power station, built on a three hundred foot frontage, would be placed amongst model houses and other civilian buildings. The accuracy of the buildings was important and Murton assured Courtenay that his company would ‘reproduce in every detail one of the most up-to-date power stations in the country’. [[227]](#footnote-227)

The aim of the show was to illustrate accurate bombing by destroying the power station while not damaging the surrounding houses and civilian population. Collapsing of the distinctions between real and imaginary, however, was a double-sided coin. It would demonstrate the power of British military aviation, but simultaneously highlight the spectators own vulnerability. When the Electricity Commission became aware of this plan, it contacted the RAF to object. An annotated clipping of the *Evening Standard* article held in the Commission’s papers suggests that after contact with a Wing Commander the proposed display was modified.[[228]](#footnote-228) When the display did take place in June of that year the set piece was in fact a representation of the ‘air policing’ that the RAF had been practising in Iraq, Afghanistan and elsewhere. The feature, called ‘White Barbarians’, involved a number of airmen dressed in ‘native’ costume acting as a group of ‘marauders, an unknown race of white barbarians’, who, having looted somebody, were then chased down and ‘dealt with by No. 32 (Fighter) Squadron’.[[229]](#footnote-229)

The display of RAF power was kept within the established imagery of bombing in British colonies to control the subjugated population. Both the sight of bombers diving down to destroy a power station and the fact that the accuracy of bombing was hardly clear and may be exposed in such a display contributed to the decision to block this proposal, and replace it with a less uncomfortable one for the audience. The disruption caused to electricity supply by the fire in Bradford cast troubling images of how the grid would struggle to maintain output in the event of aerial war, but the consequences of air raids were rhetorically increased in the winter of 1936 when the Air Ministry revised its projections of the likely weight of a bombing offensive against Britain.

The Air Ministry refigured earlier estimates that it had sustained from 1924 and dramatically scaled them up. By 1937, after studying the German air force, the weight of bombs that the Air Staff predicted could be dropped on Britain during the early stages of war more than tripled. The Air Staff now asserted that the weight of bombs that could be dropped on British cities daily during the first stages of war was no less than 600 tons, as opposed to the earlier estimate of 150 tons. The increase in daily estimates was coupled with the stated possibility that a special bombing effort by Germany could see up to 3,500 tons dropped in the first twenty-four hours. Technological advances increased the bombing capacity of the enemy and meant that the bombs themselves were likely to be more deadly. The estimates for casualties in the first weeks of war with bombs dropped at a rate of 600 tons per day was 200,000 casualties per week, 66,000 of whom would be killed.[[230]](#footnote-230)

The Warren Fisher Committee examined the revised estimates, and they were submitted to the Home Office, before being finally approved by the Committee of Imperial Defence in October 1937.[[231]](#footnote-231) From the winter of 1936 to the official acceptance of the revised bombing estimates the following year the importance of ARP was growing. ARP was in a tense paralysis as the Air Staff stressed the likelihood of a massive aerial onslaught the moment war broke out, the predicted extent of which had been dramatically increased in the meantime, the local authorities united to demand that central government provide full grants for ARP work in their regions.[[232]](#footnote-232) The stakes were ever higher, but progress on passive defence was being held back by finance. The approach to ARP from the government since 1935 had been one of voluntary responsibilities from councils, citizens and companies, but as the threat grew larger, the need for legislation grew in turn. The positioning of ARP in relation to rearmament and military preparations for war illustrated how passive defence from air attack was separate from other military actions, and raises questions about the role the expectation of war played in peacetime planning.

**Preparing for War: Rearmament and ARP in Peacetime**

Air Raid Precautions had a unique role in the discussions of the preparedness of Britain, and British cities, for war. The largely civilian and voluntary nature of ARP proposals had cast it as a peacetime activity that was to some extent isolated from the immediate political contexts of imminent war with Germany. The relatively small role accorded to ARP in the official military programmes of rearmament in anticipation of war did not indicate a lack of interest in ARP, but rather demonstrated that passive defence was not something which should be viewed as necessarily contingent to the contemporary international situation. Air power had refigured the notion of war and peace, and the government saw ARP as a continuous element in future planning that built the expectations of future war into the material environment.

From 1935 onwards, the government presented an annual White Paper to Parliament. The ‘Statement relating to Defence’ detailed the government’s policies in respect of imperial defence and the worrying international situation which ‘necessitated their proposals’. The 1936 paper noted that since the previous year ‘conditions in the international field have deteriorated considerably’.[[233]](#footnote-233) The government argued in the report that the deterioration in the international situation had significantly changed how Parliament should view the defence requirements of Britain.

Taking “risks for peace” has not removed the dangers of war. We have really no alternative in the present state of the world but to review our defences and to provide the necessary means both of safeguarding ourselves against aggression and of playing our part in the enforcement by common action of international obligations.[[234]](#footnote-234)

In this context, the government stressed that rearmament was required to provide a deterrent to attack. The historiography of Britain’s defence services in the period after the First World War has often contended that drastic cuts and dangerous neglect of the army, navy and air force left Britain in a militarily deficient and vulnerable state in comparison with other world powers.[[235]](#footnote-235) As David Edgerton has argued, however, this picture has been clouded by the common assumption by many historians that a reduction in military strength from 1918 levels represented a profound moment of disarmament, rather than a reversion to peacetime requirements.[[236]](#footnote-236)

The annual defence statements addressed the condition of the three armed services, and detailed the extent of reinforcement that may be required to form an adequate defence. The influence of air power loomed large over these discussions of future war, as it had for decades. In the 1936 paper, building up the RAF to function as an effective deterrent to attacks against Britain was described as ‘the most urgent and important of our defence requirements’.

In 1936, the section of the White Paper dealing with air power focussed on the offensive capabilities of Britain, rather than any defensive requirements. The paper defined the role of the Royal Air Force as providing an ‘effective deterrent to any attack upon the vital interests of this country’. The strategy of continuous offensive that had taken root in the Air Ministry in the decade in which it was under Hugh Trenchard’s leadership, persisted in this description of the deterrent effect of air power. Air raid precautions received little mention in the 1936 paper, with passive defence accorded a single paragraph out of sixty-two. The reasoning was that plans had been prepared over previous years and satisfactory progress was being made.[[237]](#footnote-237) The reality was that ARP had been established in the Home Office just a year earlier, and the political support this evidenced had, in fact, yielded few results. The short attention given to ARP in the 1936 White Paper indicates the lingering influence of the air war strategy put forward by the Air Ministry for the previous twenty years, namely that offensive power as a deterrent would be more effective than any passive defences. Add to this the voluntary and civilian nature of ARP following its unveiling in 1935, and the small part it played in the analysis of Britain’s defence position in 1936 can perhaps be explained. Domestic events like the fire in Bradford’s electricity station, which brought the nightmare of air war closer to reality, were analysed in the context of future aerial war and contributed towards a renewed focus on ARP.

In 1937 the Cabinet discussions began to move away from the more abstract analysis of air war to focus on the visible implications of the bombardments in Spain.[[238]](#footnote-238) The attacks on Guernica and Barcelona demonstrated that Germany and Italy were willing and able to bomb urban centres. Meanwhile, the British government continued to produce defence audits and war predictions. In February 1937, the Chiefs of Staff presented a review of the progress of British preparations for war to the Cabinet. The main body of the report dealt with analysis of the relative strengths of the armed forces of a number of major powers. Further analysis addressed the perceived ‘likelihood of powers considering themselves ready for war in May 1937’.[[239]](#footnote-239) Thomas Inskip, the Minister for Co-ordination of Defence, wrote in his foreword to the report that ‘in order to complete the picture’, an analysis by the ARP department of the probable position of British ARP by spring 1937, was included as an appendix to the report.[[240]](#footnote-240) This amounted to a much more considered treatment of ARP than in the 1936 White Paper, while still treating ARP as separate to the rearmament programme that was specific to the contemporary situation. The ARP department’s report stressed how a meaningful prediction of the future conditions of passive defence was difficult given the prevailing ‘voluntary system of enlisting the aid and sympathy of local authorities’. The problem of responsibility and cost in peacetime was as apparent in dealing with private utility firms as it was with local authorities. On the topic of the maintenance of essential public services, the report repeated the difficulty of making any predictions with regards to future ARP provision. Protection of the three main services (water, gas and electricity), depended ‘largely on the decision of the perspective undertakings as to the financial liability involved’.[[241]](#footnote-241)

The vital services were given special consideration by the CID due to their importance in maintaining war production and the daily life of the cities. An interim report by the Sub-committee on the Protection of Vital Services from December 1937 detailed the position of passive defence in two key services. Appointed with terms of reference to set out the measures to be taken ‘in time of peace, for the protection and maintenance in war of those public or essential services which are vital to the effective prosecution of war and the life on the community’, the sub-committee reported on the gas and electricity industries.[[242]](#footnote-242) The report deals in detail with ARP and the issues of responsibility for their provision, being either with the government or with the undertakings themselves. The sub-committee broke the provision of passive defence measures into two categories, the standard ARP measures, and ‘special measures for additional protection to vital portions of the machinery for production and distribution’.[[243]](#footnote-243)

The report proposed that financial assistance from central government should be provided only for the ‘special measures’, and on the condition that the industries themselves meet the requirements of the standard ARP measures.[[244]](#footnote-244) The companies were, however, clearly unwilling to consider large capital expenditure for passive defence measures which they considered the responsibility of central government. The key point in the government’s argument that utility companies should fund the standard precautions stipulated by the ARP department, stressed the peacetime benefits of carrying out the works, and their position in the more general development of the nation’s infrastructure networks.

The sub-committee suggested that the state ‘could require the industries to provide, without Exchequer assistance, reasonable precautionary measures to guard against the risk of interruption of their services in war’ as part of the conditions associated with the monopoly status afforded by government.[[245]](#footnote-245) In this respect, the sub-committee proposed that defensive measures designed to maintain supply during war would became a permanent feature of the utility industries material development. The ARP Department cited the division of switch houses into two buildings as the most important special measure for electricity undertakings to implement. For the sub-committee, the peacetime benefits of having two separate switch houses were clear.[[246]](#footnote-246) They made reference to the fire at the Bradford electricity plant as an example of how a fire in the switch house had stopped all supply, whereas if the ARP measures of divided switch houses had been in place, supply would have continued.[[247]](#footnote-247)

ARP advocates argued that the need for self-provision of defensive measures by the industry would also have a beneficial psychological effect to the country at large. The sub-committee argued that the importance of ARP would be demonstrated by industry taking responsibility for carrying out the necessary precautions. ‘There is’, the report stressed, ‘a great need to make every citizen in this country, including those at the head of large industrial and commercial organisations, more sensible of the need for air raid precaution measures and their own individual responsibility in regard to them.’[[248]](#footnote-248) The government was looking for a way to justify the costs and delegate some of the responsibilities for ARP to private companies and citizens, while linking the notion of citizenship with vulnerability to air raids.[[249]](#footnote-249)

The difficulties in legislating for the unknown were clearly present in debates about ARP requirements. It was still hard to quantify the danger, problems which were complicated by the strong pacifist movement and the government’s desire to be seen to be actively pursuing peace above all else.[[250]](#footnote-250) The lingering influence of fictionalised air war and the re-estimation of German bombing strength by the Air Ministry had re-affirmed the power of the air in the government’s imagination. The dire casualty predictions of the Air Ministry were accompanied with equally terrible predictions of the effect attacks would have on the nation’s psychological wellbeing.[[251]](#footnote-251) As expectations of war grew in the mid-thirties, the strength of the Luftwaffe and the increasing likeliness of war, made Trenchard’s doctrine of the continuous offensive less palatable. As a consequence of the shift to possible defensive measures, more attention was paid towards air raid precautions both in government and in fiction.[[252]](#footnote-252) In this context, the maintenance of everyday life through the protection of key utilities was as important as ever to the country’s war effort, and crucially, its ability to withstand aerial bombardment on the scale officials envisaged. Survival was understood in terms of endurance in the cities and this led to a renewed focus on the built environment as a battlefield in air war.

The government’s interest in ARP in cities led them to approach technical experts to offer advice on passive defence in cities. The professionals who might be involved in the design and building of the structures that could shield civilians from the bombs were increasingly preoccupied with discussions about ARP. Architectural journals increasingly discussed structural precautions and called for more clarity from the government. The ARP Department publicly approached architects and engineers and organised a conference in partnership with the RIBA on the subject of structural precautions against air raids. Over three days in June 1938, the RIBA hosted the conference at their Portland Place building in the West End. The conference was, at the Home Office’s request, open to all registered architects, with local authorities invited to send representatives. In the introduction to the subsequent publication in the *Journal of the RIBA* of the lectures and discussions, which extended to fifty two pages, the conference was described as ‘the biggest task ever laid on the RIBA, or the profession by the government of this country’.[[253]](#footnote-253)

The role of architects in ARP had been officially established since the structural precautions committee was formed in 1935, and since November 1936 a section of the *Journal’s* review of periodicals was devoted to discussions of ARP in other journals across the world.[[254]](#footnote-254) On the first day of the conference, architects Thomas Scott and Eric Bird outlined the key issues facing architects with regards to passive defence. Although there were complaints in the hall that undertaking such preparatory work was making war more likely, the consensus was that architects must use their skill and expertise in any way possible to attempt to combat what Scott described as ‘the hideous and tremendous forces of air attack as depicted by the popular Press’. The fact of having such a large conference in peacetime was indicative of the increasingly mainstream position of ARP in public discourse, particularly in relation to the future development of technology and the built environment. As the design and plan of electricity stations had been subject to discussions about protection from air attack, so architects at the conference situated structural precautions against bombardment as central to the future of architecture. Scott stressed in his speech how ‘peacetime precautions’ were clearly preferable to ‘emergency measures’ rushed into place when a war was declared. Since air power had superseded older notions of war, it could not be assumed that there would be time to prepare. If an enemy decided to launch air attacks against British cities without formal declarations of war, there was a genuine fear that there could be little or no warning of the attack. One of the effects of the speed and unpredictability of attack afforded by air power was that the threat may grow or fall in line with the contemporary political and international circumstances, but it would never be truly diminished. Architects took account of this by bringing ARP into the standard considerations in building design.

The division of switchgear houses in electricity stations and the desire to bury electricity cables demonstrates that the process of bringing ARP into the mainstream in planning and design had been in progress for over a decade. Scott argued that the inclusion of structural precautions in design should be ‘a new and permanent factor in the design and construction of buildings’. This could be done, he argued, ‘without detriment to their artistic quality and efficiency’. The assertion of the permanence of ARP removed it from its historical context and obscured the political decisions that air war was always contingent upon. Air power had ushered in an era of constant danger and vulnerability, of constant pre-war. Scott’s assertion later in his speech that the problems of structural precautions were strictly architectural, and were not an ‘engineering or military problem’, further demonstrated that ARP was considered separate from the political context.[[255]](#footnote-255) As with the Bradford electricity station, where the danger of fire was linked to the less accidental danger of air attack, the architecture of future buildings was influenced by still uncertain consequences of aerial war. The aesthetic values of building were being recast by the inclusion of structural precautions against air attack. In his address on principles of structural ARP, Eric Bird described ‘the ideal building from an ARP point of view’, as:

one of which the structure is a steel or reinforced concrete frame having light panel walls or large areas of glass and fully fire-resisting, provided its occupant can all be contained in a properly designed basement shelter, preferably of reinforced concrete.

Bird seems to have described an archetypal modernist building. The reinforced basement shelter beneath light walls, and much glass, would in this scheme offer good protection to residents. Steel architectural skeletons overlain with light walls and glass would fall without crushing the people safely ensconced in the basements below. Bird’s analysis included the peacetime benefits of building with ARP in mind, suggesting that the provision of reinforced basements could be used for recreation rooms, communal laundries and bicycle stores. Bird also referred to department stores and suggested that more follow the lead of others who had taken the view that ARP might be considered as a type of insurance against disruptions to business.[[256]](#footnote-256)

From these discussions it is clear that RIBA architects viewed ARP largely as a civilian matter, and it needed to be incorporated into the standard factors that were considered in new buildings. The conference at the RIBA was an example of how ARP was separated from other defence measures and broader rearmament and war preparation. At the heart of the discussions of passive defence measures was the fear that wide scale bombing and disruption would have a catastrophic effect on the morale of the country. As in broader discussions of the problems of urban areas, architects drew together the vulnerability to air attack of the buildings and people of urban centres. Both the low specification, densely packed tenements that housed much of the urban population, and the people who lived there, were particularly vulnerable. The overcrowded urban areas of East London provided, in the RIBA’s words ‘a certain and enviable target for any ruthless enemy’.[[257]](#footnote-257)

Scott expressed a common concern that while shelters could provide a measure of psychological reassurance, the likely ineffectiveness of them against direct hits could result in panic and a mistrust of shelters and those who provided them, which would be greater than if there were no shelters at all.[[258]](#footnote-258) The maintenance of the provision of vital services was thus a less complicated way to attempt to protect the daily life and the morale of the country.[[259]](#footnote-259) As the international situation deteriorated in 1938, and the months following the conference saw the crisis in Czechoslovakia develop, preparations for war took on heightened urgency.

**Crisis, Civil Defence and the Role of Town Planning**

The crisis in the Sudetenland in 1938 prompted a wide-ranging review of the emergency measures taken in regard to civil defence, and exposed the uncertainty about a future ‘knock-out blow’ amongst the chiefs of staff who, in Wesley Wark’s words, had left the question ‘to the imagination of ministers’.[[260]](#footnote-260) Different departments were asked by the CID to quickly produce reports before a conference was held to discuss the findings under the Chairmanship of Warren Fisher, who had gained considerable experience and knowledge of ARP during the preparation of the 1937 report. The review into precautionary measures taken during September 1938 was written up in November and drew three primary conclusions: a new approach needed to be taken to issue of secrecy; the responsibility for civilian evacuation should be transferred to the Minster for Health; and plans for the movement of government in event of war should be re-considered.[[261]](#footnote-261) The implications for secrecy and the processes of moving the apparatus of government reflected the broader concerns about the time taken to shift from a peacetime footing to a wartime one. The new realities of modern war meant that the old ideas about war and peace were increasingly called into question.

The report stated that conditions of modern warfare made the country’s speed of transition from a peace to a war footing of utmost importance, particularly in relation to civil defence measures. One of the key perceived hindrances to a successful and rapid transition to war was the level of secrecy attached to civil defence measures. Secrecy had, in the view of the participants of the conference, had a significant impact on both ‘the planning work and the efficiency of the measures themselves in a crisis’. The government’s view of modern war, and that it could be started ‘with little or no warning and without a declaration of war’, meant that sufficient measures must be taken in peace to limit the vulnerability of Britain to an unforeseen attack. The unpredictability of war, together with the unprecedented reach of air forces, and the legitimisation of cities as targets, contributed to the government’s vision that ‘from the first moment of hostilities the life of every section of the community may be gravely affected’.

The implications of such a vision of future war were significant for the processes of planning, and for the use of secrecy in relation to them. The conference agreed that, whereas in previous years emergency measures could be left to improvisation in the days before and the early stages of a conflict, modern war meant that the completion of civil defence measures may ‘have to be carried out in full in peace’. The need for a rapid transition between a peace and a war footing was such that large-scale civil defence preparations, with ARP high amongst them, must be in place and ready to set in motion at a moment’s notice. The whole notion of a distinction between peacetime and wartime was troubled by the potential immediacy of air war and the reach of the bombers. The speed of the bombers had to be met by the speed of response in civil defence. The complications of organising national civil defence were such that the only way the conference saw of achieving this was by full preparations being made and put into place during peacetime. In order to make this possible, secrecy regulation would need to be modified to provide sufficient information to regional and local officials to carry out the required work. The conference unanimously concluded that secrecy regulations should be dramatically relaxed for civil defence measures: ‘the general principle should be to reduce the secrecy requirements to a minimum rather than maintain them at a maximum’.[[262]](#footnote-262)

The recommendation that secrecy around civil defence should be lowered reflected the broader process of closing the gap between the peace and war structures of national government. As the need for a rapid transition between these two states of being became a dominant concern following the 1938 crisis, it followed that the exigencies of war must bleed into the structures of everyday life in peace. The connections between war and peace in survival and the continuation of everyday life, was nowhere more apparent than in the provision and protection of the public utilities and vital services in cities. Government planning and pressure on private utility firms to progress their passive defence increased.[[263]](#footnote-263) ARP was a central element to the analysis of civil defence measures taken during the crisis.

The Czech crisis offered an opportunity to review the current arrangements and response of departments and redesign plans to take account of the evident failings. The Home Office’s section of the report centred on the state of ARP and how it could be improved. In the first months of 1938 the ARP Department had been enlarged and reorganised with new appointments. New offices were opened in Leeds, Birmingham, Edinburgh, Newcastle, Liverpool and Nottingham in January 1938, with more opened in Reading, Bristol, Glasgow, Cambridge and Cardiff in the following months.[[264]](#footnote-264) The ARP Department’s staff was mainly composed of civil servants, former colonial officials and retired members of the armed forces. The employment of men retired from other posts was not ideal in the context of ARP when the department had to come to terms with a new branch of engineering against air attack. [[265]](#footnote-265)

The failings of the ARP department were thrown into relief by the response to the crisis in the autumn of 1938, despite the distribution of 38 million civilian gas masks.[[266]](#footnote-266) When war seemed imminent, there were no public shelters. The authority’s response was to dig miles of shallow trenches and install anti-aircraft guns in public parks.[[267]](#footnote-267) The continuous evocations of devastating aerial war in the previous twenty years had coloured perceptions to such an extent that in 1938 the crisis had little to do with Czechoslovakia, and instead represented the beginnings of a battle for the very future of civilisation.[[268]](#footnote-268) The short-lived public euphoria that met Chamberlain’s return from Munich reflected the gravity of what war meant to the British people. Republican Spain was defeated, Prague was occupied, and the Munich reprieve had been overwhelmed by the feeling that war was indeed coming. The years of uncertainty and anxiety were giving way to a view of war that saw it, in Richard Overy’s words, ‘as a possible means to resolve not just narrow issues of foreign policy but other issues to do with the political future and the progress of European civilization’.[[269]](#footnote-269)

The aerial bombardment of Spanish towns and cities was an object lesson in the power of the air, and according to the Chiefs of Staff, Britain was behind both France and Germany in terms of passive defence arrangements.[[270]](#footnote-270) Newsreels which vividly displayed the consequences of the air attacks in Spain to the British public were an important factor in challenging the accepted wisdom of the Air Staff.[[271]](#footnote-271) The shift in emphasis to defence against bombing undermined the basic assumption that lay at the heart of twenty years of air power theory. The RAF had been built up under Trenchard on the basis that public defence from aerial bombardment was virtually impossible. With the Munich crisis and the increasing clamour for shelters the RAF’s aggressive declaratory policy had, as Tami Biddle says, ‘come home to roost’.[[272]](#footnote-272) Through the strategy of publicly stressing the power of the air, the RAF and Air Ministry had secured a strong position for an air arm in the British armed forces, but had simultaneously helped to create an atmosphere of extreme anxiety in Britain that was evidenced during the autumn of 1938.[[273]](#footnote-273) While debates continued over air war strategy and its effectiveness, public calls for air raid shelters and increased government focus on defence at home contributed to the development of new civil defence policies.

The crisis of 1938 focussed the minds of parliament on ARP and the new language of civil defence. The provision of shelters and the arrangements for civilian evacuation had gained new importance. Government preparations for air raids had been dominated by fears of gas attacks. By the time the ARP Handbook No.5 on structural precautions was belatedly published in 1939, four years behind schedule, numerous publications on protection against gas attacks had been published, sold in their hundreds of thousands, revised and re-published.[[274]](#footnote-274) The need for shelters and evacuation were framed by the return to the centre of debate of fears over the ‘moral effect’ and the dislocation of daily life, which the government believed may have resulted in a catastrophic social breakdown.

In his report presented to the CID in September 1938, John Anderson argued that at the heart of the problem of air attacks, particularly in London, was the ability to maintain public order. An influential report by two of the central figures in ARP and civil preparations for war in Britain, Warren Fisher and Maurice Hankey, brought the issue of the ‘moral effect’ and the threat to order at home in the event of a large-scale bombing offensive back to the centre of the agenda.[[275]](#footnote-275) In the period of development of ARP since 1935, the ‘moral effect’ had largely been relegated to the back of the debate by concerns about financing structural precautions and the mechanisms of government control. The emergence of the term civil defence at this time reflected an attempt to come to turns with and prepare for almost all the exceptional measures that civil departments would be tasked with in the event of war. The shift in focus to the home front, and insecurities within Britain was also reflected in the name given to the new war-time Ministry that grew out of the Fisher-Hankey proposals from 1938, the Ministry for Home Security.[[276]](#footnote-276)

The focus on home security as a key threat under aerial bombardment was a return to a dominant theme in the decades immediately following the First World War. From 1935 when the government began to discuss ARP in public, it placed the emphasis on its civilian and voluntary nature. ARP schemes became compulsory when the Air-Raid Precautions Act was passed in December 1937, coming into force the following month.[[277]](#footnote-277) Uncertainty continued, however, and the as the crisis of 1938 unfolded the importance of ARP was heightened. Public order under attack could not be assumed and the role of the army in maintaining it should be clarified, with precautions taken to ensure that sufficient army units would be made available for policing the cities.[[278]](#footnote-278) The provision of shelters was aimed at staving off panic when the air raids came, but in the Air Ministry’s established analysis of the ‘moral effect’, the dislocation of daily life was presented as the primary factor in maintaining public morale, and quelling popular dissent at home. The government hoped that the maintenance of public utilities through the protection of key infrastructure could keep the country functioning during a war. Successful and rigorous planning would be essential if the cities were to survive air raids. Roads and transport infrastructure were of particular importance as they would enable people and materials to move quickly into and out of cities under attack.

In March 1939 former Minister of Transport and then London County Council leader Herbert Morrison, an outspoken supporter of planning who could claim the creation of the London Passenger Transport Board and the Metropolitan Green Belt amongst his successes, opened an exhibition at the RIBA on road architecture. Morrison stressed his belief that road schemes were ‘the backbone of town planning’, and that the role of the modern architect was not building luxury buildings. ‘The architect’, Morrison said, ‘has functions which are far beyond those considerations’.[[279]](#footnote-279) If planning were to be successful, Morrison argued, the vested interests that had held it back for so many years must be swept away. The congestion in the cities that he sought to alleviate through planning was placed explicitly and fearfully in the context of aerial war by one of the posters from the exhibition, which was subsequently reproduced in the journal. The poster showed bombs falling onto a patch of land drawn as a building with brick exterior walls, while people fled away from the centre.



Figure . Poster from RIBA Exhibition March 1939, *Journal of the RIBA* 46 (20 March 1939), p. 509

The subtitle of the vivid imagery of smoke and fires rising up beneath steady stream of bombs, ‘THE DANGER OF CONGESTED AREAS’, reflects how congestion in cities, which had long been criticised on the ground of hygiene, efficiency, and the germination of slums, had been reconfigured by the growth of air power. The same congested areas that had caused concern in the nineteenth century, which Eric Bird described as ‘the rotten old cores of towns consisting of huddled buildings of poor construction’, were re-designated as the most vulnerable points to air attack. With the expectation of war hardening, Bird argued at the end of 1938 that ‘mankind would even bless the threat of air-bombing’ if it had forced them to rebuild their towns, ‘with widely-spaced multi-floor framed buildings in the centres and gardens suburbs on the outskirts’.[[280]](#footnote-280) The fear of imminent war only made clear and urgent the already well-rehearsed drawbacks of such thickly populated urban areas.[[281]](#footnote-281)

The gravity of ARP lent weight to a scientific approach to design, and the self-image of architects and planners as essential to the future of the country. The crisis had shown how urgent planning for defence was. The task for architects and planners was now, as William Holford said in a speech to RIBA in December:

To plan the fabric of civilian health and civilian protection, to plan for education and housing, to plan for large-scale evacuation (not only as regards camp accommodation but for the whole altered pattern of daily life which an emergency might create), to plan new towns and cities – in a word to plan the militant peace which to-day is the only alternative to a barbarous war.[[282]](#footnote-282)

The ‘militant peace’ which Holford envisaged represents the co-ordination of town planning, ARP and civil defence, the normalisation of emergency measures, and the acknowledgement that the old ideas of war and peace had been irrecoverably changed by the development of air power. Holford’s views were representative of those who believed that architecture and planning had an essential part to play in the defence of the nation from air attacks.

The debates about architecture and planning for defence were not confined to the specialist press. An article in *Picture Post* in January 1939 entitled ‘A Realistic Plan for ARP’ addressed the problem of shelters and extended the analysis to what town planning could achieve in peace and war.[[283]](#footnote-283) The article first highlighted the vulnerability of built-up urban areas to bombing, with pictures of ruined buildings in Spain, an aerial photograph of tangled streets in London captioned ‘A Perfect Target’, and a picture of back-to-back terrace housing captioned ‘A Modern Death Trap’.[[284]](#footnote-284) The article then proposed how town planning could relieve the pressure on cities in a way that would be beneficial in both peace and war. The layout of housing, the provision of open space, and the organisation of a road network that would not be disabled by congestion or by air raids were cited as key elements in a successful and modern town plan.[[285]](#footnote-285) The mutual benefits for cities in peace and war were a central part of the discussions about planning and the fear of air raids. The drawing together of peace and war in planning discourses was part of Holford’s idea of a ‘militant peace’ which dissolved the barriers between civil and military visions of the future of cities.[[286]](#footnote-286)

The government and town planners did not fail to notice the potential for ARP and town planning to work hand-in-hand to build a new, decongested, less vulnerable Britain. The ARP Department consulted with both architects and town planners on how their interests could coalesce. The Chief Technical Officer of the ARP Department, Alexander Rouse, who would later become the Chief Engineer in the Ministry of Home Security, was a member of the Town Planning Institute. At a meeting of the Institute, Rouse stated that there was ‘only one field in which A.R.P. and modern thought go together and that is the field of town planning’. Rouse supposed that town planners, with the gift of prophecy, had arrived at ideals which were ‘to a large extent the ideals of planning for A.R.P.’.[[287]](#footnote-287) The ARP Department and the Town Planning Institute agreed that the concentration of population in urban areas was ‘bad from both points of view’. Dispersion was the fundamental principle governing ARP planning and the creation of ‘grouped communities set in an unspoilt Countryside’ was the aim of town planners. One of the examples given for the potential of a common approach to achieve commons aims was the introduction of small parks, playing fields and allotments, which was described as both ‘sound planning and [beneficial] to safety’.[[288]](#footnote-288)

The return to the London plans after the Great Fire in the *Town Planning Review*, the response to the fire in the Valley Road electricity station, and the architectural discourses of normalised structural precautions demonstrate a crucial point. The question of passive defence against air raids was presented as both a feature of design and planning that was necessarily becoming embedded in practice, and as a solution to the historic problems of congestion and poor quality building in the cities. Air war was equated with natural disasters in a way which depoliticised and decontextualized war and made structural precautions against air raids a civilian concern that would stretch indefinitely into the future. Cities, definitively recast, existed in part through their susceptibility to aerial attack which was a continuing and unknowable threat. Planners and architects argued that the multi-floor buildings would better withstand bombing, as Bird had explained in the RIBA conference in the summer of 1938, while the dispersal of population away from the centres would immediately decrease susceptibility to bombing.

Infrastructure networks and housing were the key construction projects that could facilitate the decentralisation of cities and industry while creating a rejuvenated Britain, less susceptible to air attack, and relieved from the social problems associated with urban slums. Like electricity, the roads were key arteries that sustained life in the cities and the country. The identification of cities as targets only heightened the importance of these infrastructure networks. Mervyn O’Gorman wrote in the *Journal of the RIBA* in the month following the road architecture exhibition: ‘The 400 square miles of London’s built-up area is a target of humanity exposed to war wounds which can only be tended via the roads.’[[289]](#footnote-289) For O’Gorman a motorway around the hub of London was ‘as essential as drains’ and would save ‘life and health’.[[290]](#footnote-290) While architects and politicians stressed the importance of effective infrastructure planning to surviving air raids, the question of shelters was still unresolved. When the *Journal of the RIBA* reviewed the long awaited ARP Handbook No. 5, the reviewer stressed that the notion of a ‘bomb-proof’ shelter was still a fallacy. Despite the claims of the sponsors of numerous shelter designs, the review stated, ‘that there is practically no such thing as “bomb-proof”’.[[291]](#footnote-291)

Public desire for shelters and government determination to keep key utilities functioning were key points of debate in this period. These questions were addressed at a meeting at the RIBA on the topic of ARP in December 1938, which featured contributions from both J.B.S Haldane, the author of a vivid account of the air raids in Spain, and Eric Bird.[[292]](#footnote-292) Bird, who had been a member of the Home Office Structural Precautions Committee since 1935 and had taken a leading role in ARP discussions amongst architects, asserted that the purpose of ARP was to help win a war, ‘by making air raids not worthwhile to the enemy’. For Bird, an important part of this was ‘maintaining a life and work of the nation’, which led him to conclude that deep shelters would be too disruptive to work efficiency.[[293]](#footnote-293) He reflected a familiar idea that can be traced back to the bombing surveys of the First World War, which had argued that a significant amount of lost production was due to the tendency of workers to remain in the shelters for hours after bomb scares.[[294]](#footnote-294) Following the 1938 crisis, the debate about the importance of providing shelters, while keeping the city functioning, was demonstrated in discussions about whether or not London’s tube stations should be made available as public air raid shelters.

A meeting was held at the Ministry of Transport in July 1939 to debate the use of the underground network in wartime. [[295]](#footnote-295) The main points of discussion were whether or not stations should be made available to the public as air raid shelters, and whether they should be used as first aid points. High-level representatives from the Ministry of Transport, the Home Office, the police, the Ministry of Health and the London Passenger Transport Board attended the meeting. There was disagreement about how to deal with the likely clamour for refuge in the stations, despite a broad agreement that keeping the tube functioning was a more pressing concern than use of the stations as shelters.[[296]](#footnote-296) The delegates at the meeting were responding to a memorandum circulated by the Chairman of the London Passenger Transport Board, Lord Albert Ashfield. Ashfield outlined the danger that damage to water and sewage pipes held for the underground network, and provided details of work carried out by the London County Council and the Metropolitan Water Board to evaluate stations and their vulnerability.[[297]](#footnote-297) The threat of flooding to the tube network was the primary concern and Ashfield’s proposal for structural precautions to be taken to safeguard against this were supported at the meeting. The relatively straightforward provision of water-tight steel doors would enable stations to remain open and traffic to continue. The main danger to the continuing functionality of the underground network was a terrified public streaming into the stations seeking refuge and thus clogging the system.

The problematic nature of Ashfield’s tentative suggestion that some stations be set aside for shelters while others held back for traffic was raised in the July meeting. The expectation that ‘a panicked public would not discriminate between refuge and traffic stations’ meant that such a scheme appeared unworkable, and a more flexible and pragmatic approach would be needed. Despite the difficulties expected stopping stations being used as refuges, the meeting agreed that keeping the stations open to traffic was of primary importance. The suggestion that stations be used as first aid posts was dismissed quickly.[[298]](#footnote-298)

The discussions about the use of the underground in war illustrated both the primacy given to maintaining vital services and how urban infrastructure was recast by the fear of war. With the development of the Civil Defence Bill in 1939, another aspect of the discussion of public shelters in tube station becomes apparent. Air raid shelters, as advanced in the 1939 Bill, were a private rather than a public matter. The situation of air raid shelters in the domestic sphere, with the provision of individual family Anderson shelters, the focus on protection in the home, and the absence of large public shelters, reflected concerns about the susceptibility of the urban population to civil unrest when under fire.[[299]](#footnote-299) As Susan Grayzel argues, the ‘primary unit left to face the air raids remained the household’. The focus on the domestic and private sphere reflected the changed role of civilians and domestic space in war.[[300]](#footnote-300) The fear of crowds was an important element in the government’s emphasis that civil defence should be focussed in the private sphere. As well as the threat of unrest, the government was concerned that masses of people gathering in public shelters during air raids was a potential threat to productivity. While families were encouraged to prepare for war with their Anderson shelters at home, the Civil Defence Bill saw an increase in the government’s willingness to contribute to the costs of ARP for vital infrastructure services and industries.

The Civil Defence Bill of 1939 required all public utility companies to quickly complete and submit a report detailing the measures they were taking, or about to take to train all employees in ARP.[[301]](#footnote-301) Further requirements focused on the structural precautions that would be required to keep supply going during air raids, and provide some kind of shelter for employees.[[302]](#footnote-302) The Act saw the government commit to providing companies with a fifty per cent grant for measures ‘to secure the due functioning of their undertaking in the event of hostile attack’.[[303]](#footnote-303) Despite the increased government commitment to financing ARP in the public utilities, where just a few years before the government had asserted that the costs of structural ARP must be met in full by the companies themselves, the speed of developments was still slow. Amid much criticism from the opposition of the slow work of the government in relation to ARP, there was still a concern about the effectiveness of structural precautions against the still largely unknown danger of air attacks.[[304]](#footnote-304)

Matthew Grant has shown that during the Cold War civil defence was a central element in the British way of life, and was at the head of the debates about nuclear war. Grant’s argument, and that of critics of the nuclear policy, was that volunteers in the Civil Defence Corps were ‘being used to create the impression that people would survive an attack in order to convince people to support the nuclear deterrent’.[[305]](#footnote-305) In the period before the Second World War, critics of the government’s policies likewise sought to stress that despite civil voluntary ARP measures, safety from the bombs was unknown. Labour MP for Liverpool, David Logan, argued in the second reading of the Bill in April 1939 that: ‘It is no use trying to persuade ourselves that we are all going to be safe. We shall not all be safe. In the track of a bomber there will be a line of death, showing to everyone that a bombing plane has been across.’[[306]](#footnote-306)

The criticisms of the government policy by the Labour party around the reading of the Act focussed on the issue of shelters for workers and civilians. But the concern that the provision of shelters was inadequate and the belief that total protection was impossible were reflected in the discussions relating to infrastructure. The Minister for Transport, Edward Burgin, when faced with criticism about the perceived lack of protection for utilities stressed that: ‘where you are dealing with a public utility undertaking, in the case of air attack, you cannot completely protect it’.[[307]](#footnote-307)

The unique dangers of air attack were reiterated and reaffirmed along with the various proposed remedies, none of which could have been said to be the ultimate means of defence from bombing. In the context of continuing uncertainty about how to protect vulnerable areas, the government had, throughout 1939, been encouraging firms in designated danger zones to consider ‘permanent’ evacuation while peace held.[[308]](#footnote-308) Despite the debates and the legislation, when war was declared in September of 1939 the high level of uncertainty as how to protect against bombing was matched by the persistent uncertainty with regards to when and how and the bombs would come. As war drew closer in 1939 the fear of bombardment was as vivid as ever. As John Baker, then Professor of Civil Engineering at Bristol University, and a member of the recently formed Civil Defence Research Committee, recalled of their first meetings in the spring of 1939: ‘The prospect of 35,000 casualties a day, one third of them fatal and possibly all in the Greater London area was almost more than the Committee could contemplate.’[[309]](#footnote-309) The Air Ministry’s estimates of German air power and the faltering nature of ARP led Baker and his colleagues to discuss ‘such topics as the availability of cardboard coffins and the practicability of taking barge loads of corpses for dumping in the North Sea.’[[310]](#footnote-310)

**The ‘Twilight War’**

The fear amongst the engineers and politicians in the Civil Defence Research Committee, evidenced by the images of cardboard coffins and barges loaded down with corpses, is a potent reminder of how, on the eve of war, aerial bombardment was still a largely unknown enemy. The space left by the lack of conclusive proof of the damage that would be inflicted by bombardment was filled by the exaggerations and imaginations of those in the Air Ministry, and elsewhere.[[311]](#footnote-311) When Britain did declare war, the response of Professor Baker illustrated the ambiguous anxiety that air war evoked. Baker hurriedly drove to the Committee’s base at the Forest Grove Research Laboratory in Buckinghamshire, scanning the horizon for the first waves of incoming bombers. After a stop for lunch and a cigar, an extravagance justified by the fact that it may be his ‘last civilised meal for months’ he arrived at the laboratory, left his car running and rushed into the office. ‘I bumped into a large man, “What is happening in London?” The large man, who was Eric Bird, burst into his usual gust of hearty laughter and said “Nothing.”’[[312]](#footnote-312)

Britain had declared war in September 1939. An initial period of action and fear characterised by O’Brien as a period of ‘stand-to’ soon drifted into an ambiguous calm on the home front which became an almost year-long period of ‘stand-by’.[[313]](#footnote-313) With more trenches dug, windows boarded up and sandbags stacked up in doorways and on street corners, the face of the city was quickly changing and the reality of war could be seen in the public spaces of British cities. Despite the catastrophic predictions of the previous two decades, no ‘knock-out blow’ came, and civilian life in the cities continued. The exigencies of war were making significant demands on civilians while the much feared aerial attack never came, and the government had to watch evacuees return to their homes in the cities.[[314]](#footnote-314) The need to close the gap between peacetime conditions and wartime requirements, to narrow the transition from pre-war to war, were closely examined in this uncomfortable period of ‘twilight war’.[[315]](#footnote-315)

In the first three days of September 1939 the government’s evacuation scheme quickly moved 1,473,000 people away from the congested and vulnerable cities.[[316]](#footnote-316) Within these totals the variations across cities were large, with the percentage of children and mothers taking up official evacuation ranging from 67 per cent in Gosport to just six per cent in Rotherham.[[317]](#footnote-317) Alongside those officially evacuated, an estimated 2,000,000 people privately evacuated themselves during the summer of 1939.[[318]](#footnote-318) The breathless movement of children, mothers and teachers in the first days of September was a central part of the government’s passive defence policies against air attack. The evacuation was a sign of things to come. Reporting the start of evacuation, the *Manchester Guardian* stressed how that evacuation of the cities ‘will become a great defensive advantage to this country in any struggle’.[[319]](#footnote-319) Even on the verge of the war, air raid precautions were seen as an increasingly consistent feature in the future of Britain, a future of aerial war that was not necessarily contingent on a state of war being declared. While millions hurried away, the cities they were evacuating were left to bear the brunt of the first waves of attack. The transformation experienced by the cities would be immediate, with, in the words of the *Manchester Guardian*, the ‘congested and dangerous districts of the East End, of Tyneside, of Clydebank’, finding ‘a new spaciousness’.[[320]](#footnote-320) The crowded working class districts of cities were now especially endangered. The new threat faced by the cities was rehearsed as the initial rush of evacuations was almost complete. On the third day of September, after two days of mass evacuations, Chamberlain announced Britain was at war, and the first air raid siren promptly sounded. As Tom Harrisson observed, ‘A lot of people went digging that morning’.[[321]](#footnote-321) The quarrying of trenches in public parks that had been started during the Munich crisis began again, while sandbags were filled and piled up, windows boarded and gas masks held close.

The government had planned the evacuation of the cities well in advance of September 1940. The discussion of evacuation in the years before the war followed the idea that wartime emergency measures should continue to have a purpose during peace. Governmental discussions about structural precautions in electricity stations, the layout of towns, and the building of roads, placed planning considerations for peacetime works within a context of vulnerability to air attack. The need to build camps for refugees of war was explained in terms of the multiple uses such developments could have. A government conference organised by the Board of Education in January 1939 discussed the question of camps for peace and war purposes. Their discussions and recommendations were subsequently circulated to the cabinet by Anderson. The conference agreed that camps would serve a triple purpose, for schools, holiday-makers, and refugees.[[322]](#footnote-322) The discussion about camps in the country illustrates how the debates about planning and building were intimately concerned with the prospects and possible impact of air raids. The insistence on peacetime uses for such camps was both an economic point and reflected how planning for future war was seen outside temporal boundaries. If these camps were built, they could be used as housing for refugees in any future war, they would be constructions prepared in anticipation of war and ready to be converted to their wartime uses very quickly.[[323]](#footnote-323)

The speed of conversion from peace to war was again of primary importance in the government’s plans. The conference presented the peacetime use of camps for holidays and schools as a way to help fund the building of refugee camps in war. The camps were also envisioned as potentially operating as emergency hospitals.[[324]](#footnote-324) If the cities were to be attacked, the government saw the creation of these camps as a crucial precaution to help facilitate evacuation. The previous years of debate and strategy in government and outside, had resulted in the firm positioning of cities and their inhabitants under the crosshairs of the bombers. As Terence O’Brien wrote in his official history, in September 1939: ‘all civilians stood for the first time in the front line and could, irrespective of age or sex, properly be called ‘troops’ ’. [[325]](#footnote-325)

**Conclusion**

The establishment of the Air Raids Precautions Department in the Home Office placed ARP in the political and public eye, and marked a period in which the government made a more concerted effort to encourage local authorities and utility companies to consider ARP. Despite the recommendations and publications, passive defence from air attack was still a largely rhetorical science. ARP considerations in the building and extension of electricity stations became a planning concern like any other, while the government and industry analysed a breakdown in supply in Bradford through a war optic. As war drew closer and crises gripped Europe, the question of passive defence was still unresolved in Britain. Architects, planners, and engineers stressed the relevance of ARP design features to peacetime building and planning. The traditional ailments of congested cities and poor quality building had never been of such crucial national importance. But debates persisted about whether to concentrate on shelters for the public above all else, and the government responded by in effect situating shelters in the private realm of households. In the government’s eyes this limited the likelihood of mass casualties if a large public shelter were hit, while also reducing the chances of unrest in crowds, and removing the politics from shelters, essentially making them a feature of house design.

A continued focus on keeping cities alive and working during war was reflected in the opposition to deep shelters and the use of the tube stations for protection. Evacuation, sandbags and trenches, had transformed the face of the city, and the use of holiday camps as evacuation camps had changed the countryside. The inability to predict when or in what force the bombers would arrive had been exacerbated by official declarations about the expected bombardment. Air power had shifted the terms of reference for war and peace. In this period of imminent disaster the government sought to narrow the space between the nation’s peace and war-footings, by presenting ARP as technical measures that would benefit cities and utilities long into the future. Air power meant war could erupt at any moment, so it followed that to be prepared for the future was to be prepared for air raids.

**CHAPTER THREE**

**Cities Under Fire**

The ‘New Blitz Reality’

‘Destruction, so long predicted, came from the skies at last.’[[326]](#footnote-326)

(*Architectural Review*, 1942)

After decades of fearful premonitions, bombs fell on Britain in 1940. Planners, officials, military theorists, and architects had rhetorically transformed the city into the key strategic centre in modern war. The physical consequences of air war against cities and civilians, on a scale beyond that of the First World War, were witnessed in the fires and rubble of British cities. The planning to protect infrastructure and keep cities functioning under war-time conditions was tested by high explosive bombs, incendiary bombs, mines and machine gun. However, the much-feared gas attacks, which had been so central to civil defence and air raid preparations, never materialised. When cities and their infrastructure came under fire, the danger of living in urban areas and the central place of cities in the new realities of war were drawn by the destruction from the skies.

Cities and their networks of life had been recast in literature, and planners had brought expectation of air raids into visions of the future city, but during the Second World War air raids now became part of everyday life and routine. The ‘new blitz reality’ and its air raids were, in the words of a 1942 psycho-analytic survey of Britain, ‘unpleasant but unavoidable’.[[327]](#footnote-327) The historiography of the ‘Blitz’ has been shaped by the accounts of home front unity and stoic resistance to air raids, tempered more recently by an awareness of the problems of determining a singular ‘people’s war’.[[328]](#footnote-328) In these accounts, the ‘Blitz’ has blended into British national identity in a way which still resonates in the twenty-first century.[[329]](#footnote-329) But while these studies have described social and cultural identities of people, they have not discussed the significance of the changing vision of cities themselves. This chapter highlights how views of material infrastructure and architecture were affected by bombing and how the ‘new blitz reality’ was projected onto the materiality of cities as spaces of danger and protection, death and survival, destruction and renewal. It asks how the perception of infrastructure as networks of life developed during the emergency conditions of British cities during war. It thus builds on the approach that considers ‘war as a condition of society’, by moving from the everyday experience of urban populations under fire, to the transformation of the city’s own materiality.[[330]](#footnote-330)

In order to do this, it considers how different elements of the built environment were refigured by bombing, in both a strategically important provincial city and the capital. The argument that the bombing was not an isolated moment, but part of a longer history of air war and the redefinition of cities and civilians runs throughout the chapter. The physical remaking of cities under fire is crucial in understanding how the fear of air raids came to be a routine aspect of visions and plans of cities. The experience of air raids, and how cities survived during the Second World War, played an important role in government planning for the development of the nation’s infrastructure after 1945.Vulnerability was central to government thought and planning before and after the war. When the consequences of air war were displayed in British towns and cities, it signalled the end of an old era, and offered both opportunities for planned rebuilding and a world in which the worst fears about air raids had been made real. The simultaneous fear of the future and optimism for its potential, which characterised the period between the wars, was reflected in the responses to the material metamorphosis of cities.

**Infrastructure Under Fire**

In the summer of 1940, after the evacuation of Allied troops from France and Hitler’s push west, the island of Britain stood on the edge of the rapidly changing Europe. The threat from the skies of falling bombs and parachuting soldiers meant that the whole of Britain was placed on the front line against an enemy which had already swallowed up much of Europe.[[331]](#footnote-331) When the Luftwaffe first began its attacks on Britain the fear of a German invasion after the fall of France was at its height. The Southern ports which offered the most likely point for a German invasion from Northern France were of crucial importance. The ‘Battle of Britain’ fought in the skies over Southern England, in the ‘Spitfire Summer’ of 1940 brought the spectacle and danger of aviation into in the lives of civilians.[[332]](#footnote-332) The shift in the focus of air attacks to towns and cities at the end of the summer of 1940 brought the realities of air war down into the streets themselves.

In 1940 and 1941 many cities experienced bombing and some suffered ‘*Coventrieren*’ (‘Coventration’), a term coined by Nazi propagandists after the bombing of Coventry to describe that version of bombardment, a kind of attack which sought ‘the physical and psychological destruction of an entire city’.[[333]](#footnote-333) London experienced nightly raids for months of varying intensity, the strange familiarity of which enabled a series of strategies and techniques for living under bombardment to emerge.[[334]](#footnote-334) The bombing of provincial towns and cities, with less capacity to absorb the damage and the losses, often held a much more potent threat to the ability of those cities to continue to function. The strategy of a few nights of intensive raids, amongst weeks of quiet and false alarms meant that the citizens could not learn to adapt as those in London did. There was no chance for what Angus Calder termed the ‘even tenor’ of the Blitz, the regular rhythm of raids of similar intensities, to be established in towns and cities like Bristol, Portsmouth, Liverpool and Hull.[[335]](#footnote-335) The danger to the morale of the inhabitants of smaller cities was elevated by the pressures of homelessness and the image of their towns suddenly razed to dust before their eyes.

The importance of ensuring that towns and cities would continue to function had never been clearer than in the summer of 1940, when Britain was isolated in Europe and the requirements of modern warfare were witnessed in the demands for aeroplane production to hold off the threat of invasion. The port towns were vital to keeping Britain functioning, secure from invasion but not helplessly besieged. One such place, Southampton, offers a view into how a provincial urban area of strategic importance coped under fire, and how the planning for the protection of the utilities that would keep the city working fared against ‘Coventration’. Southampton was also home to the symbol of British defence in 1940, the Supermarine Spitfire. A discussion of both a provincial port town, and a consideration of the infrastructure networks in London, illustrates how the government analysed the attacks on infrastructure. The government’s conclusions about the benefits of interconnecting grids and regional control of utilities for the future development of the country were in part informed by concern about urban vulnerability to aerial bombardment.[[336]](#footnote-336)

The experience of Southampton illustrated how rapidly the material aspect of the city was changed by air war, in a way which went beyond the rendering of the buildings into rubble.[[337]](#footnote-337) The city and its infrastructure, the methods by which essential utilities were supplied to its people and factories, were transformed by the exigencies of the air raids which had a profound impact on the city. The maintenance of some level of infrastructure became a matter of survival. Air power theorists in the preceding decades had recast infrastructure networks as the vulnerable nerves to a modern industrial city, which if disrupted could bring a war economy to a sudden halt. The redefinition of the city as a site of destruction from the air, begun in the First World War and rhetorically ratcheted up in the texts that followed, was materially realised in Southampton. A discussion of how a provincial, but strategically important town, endured and adapted in an attempt to maintain the life of the city marks the transition of planning for air raids into practice during them.

Southampton is situated on the northern edge of the deep water estuary, Southampton Water, which flows into the Channel. After the Norman invasion Southampton had grown to an important international port. In decline by the sixteenth century, it was not until industrialisation in the nineteenth century that the town’s fortunes changed.[[338]](#footnote-338) The rapid growth of towns and cities in Britain in the nineteenth and twentieth centuries had dramatically altered the structures of the country, and Southampton was no different. The population rose from 8,000 in 1808 to more than 180,000 by the outbreak of war in 1939. The port had become an important base for travel, trade and the military, with a significant marine air base. It was through these multiple facets that Bernard Knowles saw Southampton in 1939 as ‘not only a major link in the chain of modern world communications, but as a linchpin upon whose stability the economic welfare of Britain itself largely rested’. [[339]](#footnote-339) When planning the air defence of Britain in 1935, the neighbouring port towns, Southampton and Portsmouth, were designated as the point on the south coast that required the most defence measures, and formed the base of a corridor of air defence that would travel east and north, covering London, the industrial midlands, and up to Teeside.[[340]](#footnote-340)

Local authority planning for war in Southampton in the 1930s had a sense of urgency that illustrates the concern that the town would be an early target for air raids in anticipation of an invasion. In the summer of 1938 Southampton became the first town in Britain to stage a ‘black-out’ exercise. The following summer saw 2,000 Air Raid Precautions (ARP) personnel take part in a large ‘black-out’ and ‘air defence exercise’, the first of its kind in the country. The geography and architecture of the town was redefined that summer when one hundred basement air raid shelters that could accommodate 10,000 people were opened to local citizens. One of these public shelters was an old Norman vault, buried beneath the town’s historic stone walls, which had been converted into a shelter able to hold 200 people.[[341]](#footnote-341) When more than 11,000 children (around 37 per cent of the total in Southampton) were then evacuated at the start of September the public shelters appeared to offer a measure of protection for the town’s remaining population.[[342]](#footnote-342) The provision of shelters was not met, however, with military anti-air defences, which in 1939 consisted of six balloons, a single anti-aircraft gun to protect the Shell-Mex Oil Installation, and a few searchlights spread across the countryside. The decision to deploy the one anti-aircraft gun at the oil installation demonstrates the prioritisation of utilities for industry and production. Knowles put the scarcity of air defence down to typical ‘bungling Britain’.[[343]](#footnote-343) The preparations made to protect the utility infrastructure in the town were, however, more advanced.

The water supply, along with electricity and gas, was crucial to both continued industrial production, and the survival of the city as a place to live and work. Water in Southampton was under the control of the local Corporation and the prominent Water Engineer and Manager, Joseph Hawksley. Hawksley had been proactive in working with the ARP Department before the war, and had completed a report on the precautions undertaken by the Waterworks Department to the local council soon after war was declared in 1939.[[344]](#footnote-344) Hawskley had first reported to the Council on his proposed ARP measures for water supply as early as 1934, after meeting with the Ministry of Health and the Air Council in November that year, a subsequent report in January 1938 was approved by March and the work followed.[[345]](#footnote-345) In December of 1939 the town’s civil defences, and every aspect of air raid precautions, were inspected by a delegation from the government and the military, which commended the precautions that had been made.[[346]](#footnote-346) A further visit to the town by the Minister of Home Security, John Anderson, was testament to the strategic importance of Southampton, and its ability to withstand aerial attack and be prepared to resist a possible invasion. Anderson was impressed by the preparations in Southampton, both material and mental, praising the ‘efficiency of the civil defence services’ and ‘the high courage and determination’ of local people.[[347]](#footnote-347)

Anderson was writing before the bombing experienced in Southampton intensified in the winter of 1940/41. The most devastating attacks were the large incendiary and high explosive raids on 23 November and a week later on consecutive nights, 30 November and 1 December. The main infrastructural arteries were cut, and the town centre was gutted by fire.[[348]](#footnote-348) Water, gas, electricity, and telecommunications suffered greatly as repair teams scrambled to get the networks running. The headquarters of the Water Department were wrecked, with distribution stores burnt out and more than 100 mains broken. Fractured mains resulted in a huge increase in the amount of water escaping the system, with around twice as much water consumed or wasted in the first days of December than had been in the entire month before the attacks.[[349]](#footnote-349) Areas of the town went without any mains water to drink, cook and clean, and fire fighters had no water to quell the burning buildings. The need for mobile water supplies to assist fire fighting during and immediately after air raids was being addressed in months before the raids, with the Home Office encouraging the Council to make extra provision, and an order given to buy eight lorries to assist the fire fighters, but quick action was needed to provide the water to keep the town, and its port, functioning.[[350]](#footnote-350)

The structural precautions government and industry took with regard to water supplies were in many ways similar to those of the gas and electricity industries. Spares parts were stockpiled, key equipment in pumping stations, as in generating stations, was separated and duplicated, with some shelter provided for employees. In the precautionary work there was an emphasis on securing as many different supply points as possible, and making these as interchangeable as achievable in what was a vernacular infrastructural architecture that sought to recreate the more developed grid system of larger cities like London.[[351]](#footnote-351) Mains could be repaired relatively quickly for all three vital piped utilities, but the demands for water were different from those of electricity and gas, both because of the danger of fire and need for water for the essential sustenance of the local population. Bringing more water into the local system in Southampton required the erection of a number of large new reservoirs in open spaces across the town, and fleets of trucks including military vehicles and old milk tankers.

New temporary reservoirs were built in the town in the years following the devastating attacks at the end of 1940, and temporary sumps were created in bomb craters where mains had been damaged to assist fire fighting.[[352]](#footnote-352) These constructions contributed to the changing landscape of the town, as more and more people nightly abandoned the urban area for the surrounding countryside, ‘trekking’ out looking for safety.[[353]](#footnote-353) The problem was such that, in August 1941, permission was granted for the construction of fifty-two 100,000 gallon static water basins, in addition to the ten which had been, or were being built.[[354]](#footnote-354) In a review of the state of preparedness in 1942, the Fire Brigade assured the Corporation that once the new measures were in place the supply of water would be sufficient to meet an emergency.[[355]](#footnote-355) In addition to the new infrastructure of static water tanks in cinema car parks and any available open spaces, local people were instructed to consume water modestly, and in the event of an air raid not to draw water except when absolutely necessary.[[356]](#footnote-356) Posters were pasted up around the town showing where water could be found, and what precautions individuals and their families should take to help maintain supply. Local residents were advised to boil water to protect them from potential contamination.[[357]](#footnote-357) Southampton was not alone in having to construct ad hoc water tanks in open spaces and bomb craters. In London, buildings destroyed by bombing, whose basements were now exposed, were converted into water tanks to supplement the water supply in just the same way. By the autumn of 1942 the supply of water provided by static tanks in London was ten times that when the bombing began two years earlier, with some of the largest tanks linked by twenty miles of steel pipe.[[358]](#footnote-358)

Despite the pro-active planning carried out by Hawksley, when the bombs arrived the city relied on an ad hoc system of temporary reservoirs and lorries to maintain some level of water supply. The creation of a vernacular infrastructure system brought the architecture of survival into the streets. With subterranean pipes exposed by explosions, craters turned into sumps, and car parks transformed into reservoirs and points for the public to collect their water, the city’s infrastructure and the life of its citizens and industries were demonstrated to be entirely interdependent. The emergency measures taken demonstrated the importance of regional co-operation and co-ordination, as deficits in supply could be dealt with from areas where there was a surplus.

Mutual assistance schemes were central to the emergency measures adopted by utility companies across the country, Southampton waterworks was part of a group of nine Hampshire water undertakings who made up the No. 5 South East Hants Group.[[359]](#footnote-359) The erection of temporary static water tanks to increase the variety of sources of supply for an urban area, and central co-ordination, was an attempt to ensure that areas without water could be relieved by excess from elsewhere in the system. The excess had to be created by simply increasing the amount of water, or equally electricity or gas, into the network. A functioning and wide-reaching grid system with effective co-operation across a large area was an effective way to increase the potential supply into the networks of pipes that stretched below the streets. Planners had praised the potential of fully integrated supply grids before the Second World War, highlighting their role in the future of Britain’s infrastructure networks. In the capital, which suffered prolonged bombing, the complex of streets and buildings provided a different type of problem to the ‘Coventration’ of smaller provincial towns. In London, the reliance on mutual assistance and grid systems presented an image of the future structure of utility industries, heavily influenced by the war emergency.

**Networks of Survival**

The experience of air war played an important role in discussions about the future of cities and infrastructure after the war had ended. The density of people and buildings in London, along with the concentrated industry and the location of the seat of government, meant that the maintenance of essential services was a matter of national as a well as local survival. The attacks on London were very different to Southampton, with at times daily raids continuing for months on end, rather than the short bursts of intensive bombing characterised as ‘Coventration’. The ability of London’s infrastructure to withstand the bombing was a crucial test. During the ‘Blitz’ period, the government discussed the vulnerability of the city’s nerve system both in terms of the pre-war plans, but also with an eye to the future organisation of industry. Just as the government and planners had imagined the future of cities and infrastructure in the context of the fear of air raids before 1940, the experience of bombing impacted on the visions of cities that would emerge out of the war. The air raids in London indelibly marked the city as a site of destruction and infrastructure as networks of life. The principles of co-operation and mutual assistance were vital to maintaining supply after air raid damage, and the structures established during the war presented an image of the future of infrastructure.

In order to make more water available to the city and the region, the thirteen water undertakings in the city (of which the London Metropolitan Water Board constituted about two thirds of the total supply) developed effective schemes of mutual assistance and intercommunicating mains infrastructure. The principle that shortfall in one area would be relieved by excess in another area, which had not suffered such disruption, was largely proved true in London. The report into the performance of the water system in the London Civil Defence Region during the war emphasised the effectiveness and usefulness of different undertakings in different areas working in co-ordination with each other.[[360]](#footnote-360) An integrated grid distribution system would increase the homogeneity of supply and the ability of urban areas to withstand emergencies of any kind that threatened to disrupt the supply of water to homes and industry. In the related industries of gas and electricity similar techniques were used to attempt to keep power flowing through the country and its capital. With the reorganisation of utility networks after the war, the wartime experience proved to be an important reference point for future planning.

The Water Act of 1945, generally aimed at consolidating the thousands of independent undertakings, stopped short of nationalising the industry, but it did provide the Minister of Health with more power to force undertakings to amalgamate. Planners had argued that greater co-operation and co-ordination would result in improved preparation for air raids, and set this against the characterisation of the pre-war structure of the water industry as highly localised and poorly co-ordinated. The problems of the older structure of the water industry were highlighted in discussions about expected air raids, and a newer model of greater co-ordination and central control was tested during the air raids of the Second World War. In the gas and electricity industry the experience and the analysis of the functioning of their infrastructure networks during the war was similar. While the post-war developments of water, gas and electricity were heterogeneous the war had a significant impact on how planning developed. Martin Chick has argued that the ‘jumble of ideas that formed the “public interest” provided an important basis for legitimating this forcible transfer of property’, that meant central control and ultimately nationalisation of the electricity industry. If, as Chick argues, the support for nationalisation ‘gathered pace and bite in the decade preceding nationalisation, and in particular during the war years from 1942’, then the national importance attached to the defined ‘vital services’ of electricity, water and gas, should be considered in the context of the expectation of aerial war. [[361]](#footnote-361)

The nationalisation of utilities after the Second World War followed the lines of industrial organisation that were established when there was a significant concern that air raids would dislocate industry and daily life. The measures taken during the war to maintain utility supply were in part reactions to the concrete reality of life under fire, but reflected changing views about the relationship between the government and essential infrastructure that were, in part, informed by spectre of air raids paralysing cities. The gas industry was nationalised in May 1949, bringing one of the last key utilities under public ownership and control, and was part of the reshaping of Britain after 1945.[[362]](#footnote-362) Gas was an important part of the National Plan, and a crucial part of the national infrastructure, which lacked the central organisation which the Central Electricity Board had provided the electricity industry since 1926. The gas industry had developed as an atomistic and localised service and was operating on an outdated model even before the Second World War. John Wilson argues that the structure of the industry, ‘competition from electricity, socialist doctrine, [and] the need for an integrated national fuel policy’, were important factors in the move to nationalisation. He also notes the feeling at the time that the planning techniques which had been developed and operated during the war should be maintained after victory.[[363]](#footnote-363) Support for state control of vital industries was coloured by the fear of war before 1939, and when the exigencies of war brought more of these industries under the control of the state, it was not an isolated moment, but part of the changing government approach to vital services. As the borders between war and peace changed, so the government saw state control of utilities as increasingly attractive in peacetime.

The gas industry had been the subject of debates about modernisation and regionalisation before the war. The rise of electricity, and the innovation of the National Grid, had seen gas, with its numerous small suppliers and few large ones, struggle to keep pace. These two industries should not be held in direct comparison, as a national grid was not viable for the gas industry. But, as Wilson notes, ‘most authorities agreed that the atomistic structure so typical of gas supply up to the 1930s should be substantially overhauled along regional lines’.[[364]](#footnote-364) An important restructuring of the gas industry and regionalisation of supply occurred during the Second World War.

The weaknesses of the nation’s gas infrastructure were exposed by the bombing of Coventry in November 1940. After the bombing the Regional Commissioner made a request to the Board of Trade for assistance to repair the damage that the gas undertakings suffered in the attacks. The bombing of Coventry, like that of Southampton, was an all-out attack on a provincial city that lacked the spare capacity to endure air raids, which London possessed. The President of the Board of Trade, acknowledging the difficulties in sending engineers from London to assess the damage, and envisioning many similar attacks, decided to create the position of Regional Gas Engineering Advisers.[[365]](#footnote-365)

The gas industry was restructured into the twelve Civil Defence regions each controlled by a Regional Commissioner. The regional boundaries themselves had been drawn up primarily as part of the broader implementation of Civil Defence policies, and the government used this structure to bring the gas industry onto a clear war-footing. With the production and distribution of gas for industry, military and civilian uses under threat from intensive air raids, the government appointed men from the gas industry to be the advisers to the Commissioners.[[366]](#footnote-366) The Engineering Advisers were asked by the Board of Trade of to ensure that, in the event of an emergency, full co-operation between neighbouring undertakings would protect the supply and limit the interruptions that air raids might cause.

The regional organisation was also intended to make it possible to suddenly disable supply in the event of an invasion. The Ministry of Fuel and Power credited the system of mutual aid and assistance during the war with ensuring quick repairs and restoration of supply. [[367]](#footnote-367) The first example of the intensive bombing of provincial cities forced the hand of the government and brought more regional organisation of the gas industry. However, before the bombing had begun the question of more local co-operation was being debated by a number of gas companies in Britain. After Coventry was bombed an organisation from the gas industry in London were among those who leant their assistance to colleagues in Coventry.

The London Regional Gas Centre was formed in early 1939 in anticipation of war and air raids. The voluntary association of gas companies in the capital was primarily concerned with improving the lines of communication between different companies to ensure that a full picture of the industry could be drawn and maintained during raids. The Centre became the official body representing the gas industry in London, and the link between industry and government. The co-operation and interdependence of the companies was enhanced by the creation of a headquarters for communication and further by the interconnection of distribution systems across the capital. The move to a more effectively networked grid system was aimed at keeping the supply consistent despite the disruptions caused by air raids.[[368]](#footnote-368) When the war ended the London region found that the wartime arrangements for mutual assistance and co-operation between undertakings had created the largest gas grid in the world.[[369]](#footnote-369)

Commentators and observers had highlighted the benefits of an interconnected gas distribution system before 1939. In 1938, one such person, the economist Philip Chantler, proposed a regional structure for the industry. Chantler was closely involved in the debates about the future of gas that lead to nationalisation a decade later, including work on the important 1939 Political and Economic Planning report.[[370]](#footnote-370) Gas supply in London between the wars was concentrated among relatively few undertakings, and thus leant itself to better co-ordination. Before the war threatened so immediately, however, the innovations occurred away from the capital. It was in Yorkshire that regional structures were being tested. While a national grid system for gas never seemed economic, the development of regional systems through the Sheffield Gas Company and the West Yorkshire Gas Distribution Company were successful before the war.[[371]](#footnote-371) The Yorkshire model continued to be praised and placed as an example to follow during the reconstruction after 1945. Writing in a special number of the *Architectural Review* in April 1947, devoted to the place of gas in Britain’s future and prepared in co-ordination with the Association for Planning and Regional Reconstruction, W.M. Ogden used West Yorkshire Gas as an model which demonstrated the advantages of a grid system.[[372]](#footnote-372) Gas grids had been steadily developing in the intervening years, accelerated by the demands of war and the increased power of the state.

The move towards an integrated gas network reflected the desire for both greater economies of scale and a national infrastructure more resistant to air raids. Stirling Everard, in his history of the Gas Light and Coke Company before nationalisation, recalls how during the war ‘integration’ was the word at the heart of discussions in the industry about planning for the future.[[373]](#footnote-373) Everard, no supporter of nationalisation, praised the effectiveness of co-operation between undertakings in London during the war in both his 1949 book, and his report to the government on the gas industry in May 1945.[[374]](#footnote-374) Different undertakings were connected to pool supply for emergencies and a thorough system of valves was developed to isolate sections of mains throughout London so that supply could be cut during fires. The valve system was used most effectively to cut off gas for large areas during the fire raids at the end of 1940.[[375]](#footnote-375) The report submitted by Everard days after the war ended in Europe, detailed the successes of the wartime arrangements in the London region, in which all large gas undertakings suffered damage and disruption. The effects of this were limited by the improved communications and co-operation between different undertakings, the sharing of information, the valves system in mains, like turncocks in the water system, and the effective work of the repair gangs. Appeals for assistance were made by the Centre control room, from where mutual assistance was directed.[[376]](#footnote-376)

In the three years between the end of the war and the publication of the government’s 1948 Gas Act the shadow of war lingered over the debates about the organisation of the gas industry. The popularity of integration and co-ordination in the discussions by planners about the future of the gas industry were tied to the experience of war, and the ability of the industry to survive air raids. War and the expectation of war had a significant influence on the development of the gas industry, which occupied a key position in the national plan for reconstruction and rejuvenation, and similarly to electricity, served as a symbol of technological modernity. Its significance extended well beyond the technical questions of gas engineers and was at the heart of the national plan. M. Hartland Thomas asserted in the *Architectural Review*’s gas issue that the industry had ‘from its earliest days been a significant focusing point of contemporary views on social, economic and political questions’. Gas seemed to offer a smoke-free future, could bring cheap heat to the masses, and as such had an important role for health, housing and planning. [[377]](#footnote-377) The commission of the Arthur Elton and Edgar Anstey film, *Housing Problems*, by the British Commercial Gas Association in 1935, had expressed clearly how gas could figure in Britain’s development.[[378]](#footnote-378) Set against a backdrop of urban decay and the same cramped, unhealthy slums that architects warned made inviting targets to bombers, the film presented gas as part of the planned future of working class housing. The nation’s gas infrastructure was important for slum clearance and the provision of new housing. The air raids of the Second World War changed the language of slum clearance to that of reconstruction, but again gas infrastructure was a key element in the plans.

The structure of the industry in nationalisation ran similar to that established during the war in order to maintain supply under the threat of extensive and unpredictable air raids. Two elements were particularly important in this analysis, namely the effectiveness of grids and the appeal of a more decentralised, but publicly run, industry. In correspondence between Hugh Gaitskell and Herbert Morrison in the run up to nationalisation, decentralisation figured prominently. Replying to a letter from Morrison in January 1947, Gaitskell agreed that ‘the general objective of the upcoming gas bill ought to be decentralisation and area autonomy’. [[379]](#footnote-379) Within what Wilson terms, the ‘collectivist atmosphere of the 1940s’, the regionalisation of the gas industry had a sense of inevitability. Nationalisation came despite reluctance in the industry itself for radical change. The Labour government’s desire for a co-ordinated fuel sector brought electricity, gas and coal together, and under state ownership. The relatively late nationalisation of gas indicates that its importance had fallen, particularly behind electricity.[[380]](#footnote-380)

For the gas and electricity industries, the benefits of local co-ordination between undertakings and utilisation of distribution grids reflected the economic benefits that were at the heart of nationalisation, but also the strategic importance of these industries to the life of the nation. The structures for industry that had been implemented during the war were designed largely to secure a steady supply despite the danger and destruction of air raids. The strategic importance of utility networks was still central to the analyses in the years leading up to nationalisation. The gas industry had learnt how successfully grids could maintain supply and cope with emergencies, and when the electricity industry returned to the questions of expansion in reconstruction, the lessons of war were evident.

The years of debate about how to protect the nation’s electricity infrastructure, from the burying of cables to the duplication of plant and the location of generating stations, came under scrutiny when the bombs began to fall on London in 1940. The early concentration of bombing on the capital was reflected in the experience of the electricity industry. In September 1940 only stations and substations within Greater London were damaged. In London that month, fifteen power and four grid substations were hit or affected by bombs falling close-by, but in only five of these cases this damage led to an interruption in supply. The industry credited the interconnected supply and distribution system with restoring and maintaining supply to consumers. The protective measures taken before the war and the co-operation between individual suppliers with each other and with the central organisation of the Central Electricity Board meant that disruption to supply in London was less than expected. The report submitted to the Ministry of Home Security cited the fact that supply was maintained at the key Battersea plant at the heart of London, despite frequent attacks, as an illustration of the success of the pre-war precautions and the organisation of the industry during the war. When supply was affected and when grid stations were shut down the grid system enabled supply to be maintained. Amongst the report’s conclusions was the assertion that ‘interconnected systems [had] enabled supplies to be restored in a matter of minutes or hours whereas without them days and in one case weeks would have been needed to restore supplies’. The mutual assistance, effective communications and pooling of labour and material in the power industries was an effective way to deal with repairs and keep the power flowing out to consumers in the capital.

The ability of a large city to absorb the damage of air raids should be held in comparison to the smaller provincial towns and cities who suffered short periods of sudden intensive bombardment, like Southampton and Coventry. While the government considered the precautions taken in London as largely successful, the analysis of the experience of air war was touched by the awareness that the reality of bombing was not quite what had been foreseen in the imaginations of the Air Ministry. The conclusion to the report into the electricity industry in London during war began with the admission that the attacks ‘lacked the concentration and weight that might have been expected’.[[381]](#footnote-381)

The question of the vulnerability of the nation’s electricity infrastructure to more intensive aerial attacks was, however, never far from the minds of the government. In London the underground material infrastructure of electricity, gas and water, were proposed as potential sites for air raid shelters in early 1940. The existing underground network of pipes was part of the discussions about how underground space in the capital could be reconfigured into subterranean shelters.[[382]](#footnote-382) Despite initial enthusiasm, the scheme was soon abandoned and it was the underground transport infrastructure of London that became the focus of government attempts to fashion shelters out of the urban fabric.

**Subterranean Safety**

The flow of population away from the centre in search of safety in the surrounding countryside was a part of the new patterns of movement established in response to air raids. The ‘trekking’ out of provincial towns and cities had equivalents in the metropolis. As life was divided into two with the strange normality of daytime and the bunker life of the night, so the natural and built environment was also possessed with two faces.[[383]](#footnote-383) Railway bridges, tube stations, chalk caves, shop basements, were all transformed as the night and the bombs fell. Dietmar Süβ has argued that the ‘temporary dispersal of wartime society under the earth signified a massively dynamic mobilization of urban daily life’. The relocation of life underground revealed the extent to which ‘war as a condition of society’ had disciplinary effects. Subterranean spaces were ‘an object of propaganda, sites for the promise of protection and the establishment of normative gender roles’.[[384]](#footnote-384) But they were also places dug into the heart of the city which became a part of the architecture of survival. From the open sky above the rooftops to the tunnels below the streets, the city in its entirety was transfigured into a space of citizenship, death and survival. The people submerging themselves into the city, were carrying out what Thomas Pynchon described in *Gravity’s Rainbow* as a ‘progressive *knotting into*’ the darkened spaces of the metropolis.[[385]](#footnote-385)

The transformation of urban space produced by air war was a profound materialisation of earlier fears. After the RIBA conference on ARP in 1938, a series of correspondence to the journal had reflected the changing perception of the city’s built environment in the minds of architects before the war. With the debate about the relative merits and dangers of different types of shelter, the more ordinary features of the city gained new significance. Fellow of the RIBA, H. Austen Hall, wrote about the potential uses in both peace and war of pedestrian subways.[[386]](#footnote-386) A letter in support of this proposal stressed the dual peace and war functions of subways, and suggested that large underground shelters could be used as car parks in peacetime.[[387]](#footnote-387) Ideas about the potential of the road network and underground car parks to provide shelter were being discussed outside the letters pages of architectural journals; it was a topic of debate in the London County Council (LCC) both in the build-up to the war, and when the bombing intensified. The images of safety underground continued to appeal to planners during the war, as underground space became understood through its association with safety from bombing. The metamorphosis of space extended down into the subterranean networks of pipes that constituted the hidden bowels of the city.

One idea which received consideration in the build-up to war was the proposal to build large underground car parks beneath public squares in London, which would double as bomb shelters whenever required. John Anderson praised plans he saw for underground garages by a London firm Messrs W.W. Baldwin and Associates, in a letter to Walter Elliot, MP in November 1938. Anderson was impressed by the plans and their suitability for use as shelters, which could be built on a large scale at little or no cost to the public. These plans belonged, Anderson said, to ‘the region of long-term policy’, suggesting that such constructions could be beneficial to Britain long after the immediate emergency.[[388]](#footnote-388) The dual considerations of traffic congestion and air raid precautions seemed for a time to make these proposals popular in government. A memorandum in early November that addressed the economic issues of the schemes stated that: ‘an immense aggregate of absolute Air Raid protection can be provided, together with a complete solution of the Car Parking problem, without cost to the Government or Local Authorities, and therefore without any increase in either rates or taxes’.[[389]](#footnote-389) The underlined promise of free provision of both car parking space and public air raid shelters was eventually tempered by the technical studies, which suggested that the proposals would be far too shallow to offer any meaningful protection from bombs.

One scheme which was discussed at length, however, was that presented by Messrs Hurst and Pierce in association with Rendel, Palmer and Tritton. The plan was analysed for London County Council’s Town Planning and Building Regulation Committee by the architect, E.P. Wheeler. The plans made particular reference to the significant sites of Leicester Square, Hanover Square, Kensington Square, and Cavendish Square.[[390]](#footnote-390) In his report, Wheeler wrote how the proposal was being sold on the dual purpose of car parks for shopping and trips to the theatre, and the use of the car parks as air raid shelters in case of emergency. He also noted that a similar plan had been put forward by Park Mechanized Parking Systems Ltd in 1935. Uncertainty about the effectiveness of shelters less than sixty feet deep, concerns about flooding from broken mains and sewers, together with anxiety about crowding a large number of people into a garage, meant that the scheme was not developed.[[391]](#footnote-391) Proposals like these plans for transforming London’s public squares into spaces permanently prepared to be transformed into bomb shelters, with minimal time needed to enact the change, reflects how local and national government was again seeing the city in the context of future aerial war. Transport infrastructure was particularly important in discussions about maintaining the life of the city, both in terms of the continuation of traffic flows and of the potential to use its architecture as shelters for local residents.

The Thames running through the centre of the city was a strategically crucial aspect of London’s defence. If the two parts of the city could be isolated from another with cross-river traffic stopped, the functioning of the city would be severely damaged. Discussions in the LCC about the bridges and tunnels over and under the Thames before the war reflected the importance attached to traffic flows, and also illustrated how the meaning and perception of underground space had been altered by the danger of air war. Preparations were well underway for emergency measures to ensure traffic across the river in war by the mid-1930s, with plans for temporary bridges at key sites.[[392]](#footnote-392) In addition to the bridges, the tunnels under the Thames (most notably the Blackwall and Rotherhithe tunnels), were identified by the ARP Department as potential bomb shelters. A plan for a new ventilation system for tunnels under the Thames was immediately interpreted by Commander A. Steele-Perkins as a device which could be used to prevent poison gas from seeping into the tunnels. The Chief Engineer T. Pierson-Frank had not envisioned tunnels as shelters, but he acknowledged in his reply to Steele-Perkins that ‘it might be possible for them to be used as shelters as you suggest’.[[393]](#footnote-393) In 1938, however, the ARP Department confirmed that the tunnels under the Thames would be unsuitable as bomb shelters, as they were simply too liable to flooding to be seriously considered.[[394]](#footnote-394) However, in 1937 the Highway Development Survey of Greater London (the Bressey Report) had suggested that the new tunnel roads should be bomb proof, and permanently available as bomb shelters.[[395]](#footnote-395)

The development of the road networks which were essential to the continued prosperity and success of London was associated closely with protection from aerial bombardment, both in terms of physical protection under the city, and the maintenance of life, communications and production. Practical and economic difficulties, combined with continuing uncertainty about what would be required to make a tunnel or shelter truly bomb proof, severely limited the actual development of these schemes. In February 1939 the LCC Highways Committee met to discuss the use of tunnels as shelters. Of the new tunnels proposed in the Bressey Report, the Council had only proceeded with the duplication of Blackwall Tunnel, a project which was not due for completion before 1944. The Committee consulted with the Home Office, who informed them that emphasis was to be placed on the maintenance of traffic and communications across the city, and as such the tunnels ought not to be used as shelters.[[396]](#footnote-396) A policy of pragmatism was agreed by the Committee, who would secure the tunnels and, when the time came, would advertise that the tunnels were too vulnerable to offer protection.[[397]](#footnote-397) The government’s focus on traffic flows and the economic life of the city over the potential of the material infrastructure of the city to be transformed into protective space was again apparent in the discussions of the Underground stations as shelters, and the response to the popular requisitioning of the platforms by London residents.

It was, however, the Underground which was remade into a crucial part of the protective architecture of the city. The opposition in government to the use of Underground stations as air raid shelters before the war had little impact on Londoners who responded to the nightly raids of the autumn of 1940 by seeking safety on the platforms. The material environment of London was changed by the falling bombs, and civilian transport infrastructure was transformed. The city’s built features were recast into an architecture of survival, in the same way that infrastructure networks were. Gas, water and electricity could bring life, and the network of deep tunnels below the city could offer protection from the bombs. Spaces beneath the city became transformed into potential shelters and places of safety and survival. The evolution of informal underground public shelters into new secure spaces was an important part of the refiguring of the city and its infrastructure as a result of air war.

The belated recognition that tube stations might be used as shelters came with concerns that while the stations served as effective shelters their primary role must remain as part of a functioning transport network that was essential to maintaining a functioning city.[[398]](#footnote-398) When newspaper reports made the use of tube stations as shelters impossible to ignore or deny, the government responded in co-ordination with the London Passenger Transport Board (LPTB). Official recognition came with a warning that ‘saturation point has already been reached’, and any further ‘encroachment’ of those seeking shelter would ‘make it impossible to operate the Underground services’.[[399]](#footnote-399) The different function of the stations could not be ignored, but the government and the LPTB were adamant that the network must retain its primary use. At an editorial conference, the government stressed their hope that the press would discourage any rekindling of arguments for a deep shelter policy, and specifically asked for special attention not to be drawn to the use of tube stations as shelters.[[400]](#footnote-400)

In an attempt to take control of the new public shelters, improve the conditions and safety and help the transport network to continue to function, a series of rules and regulations were drawn up to police conduct and organisation in the tube shelters.[[401]](#footnote-401) The appointment of the New Tube Shelter Committee in November 1940 began a process of belated formal bureaucratic control over the use of stations as shelters.[[402]](#footnote-402) The Committee set about bringing the tube shelters into the broader structures of civil defence and air raid precautions. Two ways in which the stations were established in the air raid precautions infrastructure were the creation of regulations for those sheltering on the platforms, and the provision of utility services for the shelterers to make their time spent underground more bearable.

One of the most pressing issues for the Committee was formally limiting the number of people sheltering in the stations through the establishment of a ticketing system. The need for improved safety in the tubes had been highlighted with the deaths at Balham and Bounds Green in October 1940. More deaths at the Bank tube station in January 1941 prompted an inquiry after assertions that numerous failings in the organisation and response to the bombing had increased the number of casualties. In the correspondence across government in the wake of the Bank deaths an indication was given of the government’s unwillingness to formalise the role of the tube stations as air raid shelters. The repetition of the description of shelterers as ‘those taking temporary shelter during heavy gunfire’, appeared to obscure the much more widespread and common use of tube stations as air raid shelters, well established by 1941.[[403]](#footnote-403) The Bank inquiry discussed suggestions that the lack of formal control in the tube stations and the absence of facilities such as toilets had contributed to the severity of the disaster. After a dispute about the exact course of events on the night the station was hit, the report’s primary recommendations were that emergency lighting be installed, and a stock of first aid supplies, be kept at all stations.[[404]](#footnote-404) The equipment of the stations as proxy shelters and the conduct of the shelterers were issues that threatened the safety of those underground, and were to be addressed by the new Committee.

The appointment of the New Tube Shelter Committee was part of a process of tackling the problems of such makeshift shelter arrangements that had sprung up across London in the autumn of 1940. The increased government involvement and formalisation of tube shelters was both a response to an emergency and a reflection of the increasingly indelible association of underground space with safety from bombs. The scenes of people lain out under bridges and arches, ‘trekking’ out of the cities, and taking refuge in chalk caves brought the problem of public shelters into relief. It was in response to this that the decision was taken to construct ten deep shelters, below the existing Underground network tunnels. The shelters would each hold ten thousand people. Though the plans were scaled back from ten to eight, this was still a significant undertaking.[[405]](#footnote-405) The plans demonstrated the concerns about unofficial public shelters, and the need to keep transport infrastructure functioning effectively, free from the problems and congestion caused when platforms became shelters. Each of the shelters was comprised of two parallel tunnels approximately thirteen hundred feet long, below the tube lines and stations. The two tunnels were joined at five points by passages spaced equally. The tunnels were split into two decks and each deck into smaller sections with bunks which provided beds for eight thousand people. Toilets, control rooms, switchrooms, and medical posts were built off the passages which linked the tunnels, and were thus separated from the sleeping areas.[[406]](#footnote-406)

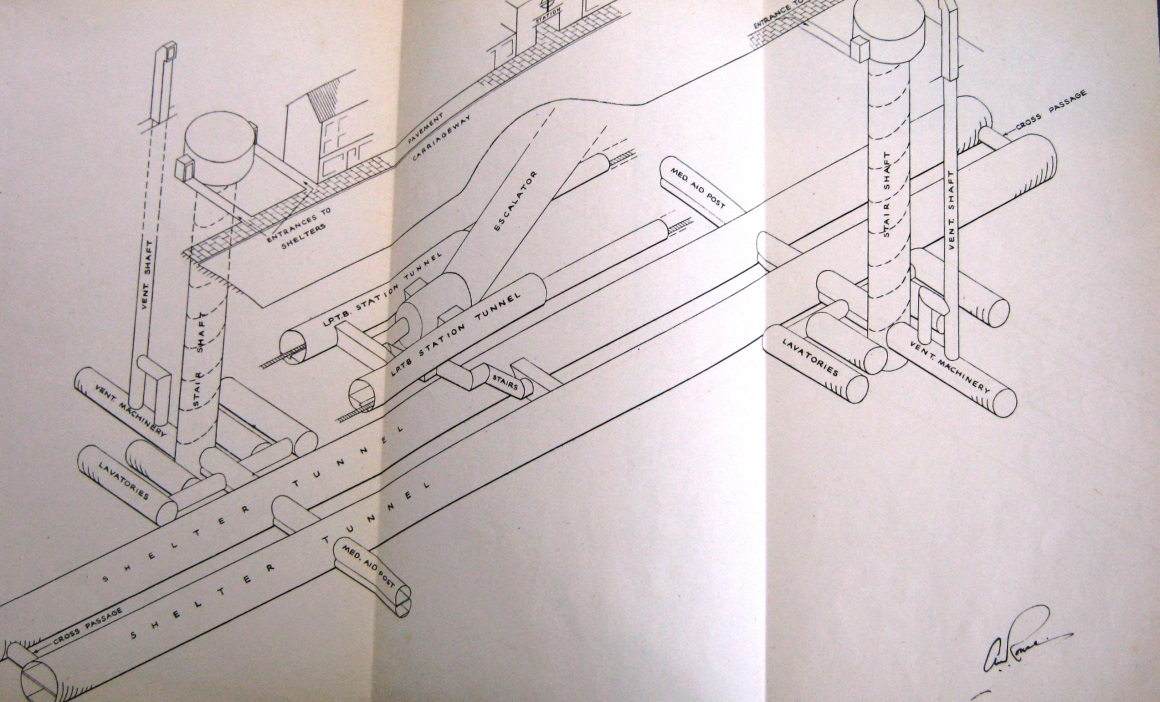


Figure . TNA: HO 200/4 Plan for new deep tube shelters included in ‘Report on the New Tube Shelters and their use by the Public, 22 April 1943.

The debates about how these shelters should be operated continued despite the agreement to construct them when the committee was appointed in November 1940, which had itself followed a statement by Morrison to the Cabinet that new deep shelters would be built in London.[[407]](#footnote-407) The Committee produced its report on the new shelters and their use by the public in April 1943, in the wake of a further disaster at Bethnal Green, in which 173 people died.[[408]](#footnote-408) How and when to open the shelters to the public, had not, however, been decided.

The April 1943 report outlines the main debate between the Committee and the Ministry of Home Security about the use of the new deep shelters. The Committee argued that at least some of the shelters should be opened in order to gain experience of running them, so that if an intense attack came, it would not be the first time the shelters were used. Their recommendations also went further, positing that the new tube shelters should become the ‘first line of defence’, for Londoners, while the tube stations themselves could be reserved for overflow in case of excessive numbers. Central to the objections of Herbert Morrison and his ministry was the still potent fear that a ‘deep shelter habit’ would develop if the new shelters were open to the public.[[409]](#footnote-409) The concern about the ‘deep shelter habit’ reflected the government’s anxiety that that life and production should continue as normally as possible. While the efficient functioning of the underground network would necessarily suffer as a result, it was more important to keep the city moving more generally. By preferring the more informal tube platform shelters, the government could maintain the perception of the air raids as being exceptional events, a position that was belied by the increasing formalisation of arrangements for public shelters, and their place within the geography of London. The provision of services and facilities to make the shelters more bearable and the creation of official rules and tickets for entry had brought the tube stations into the formal landscape of London. Despite the first of these deep shelters being completed in March 1942, none were opened to the public until the V-1 and V-2 attacks in 1944, and then the shelters never reached full capacity.[[410]](#footnote-410)

The government was reluctant to acknowledge it, but sheltering had become a way of life, a part of daily routine and experience, and the tube shelters part of the city’s landscape.[[411]](#footnote-411) The government saw in the demographics of the shelters ‘such types as those to whom the social intercourse in the shelters fills a need in their lives’.[[412]](#footnote-412) The shelters had become part of how people understood the geography of the city, an area associated with safety and survival. In September 1942, the London Appreciation Society wrote to Morrison asking if members of the society could be given a guided tour of one of the new deep tube shelters. The Society described their interest as being to ‘awaken in Londoners an interest in the history and activities of this great metropolis’. The proposed tour of the deep shelters would be situated among a schedule of tours to notable places in London such as Hampton Court Palace and the Golders Green Crematorium.[[413]](#footnote-413) Shelters had become a part of everyday life and the landscape of the city. The discussion of shelters connected to the underground network illustrates how the new architecture of survival in the city had become familiar and closely associated with ordinary life in the city. While the London Appreciation Society wanted to bring the shelters into their official landscape of London, their construction made permanent deep shelters in London, which were tied to, but not a part of the transport infrastructure. As central government and the LPTB used the city’s transport network to find shelter space under London and the local authority explored the possibility of using the road network as a platform for potential shelters, both the perception and the material aspect of cities were transformed by bombing.

**Cities Recast and the ‘Architecture of Destruction’**

As buildings, cities, and streets were transformed, the architects and town planners, who imagined attacks on the urban slums before the war, saw cities under fire and witnessed what they regarded as a profound break from the past. The war years were crucial in the development of architecture and planning after 1945, and mass reconstruction programmes of that time recalled the ideas about scientific planning and modernistic design before 1939.[[414]](#footnote-414) In order to understand the impact of war and the militarisation of cities and civilian urban infrastructure, one must consider the response of architects to destruction and survival in cities under fire. A discussion of architectural responses to air war in Britain after 1940 reveals the extent to which the built environment was recast through bombing. The transformation of cities was reflected in both government approaches to the infrastructural architecture of survival, and the way in which the new landscape of ruins was incorporated into an urban historical narrative. The dialectic of destruction and survival was articulated in cities and infrastructure that both offered protection and stood as ruin artefacts of an old world. The processes through which bombing became an acknowledged part of the urban picture can be further illuminated by considering official planning and unofficial architectural reactions to cities under fire.

The *Architectural Review*, which had published numerous plans and discussions in the decades before the war, first turned its focus to the actual impact of the war in a special issue published in July 1941, titled, ‘Destruction and Reconstruction’.[[415]](#footnote-415) The journal was dominated by page after page of large photographs of Britain’s ruined buildings. Here, architects presented destruction and reconstruction (which signified survival) as interdependent. The damage continued to be recorded monthly in a regular supplement of the same name that featured photographs of ruins from across the bombed towns and cities in Britain. The *Review* argued that the task of creating a photographic record of the destruction of buildings in Britain would not only illustrate and catalogue damage to buildings, but also have a broader, more profound symbolism. The black and white pictures of scattered bricks, splintered glass, and twisted steel skeletons, served as visual representations of a world in transition. The pictures of architectural losses illustrated ‘the disintegration of the whole pre-war era’. A violent disintegration was, in the eyes of the *Review*, an apt conclusion to a sorry era. The journal’s editorial continued: ‘The congested centres of our cities could not have a fitter end than such an apotheosis, and the individually meritorious buildings that have been lost in the process must be regarded as burnt-offerings on the altar of reconstruction’.[[416]](#footnote-416)

The discourses of destruction (focussed on the congested urban areas that had troubled planners, social reformers and politicians since the nineteenth century), persisted when the much-anticipated destruction finally happened. For the *Review,* the violent dismantling of the blighted centres was an appropriate way for these areas to be finally cleared in order to allow a properly planned future for British cities. The areas which had been associated with violence, depravity and poverty for so long were ultimately cleared through aerial bombardment, much in the way anticipated by architects in the preceding years. Architects’ and planners’ approach to this new architecture of air raids was informed by long-standing concerns about degeneration in the already crumbling urban slums, the profundity of historical change, and the incongruous aesthetics of surrealism.[[417]](#footnote-417) A new ‘architecture of destruction’ was apparent in British towns and cities.[[418]](#footnote-418) This ‘architecture of destruction’ was inextricably related to the architecture of survival as both signified the rendering of the built environment into a target, and demonstrate the impact of war on cities. The architectural phenomenon of ruins was a central point of enquiry among architects during this period. The destruction encountered in the cities provoked serious reflection on historical time, with architecture acting as monuments of civilisations. A key voice in this period was the editor of the *Architectural Review*, James M. Richards. He said the material destruction of the cities articulated a haunting ‘embodiment of historical experience’ and in the ruins he saw revealed ‘the form and colour of architecture itself’. For him, ruins were symbols of a lost past that should be remembered to show the gravity of the times and the historical story of disaster and reconstruction through ‘the poetry of destruction’.[[419]](#footnote-419)

Richards was the sole editor of the *Review* in the war years until he joined the Ministry of Information in the spring of 1942. He also edited a book with John Summerson recording war-time damage to British architecture, and was acutely attuned to the symbolism and unique aesthetics of ruins.[[420]](#footnote-420) His two articles about the ‘architecture of destruction’ in 1941 and 1943 illustrated the effect life in this new urban landscape had on architects’ approach to reconstruction, and the potent sense of historical continuity and change represented by ruins. Richards was part of a tradition of ‘preservationism’ in Britain, and particularly British architecture, which grew from Ruskin’s proposal for an inventory of threatened buildings in 1854, and has been the cause of many Societies since then.[[421]](#footnote-421) Richards and Summerson’s work followed the establishment of the National Buildings Record in 1940, which aimed to compile a photographic archive of British architecture now threatened by bombs as it had been threatened by the forces of modernisation.[[422]](#footnote-422) Richards could see the ruins ‘as objects picturesque and pleasingly horrifying’, but only through a willed detachment from the more everyday meanings of bombed out buildings.[[423]](#footnote-423) The materiality of the architectural ruins made legible and comprehensible the experience of living through the ‘Blitz’. In Richards’s words ‘the ruin, looked at as architecture in its own right, represents the apotheosis of the past: the intense experience of these active days crystallized in architectural form’.[[424]](#footnote-424) As Mark Pohlab argues, Richards saw the destruction in London ‘not as a singular catastrophe, but as part of the inevitable, even beautiful, dissolution of historical time’.[[425]](#footnote-425) The submersion of destruction and war into a historical and literary narrative is a crucial factor in how war and all its hardships were understood.[[426]](#footnote-426) Richards, who was based in London during the ‘Blitz’ period, acknowledged the spectacle of bombing in the issue of the *Review* which followed the night of 29 December 1940, when heavy incendiary bombing resulted in mass destruction, which claimed the buildings of the *Review’s* printers. He described a ‘theatrical night’, with a ‘continuous red glow reflected in the clouds of smoke’ above the city.[[427]](#footnote-427) While in London, Richards was a member of the St Paul’s Night Watch team, who patrolled Christopher Wren’s cathedral attempting to extinguish any fires caused by bombs. The nights spent at St Pauls, walking the labyrinthine passages and corridors, playing chess with the Dean, and sleeping in the crypt were nights apart for him. The months of rehearsals for attacks and the nights spent in the darkened cathedral became part of his routine, and a part of everyday life, like others queuing to get into shelters or ‘trekking’ to the countryside each night.[[428]](#footnote-428)

He saw the ‘architecture of destruction’ as having become ‘part of the background of English city life’. One of the ways in which this experience was given meaning was by situating it in a historical context. In an article published in July 1943 a few months after Richards left London for the Ministry of Information’s Middle East office in Cairo, he quoted long passages from accounts of three previous examples of urban destruction.[[429]](#footnote-429) Richards’s historical precedents drew a trajectory from the early nineteenth century to the air raids of the Second World War. Beginning with ‘the destruction of Moscow by fire in 1812’, Richards continued to the earthquake in Chile of 1835 which devastated Concepción, before entering the modern era with an account of the bombardment of Rheims in the First World War. Richards saw in all three of these accounts similarities with the experience of contemporary London. [[430]](#footnote-430) The repeated references to the 1666 Great Fire in the planning and architectural literature in the 1930s were recalled again when incendiary bombing brought great fires back to London. A raid on London on 29 December 1940 was responsible for ‘the Second Fire of London’.[[431]](#footnote-431)

In contrast to the preeminent pre-war fears of suffocating gas attacks, fire storms were the defining feature of the air war in Europe. In Britain, where the severity of the storms was far below that suffered by Germany, the responses to the fires were complex and varied. For a number of writers the fires were understood historically and as part of a process of change and revolution.[[432]](#footnote-432) For those concerned with architecture and planning, the purging qualities of fire reflected back on the interwar discourses of slum clearance and urban renewal, and longer histories of urban destruction and reconstruction. James Pope-Hennessey’s 1941 book *History Under Fire* (with photographer Cecil Beaton) began with images of a seventeenth century fire and a contemporary London fire fighter.[[433]](#footnote-433) It was not lost on Pope-Hennessey that the areas most affected by bombing were the same areas which had suffered most during the Great Fire nearly three hundred years previously.[[434]](#footnote-434) The sense that the city under fire was revealing its past in its ruins was also echoed in a photograph by Beaton which was published in *Vogue* in September 1941. The picture, captioned ‘Fashion is Indestructible’, features a smartly-dressed woman in front a ruined building, reading an inscription on the remaining façade which commemorates the 1666 fire. As Kitty Hauser points out, the picture identifies the place of both a recent aerial attack and a history of urban destruction.[[435]](#footnote-435) The nature of the destruction was, however, different, and posed significant difficulties for writers trying to depict fire.[[436]](#footnote-436) Richards recognised that the consequence of modern war was first witnessed in a new ‘architecture of destruction’ rendered in the First World War, but it was the bombardment from the air in the Second War which cast these events as mere precursors and ancestors to the destruction of the 1940s. The ‘architecture of destruction’ was both a symbol of historical continuity, and of loss.

The ‘architecture of destruction’ was given a new meaning by the decision of the Ministry of Information to organise an Army exhibition in the bombed-out shell of the John Lewis department store on London’s premier shopping area, Oxford Street, in 1943. The exhibition demonstrates how the ‘architecture of destruction’ was situated within the broader architecture of survival in cities which incorporated ruined buildings into a narrative of national survival and the promise of reconstruction and a peaceful future.

The Army Exhibition, which became the largest of the war at that point, covered 56,000 square feet and featured 23,000 exhibits illustrating the equipment of a division, was part of a significant programme of exhibitions in wartime Britain. The impact and the ambition of the wartime exhibitions represented a significant improvement in design on the often more conservative exhibitions of the 1920s and thirties. German émigré architect, Gerhard Kallmann, credited the demands of the time with bringing about a new, ‘utility character’ and ‘single-mindedness’ to the exhibitions. A shortage of labour and material was met by an end to what he saw as the ‘mood of flippancy’ that had pervaded before the war. [[437]](#footnote-437) The exhibition, and others like it, demonstrated that government departments could produce exciting and modern displays, engaging with leading figures in modernism. The Ministry of Information was led by Frank Pick and included in its design team for the exhibitions Misha Black, who had played a significant role in the MARS 1938 exhibition, as well as designers Milner Gray and Peter Ray. The introduction of younger people interested in the newer ideas of design into the wartime staff of government departments appeared to help instil a new view of design in government. The renewed purpose of the exhibitions was met by a strong response from the visiting public. Kallmann explained the popularity of the exhibitions as a reaction to ‘the threat of siege and test of mass destruction’, which had ‘brought about a determined reassertion of values’, and a feeling that culture was a ‘necessity of life’, not just for the social elite.[[438]](#footnote-438)

The Army Exhibition in what remained of the John Lewis store in Oxford Street demonstrated an ambiguity and interest in the spectacle of material destruction.[[439]](#footnote-439) Exhibitions at this site were mostly staged in the lower basement level of the store. Bomb damage had exposed subterranean sections of the building and afforded passing shoppers in Oxford Street a bird’s-eye view. As in Southampton, where craters were turned into sumps for fire fighters, so in London ruined buildings were used as emergency water tanks. The image of a house being entirely erased, and the foundations filled with water, is powerfully evoked in Michael Powell and Erich Pressburger’s 1943 film, *The Life and Death of Colonel Blimp*. The ageing Colonel and his chivalrous and honour-bound approach to war has been displaced by the new realities of Second World War. As he reflects on the static water tank that occupies the place where his former house used to be, a scene heavy with the resonance of biblical floods is subsumed into a history of change and an old world lost. The film reflects on ruins as profound signifiers of the end of an old order, but while Richards saw this as potentially positive, Colonel Blimp struggles to comprehend the loss of innocence and honour that the aerial bombardment of civilians represents.[[440]](#footnote-440) In the Army Exhibition, an old building recast first by the air raids of modern warfare, was recast again by a progressive contemporary exhibition.

The *Review* likened peering down into the basements of the building that was no longer there to ‘the view one gets of a doll’s house when the roof is off’.[[441]](#footnote-441) For passers-by, by now accustomed to some level of underground living, this aerial view of the exhibition and the skeleton of a famous building appears to have been a popular place, with the Army ‘Equipment of a Division’ Exhibition seen by one and a quarter million people in three months. Kallmann cited the ‘use of bare walls and blasted girders to achieve a picturesque unity’ as a thrilling effect, and praised the architectural value of the site as a ‘positive part of the urban scene’.[[442]](#footnote-442)

It was with the aesthetic of the picturesque in the eighteenth century that ruins reached the height of their romantic symbolism, an association also asserted by Albert Speer in this period, through his ‘Theory of Ruin Value’.[[443]](#footnote-443) Speer’s attempt to create a sense, or a myth, of history for the Third Reich through an appreciation of the architectural allegory of ruins, conforms to the view of ruins as symbolic of history and civilisation.[[444]](#footnote-444) But Speer’s was a deeply conservative reading of the meaning of ruins. He wished to build the new Germany in such a way as the buildings would over time resemble those of Ancient Rome. He wanted to rid new buildings of the modern steel skeletons which would separate them from the Roman ancestors.[[445]](#footnote-445) For him, modern buildings and modern building materials symbolised Weimar and ‘Jewishness’. Hitler and Speer wanted buildings which would slowly weather into what they considered noble ruins, modelled on Rome. Instead, Allied air raids brought them down within a few years and the architectural remains of rubble were far from the heroic ruins Hitler wanted to act as a bridge between German generations.[[446]](#footnote-446) Richards wanted to maintain ruins as symbols of history, but in a different way.

Writing in the summer of 1941 Richards proposed leaving some of the newly created ruins for their ‘intensely evocative atmosphere’, ‘architectural vitality’, and ‘their beauty’. But while the aesthetic view of ruins was similar, Richards saw them not tying the future to the past in the way Speer imagined. Rather, he regarded them as representing ‘the dissolution of our pre-war civilization as Fountains Abbey does for the dissolution of the monasteries’.[[447]](#footnote-447) The world before 1939 had passed and while being remembered, should not be revived. The concern with the future and reconstruction did not reflect a desire to manufacture a historical connection with past civilisations, but to build a new one. Bombing had revealed the structural features of the building that dated from the eighteenth century which were then rehabilitated into a contemporary urban picture through the exhibitions.



Figure . A bird's-eye view of the Army Exhibition in the basement of John Lewis in Oxford Street, 'The Wartime Exhibition', Architectural Review 94 (October 1943), p. 100.

The exhibition in the ruined department store drew images of the future in an eighteenth century building recast by the air war of the twentieth century. The symbolic power of ruins to mark the end of an era had a dual significance. The ruined city marked a break from the past in both architectural and political terms. The destruction of the urban slums opened new opportunities for planning and ordered, scientific design. The exhibitions in the John Lewis ruins illustrated how destruction and reconstruction were drawn closely together during the war. The discussions of ruins in architectural literature placed the twin process of destruction and reconstruction within a context of longer historical change, while emphasising the significance of the time. Architects and planners had long anticipated a national emergency as being the only likely situation in which the vested interests and conservatism which held back planning reform in Britain before 1939 could be swept aside. An article in the *RIBA Journal* in the spring of 1940 on building techniques in wartime described the war conditions as a spur to new development, and a final blow to lingering obstructions to progress:

A time of emergency is a genuine stimulus to the scientists – to architects too – to think out their problems anew to discard out-worn methods and the dead traditions of a period of complacency and inertia. Many people, the building scientist outstandingly, have been aware for years of the potentialities of advanced techniques, but have been given too little opportunity of applying their imagination and scientific skill to the actual problems of structure.[[448]](#footnote-448)

Architects did not regard the emergency conditions of war as a cause to halt progress and return to more traditional views of design and planning, but rather they represented a decisive moment when the ‘complacency and inertia’ of previous years seemed more and more unacceptable. Co-ordinated infrastructure networks, the benefits of which had been shown in the war, were a central part to the development of the country on planned lines with ‘advanced techniques’. The discussions and arguments about planning had been well-rehearsed in the period between the wars. The call for scientific thinking and rational planning appeared long before the bombs began to fall on London, but by the summer of 1941 the ruined East End and Docklands lay as symbols of the failure of what had come before. Jean-Louis Cohen has highlighted the general omission of the war years from the history of twentieth century architecture, and from the story of reconstruction after 1945 which, itself, has been subject to numerous studies in recent decades.[[449]](#footnote-449) Architects and designers, now working more closely with the government than ever before, saw the modern ruins as symbolic of the end of an era and its failed ideas.

The preoccupation with past destruction and the new vulnerability of urban centres to air attack had created space in architectural discourse to situate the devastation caused by bombing. It was a part of a historical process of destruction and reconstruction that could be traced back centuries. But this modern means of aerial bombardment had seemingly brought an end to the piecemeal approach to planning and development of the past. The technology of war and specifically of air power was a symbol of a new world in which the old methods of ‘muddling through’ would not stand. The experience of civilians under fire, the disintegration of the divisions between combatant and non-combatant, and the mobilisation of the whole nation, gave the Second World War a new character. As expressed in the *Journal of the* *RIBA* shortly after war was declared, the need to ‘make the war worth winning’ was a task which architects and planners took upon themselves. A commitment to the ‘progressive elements of science and art to regenerate’ Britain, was the central aspect of architects’ and planners’ agendas during the war.[[450]](#footnote-450) The determination to continue to plan for the future was expressed in the architecture of survival constructed amongst the ruins. But while the wrecked cities symbolised the end of an era, the world did move into a lasting peace in 1945. The imagination of future air war that had been so important between the wars continued to resonate. The development and deployment of nuclear weapons in the summer of 1945 dramatically altered the realities of modern war, just as the development of strategic bombing and mass air forces had before 1939.

**Conclusion**

When the bombs began to fall on British towns and cities, the plans to protect infrastructure and keep the economy functioning were tested, and the material cultures of cities were transformed. Despite many serious raids the intensity of the attacks was less severe than the government had feared and expected. Principles of mutual assistance and regional organisation were effective in helping limit the disruption caused by bombing, as well as structural precautions such as the division of switch gear in electricity stations which had been a policy since the early 1920s. Emergency conditions resulted in complete breakdowns in utilities in smaller towns with less variation of supply. The interconnected grid system proved to be effective, enabling broken mains to be isolated and water, gas, or electricity to be delivered from other parts of the system which had not been so badly damaged. The government understood the success of grid systems in the context of an uncertain future, with a permanent threat of air war. The cities themselves reflected the powerful shift in the expectations and meanings of war in the eyes of officials and residents who sought refuge in underground spaces, and walked through the ruined streets. Architects and planners bore witness to the devastation and understood the ‘architecture of destruction’ as a powerful image that signified the end of an era of unplanned and chaotic development. The burnt out cities were to be the final cry of the old order. But as plans were made for the future development of the country the fear of air war did not slip away when the war ended.

**CHAPTER FOUR**

**A Peace that is no Peace**

Reconstruction, Containment and Dispersal

As coral is set budding under seas,

Though none, O none sees what patterns it is making?

(Philip Larkin, 1943)[[451]](#footnote-451)

The aerial bombing in the Second World War transformed perceptions of the city in a way that resonated beyond the end of the hostilities. The unseen patterns of coral, ‘budding under seas,’ which Philip Larkin imagined as he gazed upon the ruins of a Church in 1943, reflected an ongoing anxiety. Material destruction and the collapse of the visible history of an old building, which itself represented an old world and an old country, destabilised pictures of the future.[[452]](#footnote-452) Visions of the world to come were indelibly marked by the experiences of air raids, and the imagination of future nuclear war was written into the plans for British urban and industrial development after 1945. The peace that emerged in 1945 was, as George Orwell wrote in October of that year, a ‘peace that is no peace’.[[453]](#footnote-453) The bombing of cities and civilians had become more and more routine during the Second World War, and in accordance with this, the next air war figured strongly in debates about reconstruction. As Peter Galison has argued, during the Second World War ‘American and British planners and analysts learned to see through a bombsight.’[[454]](#footnote-454)

A consequence of ongoing fears of air raids in planning for the future of cities was that the perception of cities and civilians as normal targets for bombs was projected indefinitely into the future. These projections supposed that after 1945 cities would be the frontline in a future war which would, most likely, involve the use of nuclear weapons. This chapter draws on Paul Virilio’s writing about the militarisation of the eye and predominance of a military optic in technologies of war and photography. By highlighting how the government perceived cities as targets for bombs after 1945 it reframes debates about reconstruction in a way which challenges the uncritical assumption that distinctions between military and civilian were increasingly meaningless. To do this, it discusses what Virilio has called the ‘fateful confusion of eye and weapon’, which was reflected in government projections of future air raids.[[455]](#footnote-455)

The historiography of reconstruction in Britain is vast, but has often focussed on the tensions between utopianism and pragmatism in planning and architecture, and the relative merits and weaknesses of specific schemes.[[456]](#footnote-456) These studies have too easily drawn an end to the war, and have neglected the importance of more dystopian visions of the future in this period.[[457]](#footnote-457) After the summer of 1945 nuclear clouds, like the imagined fleets of bombers in the thirties, were indelibly printed on the government’s vision of the future. The designation of cities as targets deepened in this immediate post-war period, which in many ways set the terms for the Cold War. The city as a site of modernity was linked with destruction from weapons which were equally powerful symbols of a dawning new age.[[458]](#footnote-458) The reconstruction plans and debates, and their subsequent successes and failures, reveal the importance of the nascent Cold War in how Britain was rebuilt after 1945.[[459]](#footnote-459)

This chapter discusses plans made during and soon after the war for the development and reconstruction of Britain, and addresses how the government superimposed pictures of imagined future war onto these pictures of Britain’s future. A close analysis of the relationship between planning for future cities and preparing for future war can illustrate both what David Edgerton has called the ‘deep structural impact of the Cold War on post-war Britain’, and the continuities in planning ideas about dispersal for safety from the hazards of urban life.[[460]](#footnote-460) As Matthew Grant has shown, the perilous economic position of Britain after the Second World War meant that early attempts at civil defence planning against the threat of nuclear war ‘remained largely on paper’.[[461]](#footnote-461) These paper plans, however, illustrate how the future of Britain’s cities in this post-war period was closely connected to fears about the next war, and the destructive power of nuclear weapons. The central aspect in planning and defence in this period was the decentralisation of industry and people.

**Planning the Future of London, Imagining the End of London**

The historical interaction between planning for development and planning for defence was articulated in reconstruction planning in 1940s Britain.[[462]](#footnote-462) Government personnel projected their fears of future aerial war onto the planners’ perceptions of the city and explicitly reframed techniques for the organisation of cities into zones and rings as a response to the danger of air attack. As Edgerton has argued, planning for Britain after 1945 ‘was not just a question of building a New Jerusalem, but also a new Sparta.’[[463]](#footnote-463) In an historic moment when the number of reconstruction plans produced far outran the number of seriously damaged towns, Patrick Abercrombie’s London plans were perhaps the most significant and influential.[[464]](#footnote-464) The second version of the London plan, published in 1944, which had been developed by Abercrombie with the London County Council’s chief architect J.H. Forshaw was the most important.[[465]](#footnote-465) The *Greater London Plan* was a central part of the articulation of a vision of Britain after 1945.

This section considers the *Greater London Plan* alongside government imaginations of future attacks on the capital. Among Abercrombie’s assumptions for the future planning of industry, he wrote that ‘strategic considerations related to defence will not be dominant factors in the post-war planning of the [Greater London] Region’.[[466]](#footnote-466) Instead of strategic considerations disrupting planning ideals, however, they reinforced and enhanced them, providing a further reason to support the dispersal of people and industry. Grant has argued that ‘dispersal was central to the new conceptualisations of atomic defence’ in the immediate post-war period, and it was echoed by planners like Abercrombie.[[467]](#footnote-467) It was in this context that J.M Richards imagined that, in these new conditions, ‘the landscape of the future is doomed increasingly to resemble universal suburbia’.[[468]](#footnote-468)

The Royal Commission on the Distribution of Industrial Population (the Barlow Commission) presented their report to Parliament in January 1940, during the period of ‘twilight war’. The report proved to be a central text in the reconstruction planning of Britain. In the section of the report dedicated to ‘Remedial Measures’, the disadvantages of the concentration of industry and the industrial population were described as social, economic and *strategic*.[[469]](#footnote-469) Presented to Parliament before the heavy bombing of Britain began and with its recommendations influential in the reconstruction planning during and after 1945, the report indicates how ideas about the vulnerability of urban areas were a continuous presence in the government’s planning visions of the city. The importance attached to the Barlow Report and other wartime planning reports, most notably the Scott and Uthwatt reports, demonstrated the increased political influence of planners.[[470]](#footnote-470) War had strengthened the position of planners who had yearned for the chance to plan cities with a blank canvas. Edgerton has shown that the increasing presence of technical experts was not purely a response to the exigencies of war, but rather was part of an overlooked ‘expert state’, which had developed significantly during the period between the wars, and before.[[471]](#footnote-471) Planners should be considered as an important element of this ‘expert state’. Government interest in urban planning and effective infrastructure networks was not solely born through the actual and then realised destruction of aerial bombing, rather these new concerns reconfigured established discourses of the decay of urban areas.

The major feature of the *Plan* was the re-organisation of the London region into four concentric rings: the Inner Urban Ring; the Suburban Ring; the Green Belt Ring; and the Outer County Ring.[[472]](#footnote-472) The *Plan* recognised dispersal as the best solution to overcrowding, and proposed development in concentric rings of diminishing density to enable this, a method which the Barlow report had previously championed.[[473]](#footnote-473) Though unacknowledged in his 1944 *Plan*, Abercrombie was acutely aware of the defence connotations of concentric rings and green spaces in the history of town planning. Writing in 1933, he described the historic development of the ‘fortification component’ in planning, and many of the features identified as part of the fortification of towns in previous centuries were reiterated in similar terms in the twentieth century.[[474]](#footnote-474) The reservation of open space around urban areas continued to represent a means of limiting the growth of cities, which in turn would lessen their vulnerability to attack.

Green belts had been a recurrent feature in the specific context of planning discourse about the development and containment of London in the first half of the twentieth century. In May 1937, W. Loftus Hare wrote an article in the RIBA journal which traced a number of green belt proposals before the Second World War. Hare reflected on how the language of these plans explicitly connected urban containment with broad notions of defence and anxiety about future disorder and decay in cities.[[475]](#footnote-475) In the United States, so-called ‘life belts’, which would encircle cities with open spaces and highways, were, according to *Life Magazine* in December 1950 ‘long overdue, war or no war’.[[476]](#footnote-476) While some of the techniques remained alike the context had changed and the techniques of zoning space had gained new meanings with the development of air power. ‘Zoning’, Abercrombie wrote in 1933, ‘does not mean necessarily a belt: it merely means the dedication of a certain area to a particular use’.[[477]](#footnote-477) In the context of the ongoing fear of air attack, the designation of space as a simple method of defence against bombs became an increasingly important element in debates about how to build cities in a way that would limit their vulnerability.

The demarcation of the London area into rings in the *Greater London Plan* represented both dispersal of population and industry, and the zoning of space. Each of the rings was effectively a zone defined by population numbers and density, the location of industry and the use of land for recreation and agriculture. Abercrombie stated unequivocally that ‘it is the regrouping of population and industry that is the real task of this Plan’.[[478]](#footnote-478) The dispersal of industry advocated by Barlow was complemented by Abercrombie’s call for New Towns to be constructed in his designated Outer County Ring. A corollary to the drawing of cities in rings, expanding out in steps from a compact urban centre, was the adoption of planning and architectural techniques for urban containment. In the pictures of reconstruction these included surrounding urban areas with protected green space, and ringing cities with orbital roads and highways. Abercrombie took the idea of a green ring around a city to its most considered level in his 1944 *Plan*, with his picture of the Green Belt Ring. The planned zoning of London and other cities was not only part of the planning discourses of order and efficiency in the urban scene. Civil Defence planners in the years immediately following the end of the Second World War recast the zoning of cities as a potential means of defence from air attack.

Exercises carried out by the government into the effects of nuclear attacks on British cities in the years following the end of the war illustrate the communication between different aspects of planning for security and for development, and the continuing importance of the fear of air war. The plans reflect the prominent role of the Cold War in Whitehall in the immediate years after 1945.[[479]](#footnote-479) The government produced a series of estimations of attacks on key British cities, including Liverpool, Glasgow, Sheffield, and Southampton.[[480]](#footnote-480) The ‘assumed attack’ on London projected to occur, for the sake of the exercise, in 1957, and include the successful detonation of nine nuclear bombs and many more high explosive bombs and V missiles demonstrates how the development of the capital was bound up with the prevailing fear of nuclear war.

The historiography of civil defence planning that has grown in the last decade since the declassification of key documents, has discussed planning for a future nuclear war in the British government. Peter Hennessy’s *Secret State* opened the field and subsequent work has broadened the picture of the levels of preparation that the government undertook during the Cold War.[[481]](#footnote-481) Within these works, however, there has been a distinct lack of critical attention to the impact of planning and preparing for nuclear war. Hennessy’s account, partly based on interviews with government officials who worked on the plans, reflects great sympathy and admiration for those tasked with planning for something ‘too ghastly to contemplate’. ‘But contemplate it, in secret’, he continues, ‘the planners were regularly required to do.’[[482]](#footnote-482) Hennessy attributes no form of meaningful agency to the war planners and suggests that their actions were those of noble self-sacrifice, rather than a crucial part in the normalisation of the bombing of cities and civilians in war. He thus absolves them of political responsibility.[[483]](#footnote-483) The image Hennessy presents is akin to that offered by then U.S. Under Secretary of Defence, Fred Iklé, in 1985. He wrote in *Foreign Affairs* that Mutually Assured Destruction ‘offers a prospect of anxiety without relief, an intellectual legacy crippling the outlook of each new generation, a theme of desolate sadness’.[[484]](#footnote-484) E.P. Thompson’s commentary on this dismisses Iklé’s self-serving picture of the reluctant Cold Warrior, and serves as an important counterpoint to Hennessy’s more recent work. He writes of Iklé, ‘the melancholy anti-nuclear philosopher who, in his working hours is condemned to slave at a desk in the Pentagon […], justifying the greatest nuclear preparations known to the world’.[[485]](#footnote-485)

By painting these pictures of future destruction, the planners were not merely contemplating something ‘ghastly’, but were playing a crucial role in the construction and maintenance of a rationality of government that saw cities as the front line in a future nuclear war. As Thompson wrote in 1982, the analysis of worst-case scenarios ‘(by excluding the possibility of any better cases, and by refusing to consider any measures which might bring the better about) actually *induces* the worst case to arise’.[[486]](#footnote-486) This rationality developed into the tautology of deterrence theory and Mutually Assured Destruction. It was in these immediate post-war years, and in the ‘continual elaboration of worst-case hypotheses’ that the ‘self-validating logic’ of deterrence and the uncritical acceptance that future war would be measured in cities destroyed and civilians killed, was written into the images of the future of Britain.[[487]](#footnote-487) There are crucial echoes here of the self-deterring rhetoric of the Air Ministry between the wars, where the imagination of coming destruction served as a strategic technique to secure support for the air arm, and the creation of a vast bombing air force.[[488]](#footnote-488)

In writing about nuclear weapons the tendency has been for a lapse into the sort of ‘technological fanaticism’ that Michael Sherry has argued is crucial in the development of air power.[[489]](#footnote-489) Here there is the danger that historians merely replicate the thinking of their subjects without analysing them, succumbing to the same numbing awe at the power of nuclear weapons that scientists, militaries, and governments displayed in their preparations and reports.[[490]](#footnote-490) The rhetorical escalation in imagined future attacks which had been so consistently practiced by the Air Ministry between the wars was continued by a working party on the effects of air attack, which had been established in the joint planning staff after the war as part of the reorganisation of civil defence. The ‘assumed attack’ was part of a task set to assess the effects of a large aerial assault on Britain in the summer of 1948.[[491]](#footnote-491) In the spring and summer of 1948 Cold War tensions had escalated significantly following the Communist coup in Czechoslovakia and the blockade of Berlin.[[492]](#footnote-492) The details of the scale of the attack were laid out in detail by the working party:

10 atomic bombs

360 tons of 10,000lb. penetrating bombs

3240 tons of 500 lb. bombs

followed by a V weapon attack starting with 500 tons per day and building up to 725 tons per day a D plus 60.

It was assumed that the defences would inflict a loss of 16% on all forms of attack other than V.II.[[493]](#footnote-493)

In order to paint a clear picture of the consequences of an assumed attack of the scale described, the working party carried out extensive work in consultation with a host of government departments hypothesising the likely aiming points for the attackers. The imposition of circles of imagined destruction onto the map of London created a new geography of the city. The marking of London with radiating circles of destruction had a profound impact on how the government envisioned the city under the threat of nuclear attack. The aiming points for the assumed attack in 1957 were drawn onto a map of London.[[494]](#footnote-494)

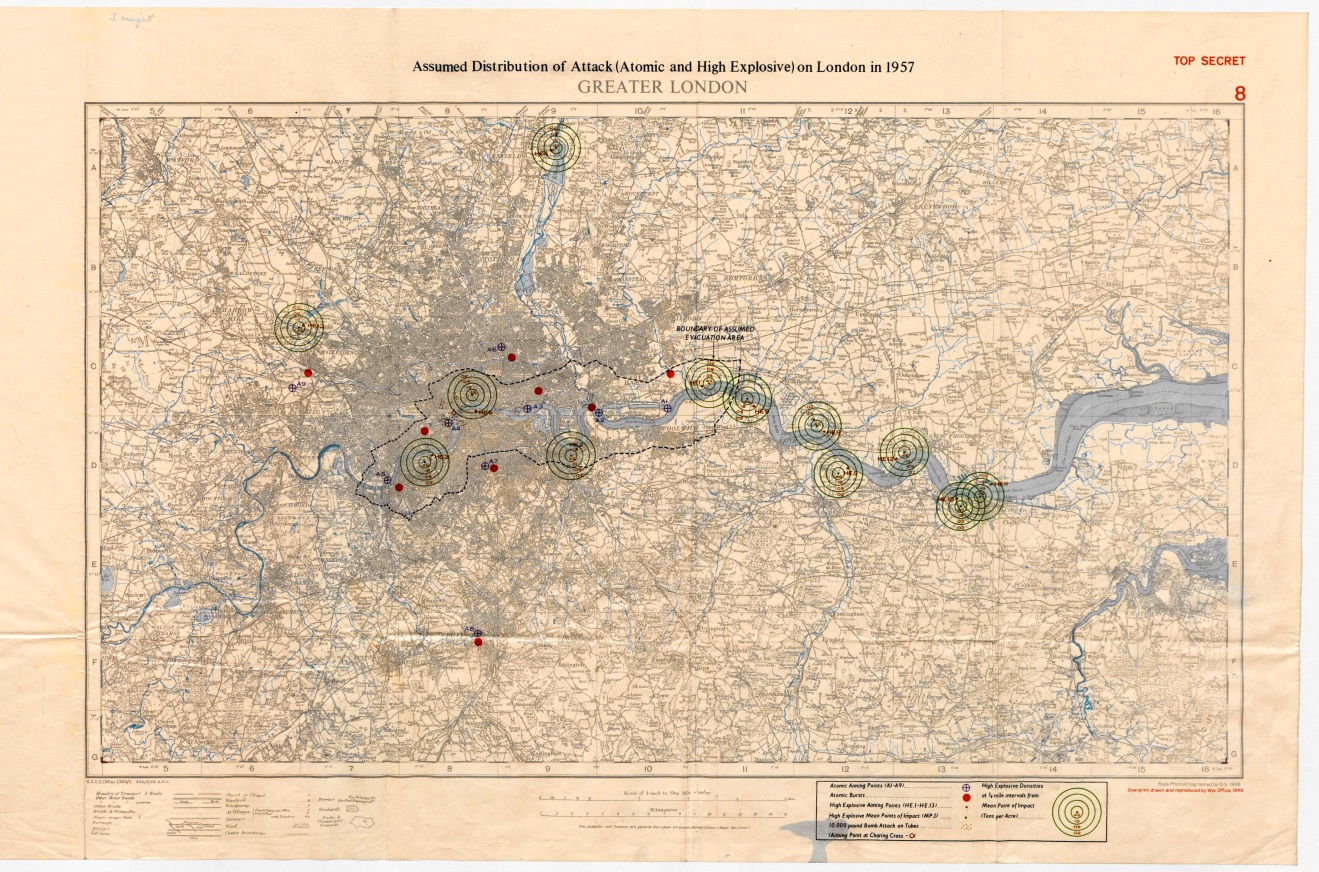


Figure . TNA: HO 357/10, map included in Working Party on Effects of Air Attack paper, 'Total Casualties from the Assumed Attack on London’, 18 May, 1949.

Maps like the once produced above and numerous others for other British cities in the immediate post-war years created a stark visual representation of the meaning of a nuclear attack. These maps positioned the eye above the city in the same way that aerial photography had done dramatically between the wars. ‘City space’ was reduced ‘into cityscape’.[[495]](#footnote-495) As Paul Saint-Amour has argued, military and civilian uses were closely linked in the development of aerial photography, which had enabled the planner and architect to easily see the city as one unit for the first time.[[496]](#footnote-496) The desire to achieve an overview, a synoptic vision of the city, was shared by the planner and the bomber.[[497]](#footnote-497) The ‘plan view’ simplifies an image by turning it into a purely schematic vision of a city. In these maps of imagined devastation the obscuring of the human element contributed to the anxiety they provoked in the government. The eye was sufficiently distant to make the assumed attack, when coupled with the predicted casualty numbers, appear as incomprehensible, thus contributing to the feeling that the there was no defence from nuclear weapons. The very act of producing such maps, and the worst case scenarios they envisaged, however, made the attack appear ever more possible and helped foster a feeling of inertia and helplessness in the face of such devastation. This map drew the end of London onto pictures of the future of London. The aiming points were chosen and the casualty calculations were made.

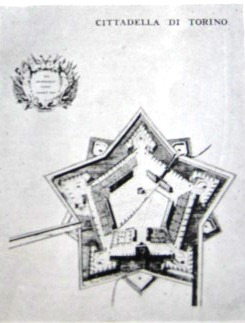
The fascination with, and aestheticisation of, apocalypse is a peculiar problem for historians of nuclear cultures, and air power more generally, and it finds crucial parallels in the writings of architects and planners about the future in this period.[[498]](#footnote-498) The intersections between discussions of air power and discussions about the future of cities again illustrates how the two separate practices of futurology served to reinforce the assumptions of the other, and obscure the political question of the designation of civilians as targets in war. As London and cities across Europe lay in ruins, the next air raids were being marked on maps and plans. The mapped visions of future attacks served as signifiers of vulnerability and the designation of cities as targets. There is an echo of the way planners gazed at maps and imagined future destruction in the way architecture and ruins symbolised past and future.

The eponymous architectural historian in W.G. Sebald’s *Austerlitz* describes an uncanny realisation when looking upon the Palace of Justice in Brussels. Such monumental constructions, he says, evoke ‘a kind of wonder which in itself is a form of dawning horror, for somehow we know by instinct that outsize buildings cast the shadow of their own destruction before them’.[[499]](#footnote-499) Sebald’s narrator here echoes Albert Speer, who, as Virilio has discussed, argued that ‘to construct a building is to foresee the way in which it will be destroyed’.[[500]](#footnote-500) Speer’s longing for destruction to inspire future generations of fascists, could, however, scarcely be further removed from the deeply melancholic gaze of Austerlitz.[[501]](#footnote-501) The imagination of destruction was in both cases a deeply evocative moment, which was repeated in the creation and viewing of the Working Party on the Effects of Air Attack’s map of London under fire. The accepted theories of air war dictated that large urban areas were seen as targets for bombing, and the shadows of their future destruction were drawn onto these maps, which promoted dispersal and deterrence as the only means of defence.

In both Abercrombie’s plan and these government maps, the existing city of London was being attacked. The density which had signified an unhealthy vitality now marked it out for destruction. The main precaution against the double vulnerability to air raids and social decay was the dissolution of the centre and a radical contraction of population. An article in the *Town Planning Review* in the summer of 1947 saw an apocalyptic imagination in Ebenezer Howard’s vision of the future London, reiterated by Abercrombie in his *Greater London Plan*, which celebrated the projected reduction of London to ruins. The article likened Howard’s vision to William Morris’s post-apocalyptic England in his 1890 novel, *News from Nowhere*. The great act of violence that had enabled the renewal of life in Morris’s book was an example of the imagined destruction that had informed the slum clearance debates between the wars.[[502]](#footnote-502) The desire amongst architects and planners for reconstruction had always demanded first a period of clearing away the old.[[503]](#footnote-503) Architecture’s ability to survive the period of collapse and provide a new structure for life was questioned by the destruction of Hiroshima and Nagasaki. The question of ruined buildings extended into the question of ruined cities.

In November 1945 the cover of the *Architectural Review* featured a picture of the *Cittadella di Torino*, the sixteenth century fortified city in the shape of a star, built with a view to future weapons. The *Review* praised the beauty of the design, which was subsequently destroyed in a siege. The development of modern war had led to a decline in the beauty of protective architecture, and ‘the atomic bomb has made the very phrase an anachronism’.[[504]](#footnote-504) Here the inertia that informed deterrence theory, and was fed by the imagined attacks drawn up by the government, was reflected in architectural writing. The only form of passive defence in the ‘nuclear age’, which always anticipated nuclear war, was dispersal and the systematic dismantling of large cities. The decentralisation of cities for defence reversed the architectural strategy of urban containment represented by the *Cittadella di Torino*. But the ‘de-containment’ of cities was itself part of a broader strategy to contain future war, while not challenging its conception. The government’s civil defence officials, as well as private architects and planners, framed dispersal as a means to limit the effectiveness of future air raids as they endorsed an entirely unbound and limitless version of warfare; a war that the government anticipated, and sketched the consequences of, in terms of the population density of the target areas and the estimated civilians killed. Here the character of the Cold War, the attempt to contain and simultaneously sustain an imagined future war which would be without any limits or boundaries, was reflected in the architectural visions of the future of cities.

Figure 5. Cittadella Di Torino, Architectural Review 98 (November 1945).

Architectural plans for decentralisation had often relied on a moment of willed cataclysm to provoke change. After the evacuation of the cities in 1939, a columnist in the *Review* remarked how evacuation should have been carried out in peacetime and said a consolation ‘for having to suffer an emergency such as a war is that it often compels a lethargic administration to undertake planning of permanent value, and thus the rate of social progress is accelerated.’[[505]](#footnote-505) Before, during and after the 1939-1945 war, the dispersal of cities was not just a matter of social progress, but of survival. In the government analysis of the 1957 ‘assumed attack’, the predicted deaths and physical destruction were indirectly drawn on to the image of the city in accompanying tables of statistics. The development of nuclear weapons had closed the gap between rhetoric and reality, but the result was much the same, a strategy of escalation and armament.

In the working party’s calculations, one of the ten nuclear bombs was shot down and prevented from reaching its target by the country’s defences. Nine would hit their targets as well as thousands of tons of other bombs and missiles. The working party carried out a detailed analysis of the casualties expected from one of the nine nuclear bombs, the one aimed at Dalston Junction.[[506]](#footnote-506) Dalston Junction was chosen for the density of the population in the area rather than for the presence of particular industry or infrastructure.[[507]](#footnote-507)

When these predictions were expanded over Greater London, the casualty numbers in a variety of situations with different shelter provisions were drawn. The working party utilised pictorial statistics, which had been popularised by the social scientist Otto Neurath and were used by planning groups in Britain, to communicate the estimated effects of the attack.[[508]](#footnote-508) The use of what Neurath called a ‘visual argument’ reflects again the importance of picturing future attacks.[[509]](#footnote-509)

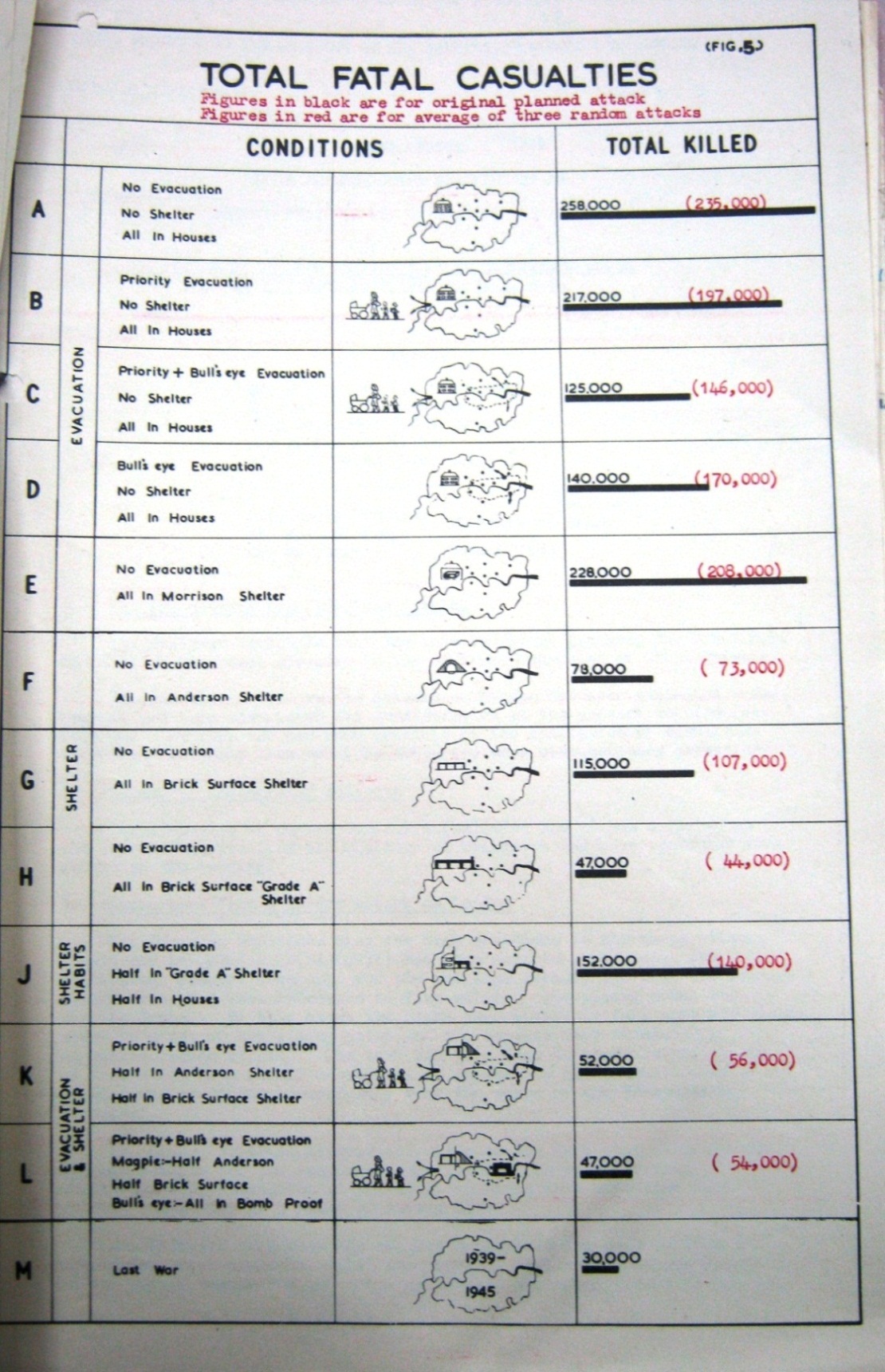


Figure . TNA: HO 357/10, Working party on effects of Air Attack, ‘Casualties from a Random Attack on London’, c. September 1949, p. 7.

It became clear to the government that, with problems of shelter and air defence, the density of the population in a given area was the final determinant of the level of casualties from a nuclear attack. Even with the highest level of preparation envisaged with evacuation and extensive shelters the predicted casualties of the assumed attack were 47,000, more than 50% above the 30,000 suffered during the entire previous war.[[510]](#footnote-510) The analyses and predictions of devastation were extended out of London and across other major towns and cities across the country.[[511]](#footnote-511)

Before these extensive analyses were drawn up, already in January 1946 a report into the consequences of the new era of nuclear warfare concluded that ‘the net effect [of nuclear weapons] is to give an overwhelming advantage to the attack in the case of large targets, but no comparable advantage to the attack on small or dispersed targets’. The report continued:

The most obvious result is that the bombing of towns and industry now gives a far greater return for war effort expended, and may therefore become the most profitable type of war. It is therefore desirable to examine the prospects and economics of strategic bombing.[[512]](#footnote-512)

For the government and the military planners, nuclear weapons meant simply an escalation of the aerial bombing of towns and cities that had been such a prominent feature of the previous war. The work that the government carried out in the following years, predicting the extent of the death and destruction that would be consequence of a large attack on Britain, quantified this fear and explicitly drew the imagined destruction onto British cities. Crucially, however, this did not cause a rethink about nuclear weapons, but served to further embed them into government thinking about the future. Before the work of the working party on the effects of air attacks had vividly illustrated the consequences of an attack on Britain, a view had persisted among some within the military and government that if necessary actions were taken the effects of a nuclear attack on Britain could be limited. In a report on the ‘Likely morale effect of atomic bombs’, the military argued that in modern war

no nation ever fights until it is physically incapable of doing so. At some point, far before this stage it accepts the idea of defeat, and surrenders. Defeat is a state of mind, and the infliction of casualties and material damage are merely means by which this state of mind is brought about.[[513]](#footnote-513)

Despite the destruction promised by nuclear weapons, this principle, the report argued, was likely to ‘remain true’.[[514]](#footnote-514) In this analysis a crushing blow to morale appeared illusory even in the nuclear age. Rather than challenging the conception of war that meant killing civilians in huge numbers, military planners used the nebulous idea of morale to frame a vision of war that threatened to go beyond even the area bombing campaign of Bomber Command.

The Joint Technical Warfare Committee concluded that the most effective way to bring about the final defeat of enemy morale was by establishing two principles in the minds of the enemy civilians:

1. That no town is safe.
2. That even the survivors of towns that have been raided cannot depend on not being raided again.[[515]](#footnote-515)

The doctrines of air war that had been circulating since the First World War and had led to the wholesale destruction of Hamburg, Dresden, Coventry, Hiroshima, Nagasaki and many other cities, had not been displaced. In the context of these visions of air war and the arguments that a nuclear war could in fact be fought, the reports into the effects of attacks on British cities contributed to the numbing effect of statistics which masked the human cost and obscured the political choice of going to war. Similarly, the reduction of the potential casualties in a nuclear war to ‘means by which’ a defeated ‘state of mind is brought about’, entirely negated the reality of what the consequences of nuclear war would be. This notion that a nuclear war would be winnable was founded on two assumptions: firstly that, buoyed by the ‘Blitz spirit’, British morale would hold up under fire when that in other countries would collapse; and secondly, that the principle that ‘no town would be safe’ and that the attacks on civilians would be relentless and continue indefinitely. To consent to these terms of reference for future war, no matter how passively or reluctantly, meant that cities would be indelibly marked as targets. This was reflected in the fact that the only defensive remedy which the government consistently argued for, other than the need to develop Britain’s own nuclear weapons, was the planning policy of the dispersal of urban areas and industry.

In an important conference on the future of civil defence in June 1948, the dispersal policy which had been central to debates about defence from air raids for decades retained its position, and was reinforced by the problems of shelters against nuclear weapons and the danger of radiation and fall-out. But as the Chairman of the conference, Frank Newsom of the Home Office, noted, the dispersal policy was difficult to implement with all the competing interests:

the policy of dispersal is going on all the time, so far as the economic situation allows. […] We are pushing that policy all the time of trying to get industries out into the country. As to the population, there again we are going through what we call an evacuation of population. We are trying to disperse and evacuate them either by building new satellite towns or in other ways. I do not know that we can take that any further.[[516]](#footnote-516)

The principles which lay at the centre of Abercrombie and Forshaw’s plan for the future of London were also at the centre of the government’s policy of national development, which they hoped would reduce the vulnerability of Britain to aerial attack. The dispersal of population and industry and the creation of New Towns were explicitly linked to the government strategy of civil defence in the years immediately after the Second World War. Kathleen Tobin has argued in her analysis of Cold War suburbanisation in the United States that although people were able to move because they could afford it and they wanted to, government funding for ‘highways, utilities, and low interest suburban mortgages’ played an important role in facilitating the rush to the suburbs.[[517]](#footnote-517) Similarly, Peter Galison has highlighted the incentives Federal Governments laid out for industrialists to disperse in the U.S. The benefits of strategic dispersal were sweetened with the promise of better living and working conditions, more productivity and more stability.[[518]](#footnote-518) In Britain the government practiced the same overwriting of strategic advantages with social ones in discussions about New Towns and decentralisation. The construction of New Towns was linked to the need to ‘disperse and evacuate’ cities informed by a fear of aerial war.

In Abercrombie and Forshaw’s plan, Greater London was understood in terms of rings of diminishing population density. The plans which measured the city’s reach in radiating rings, when seen now, evoke the maps of imagined nuclear attacks. The above map also indicates that while high-explosive bombs would trace the river inland, the nuclear bombs would largely be concentrated in the urban centre of the city, gathered around the area marked by a dotted line. The working party, which produced the map, designated the targeted area as Zone A. The zoning of the city was carried out twice.[[519]](#footnote-519) The *Greater London Plan*’s inner urban ring corresponded roughly with Zone A of the civil defence plans of London under attack, the most densely populated and heavily industrialised area of the city. The doubled zoning of London for defence and development bought the two versions of planning together. In meetings of the working party, Zone A, which was marked as the boundary of the assumed evacuation area, had been described as containing 67% of the electricity production in Greater London and 65% of the gas production, 73% of food key points and 15% of factory key points.[[520]](#footnote-520)

In December 1946 the military defined ‘the battle area of London’ as comprising of ‘a target area containing the docks, the City, and the areas on either side of the river which contain a large percentage of all the key-points in London’. A target was conceived simply by the density of population and industry in an area. The second ring, which in the *Greater London Plan* was called the ‘Suburban Ring’, was also approximated in the civil defence view of London. Abercrombie’s ‘Suburban Ring’ was designed in part as insulation and a barrier to urban growth as was the Green Ring which surrounded it. Through a military optic the suburban area became ‘a cushion area consisting of the surrounding suburbs which are mainly residential’.[[521]](#footnote-521) In the zoning in the *Plan*, the rings were the main feature. Within those rings, however, the zoning of the London region was repeated in micro-scale through the government and civil defence discussions of zoning cities so as to limit the possibilities of fire storms breaking out.

During the war, a number of RIBA architects including Eric Bird, who had been involved in ARP and structural precautions since the mid-thirties, worked on drawing up fire hazard maps for towns. A collection of 145 ‘Fire Hazard Town Plans’ were drawn up covering Northern Europe, the Mediterranean and the Far East.[[522]](#footnote-522) A report by the Scientific Adviser’s Office in January 1949 argued that fire zone maps should be developed in peacetime and built into the government’s plans for reconstruction and urban development. The report wrote that such maps ‘should be prepared for every town of any size and importance, and each main area of every large city’. The Scientific Adviser’s Office divided the ‘typical British town’ into the town centre; the inner suburbs; the outer suburbs; and the industrial areas. The town centres represented the most vulnerable areas and the dispersed outer suburbs the least, the latter of which represented ‘an exceedingly poor incendiary target’.[[523]](#footnote-523)

The report began by stressing the impact mass fires had on towns suffering air raids in the war, noting that in the fire storms in Hamburg and Tokyo ‘the completeness of the destruction, and particularly the associated loss of life’ was far greater than in raids where the incendiaries were localised in small blocks and did not join together. The reason that fire caused such devastation was not necessarily, the report argued, a result of the concentration of the attack on dense urban areas, but rather ‘their inherent susceptibility to this form of attack’.[[524]](#footnote-524) It followed from this argument that better planning and organisation of towns and cities could limit the potential for mass fires to sweep through them. The proposed development of fire zone maps would redraw the material layout of cities along defence lines. The report reiterated the broad arguments that closed and narrow streets were dangerous, and that open space and wide streets would create a safer urban environment. Particularly vulnerable areas should be identified and important buildings relocated, or transformed into ‘fire fortresses’, and made completely invulnerable.[[525]](#footnote-525) The report explained the severe devastation of the air raids and fire storms in Hamburg, Nagasaki and Hiroshima as part of the techniques of modern war. Rather than exceptional events, aberrations enabled by atmospheric conditions, these intensely planned attacks had helped to form new perceptions of urban areas and their vulnerability. The basic remedy was still simply the creation of more insulating space between buildings and between areas.

Abercrombie mentioned in his plan that ‘some departments of the Government may also wish to remain outside the central area’.[[526]](#footnote-526) The government did make plans to move departments out of the urban centre of London. The plans were informed by Abercrombie’s intention to decongest the city, provide jobs in New Towns, and by the desire to limit the vulnerability of the government infrastructure. The equation of the dispersal of government departments and functions to aid regional development with the evacuation of the government from London to reduce vulnerability, reflected how closely broader planning ideas had become entangled with strategic considerations. The plans to remove 50,000 civil servants, many of whom would be moved to support the development of the New Towns, were a central aspect of government planning for reconstruction.[[527]](#footnote-527) The Lord President’s Committee agreed in January 1947 that the policy of the dispersal of government departments should be extended to the nationalised industries.[[528]](#footnote-528) A case study of debates about the future of the electricity industry in and around London demonstrates how development and defence were closely linked. It reveals how pragmatic political planning decisions masked the increasing inertia in government about nuclear weapons, and the uncritical assent to the notion that war meant the complete destruction of cities.

**Dispersal for Defence and Development in the Electricity Industry**

In the ‘assumed attacks’ imagined by planners, the most heavily targeted areas were the industrialised docks where a large number of electricity plants were situated.[[529]](#footnote-529) Of the infrastructure networks, electricity was both the most strategically important and was a defining symbol of modernity. Economic and social development depended to a significant degree on the expansion of the electricity industry. By considering the industry’s development in and around London, this section focuses in on how the fear of air attack was translated onto plans for national development. The calls for dispersal and decentralisation made by civilian planners were echoed by the military. The Working Party on the Effects of Air Attack assumed that the primary targets would be the power stations, ahead of the road network and the water network.[[530]](#footnote-530)

The association of electricity with national survival meant that essentially civilian infrastructure was recast as permanently militarised in a state of constant pre-war. Power stations, reservoirs, roads, and gasworks had become signifiers for surviving nuclear war. The re-designation of these utilities, and the cities they served, happened decisively in the Second World War, but the nature of air war and missile technology meant that the danger did not end in 1945. The common ideas about planning for development and for security were illustrated in the debates about the future of the electricity industry in and around London. Before turning to the discussions about development after 1945, it is important to detail the impact air raids had on the planned future of the electricity industry while the war continued. The plans for the electricity industry were informed by the experience of war, and the expectation of future nuclear war.

In the spring of 1944, after the heaviest period of bombing had long passed and before the V weapons began to fall, the question of structural air raid precautions in peacetime industrial buildings was on the Home Office Civil Defence Committee’s (CDC) agenda. Particular attention was paid to electricity stations, their location and the maximum size that should be permitted. The importance of electricity was also reflected in the more overt discussions of its strategic position in relation to future air raids after 1945, which echoed the debates held twenty years earlier. As decentralisation was an important factor in the reconstruction of towns, cities and industry, so the government envisioned the future of the electricity industry in similar terms. The debates among the government, military and the Central Electricity Board (CEB) were held as part of the discussions about Britain’s preparedness for ‘the next war’. John Kennedy of the CEB argued for development of the industry to continue as normal with new stations being built in such a way that structural ARP measures could be added at a later date. Under Secretary of Civil Defence Oswald C. Allen demonstrated a cautious acknowledgement of the sense of Kennedy’s proposals, which were informed less by cost and the development of the industry than by fears that developments in weapon technology could render current ARP methods obsolete. ‘Unfortunately’, he wrote to the Herbert Morrison in April 1944,

whatever may be decided now may be useless against new forms of attack, and I suspect that, just as in other fields of civil defence, there should be some central organisation studying the portents and giving guidance on the best means of counteracting the ingenuities of those whose minds are set on preparing more formidable forms of air warfare.[[531]](#footnote-531)

Proposals for plant extensions, which were sent to the Ministry of Home Security for approval in accordance with the practice established before the war, reflected the uncertainty about the role of ARP in the post-war development of the electricity industry. The uncertainty about the effectiveness of contemporary air raid precautions in the future was tempered by the importance of electricity in plans for the development of the country after the war. The Electricity Commissioners placed the need for growth of generating capacity in the context of the needs for reconstruction.[[532]](#footnote-532)

A landmark case was the proposed extension to the Battersea power station 1944. The correspondence within government in response to the Battersea extension demonstrates misgivings about the strategic sense of having such a large and conspicuous generating station, easily seen from the sky, positioned along the line of the Thames.[[533]](#footnote-533) Ambiguity about the future of air war, however, meant that the political will needed to oppose a seemingly important economic development was lacking. In the autumn of 1944, when the full devastation of nuclear weapons was yet to be witnessed, the extensions were approved in principle.[[534]](#footnote-534) The structural precautions that had been established were, however, cast into doubt by the arrival of nuclear weapons. In response to a question from the Electricity Commission in October 1945, the Civil Defence Department had to admit that it ‘was not yet in a position to advise on the precautions that can be taken against the effects of an atomic bomb’.[[535]](#footnote-535)

When the effects of nuclear weapons became clear, the Electricity Commission reacted by proposing that existing structural precaution requirements be relaxed or even removed entirely. Writing to Oswald Allen in December 1945, the Commission referred to the existing required precautions and asked if the circumstances had changed.

It now appears to the Commissioners, however, that the position may have altered substantially as a result of recent developments in aerial warfare and having regard to the shortage of labour and materials, the incorporation of the precautions in the design of generating buildings may be an unnecessary extravagance.[[536]](#footnote-536)

In the winter of that year, the utility and necessity of existing structural precautions were debated in correspondence within government. The Ministry of Works (now responsible for new buildings) and the Chief Engineer were consulted.[[537]](#footnote-537) The first indication that the new realities of the nuclear age may cause a major rethink in defence policy came when the government wrote to the Electricity Commission in February 1946 and stated that:

the vastly increased power and range of destruction of new methods of aerial warfare may make it desirable to examine whether a policy of concentration of production in relatively few generating stations which are not themselves adequately protected, does not entail greater danger to the national interests.[[538]](#footnote-538)

Nuclear weapons had quickly made debates about whether switch houses should be separated by more or less than 100 feet and the importance of a national pool of spare plant seem almost entirely redundant. The principle that space between parts of a station could offer protection had to be expanded to a separation of electricity stations themselves, and even a separation of them from any other urban or industrial areas. While the attractiveness of a dispersal policy was clear to Allen and the Civil Defence Department, the economic considerations and the need for a rapid expansion of electricity supply were compelling. The discussions about the future of the electricity supply were occurring against a backdrop of a struggling industry.

The electricity demands of the winter of 1945/46 were negotiated largely successfully, but it became clear as 1946 went on that the rising domestic consumption could not be met by the network as it stood. Emergencies and crises, so feared for their impact on morale in war, continued in peacetime and threatened to debilitate the industry. In the following winter a struggling system broke under the weight of demand.[[539]](#footnote-539) With most street lighting cut in order to relieve pressure on supply the cities returned to the darkness of the blackout.[[540]](#footnote-540) The government used Defence Regulations to enforce a scheme to reduce demand from industry at peak times, and set up a directorate along the lines of a wartime priority organisation to expedite orders for equipment required to increase station capacity. Some progress was made on other measures which had been discussed before the Second World War, such as standardisation of equipment and better co-ordination of orders for plant, but major delays remained. Another power crisis the following winter was only averted thanks to better than predicted weather.[[541]](#footnote-541) The strategic concerns about the expansion of the industry existed in the context of this post-war emergency.

The need to expand the capacity of the country’s electricity industry was clear. The questions about how to do this, however, remained problematic. The conflict of interests was illustrated by the proposal by Poplar Borough Council in March 1946 for a new generating station on a site at the East India Export Dock and Brunswick Wharf, Poplar. [[542]](#footnote-542) The Electricity Commissioners argued in favour of the development, saying that the new station was ‘urgently required to deal with the growth of load in the area of the South East of England Electricity Schemes, 1927 to 1940’.[[543]](#footnote-543) The proposed station would have a capacity of 300,000kw, which placed the scheme on the top-most limit of size then acceptable from a civil defence point of view.[[544]](#footnote-544) In addition to the potential concerns about the size of the station, its location – on the north bank of the Thames in East London, in one of the areas of the country that was most vulnerable to air raids and had been seriously affected by bombing during the war – was the element of the plan that provoked the strongest reaction. The dangers of the chosen location were made explicit in discussions in the Home Office: ‘The site within the Borough of Poplar is in the heart of the Dockland and would appear therefore to have “target” considerations, not only as to itself, but relative to other “targets” of great importance’.[[545]](#footnote-545)

When the proposals were made in March 1946, both the Civil Defence Department and the Air Ministry stated their opposition strongly. In a reprise of the debates between the electricity industry, the government and military between the wars, the issue of the vulnerability to air attack was at the forefront of these plans for post-war development and reconstruction. The Brunswick Wharf proposal prompted questions in government about the whole nature of air raid precautions in the ‘nuclear age’. The Civil Defence Department saw the issue as illustrating potentialities ‘which would appear to call for a review on much broader considerations than the structural aspects of “security”’.[[546]](#footnote-546)

The April 1944 agreement limiting the size of stations was now outdated. The second significant statement in the establishment of procedures for electricity expansion and defence was the directive by Winston Churchill as Prime Minister in February 1945. This second text, still before the effects of nuclear weapons were seen, though not before knowledge about the development of them and the fear of Soviet ‘atomic blackmail’ in the future, placed much greater emphasis on dispersal as part of a defence strategy.[[547]](#footnote-547) Allen wrote to his colleague A.J. Edmunds in April 1946 in relation to the Poplar plan, and noted that the Electricity Commission seemed unaware of this second directive, which stated that:

The highest degree of security lies in dispersal in smaller units and duplication, and large and concentrated plants should, if possible be avoided […].

In locating vital installations, security would be increased if large centres of population, which themselves present profitable targets for attack could be avoided. London is the supreme example.[[548]](#footnote-548)

The fact that work had already begun on the Poplar site to bring capacity to 100,000kw, before the Home Office heard of the plans (in the same way that the Air Ministry at this time ordered atomic weapons from the Ministry of Supply before the government had agreed to develop them), meant that they could not oppose this first development, but reserved the right to oppose any future expansions.[[549]](#footnote-549) The Air Ministry, however, expressed strong opposition to the development and to any increase of the concentration of power stations on Thameside, and suggested that ‘every effort should be made to find an alternative location’. The case highlighted some of the perceived inadequacies of the incumbent system of checks and balances in the procedures for new stations. The Air Ministry proposed to the Electricity Commission that a new system be established, which would ensure that ‘proper weight could be given from the outset to the strategic aspects’.[[550]](#footnote-550) Over the following months all parties agreed that the Physical Planning Committee of the Ministry of Town and Country Planning, rather than Panel A of the Committee on the Distribution of Industry, would operate as the forum for these discussions. The Air Ministry and the Home Office would also be added to the Committee.[[551]](#footnote-551)

The dispute over the Poplar station extended to the very top of government, when a meeting was held on the project between the Minister of Fuel and Power, the Parliamentary Under-Secretary of State for Air, the Foreign Minister and the Prime Minister in August 1946. Shortly before this, the Air Ministry’s concerns were detailed to the Cabinet in a memorandum on 29 July, which was prefaced with the acknowledgement that the ‘conflict between social and economic factors on the one side and strategic factors on the other is likely to be a constant difficulty’.[[552]](#footnote-552) At the meeting reports from each side were discussed, before the Foreign Minister supported the Air Ministry view, which was confirmed by the Prime Minister, who stressed that it was essential that strategic considerations were given due weight.[[553]](#footnote-553) The Home Secretary sent out a memorandum at the end of October 1946 explaining why the Poplar station proposal had been rejected. The dangers of future war had taken precedent over the financial implications of resituating the station. He affirmed the strategic importance of electricity stations, and evoked the attacks on Hiroshima and Nagasaki as precedents which had illustrated the vulnerability of urban areas to the new weapons.

It is time that we made it clear that defence must be one of the considerations in all future industrial planning [...]. Neither the possibility of a future war nor of the use of atomic weapons against this country can yet be ruled out; and the close proximity of the main London Power Stations in relation to the powers of destruction of atomic weapons and the vulnerability of London as a whole are only too obvious. The official published reports of the United States and British Governments on the bombing of Hiroshima and Nagasaki have made it clear that the dispersal of industrial plant and population could lessen the effects of attack.[[554]](#footnote-554)

In the Festival of Britain in 1951 the Poplar area would host the Live Architecture Exhibition and present a utopian, if pragmatic, image of the future of British housing.[[555]](#footnote-555) In the immediate post-war years, however, the government’s image of the future of Poplar was informed by anxieties about nuclear war. Utopian ideas about physical and social reconstruction were tempered by the dystopian imagery of mushroom clouds. The Home Secretary James Chuter-Ede’s memorandum illustrates how the bomb surveys were used in discussions of reconstruction and development. Aerial surveys and maps had proven invaluable for bomber targeting during the Second World War and their utility continued into the crucial surveys for construction work after the war.[[556]](#footnote-556) The advent of nuclear weapons had had a profound impact on the debates about air raid precautions, but the fundamental principles of space as a means of defence had persisted since the first meetings of the Committee of Imperial Defence about ARP in the 1920s. The vulnerability of concentrated urban areas was still the key consideration, and it followed that any proposal that would result in the further growth of already dense areas should be stopped. Chuter-Ede continued:

In so far as the Poplar project, or any other project, facilitates the development and extension of built-up areas already containing a number of key points, it cannot be expected that the Minister responsible for Civil Defence will give his support to this type of development. When a power station is intended not only to serve consumers in the immediate proximity, but also to provide power for other districts, particular care should, in my view, be exercised not to place it in the midst of what is already an attractive target.[[557]](#footnote-557)

A dense urban area, crowded with important industry and infrastructure, was already an appealing target for bombing. While the Ministry of Fuel and Power had argued that the ability of the Poplar station to serve a range of customers across the region made its development even more important, the Home Secretary turned this around, by arguing that the importance of the development meant that even more consideration should be given to defence.

The Home Secretary drew on the Air Ministry’s report to the Defence Committee for the 7 August meeting. The Air Ministry had highlighted the importance of the proposed station to war potential as well as domestic supplies, and similarly used knowledge of the effects of nuclear weapons to imagine what would happen if the site were attacked. One of nine assumed aiming points in an estimation of a future nuclear attack on London was Royal Victoria Dock, a second was the Royal Albert Dock.[[558]](#footnote-558) Despite the focus on the specific aiming points, the Air Ministry argued that the Second World War had proved Poplar to be ‘a likely target whether bombing in another war takes the form of aimed or unaimed attacks’.[[559]](#footnote-559) The Air Ministry adopted the planners-eye view, which was also the bomber’s-eye-view, of the area to draw a picture of the site’s vulnerability. They zoomed in on the docklands, and sketched out rings of predicted destruction.

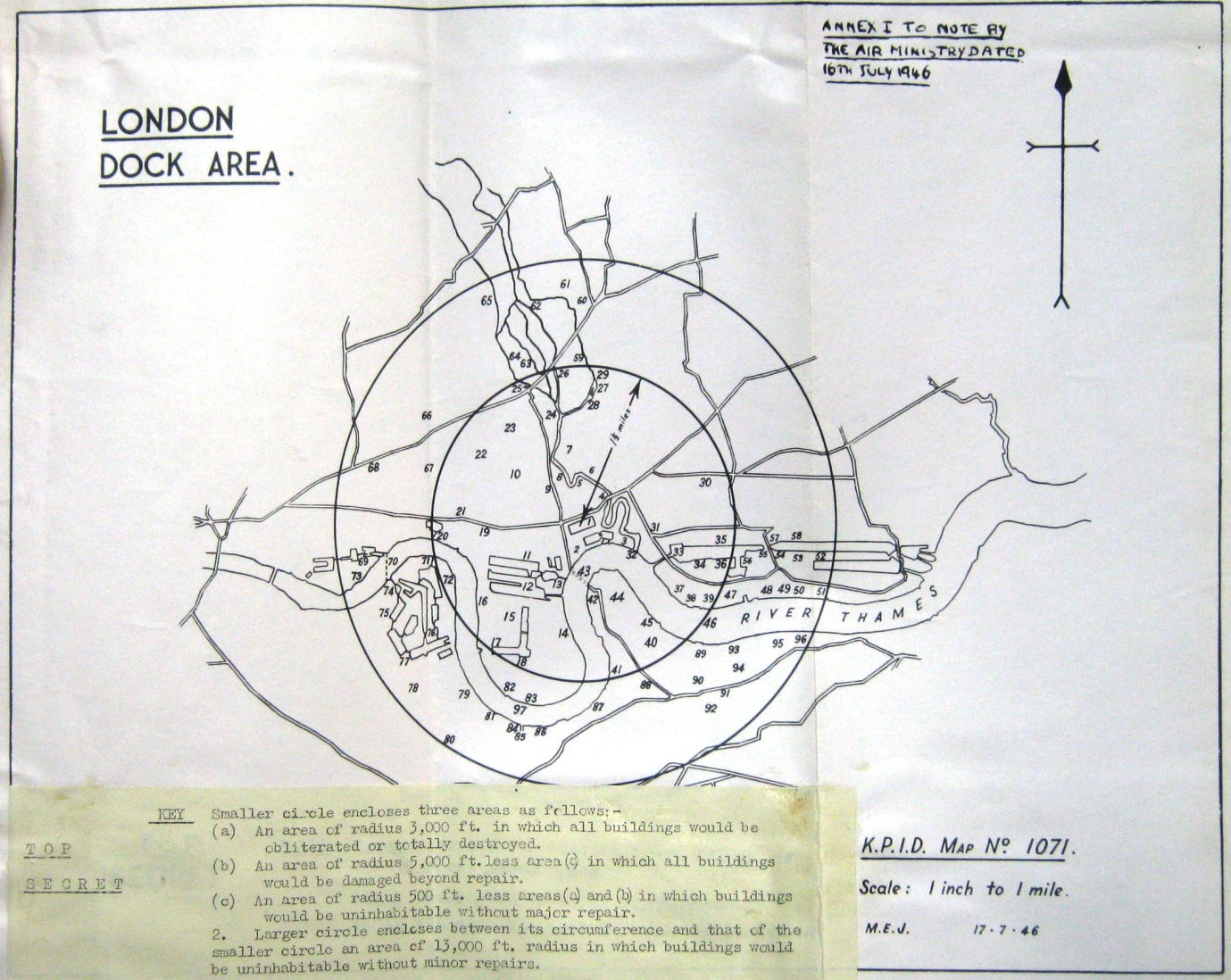


Figure . This map was included as Annex I in HO 205/296: Location of the Power Station Proposed to be erected at the East India Docks, Poplar, note by the Air Ministry, 10 July, 1946

The report coupled the rings of devastation, superimposed on a map of the docklands, with information on attacks suffered by the area in the last war and drew a fearful picture. The combination of imagined future attacks with a record of actual bombing in the previous war reflects how real and unreal were drawn together. There is an early foreshadow here of what Jacques Derrida would later describe as the ‘“reality” of the nuclear age and the fiction of war’.[[560]](#footnote-560) Imagined attacks were layered upon the reality of recent bombing and the potential effects of a future war. The real and the imagined were, as Derrida said, ‘perhaps distinct’, but ‘not two separate things’.[[561]](#footnote-561) On this map the distinctness of each was entirely lost and the imagined attacks gained the same reality as those marks where bombs had actually fallen. This map revealed marks of bombs past and bombs future, as the references to the bombing surveys conducted at the end of the war in Europe and Japan projected the results of Allied bombings back onto the future of the Allied countries. An appendix to the Air Ministry’s report listed the ninety-seven ‘key points’ identified in the area. Fourteen of the ninety-seven points identified were grouped around the Victoria and Albert docks.[[562]](#footnote-562) The message from this map echoes that of the bomb surveys: bombing worked against concentrations of industry, it failed when industry was effectively dispersed.[[563]](#footnote-563)

It was after seeing this report that the government blocked the development, and it appeared strategic concerns had won out. The planners’ dream of decentralised industry would become a determined policy, albeit one irretrievably bound-up with the expectation of air war, and the assumption that cities had now been irreversibly recast as targets. But just two days after the Home Secretary sent his strongly worded memorandum to the Cabinet, a further meeting was held, the decision was reversed, and approval was granted. It seemed the immediate exigencies of the developing crisis in the electricity industry overcame the less concrete chances of future nuclear war.[[564]](#footnote-564) In a note to the Secretary of State for Air, Allen suggested that the maps similar to the one above inscribed with the spreading rings of nuclear destruction, which had initially caused the government to block the development, had played a key role in the reversal of the decision.

I gave the Lord President the map showing the location of the principle key points in London on which had been superimposed, in shaded circles, the estimated effects of five atomic bombs. When the Prime Minister saw this he made an unguarded comment to the effect of “of course we could not do anything about this”.[[565]](#footnote-565)

The Prime Minister’s opinion reflected a similar ambiguity about the effectiveness of defence from nuclear attack that the Electricity Commission had demonstrated the previous year. Clement Attlee had been one of the earliest proponents of the argument that nuclear weapons had revolutionised warfare, and had seen little hope of defence from nuclear weapons, other than the mutually deterring possibility of retaliation.[[566]](#footnote-566) He had written in 1945 that the ‘answer to an atomic bomb on London is an atomic bomb on another great city’.[[567]](#footnote-567) This rationality resonated throughout the subsequent debates about planning for defence and development, and was reflected in the belated decision to approve the Poplar extension. Attlee’s unguarded comment reflected the ambiguity John Baylis describes in British policy about nuclear weapons. Vulnerability to air raids had been a significant factor in British strategy since Baldwin’s ‘the bomber will always get through’ speech in 1932.[[568]](#footnote-568) However, it is important not to suppose that fear of air attack debilitated government, and thus neglect the role government played in normalising the classification of cities as targets and developing new weapons which would be trained upon them.

The decision to approve the Poplar station indicated to Allen that it would become harder and harder to ‘inculcate defence-mindedness in the Civilian Departments represented on the Home Defence Committee’.[[569]](#footnote-569) Far from challenging a defence-minded approach to reconstruction and development, the debate over Poplar illustrates how the chances of a nuclear war were slipping closer and closer to routine and ordinary thinking in government, becoming imaginable, and foreseeable. Attlee’s “of course we could do nothing about this” is both a straightforward acknowledgement of the enormous devastation that a nuclear attack on London would bring, but is also a passive acceptance that it could happen, that governments would actually launch a barrage of nuclear weapons at foreign populations. Cities and civilians were now definitively placed on the frontline of a future nuclear war.

The government’s response to the Poplar proposal set a precedent for the development of the electricity industry around London. In the spring of the following year the same questions were asked, this time about the Bankside power station.[[570]](#footnote-570) In a meeting of the Cabinet the day after the Air Ministry’s memorandum, and despite protestations from the Secretary of State for Air, Philip Noel-Baker, the Bankside project was approved.[[571]](#footnote-571) The official ‘Conclusions’ minutes provide only a limited picture of how discussions about the vulnerability of London to nuclear were discussed in the Cabinet. In the Cabinet Secretary’s notes of the meeting, a more candid account revealed that the inertia Attlee demonstrated in the Poplar debates continued and deepened. In response to Noel-Baker’s alternative sites to Bankside, Attlee is reported to have said: ‘An atom bomb dropped there will make such a mess that a few power stations less won’t matter. This is a 1937 argument now out of date.’[[572]](#footnote-572) The Air Ministry’s reiteration of worst-case scenarios had had a self-deterring effect which countered their strategic arguments to the point where, for Attlee, any proposal to halt development around London was ‘out of date’, a ‘1937 argument’.[[573]](#footnote-573)

In November 1947, after the Poplar and Bankside stations had been approved and the Air Ministry had seen their arguments defeated, a meeting between all the major parties attempted to agree a framework for the development of the industry. The Chairman of the meeting, Sir Findlater Stewart, began by reading an extract from the interrogation of Albert Speer, which emphasised the importance of electricity.[[574]](#footnote-574) Speer had stated that grid systems with numerous smaller electricity stations were the least vulnerable to air attack. Even with the benefits of such a network, however, Speer said that the failure of sixty per cent of generating station would have caused the whole system to collapse. Stewart used Speer’s assertion that ‘the destruction of power stations is the most effective means of bringing the whole of industry and public life to a standstill’ to situate the debate.[[575]](#footnote-575) The Electricity Commissioners were unmoved. The government’s ambiguity about the possibility of defending against nuclear war by any means other than deterrence was coupled with economic crises in Britain, and the dispersal policy struggled to move forward. Despite some changed attitudes about the need to consider defence as more integral to development, the representation of interests in the Commons was largely unchanged.[[576]](#footnote-576) Matthew Grant has argued that of the key civil defence ‘policies of the 1945-48 period, only industrial dispersal failed to take root’, arguing that it was too ambitious ‘and would have had far too large an impact on the ordinary domestic economy for it ever to have been a viable peacetime policy’.[[577]](#footnote-577) But while the policies of dispersal did not become the new norm in industrial planning, the debates demonstrated that the bombing of cities and civilians had a central place in the version of war that the government was committed to. The conjunction of the planning theory of architects and town planners, and the practice of government departments making decisions about where to build electricity stations, enabled dispersal policies to be seen as part of a broad approach to development.

The importance of war preparations and the acceptance that a future war would involve nuclear attacks on civilians were obscured by the familiar language of planning in the architectural press. The interdependence of dispersal and development were major themes in architectural writing on reconstruction. Architects and planners had cited the development of a national electricity infrastructure as the most important material element in the building of a new, decentralised, Britain. In April 1945 the *Architectural Review* devoted an issue to electricity, which was prepared by the Association for Planning and Regional Reconstruction (APRR). The introduction stated that the grid had ‘saved Britain in her darkest hour by its invulnerability’, but lamented that ‘administratively, economically and socially there is no evidence that its development has been anything but piece-meal’.[[578]](#footnote-578) The electricity grid was, however, praised by Lord Forrester, the chairman and chief financier of APRR, as ‘one of the few examples of national planning that we have’.[[579]](#footnote-579) The dangers of high-density urban areas to civil defence were coupled by architects with the destructive effect of urban living on people’s spiritual and physical health. The Air Ministry’s assertion that the heavy concentration of industry along the Thames should be tackled was echoed by Hugh Quigley in the *Review*, who argued in 1945 that ‘no new generating stations should be permitted within the London area. On the contrary a scheme should be drawn for the gradual extinction of those already on the Thames’.[[580]](#footnote-580) In the same issue prominent planner Thomas Sharp, a campaigner against industry in towns, warned of the damage to the human spirit of such developments.[[581]](#footnote-581) While architects and planners had explicitly associated dispersal with defence from air attacks throughout the 1930s, the practice of the dispersal of industry into the rural areas raised concerns about the conservation of nature, green space and the aesthetics of the buildings themselves.

**Industry and the Environment: Defence, Conservation and Camouflage**

The dispersal of industry away from urban areas was a matter which concerned the whole of Britain. As well as desiring the dispersal of industry and population, the conservation of rural areas had been a consistent concern for architects and planners in the debates about the decentralisation of industry. The language of preservation and conservation has also been adopted by militaries after the Second World War, and environmental historians have challenged the environmentalist claims of militaries across the world.[[582]](#footnote-582) The historical military landscapes of the Cold War have become surprisingly fertile grounds for the heritage industry in Britain. The National Trust/English Heritage image of Cold War Britain has sought to uncover hidden structures in a wave of problematic Cold War nostalgia.[[583]](#footnote-583) The rendering of military infrastructure into heritage and curiosity fundamentally obscures what such structures were built for. Nuclear war is reduced to historical oddity, rather than being presented as a product of government rationalities which explicitly consented to the notion of nuclear war, with no illusions as to what this meant.[[584]](#footnote-584) Before the heritage industry’s interest in discarded Cold War bunkers, the debates about reconstruction and development planning in the 1940s highlighted possible links between conservation and security. The debate about the proposed expansion of the Trafford Park Industrial Estate in Manchester in 1946 reflects how different ideas about the dangers of urban and industrial concentration were articulated by different elements of the government and their technical advisers. The fear of aerial war remained an important part of these discussions.

In a report compiled by Panel A in the autumn of 1946, a brief history of Trafford Park was preceded by a summation of the Panel’s view on the expansion. The Panel recommended that no new firms should be able to establish themselves at Trafford Park, while ‘every effort should be made to discourage firms already established there from extending their present factories’. Any extensions that were recommended by the Board of Trade would have to be vetted by Panel A. The report cited labour and transport problems in the area as well the impact on the surrounding area as a reason to stop development. The extension of Trafford Park would, the Panel argued, bring about an extension of the built-up area of Manchester and encroach into green space. Overbuilding of the green space would have eradicated the planned buffer between Manchester and Altrincham.[[585]](#footnote-585) The Panel’s report was welcomed enthusiastically by the Air Ministry, who hoped it could serve as a model for the future.

In September 1946, Air Vice-Marshall, T.E. Williams, forwarded the Panel’s report to Allen, with whom he had regular correspondence. Williams noted in his covering letter that Trafford Park, ‘from the strategic point of view’, was an ‘attractive target area’, and saw in the Panel’s recommendations an opportunity to ‘influence policy in the future of this area’. Trafford Park had been an important industrial centre during the war, and Williams stressed that its vulnerability threatened the country’s ‘war potential’ as a whole.[[586]](#footnote-586) In this immediate post-war period the development of the country’s industrial base had to consider, and plan for, the next war.

The Home Office wrote in a memorandum to the Cabinet Home Defence Committee in October 1946 that ‘great stress should be laid on town planning with the objective of ensuring greater dispersion of industry and the population to maintain it’.[[587]](#footnote-587) In order to carry forward plans which proposed a move away from highly concentrated areas to smaller, more dispersed developments, new sites in the country needed to be secured and the existing cities needed to be stopped from sprawling out any further. In this context, familiar ideas about urban containment were relevant to defence. The military sought to superimpose a militarised view of the landscape, highlighting the vulnerability of the country to aerial attack. The influence of this military optic was reflected in the interest in building underground, or in some other way obscuring constructions from the aerial view. Alongside dispersal, the government discussed burying or camouflaging important buildings and sites as a potentially useful planning technique in the early stages of the Cold War. An analysis of reconstruction and development planning in Scotland, illustrates how the conservation of picturesque countryside was brought into the broader concern about Britain’s vulnerability to air attack.

A programme developed during the Second World War which envisaged a network of hydro-electric plants in the Scottish Highlands, received enthusiastic backing from the Secretary of State for Scotland, Tom Johnston. Despite the assumption that the Scottish Highlands provided a significantly less attractive target for nuclear attack than elsewhere in Britain, the Scotland Home Department wrote to Allen in London at the end of 1947, requesting that any available information on structural precautions be forwarded to the North of Scotland Hydro Electric Board, the agency responsible for the new hydro-electric developments.[[588]](#footnote-588) In April of the previous year the same Department had raised the issue of the security aspects of the scheme. Lord Sempill put the Department in contact with Swedish engineer Professor Bo Helström. Sempill was an experienced aviator, and by 1946 a suspected spy for Japan, who had been banished to the North of Scotland but not prosecuted.[[589]](#footnote-589) Helström had devised a design for underground hydro-electric stations, which had clear potential advantages for defence. Underground construction would both obscure the stations from view, and possibly offer some protection from blast.[[590]](#footnote-590) A subterranean factory built in a section of the London Underground during the war offered a potential model for future development.[[591]](#footnote-591) A. J. Aglen sought the advice of the Cabinet Office in London about the utility and necessity of such precautions in the Scottish Highlands.[[592]](#footnote-592) The quick association of new infrastructure projects with air attack, however, reflected the prevalent anxieties of the time, and the extent to which infrastructure signified survival in a future war. The importance of the Highlands and the potential implications of the Board’s plans on the landscape, and lives of the people living there, were discussed in a number of articles in the *Architectural Review* electricity issue.[[593]](#footnote-593)

Despite the problem of a declining population in the Highlands in the period between the wars, George Scott-Moncrieff wrote that the fertility of Highland women was ‘almost double that of the women of the Scottish borders’, and because of this the area and its people should be protected.[[594]](#footnote-594) If the ‘draining away’ of the most fertile of the national population into the exhausting cities were allowed to go on, Scott-Moncrieff worried, the national population would continue to contract dangerously. He warned that the schemes under consideration would ‘cover the map of the Highlands like the wire of a concentration camp’. The government’s desire to develop what it saw as an area blighted by poverty and squalor was challenged through references to the value of rural lifestyles and the landscape itself. There was a continuation of established discourses of the damaging influence of urban life, and the restorative power of the countryside.[[595]](#footnote-595) These concerns about the country and city in reconstruction echoed similar ones during the war. The demands for workers in English industrial cities meant that women from Scotland were brought to work in factories south of the border. As Sonya Rose has argued, the anxiety in Scotland about the loss of women from country to city reflected ongoing concern about the destructiveness of urbanity.[[596]](#footnote-596) The discourse of urban danger that was associated with the threat of bombing and the degenerative effect of life in cities were both part of the debate around hydro-electricity in Scotland. The rural and isolated Highland setting offered both a degree of relief from the looming danger of nuclear war, and the relentless life of the city.

The conservationist concerns about the development of industry in the countryside, and aesthetic worries of architects about the proper placing of buildings in the environment again featured elements of what Allen had termed ‘defence-mindedness’. The experience of war and the employment of architects, artists and designers in the wartime government and military had a lingering influence on the way reconstruction and development was understood. The aesthetic desire to create a harmonious visual relationship between a building and its surroundings had gained more varied connotations and uses with the work of the Camouflage Committee during the war. The committee’s concern with the obscuration of buildings, rather than just designing patterns to hide soldiers in the battlefield, reflected the centrality of air war.

What Hanna Rose Shell calls, the rapid ‘codevelopment’ of aerial photography and camouflage during the First World War, continued into and beyond the Second World War.[[597]](#footnote-597) The twinned technologies that revealed and obscured were instilled with a militarised view of landscape. As with the maps of imagined destruction above, the aerial view was a decisively military perspective. The development of camouflage alongside the aerial view was a rewriting of landscape in line with a ‘military pedagogy’.[[598]](#footnote-598) The relationship between observation and destruction resonated in discussions about the dispersal of industry during and after the War and reflects how war impacted upon perceptions of architecture and landscape.

The techniques of industrial location were more complicated than simple decentralisation. For a time, the potential dangers revealed by the aerial view and the architect’s concern about harmony between buildings and their environment coincided. Just as a large industrial building, jutting ugly and conspicuous out of the countryside offended the eye of the landscape architect, so too did it stand naked and exposed to the passing bomber. Camouflage had played a large part in the wartime strategies of Britain, as well as France, Germany, Russia and the United States.[[599]](#footnote-599) In the Second World War architects became the key experts employed by their governments to develop camouflage, displacing the painters of the First World War. The need to obscure industry and materiel from the bomber’s eye became the most important aspect of their work.[[600]](#footnote-600) Camouflage represented an artful harnessing of nature and understanding of technical design that particularly appealed to architects. The relationship between nature and design was highlighted in the summer of 1940 when the RIBA *Journal* published a review of a book on the adaptive colouration of animals. The review focussed on the unique abilities of architects with regards to camouflage.

Camouflage is not only a painter’s affair, essentially it is a science which must depend in part on the observation powers of artists and architects in so far as they are men with highly developed powers of visual perception – and the kind of intelligence that is needed to translate by means of pattern and structure the basic biological principles into the terms of detailed and immediate problems.[[601]](#footnote-601)

This comment in 1940 illustrated the architectural interest in camouflage that was extended and formalised during the war, as architects were employed by the government to help develop camouflage schemes in Britain. As Shell has written, camouflage is concerned with ‘human mimicry of natural forms’, and seeks to achieve this through technologies which deceive the human eye. It was human expertise in art and science that offered the chance to mimic camouflage in nature. ‘*Camoufleurs*’ used craft skills that combined form and function in a way which would have appealed to British sensibilities about design in the period.[[602]](#footnote-602) One prominent architect who worked on camouflage during the war was Hugh Casson. In an article on the aesthetics of camouflage in September 1944, he wrote that ‘after four years of full-scale experiment under active service conditions, our camouflage designers have almost perfected the technique of their art-science’.[[603]](#footnote-603) The combination of art and science is significant, as it reflects the self-image of the architects in the period, who considered their profession to be uniquely positioned to bridge any perceived gap between the two areas.[[604]](#footnote-604)

Camouflage had moved into the government structures of passive defence in 1936 with a sub-committee established in the Committee of Imperial Defence. When the 1939 Civil Defence Act was passed after the Munich crisis, a Civil Defence Camouflage Establishment was created under the leadership of Stradling.[[605]](#footnote-605) With representatives from seven government ministries, the Camouflage Committee drew up a series of memoranda as guides to camouflage techniques from 1941 to 1943.[[606]](#footnote-606) The documents covered the concealment of roofs, roads, water, and scarred ground among other things, and much of the work that had gone into the production of these memoranda contributed to the longer, amply illustrated but undated ‘Memorandum on the Siting Layout and Design of New Buildings’.[[607]](#footnote-607) If this document represented the culmination of the wartime work of the Committee, its utility was not limited to the immediate period of war; its principles contributed to the discussions about industrial dispersal in Britain after 1945.

The need to integrate buildings deeply into their environment to obscure them from view, or rather in Casson’s words, ‘deceive the eye of the pilot’, demanded thorough planning and appreciation of the characteristics of an area.[[608]](#footnote-608) The embedding of industry in its environment was also a technique advocated by architects and planners who wanted to create a closer aesthetic harmony between building and nature, but also believed that the location of industry required sociological surveys as well as physical ones. Addressing the future of industrial location in the *Architectural Review* in 1943, P. Sargant Florence wrote that planning the location of industry ‘is in essence the fitting of an industry to a locality or of a locality to an industry. The specific needs and characteristics of industries and of locations must therefore be accurately known’.[[609]](#footnote-609) By 1943 the needs of industries included a measure of defence against air attack. For industries in the British rural hinterland, camouflage, or at least the avoidance of dangerously conspicuous industrial indicators, was the primary technique of obscuration.

The questions facing those planning where to situate industry were, according to Lord Forrester writing in the *Architectural Review*, legion: ‘there are at least two hundred factors that the far-seeing concern should weigh up before finally selecting a site’. The factors varied from the hardness of the local water, to the ‘age-grouping and sex-grouping of the adjoining population’.[[610]](#footnote-610) The turn to logical positivism and quantitative analysis in geography in the 1950s was part of this process of rationalised planning. What Peter Hall describes as the search for ‘underlying laws’ governing the science of spatial distribution was not far removed from the art-science of camouflage and industrial location techniques advocated by architects, which drew function and aesthetics together.[[611]](#footnote-611) Landscape architect Geoffrey Jellicoe wrote that the ideal location for power stations was ‘within the landscape’. He argued that an effective layout, ‘planned not for beauty but for purpose’, could create a relationship between the ‘power house’ and its environment, and would have multiple benefits. The Camouflage Committee used planting as a simple, economic and environmentally sensitive method to disguise buildings. Trees could function as wind shelters, for shade, dust filtration, and for the ‘camouflage of inevitably dirty corners’.[[612]](#footnote-612) Jellicoe was not referring to camouflage from bombers overhead, but the language of war had been established within the architectural profession, which had been conscripted to develop wartime camouflage schemes. The understanding of industrial architecture and its situation within the environment had been profoundly impacted by anxiety about aerial war. The suggestion by painter John Piper that some camouflage schemes should be retained after the war reflects how the use of non-military personnel, such as architects, brought military techniques into the planning, design and location of civilian industrial buildings into peace.[[613]](#footnote-613)

There was, then, a double obscuring at work. As the objects of a modern industrialised nation, factories and infrastructures were subject to techniques of camouflage in order to hide them from the aerial view. The rationalities and decisions which made that hiding seem necessary were also decentred and unseen. The militarisation of landscapes and buildings, as well as the technologies used to picture and see them, was thus taken out of discussions about industrial location. The extent to which the government debated the future of cities and industry after 1945 under the shadow of future war reflects how decisively the distinctions between peacetime and wartime had been diminished. The fog that imagined war cast over plans for the future of cities was a product of a conception of war in which cities and civilians were the primary targets. The dynamics of innovation in reconnaissance technologies and camouflage techniques mirrors that of air war and air raid precautions. In both cases the ability to see the target has outrun the object’s ability to disappear. Dispersal represented an attempt to dissolve the city, to build it into its surroundings in a more organic way. If this was not an attempt to make the city disappear, as in the blackout, it was at least an attempt to lessen its exposure.

**Conclusion**

The danger of air war continued to influence government perceptions of urban areas after the Second World War had ended. The plans for the reconstruction of the country and its projected development in the second half of the twentieth century were drawn up under the cloud of imagined nuclear war. The debates about reconstruction reflected how the government consistently and uncritically perceived cities and infrastructure as primary targets in future war. The dominant policies for defence and development were deterrence and dispersal. Military ideas about urban containment, zoning and dispersal were projected onto civilian town planning techniques and theories. Abercrombie’s vision of the future of the London region, with a broad green belt constraining the urban centre, and people and industry dispersed out in smaller satellites, was one the civil defence planners argued was needed to protect the country. The research the government carried out into the consequences of nuclear attacks against British cities drew the imagined devastation onto the national landscape, and in this way, a fictional nuclear war was written into the reality of the ‘nuclear age’. The preoccupation with worst-case scenarios closed off the possibilities for a peaceful future, or at least one in which civilians and cities would not be on the frontline of a nuclear war.

The electricity industry was regarded as the most crucial part of the national infrastructure, and was subject to debates in government about how to develop the industry quickly to meet the country’s needs, and limit vulnerability to nuclear attack. Industrial dispersal became a central feature of peacetime planning. Military techniques of camouflage were understood as beneficial in peace as in war and were linked to dispersal and the decongestion of cities. Immediate economic problems, the scale of the task and the determination to secure nuclear weapons as a deterrent, all meant that dispersal policies faltered. But in the debates about reconstruction, the planning language of decentralisation, healthy living and national development, was brought together with the civil defence language of vulnerability, dispersal and evacuation, and the perception of cities as targets was ever more firmly embedded.

**CHAPTER FIVE**

**International Dispersal**

Survival, Development, and the ‘Second Colonial Occupation’[[614]](#footnote-614)

There is no single device for making love work or for controlling the flood-waters of hate and aggression. As with destructive rains that man must harness, part must be conducted into natural reservoirs, part must be held back by dams, part must be made to work turbines, and part must be used for irrigation.

(Lewis Mumford, 1946)[[615]](#footnote-615)

In his 1946 *Programme for Survival*, Lewis Mumford depicted the technological control of the wild power of water to provide electricity and cultivate arid land, as the model with which mankind must channel its own unthinking powers in order to avoid nuclear catastrophe and global devastation. The image of dams, reservoirs and turbines funnelling and controlling the ‘flood-waters of hate and aggression’, reflects the belief that rational planning could temper destructive tendencies. His image of the technology of hydro-electricity was one of a harmonious relationship between humankind and nature. He appealed to a biological understanding of the interdependence of the world’s elements in ‘the race between education and catastrophe’.[[616]](#footnote-616) He echoed his 1938 warning that ‘history is full of burial grounds’ housing the dead forms of those who had not learned to live in peace with nature and other societies.[[617]](#footnote-617)

The apocalyptic images which Mumford expressed before and after the war were symptomatic of an understanding of history that required decay to accompany growth, death to accompany life, and destruction to accompany reconstruction. This was an ecological ‘cycle of life and death’ that was read in the built environment, in the rise and fall of cities and civilizations.[[618]](#footnote-618) Open space lay outside the metropolis and represented the capacity for development and new beginnings, while simultaneously evoking post-apocalyptic images of wasteland and ‘no-man’s land’.[[619]](#footnote-619) The lure of ‘open space’ was an important element in imperial expansion, as was an imagined European future of disaster, overpopulation, congestion and degeneration envisioned as early as the 1830s and 1840s.[[620]](#footnote-620)

Although he was a critic of imperialism, Mumford’s image of dams and reservoirs reflects a dominant strain of thought in British imperialism in the period he was writing. Joseph Hodge has argued that ‘the most striking feature of British colonialism in the twentieth century is the growing confidence it placed in the use of science and expertise’, and the bureaucracies of the state, to develop and manage the ‘natural and human resources of the empire’.[[621]](#footnote-621) Many of the assumptions relied upon in the analysis of the development needs of the colonies mirrored those used in Britain to describe the dangers of urban decline and degeneration, both before and after the Second World War. The turn to science, and specifically to its application through rational planning, was in large part a response to the persistent fears about impending catastrophe expressed across British society throughout the period of this study.

This chapter discusses the influence of the ongoing dangers of air war in the context of the development of the Cold War after 1945 on the British government’s approach to the planning and development of the empire. The movement to an interventionist policy in the empire after 1945 has been described in the historiography as both the ‘second colonial occupation’ and a ‘colonial development offensive’. [[622]](#footnote-622) The period, between 1945 and the British explosion of a nuclear weapon in 1952, which reached its high-water mark with what Hodge called the ‘development offensive of 1947’, is the focus of this chapter.[[623]](#footnote-623) The desire to develop a nuclear weapon was a key factor in the turn to the resources of empire, and after the 1952 test closer co-operation with the United States began to diminish the importance of empire to Britain.[[624]](#footnote-624) The following analysis will develop the argument that this late imperial push was shaped by the government’s concern about Britain’s relative decline to indicate how the fear of air war penetrated and informed these anxieties. Government analyses of the future of Britain and her empire in the immediate post-war years were articulated in the context of questions about how Britain could survive a future aerial war. This final chapter extends the analysis of planning for war in Britain to discuss how reconstruction and development planning in the first years of the Cold War extended out in Britain’s colonial and dominion territories.

The different ways in which ideas of international dispersal were expressed in this period is the focus of this chapter. Dispersal meant at different moments the physical relocation of British citizens, the movement of industry, and the development of international networks of military-scientific knowledge and research to Commonwealth countries. The penetration of fears about future air war into the scientifically-informed colonial planning policies of Britain after 1945 illustrates how air war and the destruction of cities and industry had become an accepted and expected part of everyday life and government thought.

**Space for Survival: Imagining Dispersal Throughout the Commonwealth**

A proposal for the strategic dispersal of population and industry away from Britain in the years after 1945 reflects the continuation of wartime thinking in the government, and the desire to engineer an environment in which Britain could survive a future air war. These plans illustrate the established links between urban planning and air war, and the crucial importance of the perception of an on-going vulnerability to governmental thought and planning. The debates across government departments in 1947 and 1948, in these key years when civil defence policy and deterrence were debated, illustrate how the dual discourses of development and defence were the lenses through which different government departments understood international dispersal. In this section the significance of the fear of air war in government planning will be discussed in relations to plans to industrialise and modernise the wider Commonwealth.

The British approach to the development of colonies displayed a growing belief in the powers of research, planning and the creation of scientific knowledge of people and their living environments to avert the always impending disaster.[[625]](#footnote-625) The visions of future catastrophe incorporated what Hodge calls a creeping ‘neo-Malthusian crisis narrative’ which envisaged ‘land shortages, famine, desertification, and widespread social unrest’ in the colonies.[[626]](#footnote-626) The discourses of decline which played such an important role in the development of planning and social reform groups in Britain were reiterated in analyses of the future of the colonies. There was a strong environmental aspect to degeneration narratives in the colonies, which saw the disordered use and ultimate exhaustion of natural resources as a harbinger to a wider fall into cultural and material destitution. The cultural construction of the theories of air war and the doctrine of the moral effect of bombing on civilians was informed in part by British perceptions of the susceptibility of colonial subjects to panic and disorder.[[627]](#footnote-627)

The advocates of scientific modernization were, as Guy Ortolano has argued, ‘advocates of their society more generally’.[[628]](#footnote-628) The desire to rejuvenate society at home and abroad was part of the language of reconstruction which continued throughout this period. The fear of upcoming destruction reflected both a dread of social and environmental decline and the anxieties provoked by the development of air power which promised to bring destruction to any and every corner of the globe. Air war framed the proposals which combined the development of Commonwealth countries and the simultaneous strategic dispersal of the population of Britain with the perceived weakness in Britain’s economic structure.

The Home Defence Committee report on the problems of passive defence against atomic weapons in 1947 prompted the government to turn serious consideration to the proposals for international dispersal. The report was the culmination of an almost year-long study of the implications of new weapons on civil defence policy. The report operated on the assumption that an enemy would use weapons of mass destruction against Britain in a future war. The scale of a potential attack was unknown, but the Home Defence Committee argued that it must be assumed that ‘the weight of attack will be sufficient to threaten our very existence’.[[629]](#footnote-629) It maintained that defence policy should be focussed on Britain’s own capacity for offensive action. A focus on passive defence would make ‘depressing’ reading, with industrial concentration cited as Britain’s main vulnerability in a future aerial war. The Committee claimed that morale would be particularly vulnerable if the dense population centres were hit with nuclear weapons. The new weapons of air war coupled with industrial concentration had made a decisive disruption of daily life and of war production achievable. The well-rehearsed arguments about the vulnerability of congested urban areas and the concentration of industry were at the centre of this key report into passive defence in the nuclear era. The long-term passive defence solution the Committee proposed followed the logic of decentralisation of industry and population articulated by the Barlow Commission in 1940. But nuclear weapons made the need for defensive space even greater. ‘It may be’, the report noted, ‘that the proper solution to our problem, and the only way of overcoming the […] weaknesses in our system, lies in carefully planned large scale dispersal of industry and population to the Dominions and Colonies overseas’. The dispersal would, the report continued, ‘not only thin out the great vulnerable centres of population in this country, but would decrease the scale of our imports and ease the distribution system, while at the same time gradually creating a less vulnerable war potential on a Commonwealth basis’.

The Committee recommended that a special study should be carried out to consider Commonwealth dispersal, while their report limited itself to more practical short-term measures. They described Britain’s prospects in future war with nuclear weapons as bleak. It would, they wrote, be impossible to maintain a war effort equivalent to the last war with Britain’s national resources stretched just to defend the island. Any overseas operations would have to be left to the United States and the Dominions, while Britain ‘engaged in a fight for survival’.[[630]](#footnote-630)

When the Defence Committee discussed the idea of overseas dispersal a month later one of its architects and chief supporters Henry Tizard, then Chairman of the Defence Research Policy Committee, laid the emphasis for supporting such a proposal on the difficulties of defending Britain against atomic weapons, and called for early consideration of the policy.[[631]](#footnote-631) Tizard was a prominent figure in the wartime British government and military known for his divergence with Lord Cherwell’s argument that area bombing could quickly disable Germany.[[632]](#footnote-632) In the immediate post-war period Tizard’s thinking and work was dominated by the problem of bringing together defence problems with the broader civilian problems of reconstruction and development.[[633]](#footnote-633) His combined experience of science and government provided him with a particular qualification, which was heavily in demand by the post-war government.[[634]](#footnote-634) Tizard personified the contemporary need for scientific men who had a broad expertise and vision which drew military planning and civilian planning together. This process was a response to the development of air war, which had pulled the two spheres of peace and war ever closer and more entangled. Tizard’s dual roles of Chairman of the Defence Research Policy Committee and Chairman of the Advisory Council on Scientific Policy ensured a close co-operation between military and civilian scientific policy. He was praised by the Minister of Defence as providing an important ‘personal link’ between military and civilian research.[[635]](#footnote-635)

Soon after the war ended Tizard expressed an interest in mass emigration away from Britain. Developments in communications technology were making the prospect of international dispersal more plausible, while developments in military technology were making air war ever more dangerous. He linked a smaller population in Britain with the country’s defensive strength, citing the dependence on food imports, while arguing that reinforcements could be quickly brought to Britain in a time of crisis. Tizard considered the dispersal of the British population to increase defensive strength as interrelated with the need to help countries like Australia develop. Ideas such as this followed the development of what Edgerton called a ‘new economic empire forged in war’ that aimed for modernisation which would secure agricultural production.[[636]](#footnote-636) Tizard had forged close connections with a number of the Commonwealth nations during the war, particularly Canada and Australia, and had at Clement Attlee’s request chaired the 1946 informal Commonwealth Conference on Defence Science.[[637]](#footnote-637) Part of the argument that Australia needed a larger population and greater industrialisation was informed by the need for greater security in a strategically important area of the world.[[638]](#footnote-638) At the meeting of the Defence Committee, he stressed the strategic importance at the heart of dispersal plans, while the politicians present noted the potential political and economic benefits. The Lord President, Herbert Morrison, the Foreign Secretary, Ernest Bevin, and the Secretary of State for Commonwealth Relations, P.J. Noel-Baker, placed the Commonwealth dispersal ideas within a context of the broader development of the Commonwealth nations.[[639]](#footnote-639) Over the next few months the debate continued about who should be approached to conduct an enquiry into international dispersal, and whether this study should be limited to ‘the white Dominions’ or if it should be extended across the whole Commonwealth.[[640]](#footnote-640)

At the end of November, Tizard expanded on his proposal for a study on the feasibility of mass emigration, with a minute that formed the basis of the subsequent discussions of colonial dispersal. Tizard began by stressing the primary strategic function of dispersal. The policy initially arose because, he wrote, ‘no-one can envisage an adequate defence of the civil population of this country in the event of a major war in the atomic bomb age’.[[641]](#footnote-641) Defence considerations and specifically Britain’s vulnerability to nuclear attack from the air were the primary driving force behind Tizard’s proposals. For Tizard, the emigration policy also offered a valuable opportunity to stabilise the country and achieve a better balance of imports and exports. Concerns about such trade imbalances, which became a central element in the discussion of British ‘decline’ after 1945, were deployed by Tizard in his analysis of the vulnerability of Britain in aerial attack with nuclear weapons.[[642]](#footnote-642)

Military considerations were barely veiled by language of development and economic equilibrium. He explained that a future war or other ‘outside events beyond our control’ would expose the vulnerability and structural instability of Britain in the post-war world. ‘A better distribution of population throughout the Commonwealth’, would, he argued, ‘not only greatly ease our Home Defence problem, but would be a source of strength in war’. If a dramatic reduction in the population of the United Kingdom enabled self-sufficiency in food, then the islands ‘should be able to stand a great deal of knocking about provided our morale was high’.[[643]](#footnote-643) The assertion that a more sparsely populated British Isles would equate to a less vulnerable one, and a country able to withstand aerial bombardment for longer followed the established logic of passive defence through open space. He lamented the uncontrolled growth of the population in Britain which signalled a significant break from the argument between the wars that a declining birth-rate was weakening the nation. As air power had developed and its devastating effectiveness escalated with the development of nuclear weapons, a small population had, in Tizard’s eyes, been transformed from a weakness to a potential strength. Tizard addressed those who clung to the received wisdom that a declining population is always accompanied by declining prosperity.

What do they think will happen in the future if such emigration is not encouraged? The population of the United Kingdom when I was born was a little over 30 millions; it has increased 50% since then. At what point are we going to stop? Shall we leave it to chance, and stop when the birth rate equals the death rate, when a large part of the population will be too old or too young to be productive and will have to be kept alive by imported food; or shall we take thought for the morrow?[[644]](#footnote-644)

Tizard’s appeal was above all one for planning. Having begun by explaining how the policy of international dispersal was an immediate and pragmatic response to the vulnerabilities of Britain in the conditions of modern warfare, he utilised the language of national survival in a less exceptional situation. He combined visions of the survival of Britain in a future war and the broader economic and social survival of Britain in the future. The dispersal of large percentages of the British population into Commonwealth countries was painted both as a means to reduce vulnerability to nuclear air attack and to preserve a healthy and productive society. The structural vulnerabilities, most particularly the dependency on food imports, were not just necessary to improve the economic position of Britain, but were understood as vital to Britain’s survival in a future war.

Anxieties about agriculture, health and environment had deepened in the Depression, with the international nature of these problems becoming increasingly central. Historians have argued that the period between the wars represent a formative period in the creation and functioning of transnational networks and approaches to food, health and environment.[[645]](#footnote-645) After 1945 the focus of international co-operation shifted from a European to a more global arena.[[646]](#footnote-646) Tizard’s argument about Britain’s dependence on imports was heavily marked by a fear of future war, but also of a more general decline in Britain, whose former economic power had been severely challenged.[[647]](#footnote-647)

Agriculture and food security were particularly potent in the immediate post-war years as were the connected concerns about environmental protection and conservation. The creation of United Nations Educational, Scientific and Cultural Organisation (UNESCO) provided a large international institution which worked with other groups to shape the agenda of conservation and environmentalism. The first Director-General of UNESCO in 1946 was British biologist Julian Huxley who represented a bridge between older preservationists and the younger ecologist, expert imperialists. Anna-Katharina Wöbse argues that Huxley’s arguments illustrate how ‘traditional ideas of preservation merged with the war-time experience of scarcity and planning, imperial experience and grand-development schemes’.[[648]](#footnote-648) Huxley echoed Tizard’s occupation with food supplies, population and an efficient management of natural resources. The Second World War had a profound influence on the development of these ideas for both men.

The continuing apocalyptic fear that was reflected in Tizard’s dispersal proposals was also an important element in the UNESCO discussions about conservation and environmental protection in the first years after 1945. The discussions in UNESCO considered nature protection to be part of the urgent need to secure life on a quickly changing planet facing a multiplicity of unprecedented threats.[[649]](#footnote-649) As the discussions across government about Tizard’s dispersal proposal illustrate, the fear of future air war played a significant role in how these longer stories of change and development were interpreted. In his 1958 study of the social impact of bombing in the Second World War, Fred Iklé concluded that the maintenance of a sufficient food supply was the most decisive factor for the continued functioning of a nation and its cities. Central control of the food supply was a powerful tool to control the population in an emergency.[[650]](#footnote-650)

The apocalyptic vision Tizard drew of an aging and unproductive society huddled together into British cities in great densities unable to survive without outside help, was at once a wartime image, a product of the experience of bombing in the last war, and a projection of Britain’s future, which was itself a vision of a country at war. Air war had become an unexceptional feature of the modern landscape. When the government was attempting to plan the future of Britain and the Commonwealth, the spectre of future destruction from the air was part of the composition of contemporary life. As the APRR and others saw scientific planning as the way to avoid catastrophe and ensure national survival, governmental plans for development after 1945 were heavily influenced by scientists and the politically neutral language of science.

In December 1947, Arthur Creech Jones, the Secretary of State for the Colonies, wrote to Clement Attlee to support the proposal that the enquiry into mass emigration be carried out ‘by men of science from the Universities of this country and the Dominions’. Jones wrote how already completed enquiries, which had followed a minute by Attlee in October 1946, had concluded that large-scale European settlement would only be practical and profitable in a few carefully selected places. Jones cited the climate as a decisive factor against settlement in Africa, along with the perceived political difficulties associated with the introduction of a large European population. Examinations into the possibilities for settlement in Kenya, Tanganyika and Northern Rhodesia had been completed, while further enquiries into British Guiana and British Honduras were expected to conclude similarly that they were unsuitable for mass immigration.[[651]](#footnote-651) Discussions in the Colonial Office had concluded that, while from the ‘purely scientific and economic points of view’ the proposals had merit, the political and practical difficulties were prohibitive.[[652]](#footnote-652)

There were concerns from the Prime Minister, among others, that large-scale immigration from the UK to African colonies would cause significant political problems. Andrew Cohen, the civil servant in the Colonial Office working on drafts of early proposals, and from 1952, governor of Uganda, wrote that the motives for British immigration into West and East Africa ‘would be entirely misinterpreted’. Cohen warned of likely ‘political trouble’, particularly in West Africa.[[653]](#footnote-653) The political sensitivity and the concerns about the reaction that the enquiry may provoke meant that the requisite level of secrecy and the appointment of the people to conduct the investigation were highly important. The Prime Minister called a meeting of the Home Defence Committee on 24 February 1948 to discuss the Commonwealth dispersal proposals, by which point the enquiry was planned to cover the whole Commonwealth, but would be concerned primarily with the ‘white Dominions.’ [[654]](#footnote-654)

Attlee’s minute from 23 February considered the argument for international dispersal in two categories: military factors and economic considerations. Even the most superficial examination of Britain’s defence problems in modern war, he wrote, revealed that ‘with our present population the best we can hope for after the initial phase is an existence similar to that of Malta in the last war, and our survival even at that level would be precarious’. He echoed Tizard’s argument that it was Britain’s vulnerability to food shortages which most threatened Britain’s ability to endure the next war. He stated that a policy of dispersal may have provided an ‘acceptable solution for an economic disequilibrium’. [[655]](#footnote-655)

The desire for better economic balance between Britain and the Commonwealth was met by the concerns about the problems of social disequilibrium that led to the focus moving to the ‘white Dominions’. The need to create balanced economies and societies was an imperative that planning was designed to enable. The dangers of future air war loomed over the plans as the imagined future disaster that planning had to render survivable. Tizard told the British Association for the Advancement of Science in 1948 that a global balance must be found so that ‘the chance of a major catastrophe is made as small as possible’.[[656]](#footnote-656) He reflected the view that a planned and scientific balance of power could make war impossible, echoing the interwar proclamations that air power would make war so terrible that its destructive potential would herald world peace. It followed that if air war and nuclear war were a feature of the modern world, planning had to take account of this fact. In this speech he again stressed the dangers of Britain’s dependency on food imports. What had been understood principally a vulnerability in future aerial war became a central point in his articulation of Britain’s broader problems. ‘It our bounden duty’, he said,

and the only certain way of safeguarding our future so long as we remain a large food importing country, to develop our Colonial territories, particularly the underpopulated African Colonies, where the increase in population that would follow the control of disease and the increase of food supply would open fresh markets for international trade. This great task will call for the intensive application of science, in collaboration with other countries.[[657]](#footnote-657)

The proposals for emigration reflected how strategic planning for future war was tied to civilian planning for international development. The nature of air war meant that the government believed Britain’s vulnerability to aerial attack had to be built into the plans for the development of the country. In the eyes of influential individuals such as Tizard, Britain’s future could not be considered in isolation from nuclear weapons and their impact on the world. Planning for defence and planning for development were becoming more and more interrelated.

Tizard saw ordered scientific planning for the future of Britain as the only way to challenge the national decline he observed and feared. He was concerned with finding a solution to Britain’s economic and industrial difficulties as well as the future of Britain’s defence, and for these heterogeneous problems he saw an answer in the application of science. War had provided the opportunity for experts, be they scientists, architects, artists or planners to become involved in the official work that took them out of the specificities of their fields of interest.[[658]](#footnote-658) The creation of the bomb census and later the bomb survey reflected the role of scientists in wartime analysis and planning. The inclusion of the two professors in the analysis of bombing in Britain, Solly Zuckerman and J.D. Bernal, led to them having a voice in discussions over Allied bombing strategy, and Zuckerman being brought into the military strategic planning of offensives.[[659]](#footnote-659) The relationship between science and war in Britain reflected continuities in thought across the first half on the twentieth century. The strength of what David Edgerton calls the ‘military-scientific complex’ was evident before rearmament in the 1930s.[[660]](#footnote-660) Similarly, town planning had developed along the lines of the scientifically oriented survey and plan method before 1939. Bernal addressed the interdependence of architecture, planning and science in a speech to the RIBA before the war, and again after the war. He praised the increased interest in science amongst architects, which he saw largely as a result of the development of new materials and functionalism.[[661]](#footnote-661) The use of scientific language and the survey and plan method assumed a level of objectivity which worked to insulate the sometimes radical proposals both inside and outside government.

The 1949 report of the Royal Commission on Population reflected both the prevailing anxieties in the government about the future population of Britain and the central role of science in the analysis of such problems and their potential solutions. Presented to Parliament in June, the report drew on the work of three specialist scientific committees on statistics, economics, and biology and medicine. This extensive report followed the key wartime and reconstruction reports which helped shape government policy in Britain after 1945.[[662]](#footnote-662) Emigration of British citizens to Commonwealth countries was discussed in chapter thirteen of the report, which noted that the post-war boom of emigration after 1945 mirrored the experience of the period after 1918. In 1949, the report cited the fear of war, and specifically ‘the feeling that these islands are particularly vulnerable’ together with concerns about Britain’s economic future, as likely stimulants for emigration. The Royal Commission highlighted the connections between migration, population, development and the dangers of air war, following in the path of the Barlow Commission nine years earlier. While the suggestions put forward by Tizard and earlier by Rowse that many millions of British people should be dispersed across the Commonwealth were too unpractical, after the war plans of ‘assisted emigration to Commonwealth countries’ came to the fore, with schemes put in place for Australia and New Zealand, and other measures taken by the Canadian and South African authorities.[[663]](#footnote-663) The policy of the British government was to encourage migration, but not enforce it, as expressed by the Under Secretary of State for Commonwealth Relations in the Commons in June 1948:

I should like to say as clearly and as firmly as I can that the Government want to encourage and facilitate the flow of emigration from this island to the various parts of Commonwealth. We do not want to force anyone to go, but we want to facilitate the flow, with only this proviso, that we reserve the right to check too great a flow of certain types of highly skilled workers.[[664]](#footnote-664)

In a chapter of the Royal Commission’s report entitled, ‘Imponderables and Conclusions’, the questions of strategic dispersal, population and defence were addressed in more detail. The modern trend towards science and technology, the report argued, was shifting the relationship between population, power and military strength. They suggested that nuclear weapons may ultimately radically diminish the importance of ‘mere numbers’ for military strength, but in 1949 that was still considered speculation, and numbers remained an important military factor. In terms of the size of its population, Britain’s world position was clearly placed well-below that of the two continental superpowers. But through the maintenance of influence in the Commonwealth and with the United States, the Commission argued that Britain could contribute to a ‘balance of strength by which war may be averted’. In order to preserve this balance with the rapidly increasingly populations of ‘Oriental peoples’ questions of military and strength and security had to become merged with the ‘maintenance and extension of Western values, ideas and culture’.[[665]](#footnote-665)

The report argued that a vital and prosperous Commonwealth could be Britain’s contribution to the protection of Western civilisation in an uncertain world. Just as civil defence planning in Britain had sought to build passive defence into the everyday functioning and aspect of the city, ideas for international dispersal attempted to combine civilian and military planning to mutual benefit. In doing so, the distinctions between peacetime and wartime became increasingly obscured. The informal dispersal of population throughout the Commonwealth together with industrialisation and development was a policy heavily influenced by the anxieties of the British government about the consequences of future air war. It was a policy designed to create a global balance and equilibrium between powers that would prevent war, or would prevent the Soviet Union attacking Britain, but also allowed Britain to maintain a level of global influence.

When the Cabinet Defence Committee discussed civil defence expenditure a year later economic planning and civil defence planning were closely related. The Committee agreed that proposed civil defence measures were to be discussed with the economic planning staff in order to evaluate their potential impact on economic recovery and capital investment. The adaptability of civil defence measures, their ability to serve ‘the double object of improving our capital equipment and covering civil defence requirements’ simultaneously was a central element of the discussions.[[666]](#footnote-666) The important consequence of this approach to planning was that air war became an increasingly unproblematic and depoliticised event, which was built into the fabric of the country and the government’s visions of its future.

The 1949 Royal Commission report noted that many Commonwealth countries engaged in industrialisation were keen to attract new migrants from Britain.[[667]](#footnote-667) The authorities in Australia were especially interested in British migrant workers, for both economic and security reasons. While too dense a population in Britain would leave the country vulnerable to air attack, too small a population would leave Australia vulnerable to more conventional attacks.[[668]](#footnote-668) The United Kingdom High Commissioner in Australia, Edward Williams sent a telegram on this issue to the Colonial Office in London in January 1948 which was circulated by the Prime Minister before the February meeting. Williams noted coverage in the Australian press of statements by British politicians about the benefits of large-scale emigration, and wrote to London to stress his support for such a policy. Dispersal could, he wrote, make Britain less vulnerable to nuclear attack, permit a more equal allocation of defence and other commitments across the Commonwealth, and bring Britain nearer to self-sufficiency.[[669]](#footnote-669)

The ‘second colonial occupation’ was informed by an understanding of the world that was marked by the fears about apocalypse and collapse which had developed throughout the century. With nuclear weapons and the experience of air war in 1939-1941, the dangers appeared ever more real and immediate. The government and planners incorporated the threat from bombing into their analyses of British peacetime development. The proposals to disperse population and industry into the empire were in part informed by the perceived vulnerabilities of Britain to future air war. The policies and practices which the government imagined would enable such a dispersal scheme reflected the growth in the importance of scientific approaches to development between the wars. Biological and ecological understandings of the world lay at the heart of British post-1945 international development policies. Planners outside government developed influential theories about health and survival which were based on biology and ecology. The ever-present danger of a catastrophic future air war was incorporated into discussions about the ‘natural’ problems of decline and degradation. Both government and non-government planners argued that a scientifically managed global balance was needed to avert an apocalyptic disaster.

**Planning National Survival: Ecology, Health and the Nation**

Ecological understandings of human societies ran throughout the period in which cities and natural landscapes were being refigured by air war. Both the ecological model of development and the visions of nuclear war were founded around an essentially apocalyptic vision of the future. These visions of destruction were above all urban, and were formed in the context of the increasing normality of air war against cities and ongoing anxiety about social decay. This section discusses how ecologically-inspired planning ideas about the solutions to social decline and reconstruction after mass warfare mirrored those put forward by prominent government and military figures like Tizard. It argues that the experience of war and the threat of future air war were important mobilising forces behind ideas and plans for development and reconstruction. It focusses on the work of the planning and research group the Association for Planning and Regional Reconstruction (APRR) and two of its key figures, Jaqueline Tyrwhitt and E.A.A. Rowse.

The radical plans for reconstruction and development articulated by Rowse reflect how war influenced the development of planning ideologies and motivations in the twentieth century. In order to assess the impact of war on planning thought this section builds on Paul Fussell’s argument that ‘If the opposite of war is peace, the opposite of experiencing moments of war is proposing moments of pastoral’. The desire to create harmonious relationships amongst human societies and within the natural landscape after the Second World War was in part an attempt to propose a moment of pastoral in opposition to the destruction of war. Fussell argues that war, and especially the First World War was the ultimate ‘anti-pastoral’, taking place ‘outdoors and always within nature’.[[670]](#footnote-670) This section thus extends the analysis of the influence of war on perceptions on the future and the built environment out of the debates amongst scientists and politicians, and highlights the varied influence of war, both experienced and imagined, on the broader discussions of the shape of the world to come. In order to contextualise these plans, it is important to illustrate the development of discourses of ecology and scientific planning in relation to imperialism and development in Britain. In both colonial development projects and social reform movements in Britain concerned with planning the built environment, the language of scientific planning, health and biological determinism recalled the arguments about congestion and degeneration that had informed the theories of air power and persisted into the Cold War.

The language of agriculture and development, enthused by the ideologies of the Enlightenment, played an important part in the history of colonialism before the twentieth century.[[671]](#footnote-671) The assumption that knowledge allowed the most efficient use of natural resources had justified intervention in, and the reordering of, foreign lands and people for centuries.[[672]](#footnote-672) Botanical and agrarian metaphors were an important facet of how Joseph Chamberlain articulated his colonial development ideas to his political contemporaries.[[673]](#footnote-673) Racial doctrines ran through sociological and anthropological discourses about colonial subjects, which assumed that biology and climate were important factors determining the potential for civilization.[[674]](#footnote-674)

Richard Drayton argues that for British officials in the nineteenth century a scientific understanding of nature was a key ally of good governance, both at home and in the colonial periphery. He situates the rise of botany in imperialism as part of the larger story of ‘the global triumph of the idea of bureaucratic government as the key to social efficiency’.[[675]](#footnote-675) The development of wide-ranging state bureaucracies both domestically and internationally was crucial to the subsequent flourishing of planning ideas in the twentieth century. The fusion of science and government had, as Drayton argues, ‘forged an enduring bureaucratic instrument’ which was taken up by social reform movements. Reform groups modified the language of a landed and conservative paternalism at the start of the twentieth century, in which Chamberlain spoke of being ‘landlords of a great estate’, to argue for rational planning for social and economic development.[[676]](#footnote-676)

The APRR was a non-governmental organisation which brought together ideas about physical planning and biological science to diagnose problems and prescribe remedies. It operated in this tradition of reform and planning groups which pictured the world, its human societies and natural environment, as elements to be managed effectively and rationally to provide social and material benefits. Although Rowse was a subscriber to this biological approach, his commitment to planning and his approach to education mark him out as a radical. Having been appointed Principal of the Architectural Association in 1934, the changes he enacted were far-removed from traditional architectural education, and eventually the AA Board forced him to leave the school.[[677]](#footnote-677) But while his approach was not shared by the AA hierarchy, support from other prominent figures including Raymond Unwin and Gordon Pepler enabled him to establish his School of Planning and Research for Regional Development (SPRRD).[[678]](#footnote-678) That Rowse’s planning course was able to succeed as a distinct school on its own site at Gordon Square in 1939 was testament to the growing popularity and importance of planning in the years before the war. The APRR was an influential voice in the planning debates, being asked to provide evidence and contribute to the work of key government enquiries including the Scott Committee, the Reith Committee, the Barlow Commission, and the Beveridge Report.[[679]](#footnote-679) The APRR also produced special issues of the *Architectural Review* on reconstruction, industry and infrastructure.[[680]](#footnote-680) The work of the APRR brought together scientific techniques of sociological research with discourses of health and disease in the context of the national battle for survival. Their work contextualises the government’s planning for reconstruction after 1945 that, under threat of nuclear attack, turned to the empire.

When war broke out and, in 1940, Rowse was called up to active duty, he asked Jacqueline Tyrwhitt, a 1939 graduate of the SPRRD, to take over as interim director in his absence. Ellen Shoshkes argues that Tyrwhitt has been overlooked as an influential figure amongst those architects and thinkers who ‘shaped the post-war Modern Movement’.[[681]](#footnote-681) Tyrwhitt and Rowse were disciples of Patrick Geddes and his ecological theories of the organic growth of cities and societies, and they played a significant role in centring Geddes in the work of ‘research-based urbanism’.[[682]](#footnote-682) Their professional training reflects the directions in which planning was progressing in the first half of the twentieth century. Rowse was an architect and structural engineer, whilst Tyrwhitt had trained as a botanist, receiving a General Horticultural Diploma from the Royal Horticultural Society, before in the mid-thirties shifting her focus to town planning.[[683]](#footnote-683) For her, planning offered a more socially meaningful career than garden design, but techniques of cultivation and control continued to influence her ideas about planning.[[684]](#footnote-684)

Before taking her the post at the SPRRD, Tyrwhitt had lectured at the Royal Botanical Society, worked at the National Institute of Industrial Psychology, had been a research assistant at the Garden Cities and Town Planning Association and then in 1939 joined the Women’s Land Army, working for the Forestry Commission.[[685]](#footnote-685) Her career path, which ran alongside much of the thought in planning circles in the period of this study, as Shoshkes contends, ‘serves as a touchstone for this era’. She joined the Modern Architectural Research Group (MARS) in 1941 and contributed to the first post-war conference of the *Congrès Internationaux d’Architecture Moderne* (CIAM), where she met the General Secretary Siegfried Giedion, with whom she went on to collaborate for the next twenty years.[[686]](#footnote-686) Shoshkes argues that one of the ways her influence was most widely disseminated was with the Correspondence Course she developed during the war to prepare soldiers for post-war reconstruction, in which 1,600 students enrolled.[[687]](#footnote-687) One former SPRRD student, who would go on to have a long career in planning with the United Nations, Kenneth Watts, recalls that the influence of the APRR in the later 1930s and 40s meant that it was the ‘natural choice by the War Office to run correspondence courses on town planning.’[[688]](#footnote-688)

The APRR’s focus on reconstruction and development included an awareness of the unavoidable constraints of space in the British Isles, which echoed the debates led by Tizard about international dispersal, and prompted them to consider formal and informal population controls in Britain. The APRR evidence to the Reith Committee argued that population was one of the most important factors influencing the planning of New Towns. The argument presented in the evidence that while population settlement ‘will, of course, be voluntary, it must yet be controlled’, reflected one of the key beliefs of the APRR, that a scientific survey which recalled the ecological background of Tyrwhitt and her intellectual inspiration Geddes, was at the heart of understanding social problems.[[689]](#footnote-689) The evidence provided to the Reith Committee asserted that population control would ensure ‘a diversity of household types and of types of skill and training’, achieving a balance in the social ecology of the new communities.[[690]](#footnote-690) The desire for an ecological balance was part of the broader argument that reconstruction planning was planning for the survival of Britain.

In order to ensure the effective functioning of Britain in times of war and peace, the APPR cast the nation as an organism that could be managed as an ecosystem with a technique of survey and plan.[[691]](#footnote-691) The idea of an architecture of survival in cities was thus extended into a holistic biological vision of national landscape, human and environmental, which would provide the best structural basis for the continuation of life. Certain measures, population and land control chief among them, would, according to the APRR, allow Britain to manage its national ecology in such a way as to make the country less vulnerable and more sustainable. The survival of Britain and anxieties about population and cultural decline were a prominent issue in the period. [[692]](#footnote-692) The use of the language of the natural sciences obscured some of the difficult political questions that radical proposals about health and population may have provoked. The APRR’s vision of the world shared much with scientists like Julian Huxley and again the question of environmental conservation was linked explicitly with agriculture, food production and survival. They argued that health, survival, and environmental protection were the key elements of the broad planning structures which reconstruction required.[[693]](#footnote-693) The APRR frequently stressed the importance of agriculture in Britain, both in terms of food production and the preservation of a rural way of life.[[694]](#footnote-694) They perceived the threats to the world as being both to a traditional way of life through modernisation and urbanisation and to life itself through war and starvation.

For the APRR, the health of a nation meant of its people and its soil, and both could be treated through similar techniques of management.[[695]](#footnote-695) They called for the development of the science and art of the cultivation of man, and argued that this would require at its centre a policy that made ‘available for the healthy among the populace the opportunity to function fully in society’.[[696]](#footnote-696) Here they echoed the writing of Georg Simmel who, in his 1903 essay ‘The Metropolis and Mental Life’, had identified the influence of natural science and the money economy in ‘transforming the world into an arithmetical problem and fixing every one of its parts in a mathematical formula’.[[697]](#footnote-697) But more than this, Simmel cited the ‘slight aversion, a mutual strangeness and repulsion which, in a close contact which has arisen any way whatever, can break out into hatred and conflict’.[[698]](#footnote-698) The healthy were a group the APRR described as ‘hitherto largely overlooked in the community’, a small minority, probably ten per cent. But from this ten per cent, ‘given favourable conditions, health can spread by a natural process of infection’.[[699]](#footnote-699) Both the reduction of life to mathematical formulas inspired by natural science and the repulsion and aversion Simmel described are reflected in the APRR’s writing about health and the nation. The equation of natural processes and state planning were at the heart of the ideas of the APRR, which assumed a biologically determined rationality among subjects that healthy conditions could activate.

The need for healthy conditions entailed the identification of what the APRR speculated amounted to more than half the population, those ‘in a no-man’s-land of ‘not health’ and ‘not sickness’’, who would then be given the necessary treatment through a network of health centres modelled on the Finsbury Park Centre.[[700]](#footnote-700) The expectation that good health and healthy living could spread like an infection had played a significant part in planning discourses in the twentieth century, both in Britain and the empire. Lobbying for child welfare from colonial health workers in the 1920s and 1930s was part of a broader concern about cultural degeneration.[[701]](#footnote-701) The idea that health meant the cultivation of efficient and uncongested living conditions and that good personal practice could be transferred between subjects through association and planning were the two pillars of Rowse’s 1943 study on population and national resources that foreshadowed the government’s consideration of international dispersal later in the decade. Rowse’s work contextualises the Tizard proposal of 1947, revealing how government and planning discourse about dispersal and development echoed one another. Official and unofficial responses to threat of air war moved in tandem and after the Second World War these visions were necessarily global. Plans for reconstruction and development reflected the new reach of uncontained war which spread across the world. Like many of his generation, war had played a large part in Rowse’s life. Born in 1896, he fought in two World Wars and was consumed by ideas about reconstruction and planning to prevent future catastrophe. Though little historiography exists, Watts included a short chapter on him in his own story of planning after 1945, and argues that Rowse’s vision of the future of the world was an apocalyptic one.[[702]](#footnote-702) Watts quotes Rowse’s recollection of his reaction to hearing about the end of the First World War from one of the few personal manuscripts which remain. After fighting on the Western Front, in Serbia, Palestine and again Belgium, Rowse wrote:

I was unprepared for the suddenness of the Armistice. When I heard of it, I stood in the barrack room and yelled, “You fools, can’t you see that they have hauled us off too soon? We shall have to do this job all over again.” That conviction stayed with me throughout the inter-war period. Dead comrades live always in my mind…[[703]](#footnote-703)

For Watts, the profound impact of the First World War and the feeling that the future promised catastrophe heaped upon catastrophe, motivated Rowse throughout his life. He gravitated towards demographics as such ideas became more popular in Britain in the 1930s. He discussed the problems of development and population growth with demographer Alexander Carr-Saunders, one of the founding members of Political and Economic Planning in 1931 and the author of influential books *The Population Problem: A Study in Human Evolution* (1922) and *World Population: Past Growth and Present Trends* (1936).[[704]](#footnote-704) Rowse also met Karl Mannheim in 1936 and attempted to respond to the problems he posed in *Man and Society in an Age of Reconstruction*.[[705]](#footnote-705) His interest in the rational distribution of population across the world according to the distribution of natural resources was aimed at building a sustainable world, free from conflict. It was a view informed by a deeply apocalyptic vision of the future, which was articulated in his paper, ‘Pessimism’, written while on active duty in the Second World War.

He divided the future into eras characterised by their different roles in the incubation of a mass war which he envisioned taking place for fifty years or more from the end of the 1960s. He argued that ongoing wars of resettlement could only be challenged by an ordered balance of population across the globe.[[706]](#footnote-706) The ecological and biological roots of his Geddesian world-view helped foster his conviction that a natural equilibrium could be found and constructed, and the environment reclaimed from conflict. His vision was not, however, a solely peaceful or pacifist one. If he was proposing a moment of pastoral in opposition to war, the realisation of this pastoral was itself an inherently violent proposition. Both imagined future war and the measures Rowse proposed to avoid it envisioned the destruction or dismantling of dense urban centres. Population control was at the centre of his imagined future. His experiences in two World Wars, and the decades of reconstruction and depression in between, contributed to his plan for dispersal and development which he most clearly articulated in the 1943 APRR broadsheet: ‘The Proportion of Population to Potential: A Programme for the Reconstruction of the British Commonwealth of Nations’.[[707]](#footnote-707)

Rowse cited war as the driving force for change, both in terms of the painful lessons of war and the prospect of global conflicts continuing indefinitely into the future. ‘Economic battles’ and ‘destructive price warfare’ would presage a war that he predicted would break out around 1960, and in which, ‘Spengler’s mournful predictions will come true’.[[708]](#footnote-708) In order to avert future war, Rowse proposed the radical redistribution of British people across the Commonwealth nations. His vision required an acceptance by the British people of what he called ‘the way of abnegation’. He hoped that the privations of war had inculcated a feeling of sacrifice and mutual assistance that would have to be harnessed if Britain were to be reconstructed and deprivation and future war avoided. ‘There are many signs’, he wrote, ‘that suffering in comradeship is once again teaching them the lesson of abnegation, learned so painfully between 1914 and 1918: and so soon forgotten’.[[709]](#footnote-709)

Rowse’s plan was constructed around the full development of the resources of Commonwealth nations and the distribution of population ‘in saner relationship’ to natural resources. He described the two central elements as entirely interconnected, just as Tizard had argued that the development of resources and the proper planning of population in Britain were essential to national survival under the constant threat of air war. Rowse’s wartime arguments about structural weaknesses in the British society and economy were mirrored in the government’s concerns about future survival in air war after 1945. His analysis of the structural problems in the British economy reflected the influence of the ecologically-inspired planning ideas of Geddes. He was seeking a sustainable balance: equilibrium between population, production and environment. He proposed a dramatic pruning of the British population, to open space and allow renewal and growth at home, while British immigrants would cultivate the Commonwealth. He argued that ‘recovery and a healthier economic condition would follow’ the implementation of his plan. It would be with people that Britain would develop the Commonwealth, or in Rowse’s terms, it would be ‘with her life blood that Britain would feed her daughters’.[[710]](#footnote-710) The paternalistic language associated with Joseph Chamberlain and early century imperialism was reiterated by Rowse in common with the overarching ideology of the APRR, and following in the footsteps of Patrick Geddes.

If the language Rowse deployed was representative of a strong strain of thought towards empire, the content of his proposals were radical. Tyrwhitt reacted to Rowse’s proposals by saying ‘there’s no doubt the man’s a genius – but terrifying’.[[711]](#footnote-711) His desire to ‘put bellies near food, put hands near work’ amounted to a severe reduction in the population of Great Britain. He argued that a reduction of the contemporary population to between twenty million and twenty-five million was necessary before 1970-75. Rowse’s analysis was informed by the prominent expectation that population in Britain would continue the perceived downward trend of the years before the war.[[712]](#footnote-712) Planned reduction would offset the decline and revitalise the country while spreading its influence more effectively across the world. His image of planned population control echoed the APRR’s writings about health in this period, and demonstrate how an botanical vision of an ordered ecosystem were applied to the analysis of human societies under the threat of future war. Clive Fenton has argued that his concept of a ‘composite mind’ – where experts in all relevant specialisms ‘would perform as individual neurons of a great brain dedicated to the world’ – was equally a ‘symptom of anxiety and stress as a remedy’.[[713]](#footnote-713)

The radical dispersal plans put forward by Tizard and Rowse were simply too impracticable and politically sensitive to be carried on such a scale as they envisaged. The concept of international dispersal, however, had applications beyond the physical transfer of people. The United Kingdom High Commissioner in Australia argued that the introduction of large numbers of British citizens to Commonwealth countries would ‘perpetuate the British way of life over a greater part of the world with resulting increase in its sphere of influence’.[[714]](#footnote-714) He highlighted the direction in which government thought about a dispersal policy developed in the early stages of the Cold War.[[715]](#footnote-715) As the prospects for shipping ten to fifteen million British citizens out into distant countries dissipated, the perpetuation of a ‘British way of life’ became a central pillar to British colonial policy in the Cold War. As well as social values and structures, the built environment was a material manifestation of a ‘British way of life’. The ideas which informed the belief that town planning could cure the social ills of Britain’s cities were projected onto settlements and people in colonial territories. Propaganda based on British social democracy became an increasingly important part of Cold War foreign policy as an economic means to further Britain’s international status and influence.[[716]](#footnote-716) As Britain turned to empire after 1945, planning for the development of infrastructure and the built environment were part of the policies aimed at managing colonial change and maintaining co-operation amidst anxieties about Britain’s vulnerability to future war.

**Dispersal and International Development in the Early Cold War**

At the meeting of Commonwealth Defence Ministers on 6 March 1951 the question of the dispersal of a proportion of the British population into Commonwealth countries was not on the agenda.[[717]](#footnote-717) The Commonwealth nations still, however, played a significant role in the British government’s policy and practice for defence. The Malayan insurgency had made the Cold War in Asia a reality for Britain.[[718]](#footnote-718) Further counter-insurgency campaigns in Africa, the Middle East and Europe added to the global strategic problems Britain faced after 1945 as colonial unrest was charged by the Cold War.[[719]](#footnote-719) It was in reference to the strategies of the British military campaign in Malaya that the British High Commissioner in 1952, Gerald Templar, coined the phrase ‘hearts and minds’.[[720]](#footnote-720) The focus on propaganda as a technique of counter-insurgency was aimed not just at winning the ‘hearts and minds’ of the Malayans, but was designed to gain the support of the British public.[[721]](#footnote-721)

One of the propaganda methods deployed in Malaya was the construction of ‘New Villages’, a version of town planning which mimicked that being discussed in Britain at the same time. Although explicitly military constructions complete with barbed wire fences, lookout towers and fortified gates, these ‘New Villages’ combined the military closely with the civilian in a way which reflects the broader direction of governmental thought in the period. As Nicole Sackley argues, the British campaign in Malaya was not without precedent, but the ‘joining together of military defence with a panoply of rural reconstruction ideas and practices’ was an innovation which had a significant impact on the development of Cold War strategies. She describes how ‘New Villages’ were constructed to ‘resettle’ around half a million ethnic Chinese workers. Material and architectural features including new schools, health clinics and community halls, were combined with loudspeaker speeches and films. It was to this dual policy of development and propaganda that the phrase ‘hearts and minds’ referred. [[722]](#footnote-722)

The policies in Malaya brought together plans for reconstruction and development with military imperatives. The explicit combination of military and civilian policies and practices to secure the continued support of the civilian population can be compared to the discussions about reconstruction and development more widely across the Commonwealth. The explicitly militarised New Villages were part of a development programme which sought to secure British influence and build a culture that would support Britain into Malaya. The material benefits of the ‘British way of life’ were articulated in the architecture and the social order it represented. With British colonialists cast as ‘nation builders, preparing their charges with the outlines of a new civil society’, Mark Crinson argues, modern architecture and architectural education reflected the British colonial policies which were directed to instil ‘a sense of debt – literal and emotional – that might bind the colony to the motherland beyond formal rule’.[[723]](#footnote-723) The international culture of architecture was particularly important, as the assumption was that its rationalist methods of design could be built into any locality.[[724]](#footnote-724)

Architects and planners who were prominent in Britain between the wars played an important part in the emigration of British ideas through architecture in the immediate post-war years. One of the earliest and materially most successful examples of this was the work of Maxwell Fry and Jane Drew in West Africa.[[725]](#footnote-725) Fry and Drew were leading members of Britain and Europe’s architectural elite. Included amongst their fellow-minded friends and colleagues was the wartime APRR leader Jaqueline Tyrwhitt.[[726]](#footnote-726) Fry, Drew and Tyrwhitt were amongst the British planners and architects interested in reform and reconstruction who took their work outside Britain after 1945.[[727]](#footnote-727) It was through their experiences in Ghana that Fry and Drew developed their influential concept of ‘tropical architecture’, which Crinson argues became iconic of the idea of post-war empire: ‘modernization overseen by conscientious “pioneers” from the metropolis, bringing a claimed scientific attitude to architectural problem-solving and an expertise in the aesthetics of modernism’.[[728]](#footnote-728) The desire to disperse British citizens across the Commonwealth was mirrored by the spreading of architecture and planning ideas through the employment of experts, such as Fry and Drew, to development projects abroad.

Securing the support of the local population through the promise of development was at the centre of Britain’s attempt to maintain a level of control after the Second World War. Fry and Drew though, occupied a contradictory position building new educational buildings for the development of the nation of Ghana, but simultaneously reinforcing the hegemony of British rule.[[729]](#footnote-729) The development of Commonwealth countries was part of the complex of British Cold War policies which were aimed at securing valuable natural resources, maintaining British influence worldwide and blocking the spread of communism. As in the reconstruction programmes in Britain, a key part of development was infrastructure, and most particularly, electricity. Power was the infrastructural foundation upon which the future could be built, and electricity was its cleanest and most modern form. Fry and Drew were involved in the early planning but not final schemes for the Volta River Hydro-electric Scheme, which came to represent the grand symbol of African development for Kwame Nkrumah. As well as the Volta river dam, the scheme called for a new harbour township and the rebuilding of a fishing village. Fry, Drew and their colleagues prepared plans for both.[[730]](#footnote-730) When it came to large planned infrastructure schemes, particularly hydro-electricity, one example from the period between the wars stood out which others sought to replicate.

The Tennessee Valley Authority (TVA) project has stood as a regularly cited symbol of the benefits of planning since its inception in 1933.[[731]](#footnote-731) Julian Huxley wrote in 1943 that the TVA was becoming a symbol ‘of a new possibility for the democratic countries – the possibility of obtaining the efficiency of a co-ordinated plan without totalitarian regimentation’. That Huxley (who a year earlier had been best man at Fry and Drew’s wedding) was writing about the TVA is a reflection of the close relationship between science, planning and architecture that was also evident in the work of the APRR.[[732]](#footnote-732) He carried this influence and these concepts into his work with UNESCO after the war.[[733]](#footnote-733) In the *Town Planning Review*, the TVA was described as a part of the reconstruction of society and the physical ‘making of peace’ in a Geddes inspired vision akin to that expressed by Mumford.[[734]](#footnote-734) Mumford himself, in the foreword to the 1947 book about Geddes’s time in India edited by Tyrwhitt, observed how the work of the TVA could be considered ‘a fruit of the seeds [Geddes] tirelessly scattered abroad’.[[735]](#footnote-735) Architects and planners like Fry and Drew were carrying the seeds of Geddes’s work into empire after 1945.

In the same period during which the Volta River Hydro-electric project was being planned to bring power and industrialisation to the new Ghana, another monumental hydro-electric scheme was being planned in Australia. Both the Volta River Project in Ghana, and the Snowy Mountain Scheme in Australia reflect that such development projects were collaborations between states, rather than being simply imposed by the colonial power.[[736]](#footnote-736) Fry and Drew’s early role in the plans for the Volta River project had been preceded by a visit to the TVA that Lord Swinton had organised for Fry in 1944.[[737]](#footnote-737) In 1945 the Premier of New South Wales, William McKell, also visited the TVA and praised it as an example Australia could follow.[[738]](#footnote-738) The Snowy Mountains Scheme built over twenty-five years from 1949 in New South Wales, illustrates the connections between Cold War Commonwealth development and modernisation policies, and British desire to develop militarily. During the war the TVA had powered the Manhattan Project and it was this context of military science and development that the Snowy Mountains scheme was pitched.[[739]](#footnote-739) The construction would encourage emigration away from the British Isles, while assisting in the industrial development of a Commonwealth country.

The Snowy scheme was part of a longer process of the decentralisation of industry, and particularly munitions production, which the Australian government had agreed would be a feature of post-war development. As Britain’s dense population gathered in congested cities was considered to be a vulnerability in modern war, Australia’s lack of manpower and industry was an equivalent weakness. The war had brought the question of ‘Empire defence’ to the fore and illustrated the importance of integration and co-operation to protect the disparate countries of empire. It was in this context and, as a product of war and the incentive to disperse British industry and population, that the Snowy scheme had gained renewed momentum with the establishment of the Snowy River Committee in 1944.[[740]](#footnote-740)

In the foreword to a special issue of the *Architectural Review* on the architecture of Australia in July 1948, Prime Minister J. B. Chifley set out his vision for Australia’s planned future. Nation-wide planning would lead Australia into a bright future away from sprawl and chaos. Chifley wrote in terms that illustrated state planning and development had become an accepted orthodoxy. The reflection prompted by the war years was cited by Chifley and a visiting British architect as the key motivating force behind the commitment to planning.[[741]](#footnote-741) The Snowy Mountains Hydro-electric Scheme was at the centre of the Australian government’s development plans after the Second World War. The scheme initially promised, through a system of dams, reservoirs and tunnels, to feed sixteen power stations strategically embedded in the mountains. The predicted electricity output was stated as 1,720,000 kilowatts in 1949 before being finally devised as 2,820,000, a number which dwarfs the 300,000 kilowatt output which in Britain at the time was deemed to be uppermost limit for a station, in terms of vulnerability to attack.[[742]](#footnote-742) This figure was explained in comparison with the TVA output of 2,056,000 kilowatts, although the Minister in Australia predicted that soon enough Snowy would move ahead of the world-renowned TVA.[[743]](#footnote-743)

The Snowy scheme went on to attract immigration and capital, and provided the electricity needed for modern industry. But, as Wayne Reynolds has argued, these later successes have obscured the premises on which the beginnings of the scheme were built.[[744]](#footnote-744) It was the increased demand for power for defence industries during the Second World War which provided new momentum for a hydro-electric scheme which had been struggling to take-off for decades.[[745]](#footnote-745) The Australian government envisioned it as a crucial post-war development, one which illustrated the on-going importance of the threat of air war to development programs after 1945. The Snowy project shows how the Australian landscape was refigured in the context of air war and then nuclear weapons. The scheme was part of a Commonwealth-wide vision of defence in the age of nuclear air war. This vision was by no means complete or unanimous, but the discussions between Commonwealth and British leaders illustrates that the implications of air war were a large part of governmental thought about empire in this period. Development programmes and defence schemes were part of the same planning machinery which had been growing ever closer as air war had developed and recast cities, infrastructure and industry as the primary targets in modern war.

The defence aspects of the Snowy Mountains scheme were not obscured by the Australian government at the time. At the second reading of the Bill for the project, the Australian Minister for Works and Housing, Nelson Lemmon began by asserting that the scheme would be set-up under the defence powers of the Commonwealth. Power was, in his words, ‘the most efficient tool of the machine age’. He argued that the power requirements of Australia were so great that this scheme was of vital importance, but explicitly tied the need for power to defence both in times of peace and war.

[T]he requirements of power for [Australia’s] munitions factories and laboratories and its defence research installations, even in time of peace, are now reaching very high figures. In time of war, the power requirements for defence will be so great that they will be in excess, it is computed, of even the whole of the power that can be produced by this great scheme. In time of peace, power not required for defence purposes can be made available not only to the Australian Capital Territory, but also to the power grids of the States of New South Wales and Victoria for normal industrial purposes.[[746]](#footnote-746)

A scheme exceptional in its scope, ambition and marked by its necessity for defence, was made part of the general industrial base of the country, equally essential to the modernisation of industry and society. The Bill was simple, he continued, ‘pregnant with good for the whole community’ the scheme would make ‘available large blocks of electric power for defence in the event of war, and for industrial activities in times of peace’.[[747]](#footnote-747) The twin imperatives of development for peace and war were encapsulated in a bold infrastructure project that would be dug into the mountains of south east Australia.

As well as providing the power for military and industrial development, the mountain site had the benefit of being geographically insulated from the dangers of aerial attack. Lemmon drew attention to the vulnerability of existing power stations in Australia. In an echo of the debates occurring in London simultaneously, the Minister noted the coastal location of power stations had left them dangerously exposed to bombing. His answer was the Snowy scheme which would not only reposition the infrastructure in inaccessible mountains, but further the power stations would be underground, scattered miles apart, and thus ‘virtually safe from attack’.[[748]](#footnote-748) Once the project was well underway, Robert Coggins, in the first of a series of short texts on Australian geographies in the 1950s, noted the defence aspect of the siting of the power stations in the isolated mountain range.[[749]](#footnote-749)

The potential advantages to developing the military and industrial infrastructure of Australia were well known in Britain. One of the key voices in the arguments in favour of building-up Australian industrial capacity was Henry Tizard. As well as proposing mass emigration of industry and population, Tizard had also been concerned about the dispersal of scientific knowledge and saw this as central to the development of the Dominions and the fortification of Britain’s international military infrastructure. After 1945 this meant nuclear weapons, air power and new missiles. His role presiding over meetings of the Commonwealth Committee on Defence Science put him in a strong position.[[750]](#footnote-750) In 1948 Tizard played a crucial role in ensuring that the Woomera rocket range was built in South Australia. The Woomera project had marked the start of formal co-operation on modern deterrent weapons in February 1946, and when the project hit trouble in 1948, Tizard’s influence was such that with some modifications the scheme was continued and completed.[[751]](#footnote-751) He had visited Woomera during his six week trip to Australia at the end of 1948.[[752]](#footnote-752) It was during this trip that the Snowy Mountain Scheme was announced. Co-operation on defence science developed with significant investment made into Australia over the next decade.[[753]](#footnote-753)

During the weeks Tizard spent in Australia and then New Zealand in 1948-49, he met with politicians, military figures, scientists, and industrial leaders to discuss defence science, development and the relationship between Britain and Australia. He gave a number of speeches and lectures encouraging industrial development and support for universities. He highlighted the interdependence of Britain and Australia, framing British support for industrial development in terms of the twin viewpoints of economics and defence. He stressed the need to construct a sophisticated science and technology infrastructure in order to lift the national defence potential.[[754]](#footnote-754) The Snowy scheme came to represent exactly this combination of civilian and defence planning for national development and technological progress. Tizard did, however, express misgivings about the development of Australia, and moved away from proposals to move large numbers of British workers to the country.[[755]](#footnote-755) He wrote in notes after his trip that without significant and rapid development Australia would not become a great industrial nation, despite having the mineral and material requirements.[[756]](#footnote-756) It was when he flew over an industrial area of the United States in 1943 that he said of Britain’s future: ‘You know, after the war we’re going to be a second-rate power’.[[757]](#footnote-757) He saw the vast industrial landscape and potential for expansion as far removed from the conditions in Britain, but he did see this potential in Australia. Despite his private criticisms of what he perceived to be slow progress in Australia, the Snowy scheme which followed came to signify precisely the grand and bold military and civilian industrial project focussed on the production of power that Tizard argued was needed to transform Australia into a modern industrial nation.

The establishment of the Snowy scheme was framed by defence considerations and the interrelationship between defence and development in national survival. Support for a long-term and expensive infrastructure project in the Australian parliament, despite the economic troubles of the sterling area, reflects the centrality of the project to visions of Australia’s future. In the Australian parliament, the fear of an imminent war in the early 1950s was translated into a hardening of support for the Snowy scheme. The perception of the threat of future war developed through interactions between the central British government and the Commonwealth leaders. After a conference of Commonwealth Prime Minister’s in 1951, Robert Menzies told the Australian parliament that they must be ready for war in three years.[[758]](#footnote-758) The Snowy scheme was to be an integral part of the military and industrial infrastructure of the country. In the debates about the Defence Preparations Bill in 1951 electricity from the Snowy Mountains was regarded as essential to the survival of Australia in a future war. One Senator, Stanley Amour, argued that hindrances to the construction of the Snowy scheme represented complacency towards defence preparations.[[759]](#footnote-759) The Defence Preparations Bill was explained by the government as a peacetime response to an international emergency. The argument that the country needed to prepare for war in peacetime on a scale beyond anything previously seen was a direct consequence of the specific circumstances of air war. Similarly to infrastructure, planning and development projects elsewhere in this period of reconstruction, the Snowy Mountains hydro-electric scheme was conceived and continued to be perceived as a militarised structure. The very real prospect of mass destruction in the years immediately following the end of the Second World War informed the construction of a militarised industrial infrastructure in the landscapes of Britain and Australia.

Australia’s Great Dividing Range was transformed by the hydro-electric scheme built amongst its peaks in the name of defence, deterrence, development and survival. But physical landscapes had been recast by the development of air power and its irresistible reach across the globe before construction began in New South Wales in 1949. This distant range of mountains thousands of miles from Britain, and isolated from the Cold War protagonists, were a site of an uncontained war in the air that stretched across the world after 1945. The bleak promises of air power between the two World Wars, of instant death, cities collapsed into ruins in moments, and security only found in remote underground locations, were cut into the geology of the mountains. By the end of 1945 these imaginations of mass death from the skies had been built into the structures of governmental thought that were concerned with planning for future development. The Snowy Mountain Scheme brought migrants and electricity to power the development of Australia, while drowning existing settlements in the area, which were replaced with new planned townships.[[760]](#footnote-760)

The scheme was in its third year of construction when the British exploded a nuclear device. With the detonation at the Monte Bello Islands, off the West Coast of Australia, Britain became the world’s third nuclear power.[[761]](#footnote-761) The ‘second colonial occupation’ was closely connected with the British pursuit of security through dispersal and deterrence. Britain did not send out millions of its population into the Commonwealth, but it did use the human and mineral resources of empire to facilitate the creation of the bomb. Deterrence had triumphed over passive defence. As the 1950s went on closer co-operation with the United States, nationalism in the colonies, and the realities exposed by the Suez crisis changed the British relationship with empire. In the years between the summer of 1945 and the autumn of 1952, however, the fear of the next war, a nuclear war in the skies, informed an approach to development which was framed by defence. The co-operation between Britain and Australia continued over the next years and was only weakened when Soviet advances in thermonuclear weaponry and rocketry prompted greater collaboration between Britain and the United States. [[762]](#footnote-762) By the end of the 1950s, however, defence had played a defining role in the industrial development of modern Australia.

**Conclusion**

Rowse and Tizard proposed an unprecedented relocation of British citizens as an integral part of the reconstruction of Britain and the empire after the Second World War. The intellectual backgrounds which informed their ideas were very different, but they were linked by their belief that scientific planning and a dispassionate assessment of conditions could provide the basis for development. The lives of both men had been marked by war and they reflect how thinking about reconstruction after 1945 was both a product of the war just fought, and the next war already developing. The terms of the debate about planning Britain’s future were those of survival in a new era of air war born with the explosions over Hiroshima and Nagasaki. Planning groups like the APRR viewed survival in this context as part of a cycle of life and death that relied upon an ecological understanding of human societies. They argued that planning could address the dangers of the future through the creation of the physical conditions for peace. Lower housing densities and dispersal of industry were combined with ideas about health, which required space to be given to the healthy to allow them to thrive and blossom, as plants.

Tizard’s military science view saw dispersal and development as a measure to reduce Britain’s vulnerability and to secure the industrialisation of the empire, which could help provide the new weapons needed while the United States remained distant. Both Tizard’s arguments and those of Rowse, Tyrwhitt and the APRR, reflect how well-known planning ideas were incorporated into an understanding of the world irrevocably changed by the development of air power. The proposals discussed in this chapter represent the most dramatic manifestation of the simple plans to disperse urban populations and secure vulnerable infrastructure and industry from the threat from the air. The development programmes begun after the Second World War were informed by the nascent Cold War. The complex motivations within planning for development and defence after 1945 were captured in the Snowy Mountains Hydro-electric scheme, where technology harnessed the productive power of water, and channelled its flows through a network of underground stations, canals and turbines. The project brought the people and the electricity that powered Australia’s industrialisation, while supporting the creation of an experimental nuclear weapons programme. The ‘destructive rains’ which Mumford wrote about were indeed harnessed in the New South Wales mountains, but not for the purpose he desired; they were harnessed to bring power to prepare for the future, and for future war.[[763]](#footnote-763)

**Conclusion**

The Ordinariness of Air Raids?

When *we* concentrate on a material object, whatever its situation, the very act of attention may lead to our involuntarily sinking into the history of that object. Novices must learn to skim over matter if they want matter to stay at the exact level of the moment. Transparent things, through which the past shines!

(Vladimir Nabokov, 1972)[[764]](#footnote-764)

Rose Macaulay concluded her 1953 book, *Pleasure of Ruins*, with a brief final ‘Note on New Ruins’. She wrote how these new ruin artefacts, still ‘blackened and torn,’ smelling of ‘fire and mortality’ offered ‘nothing but resentful sadness’. She imagined past generations thinking the same about the ruins in which she saw such beauty many years later. The transformation of ruins was an organic process that took time and was performed by vegetation and softened by art.[[765]](#footnote-765) It was precisely the materiality of the destruction and the physical transformation of cities into ruins that enabled many people to understand and represent their experiences. Leo Mellor argues that it was through an engagement with the material remnants and fragments, the ‘newly made wreckage’, that the unprecedented levels of urban destruction could be understood historically. There was a ‘display of layers’ and a sense of cities and nations ‘parading their wounds as proof of a long past endured’.[[766]](#footnote-766) As well as revealing the longer histories of destruction in material artefacts, the bombing created new objects for memorialisation, new symbols of suffering. This rubble should not be subsumed into a false wholeness, the desire for which, Macaulay wrote, is ‘merely a phase of our fearful and fragmented age’.[[767]](#footnote-767)

The shattering of buildings and the splintering of cities was neither a physical realisation of literary deconstruction, nor was it a symbolic dismantling of an old order. It was a product of government and military rationalities, which developed in dialogue with the technological advances of air power, and recast cities and civilians as targets. It was industrialised war against civilian populations, often with the simple aim of killing and ‘de-housing’ as many people as possible. The question of how to talk about and represent this violence in history and literature is essential if the ruins of the air war are to be rendered ‘transparent things, through which the past shines’. The ‘thin veneer of immediate reality’ must be broken, and so historians must find themselves ‘no longer walking on water but descending upright among staring fish’.[[768]](#footnote-768)

Nabokov’s warning about ‘descending upright among staring fish’ can be read in parallel to W.G. Sebald’s argument about the historical and literary gaze in his lecture ‘Air War and Literature’. Sebald argues that ‘the construction of aesthetic or pseudo-aesthetic effects from the ruins of an annihilated world is a process depriving literature of its right to exist’.[[769]](#footnote-769) Julia Hell’s discussion of Sebald’s gaze has problematized the idea of any truly objective representation and the difficulty of avoiding the aesthetic production at the heart of art and literature.[[770]](#footnote-770) Sebald’s unembarrassed ‘ethical, if not moralizing tone’, which is itself more literary polemic than historical, represents an essential part of the work of history.[[771]](#footnote-771) It involves the burdening which Heidegger wrote ‘gives back to things, to beings, their weight’. ‘And why?’ he asked, ‘because burdening is one of the essential and fundamental conditions for the arising of everything great, among which we include above all else the fate of a historical people and its works.’[[772]](#footnote-772)

The burdening Heidegger calls for is represented in two of Sebald’s key texts by a simple steadfast gaze. In *Austerlitz*, his narrator recognises in the ‘strikingly large eyes’ of animals in a nocturama the ‘fixed and inquiring gaze found in certain painters and philosophers who seek to penetrate the darkness which surrounds us purely by means of looking and thinking’.[[773]](#footnote-773) In ‘Air War and Literature’, he echoes this with his evocation of Walter Benjamin’s ‘Angel of History’, that ‘cultural icon of the (academic) Left’, which Hell writes is ‘now so worn out, so terribly fatigued’. Hell argues that Sebald saw in the gaze of Benjamin’s angel a ‘horrified fixity’ that was ‘symptomatic of a total loss of faith in the possibility of change’.[[774]](#footnote-774) A historical analysis of how cities came to be pictured beneath bombsights, of how the theories, techniques and technologies of aerial warfare refigured urban areas, can attempt to break out of the stupefying horror of Hiroshima, Nagasaki, Tokyo, Dresden, Hamburg, Berlin, London, Coventry, Warsaw, Rotterdam, and the many other cities whose signifiers were mutated by bombing. As Ken Ruthven wrote of Hiroshima, ‘the name no longer belongs to the city but to its destruction’.[[775]](#footnote-775) It is precisely how cities and civilians were remade through their imagined destruction that this study has sought to illuminate and challenge.

**The ‘Drift and Thrust’ Towards War[[776]](#footnote-776)**

This thesis has investigated how cities and civilians were reimagined in governmental thought and plans for the future. The militarisation of society was reflected in the encroachment of military imperatives into civilian urban spaces and the infrastructure which acts as networks of life in modern cities. Planning was never just about civilian or military concerns, but was always about both. In this sense, air war has had a profound influence on Britain, contributing to the dissolution of the boundaries between civilian and military and marking this militarisation into the built environment itself. The government increasingly understood urban planning in terms of survival. Utility networks were the key signifiers for survival, which the government understood as the maintenance of life under the threat of air raids. The danger of air raids refigured the landscape, both urban and rural. Established perceptions of density and congestion as dangerous were reiterated in the context of debates about air power and the vulnerability of cities. Supporters of aerial warfare saw dense urban areas as ideal targets that could lead to swift victory, and this vision was projected onto cities which came to be understood in the same terms.

This study began by tracing the development of theories and practices of air power between the First and Second World Wars. Military theorists used the problematic notion of the ‘moral effect’ of bombing to justify the targeting of cities and civilians, as well as redrawing the lines between combatant and non-combatant. For writers such as B.H. Liddell Hart and J.M. Spaight, air war was imagined as a more humane alternative to the trenches of the First World War, but this privileged the lives of soldiers over civilians in a way which reflected class prejudices about urban populations. Perceptions of cities as places of social decay and danger were reinterpreted as a weakness in modern war that could be exploited by air raids. Throughout this period, the imagined effects of air raids far outran the reality. Experience from the First World War, literary imaginings of H.G. Wells and others, the declarative policy of the Air Ministry which was seeking funding and political support for a strong offensive air force, and the government commitment to new technologies of war, combined to construct an orthodoxy about air power and the bombing of cities and civilians.

The claims about the effectiveness of air war made by the Air Ministry were increasingly reflected back on Britain as the Second World War grew closer. The idea that the next war would involve large and continued air raids against cities was illustrated in changes in the government’s planning for air raid precautions and civil defence from 1935. In an atmosphere where war appeared ever closer, the erosion of distinctions between civil and military became an increasing central feature to war preparations. The response to the fire at the power station in Bradford and the proposed destruction of a model station at the air show in Hendon reflected how infrastructure had come to be understood through its vulnerability to air raids and importance in maintaining urban life. Imagined attacks were driving a change in the official approach to the development of the electricity industry while at the same time provoking a fundamental shift away from secrecy and voluntarism in air raid precautions to legislation and public pronouncements.

The targeting of cities and civilians represented a decisive militarisation of society. The impact of the Second World War on Britain is reflected in the transformation of cities, architecture and urban space, as air power enabled the war to reach directly into people’s lives, homes and streets far away from the frontline. Prompted by the expectation of air raids, the government’s focus on the maintenance of life in cities under fire through the protection of vital services and infrastructure, demonstrated how perceptions of cities were changing before bombs fell. As international tensions grew, planners and architects were brought into discussions about planning cities and buildings in a way that offered protection from air raids. In expectation of war, the bombing of cites was reduced to a depoliticised planning problem that would continue indefinitely.

When cities were attacked in 1940, bombing rendered buildings into ruins and created an ‘architecture of destruction’. The attempt to destroy an entire city was given a name in *Coventrieren* and in Western Europe alone, air raids accounted for perhaps 700,000 lives.[[777]](#footnote-777) The vast majority of those killed were civilians, but in accordance with the doctrine of modern war they had been reduced to the ‘machines behind the machines’.[[778]](#footnote-778) In cities under fire, the functioning of utility networks were analysed and the lessons projected into an uncertain future. Networks of infrastructure were re-structured with an emphasis on regional co-operation and communication in order to maintain supply during air raids. Emergency measures were continued outside of war and the wartime survival of infrastructure networks was heralded in the arguments in favour of nationalisation after 1945. Some city space was incorporated into an architecture of survival as the government redefined electricity stations, gas works, water pipes, roads and telephone lines according to their importance to the continuation of life in the city. Bombs craters became sumps for fire fighters and exposed department stores basements were remade by their use for official exhibitions that presented visions of a reconstructed world in the very ruins of the old one. Subterranean transport networks became a part of the city’s protective architecture and the ordinary features of the built environment were interpolated into an eschatological narrative of history and urban destruction. Architects read a dialectic of destruction and survival in the ruins which marked the end of an old era and opened the possibility of renewal.

Architects saw cities as sites of the destruction and rebirth that characterised the speed of change in modern societies. Perceptions of urban areas under the threat of air raids also referred back to historical images of urban destruction, as well as forward to an imagined apocalypse. This thesis’s analysis of government visions of the future of cities, contextualised by the work of professional planners and architects has raised a number of crucial continuities, which shed light on the processes by which cities came to be seen through a bombsight. Dispersal and decentralisation of cities and industry was the key pillar from which proposals for the future of Britain after 1945 radiated. The historical development of concepts of defensible space grew in conjunction with the planning of buffer zones and green belts around cities, which could be imagined as simultaneously containing the city and protecting the suburbs from its various kinds of radiation. The parallels between the planning techniques expressed by Patrick Abercrombie in his *Greater London Plan* and the civil defence planners working in the government reveal how planning for defence and development had grown increasingly alike. The debates at the highest levels of government about the future of the electricity industry illustrate the ongoing anxiety about Britain’s vulnerability to air attack after 1945, and the resignation to inertia in the face of nuclear weapon.

The creation of new safe spaces away from the centre in part referred back to the pre-war desire of architects and planners for *tabula rasa* and slum clearance. But they also suggested an aggression toward the urban centre that was a product of the imagery of air war and urban destruction, and a reaction against the post-war modernist transformation of cities.[[779]](#footnote-779) As cities were re-made by air war, and dispersal became a crucial aspect of development plans, the rural landscape was itself seen from the bomber’s-eye-view. Military techniques of camouflage and obscuration were applied to industrial architecture, and imagined as a permanent feature of modern design.

The long-standing desire to stop urban sprawl and limit congestion in cities was incorporated into a twentieth century view of cities, and theory of war, which read density as signifying a profitable target. These continuities reflect the impact of air war, a permanent danger, on perceptions of the future and the future of cities. It is in part through this assumed permanence of risk that the bombing of civilians and cities became embedded in British governmental thought, and the political question about military strategy was obscured. The development of air power and the powerful fear engendered by the apocalyptic visions of death from the skies were written into the landscape of Britain in a way which contributed to the perception of air raids against cities as inevitable and, by 1945, routine feature of modern war. It was through the expectation of air war in the 1930s and experience of it in the 1940s, that, before it had occurred, nuclear war was reduced to a variable in government planning and the political agency behind its conceptualisation was covered over.

When it became clear that the destruction of Hiroshima took less than three seconds, there was what Ken Ruthven called, a ‘nuclearisation of temporality’, which continued the transformation of time and space that air power had begun. The assault on perceptions of time that such weapons launched was a key point in Derrida’s 1984 essay, and is an important element in the dissolution between peace and war, military and civilian.[[780]](#footnote-780) When bombs and missiles could appear at any moment the idea that there could ever a period of peace was deeply unsettled, and much of this study has dealt with the various ways in which it was abandoned or given up. It is a contradictory story, however, that includes many examples of how planning for peace and planning for war were drawn together, but ends with most of these attempts coming nought. Dispersal of population and industry both within Britain and across the world is only the most prominent plan that struggled to make it off paper. Clement Attlee’s dismissal of proposals to block the development of the electricity network in London represents the end of dispersal as a plausible technique to lessen vulnerability. But these failed plans, and Attlee’s pronouncements that they had been made obsolete by nuclear weapons, are revealing. They highlight the uncritical assumption that in future war, cities and civilians would be the first targets and the numbers killed would be scarcely imaginable. The fundamental point that bombing cities and civilians was a legitimate and accepted practice of war continued into the ‘nuclear age’. As Albert Einstein famously said in 1946, ‘The unleashed power of the atom has changed everything save our modes of thinking and we thus drift toward unparalleled catastrophe.’[[781]](#footnote-781)

Drifting towards catastrophe is an evocative phrase that articulates the sense of a helpless falling into the ‘nuclear epoch’ that, by its nature, would offer only a precarious life. A life of waiting. But, the picture of a world drifting towards catastrophe, inert, obscures the agency, actions and complex of social, political, economic and cultural contexts that powered the transition to the ‘nuclear age’.[[782]](#footnote-782) As C. Wright Mills wrote in 1958, the thrust towards war had overtaken the drift.[[783]](#footnote-783) Like Einstein, E.P. Thompson used the word ‘drift’ to describe what he called the ‘abdication of intellectual responsibility’ in the Cold War. The ‘withdrawal or despair of the disenchanted was’, he wrote, ‘an active cultural pattern, a *logic* which carried the mind down established grooves from one premise to the next, a *drift* of the sensibility.’[[784]](#footnote-784) This study has shown how the grooves which channelled thought were established through common perceptions of the city that normalised destruction and endorsed the theories of ‘moral effect’, before the Cold War. What Thompson described in 1960 as the ‘ideology of apathy’ can be historicised and its genealogies traced.[[785]](#footnote-785)

Thompson’s analysis, in the terms of cultural patterns and logic, can be considered alongside David Edgerton’s study of political economy, the warfare state, and a ‘British military-industrial complex’.[[786]](#footnote-786) It is significant that Edgerton credits Thompson as a rare dissenting voice against the historiography of modern Britain built around narratives of national decline. It is the militarisation of society, economy and culture that contradicts the picture of British ‘backwardness’ and ‘traditionalism’.[[787]](#footnote-787) This thesis has argued, however, that Britain’s perceived vulnerability to aerial war contributed to the culture of ‘declinism’, particularly after 1945. The mass investment in Bomber Command, and then the development of nuclear weapons were in a part a response to this, which illustrate the problems of picturing Britain as a technologically inferior and generally peaceful nation, as much history written after 1945 has done. As well as securing influence and anti-communist alliances, Britain’s turn to the Commonwealth after 1945 was in part a response to the pervading sense of national vulnerability. It demonstrated, however, the strong position Britain still held internationally. Together with the economic crises gripping Britain after 1945 the prospect of future air war played a large part in the government’s perceptions of the future of Britain in relation to the empire. The ‘second colonial occupation’ is an important example of Britain’s commitment to science and technical expertise in planning and development, but is also reflects how government perceptions of Britain had changed in the wake of aerial war.[[788]](#footnote-788) Experts both inside and outside the government saw dispersal of the British population, coupled with the development of colonial countries from Africa to Australia, as a potential way to lessen Britain’s vulnerability in a future nuclear war. The long-standing technique of dispersal and space for defence was reiterated on a potentially vast scale.

The attempt to plan and construct an organised and scientifically determined global human landscape able to survive war and nuclear war, was the culmination of half a century of planning discourse heavily influenced by Patrick Geddes. Much of this work was informed by ideas about the supposed inherent order of natural systems that, when found, could be unveiled and then built into human societies and settlements by experts. There was a crucial assumption in this which, as Joseph Hodge has argued, depoliticised ‘poverty and power […] by recasting social and economic problems as technical ones that could be fixed by rational planning and expert knowledge’.[[789]](#footnote-789) The reduction of political problems to technical ones resonates in planning for a future of air war. Planning with a view towards lessening the vulnerability of cities to air raids was not an apathetic or passive act, but it exposed the acceptance of the designation of cities as targets. Planning in this way thus depoliticised the bombing of cities and civilians.

If planning is not a passive act, Foucault’s comment in the introduction that a good town plan takes into account what might happen, can be adapted. A plan for the future of a town imagines or attempts to depict what will happen, or what ought to happen, or is desired to happen. The imagined future is built into the ground. But by drawing future destruction onto and into cities the exceptional nature of bombing civilians and cities is itself built over. By picturing and planning for air war it became simply a matter of logistics, akin to preparing flood defences or building in such a way as to reduce the danger from earthquakes. It is here that the real and imagined intersect and lose their definition in a way which, as Derrida wrote, was characteristic of the Cold War. But as this study has shown, the importance of the way the real and imagined consequences of air power interacted was foreshadowed before the Second World War and is part of the longer history of air power.[[790]](#footnote-790)

In the Cold War this planning and the dissemination of information to the public along the lines of natural disasters made a thermo-nuclear war seem survivable and obscured the political nature of war.[[791]](#footnote-791) The reiteration of air war and its situation in cities played a crucial part in the establishment of the rationalities of the Cold War. Thompson wrote in 1982 that: ‘It is not just that we are preparing for war; we are preparing ourselves to be *the kind of societies which go to war*’.[[792]](#footnote-792) The endless restatement of cities and civilians as targets made society itself the object of war and thus pitched one group of potential civilian victims against another. The ongoing process of militarisation and the disappearing borders between peacetime and wartime had been accelerating since the potential of air power was first projected down on cities.

**Thinking in an Emergency?**

A consequence of the militarisation reflected by the building of emergency measures into cities and urban planning is the debilitation of thought and the depoliticisation of the status quo. In a recent book for Amnesty International, Elaine Scarry criticises the ‘seduction to stop thinking’ in an emergency, rightfully pointing out that thinking and acting are not in opposition, even thinking and rapid action are not mutually exclusive.[[793]](#footnote-793) A short discussion of this book reaffirms the importance of questioning the foundations on which the modern conception of war is built, and reflects how concerns about the targeting of civilians are focussed on the architecture of survival rather than the initial question of the bombing cities.

Scarry argues that, by ‘instilling deeply formed habits in advance of the catastrophe’, an emergency can be brought to a halt without escalation and acceleration. ‘Far from being structureless,’ she writes, ‘a crisis is an event in which structures inevitably take over. The only question is whether the structures will be negative or positive.’[[794]](#footnote-794) She argues that by fostering certain habits, reactions to emergencies can be more positive than negative. Thinking and action can co-exist in an emergency through the routinisation of positive, de-escalating action.

Scarry’s argument is informed by compassion, humanity and logic. By preparing for emergencies fewer people will die and suffer when they happen. She cites four ‘models of emergency thinking’: CPR; mutual aid contracts; the Swiss bomb shelter system; and the constitutional brake on war in the United States. The principle of ‘equality of survival’ resonates loudly, and in the examples of CPR and the Swiss bomb shelter programme, the sense and efficacy is clear. If everyone learns to do CPR and practises regularly then fewer people will die because if someone collapsed the chances of a passer-by being able to assist them would be greater. If there was a nuclear war and everybody had access to a bomb shelter, fewer people would be killed. She cites the Swiss shelter system, which promises ‘[a] place in a shelter for *every inhabitant* of Switzerland,’ as an ‘astonishingly explicit and astonishingly concrete’ example of ‘equality of survival’.[[795]](#footnote-795) It is, in her words, ‘a feat of civic and moral engineering’. The civil defence system is not limited to shelters. Male citizens are, by law, assigned specific obligations, including the requirement that conscripts and volunteers practice around four days a year, along with other refresher courses and training less frequently.[[796]](#footnote-796) This then, is (gendered) war-rehearsal that rivals the blackout and ARP drills carried out in Britain when the air raids of the Second World War seemed so imminent, or throughout the rising and falling waves of anxiety in the Cold War. It is a practice of habit-instilling. It would mean that if nuclear weapons fell on Switzerland the consequences would, most likely, be less pronounced. But it would not stop the weapons falling. Would it, as Scarry argues, give the Swiss political autonomy, and the power to affect their own destiny? Or is this a return to the ‘survivable’ thermo-nuclear war scenario? One thing is certain, and she acknowledges it, allowing it to frame her discussion: in a nuclear war ‘the casualties will be close to 100% civilian’.[[797]](#footnote-797)

Scarry’s argument pictures a version of nuclear war which would be less terrible for some people than another version. It echoes the preparation of reports on estimated or assumed attacks carried out by the British government which attempted to calculate casualties according to a formula: weight of attack divided by population density in target areas (number of people minus degree of evacuation plus amount of shelters). The numbers of predicted dead changed but the underlying assumption that cities and civilians would be the primary target did not. While Scarry’s message is a deeply humane one, her example of the Swiss bomb shelter system reflects how the fear and expectation of war has been built into the very landscape and society of the world’s most famously neutral country. The uncritical assumption that cities would be the frontline of a future nuclear war is a crucial part of preparing to accept that the distinctions between military and civilian are increasingly hard to perceive. Once these boundaries are diminished it becomes easier and easier to go to war, because war-thinking has permeated peacetime so much, and militarisation appears more and more commonplace. The construction of bomb shelters and the rehearsal of nuclear war scenarios that continue in Switzerland long after the Cold War has ended reflect that, even if the fear of nuclear war has declined, the infrastructure of warfare states remains. The shelters demonstrate the imperative to be always prepared for nuclear war, and the complicated relationship between imagined attacks and experienced ones. In both instances, preparations, precautions and special legal powers are credited with delimiting the danger, or rather with disseminating the notion of a survivable nuclear war. The habit-forming practices in Switzerland actively disregard the idea of a stable peace and shelters appear as a substitute for political attempts to reduce the threat. The shelters cut into Swiss mountains must be considered alongside legal and political frameworks which envision a situation in which they could come into use.

Legal histories have traced how this changing relationship between peace and war, civil and military has been written into law in the twentieth and twenty-first century. Mary Dudziak has highlighted how the notion of ‘wartime’ ‘becomes a justification for a rule of law that bends in favour of the security of the state’. This distortion of law has generally been accepted according to the assumption that wars end. But, she asks, in the twenty-first century, an era which the ‘war on terror’ has no foreseeable endpoint, ‘how can we end a wartime when war doesn’t come to an end?’[[798]](#footnote-798) Dudziak thus echoes the quote from J.M. Richards in the summer of 1941 which began this thesis. The time when ‘war was an interval between periods of peace […] when peace was the interval between wars’ has gone.[[799]](#footnote-799)As Dudziak argues, the notion that wartime is temporary is a crucial foundation of the conception of war. The development of air power before the Cold War, and the concomitant designation of cities and civilians as targets, was crucial to this conception of war as an enduring condition. It was not the technology itself, the bombers and the bombs, which brought about this change. As Thompson said, technology cannot creep unaided, but only when ‘ideology is creeping alongside it’.[[800]](#footnote-800) The military theorists and air power advocates after the First World War rhetorically fixed bombsights over cities and the aircraft and weapons followed. The urban and infrastructural planning that attempted to account for air raids served to further focus air power on cities and obscured the political question about the decision to deliberately target civilians. The experience of trench warfare played a crucial role in the development and support of the theories of air war. A brief discussion of two soldiers and writers, veterans of the First and Second World Wars respectively, raises some of the problems encountered in discussions of bombing civilians in history and ethics.

Basil Liddell Hart fought in the First World War. His experiences, which included fighting on the Somme, suffering a number of injuries, and being gassed, had a profound influence on his subsequent career as a writer and military theorist.[[801]](#footnote-801) Much of his work was focussed around mobility in warfare and was based in opposition to disciples of Napoleon and Clausewitz, who he said had taken the ‘more vivid assertions’ of those two defining theorists without regard for the reservations. In so doing, modern acolytes of Clausewitz had formulated a ‘doctrine of “unlimited war”’. He criticised what he called the ‘Napoleonic fantasy’ that had determined that destroying ‘armed forces themselves [was] the real objective’ of military strategy. The consequence of such a strategy was, he wrote, the ‘mechanical butchery’ of the First World War.[[802]](#footnote-802)

As well as championing tanks and armoured warfare, Liddell Hart cited air power as revolutionary, and was an influential voice in air war theory between the wars, with a considerable influence on Chief of the Air Staff, Hugh Trenchard. He was a strong supporter of air control as a method of imperial policing. The reasoning he deployed to support air control was echoed in his arguments in favour of air war. In both cases he stressed how attacks from the air would be more pacifying than destructive, and the toll on armies would be seriously diminished. Influenced by his experiences in France in 1916, Liddell Hart saw air attacks against cities as offering an alternative to the methods of war of 1914-1918, which, if repeated, he argued ‘must mean the breakdown of Western civilisation’.[[803]](#footnote-803) Liddell Hart was not advocating the annihilation of whole cities, but he was cancelling the distinction between combatant and non-combatant. As the predicted destruction was being ratcheted up by the Air Ministry in the 1930s, Liddell Hart wrote that the dangers to civilians were exaggerated. He explained in 1935 that ‘the air forces of Europe to-day are not large enough to carry out the universal devastation that is popularly imagined’.[[804]](#footnote-804) The techniques and technologies of air war had yet to be refined. A decade later however, that universal devastation was no longer merely imagined.

A response to the debates about the morality of the nuclear bombings by literary scholar, and U.S. infantry soldier in the Second World War, Paul Fussell, echoes Liddell Hart’s enthusiasm for air power after 1918. In his essay, ‘Thank God for the Atom Bomb’, he criticises the moral condemnations of the attacks on Hiroshima and Nagasaki by disqualifying those who did not experience the war, who did not share ‘experience, sheer vulgar experience,’ and thus could not know or understand what the costs of an invasion of Japan would have been.[[805]](#footnote-805) ‘In general,’ he wrote, ‘the principle is, the farther from the scene of horror, the easier the talk’.[[806]](#footnote-806) Like Liddell Hart, his argument is informed by bitter experience and great suffering, but he too endorses the overwriting of distinctions between civilians and soldiers, uncritically quoting the words of an intelligence officer in the U.S. Air Force who claimed ‘the entire population of Japan is a proper military target’, and ‘*There are no civilians in Japan’*.[[807]](#footnote-807) In his criticism of those with no direct experience, he ultimately privileges and endorses the voice of Arthur Harris and the argument that the ultimate immorality of war is a justification for anything that may shorten it.[[808]](#footnote-808)

The problems with Fussell and Liddell Hart’s argument are that, despite their essentially humane intentions, they both seek to limit the military (albeit conscripted) cost of war, at the expense of civilian life. Fussell’s dismissal of those with no experience of the front misses the fundamental consequence of air war against cities and civilians. The distinction between the front of the battlefield, and the front of the city, is gone. If he does not miss this, then he assents to it in the same way that Liddell Hart did. Scarry, Liddell Hart and Fussell all sought to reduce the cost of war, but in doing so they allowed the fundamental question of the legitimacy of deliberately killing civilians to go unasked. They thus left the very notion of a ‘civilian’ in modern war deeply troubled in a way which resounds as strongly as ever.

**New Architectures of Survival**

The development of bombing air forces and missiles, indefinitely aimed towards centres of population and industry, and the speed and reach of the weapons meant that imagined attacks sat alongside actual air raids. After the Munich Crisis, a government report concluded that in order to increase the chances of Britain being prepared for always imminent air raids, precautions and defensive architecture needed to be built into the normal functioning of cities and societies. With the growing realisation that the government could offer little genuine protection should a nuclear war start, security became increasingly privatised after 1945.[[809]](#footnote-809) There are parallels in the privatisation of security in studies of civil defence and the privatisation of infrastructure networks. The Swiss bomb shelter system cited by Scarry is a rare example of the continuation of state emergency precautions outside an emergency on such a vast and visible scale. The architecture of survival does, however, remain an important design feature in modern cities. The penetration and sophistication of militarised technologies in urban areas has continued to develop after the Cold War, into what Stephen Graham has termed ‘new military urbanism’.[[810]](#footnote-810)

Graham’s work is part of a growing field of interdisciplinary research into the relationship between cities, technology, infrastructure, violence and control in the contemporary urbanised world.[[811]](#footnote-811) These analyses of the militarisation of urban space and the proliferation of technologies of surveillance reflect how the recasting of cities, which happened decisively under the threat of air raids, has become a central feature of urbanism in the twenty-first century. The designation of cities as targets, and the discursive construction of cities as threats to order and social control were closely related in the formulation of theories of air power between the wars, and this relationship continues to resonate.[[812]](#footnote-812) The most pressing questions are how such perceptions of cities and their inhabitants are filtered into the militarisation of civil society, and what impacts this has on those people and places.

Peter Galison has written that during the Cold War in the United States, the transformation of ‘architectures of infrastructure, computation, highways and factories’ enacted the ‘remarkable practice of training Americans to see themselves as targets’.[[813]](#footnote-813) This study has not addressed directly whether people saw themselves as targets, but has argued that the militarisation of society is demonstrated in the metamorphosis of cities into targets in the eyes of military and civilian planners. It has analysed how this change was articulated in the language and pictures of the future that were centred on cities. The creation of a condition of imagined perpetual war as a response to air power that was disseminated in so many cultural and political forms in the years between 1918 and 1939 was projected directly onto cityscapes. Once cities were understood as targets it follows that people may begin to ‘see themselves as targets’. In the twenty-first century, however, urban citizens are not only potential targets, but also potential weapons.

As the complex web of security infrastructure intensifies, Graham argues that subjects must constantly demonstrate their benign intentions to ‘architectures of surveillance’, which track and record with an infinite memory.[[814]](#footnote-814) Observation technologies, which were developed in concord with aviation and aerial photography, and enabled the mapping of cities and simultaneously confirmed their vulnerability, continue to dominate a military practice which is turned back onto the home state itself. The consequence is a ‘blurring of the traditional military imperatives of war; external to the state, and those of policing internal to it’.[[815]](#footnote-815) Civilian and military uses of surveillance, communications and targeting technologies reflect how the militarisation of cities has been built into the material and information networks through which modern life is mediated.

The urban infrastructure of security is a part of the intensely networked modern city.[[816]](#footnote-816) The interactions of twenty-first century images of autonomous cyborg cities, with pictures of self-regulating organic, biological and ecological systems, reflects a common theme in city planning and sociology throughout the twentieth century.[[817]](#footnote-817) In both organicist visions of cities and those of the cybernetic cyborg, the use of the ‘network metaphor’ is characterised by a large degree of determinism, be it biological or technological, in which human agency is systematically downplayed and obscured.[[818]](#footnote-818) As Matthew Gandy has argued, ‘the development of the cyborg city is thus intimately related to the evolution of modern forms of governance’.[[819]](#footnote-819) The bio-technological networks which constitute contemporary urban spaces reproduce the removal of politics that was a central aspect in the process Susan Grayzel identifies as making ‘the once unthinkable [bombing of civilians] acceptable’.[[820]](#footnote-820) Throughout the twentieth century, planners and architects, inspired by the imagined harmony of natural systems, attempted to transpose the structures of progress promised by evolutionary theory into human settlements. The fear of a coming apocalypse informed by the experience of the First World War, and the predictions for a future of air war, prompted planners to look for peace and stability in nature. The perceived perfection of nature has been reframed as the perceived perfection of technology. In both cases human agency is hidden behind systems, complex constructions which hide the assumptions behind their application: the militarisation of society and cities and the shift to a biopolitical view of societies.

Biopolitics is concerned with the government of populations rather than individuals.[[821]](#footnote-821) The transferal of power from subjects to societies is reflected in the shift in the military focus from armies to cities, and in the concomitant turn to scientific planning for social progress. Speculations about the future induced a state of constant pre-war which made attacks on civilian populations appear always imminent. By returning to the foundations of modern theories of aerial warfare, and illuminating how such ideas became so prevalent and so closely bound up with perceptions of cities, this study has attempted to challenge the ‘inertial thrust’ that characterised the Cold War. The embedding of militarised infrastructures in cities represents the ongoing militarisation of everyday life and urban space that results in, what Paul Virilio calls, a ‘*claustrophobia* where foreclosure is intensified by exclusion of the stray, the outsider’.[[822]](#footnote-822) Writing a century earlier, Georg Simmel wrote how the perceived

incessant threat […] brought about that cohesion in political and military matters, that supervision of the citizen by other citizens, and that jealousy of the whole toward the individual whose private life was repressed to such an extent that he could compensate himself only by acting as a despot in his own household’.[[823]](#footnote-823)

The cohesion in political and military matters is built into the modern metropolis, and has been informed by the recasting of cities and civilians enacted in dialogue with the development of air power. Simmel likened the narrowed community in small towns to the ‘ancient *polis*’, but technology and infrastructure has shrunk the world and its cities to the extent that the ‘intellectual distance’ that the metropolis promised is harder and harder to sustain.[[824]](#footnote-824) At the same time new infrastructure technology has enabled ever greater decentralisation. The dialectic of containment and dispersal that characterised architectural responses to the danger of air raids continues to frame urban planning and conceptions of defensible space. George Orwell’s comment in 1945 about an indefinite period of ‘a peace that is no peace’, continues to ring true.[[825]](#footnote-825) It is through an analysis of the historical processes and structures that, what Foucault called the ‘strategic reversibility’ of power relations, can be expressed.[[826]](#footnote-826) And as Josephine Herbst wrote: ‘The individual who prefers to think he has no control over the world situation, is creating that situation, not just interpreting something that already exists.’[[827]](#footnote-827)

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77. Grayzel, *At Home and Under Fire: Air Raids and Culture in Britain from the Great War to the Blitz*, p. 34. [↑](#footnote-ref-77)
78. *Ibid*., pp. 20-34, 64-65, 6. The air raids of the First World War have been largely overshadowed by both the soldier death tolls of that war and the air raids of the Second World War. Grayzel provides the most sustained discussion of the impact of air raids on society and culture in the First World War. For air raids generally see Lee Kennett, *The first air war, 1914-1918* (New York, 1991); Andrew Hyde, *The First Blitz: The German air Campaign Against Britain in the First World War* (Barnsley, 2002); John Howard Morrow, *The Great War in the Air: Military Aviation from 1909 to 1921* (Washington DC, 1993). [↑](#footnote-ref-78)
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84. *Ibid*., p. 57. For the 1918-1919 reports see TNA: AIR 1/2115/207/56/1, subsequent reports were published as A.P. (Air Publication) 1225 and can be found in AIR 1. In contemporary discussions morale was written as ‘moral’ when part of the concept of the ‘moral effect’. It was originally a battlefield concept which air power advocates translated onto a national level, *ibid*., pp. 76-81. [↑](#footnote-ref-84)
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91. Bialer, *The Shadow of the Bomber*, p. 3. [↑](#footnote-ref-91)
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93. Satia, 'The Defense of Inhumanity: Air Control and the British Idea of Arabia', pp. 16, 18. [↑](#footnote-ref-93)
94. Sherry, *The Rise of American Air Power: The Creation of Armageddon*, p. 7. [↑](#footnote-ref-94)
95. Spaight, *Air Power and the Cities*, p. 137; Stefan Goebel and Derek Keene, ‘Introduction: Towards a Metropolitan History of Total War’, in Goebel and Keene, eds, *Cities into Battlefields: Metropolitan Scenarios, Experiences and Commemorations of Total War*, p. 7. [↑](#footnote-ref-95)
96. Spaight, *Air Power and the Cities*, pp. 138-139. [↑](#footnote-ref-96)
97. *Ibid*., p. 152. [↑](#footnote-ref-97)
98. *Ibid*., p. 151 [↑](#footnote-ref-98)
99. Biddle, *Rhetoric and Reality in Air Warfare*, p. 76. For literature on future war see Lindqvist, *A History of Bombing*; Susan R. Grayzel, ''A promise of terror to come': Air Power and the Destruction of Cities in British Imagination and Experience, 1908-39', in Stefan Goebel and Derek Keene eds, *Cities into Battlefields: Metropolitan Scenarios, Experiences and Commemorations of Total War* (Farnham, 2011), pp. 47-62; Ceadel, 'Popular Fiction and the Next War, 1918-39', pp. 161-184; Paul K. Saint-Amour, 'Air War Prophecy and Interwar Modernism', *Comparative Literature Studies* 42 (2005), Leo Mellor, *Reading the Ruins: Modernism, Bombsites and British Culture* (Cambridge, 2011), pp. 11-46. [↑](#footnote-ref-99)
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102. Sherry, *The Rise of American Air Power: The Creation of Armageddon*, p. x. [↑](#footnote-ref-102)
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104. Grayzel, *At Home and Under Fire: Air Raids and Culture in Britain from the Great War to the Blitz*, p. 140. [↑](#footnote-ref-104)
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110. *Ibid*., p. 27. [↑](#footnote-ref-110)
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116. Satia, 'The Defense of Inhumanity: Air Control and the British Idea of Arabia', p. 33. [↑](#footnote-ref-116)
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119. John Gloag, 'The Next Third', *Architectural Review* 75 (1934), pp. 185, 186. [↑](#footnote-ref-119)
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127. Stanley C. Ramsey, ‘Some Sociological Aspects of Modern Architecture’, *Town Planning Review* 15.4 (December, 1933), p. 253; see also Patrick Joyce, *The Rule of Freedom. Liberalism and the Modern City* (London, 2003), esp. ch. 2. [↑](#footnote-ref-127)
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136. ‘Journal’, *Journal of the RIBA* 40 (May 1933), p. 571. [↑](#footnote-ref-136)
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141. Stephen Brooke, *Labour's War: The Labour Party during the Second World War* (Oxford, 1992), p. 19. [↑](#footnote-ref-141)
142. *Ibid*., p. 23. [↑](#footnote-ref-142)
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146. Liddell Hart, *Paris, or the Future of War*, p. 8. [↑](#footnote-ref-146)
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156. Stefan Goebel and Derek Keene, ‘Introduction: Towards a Metropolitan History of Total War’, p. 38; Reddaway, *The Rebuilding of London after the Great Fire*. [↑](#footnote-ref-156)
157. A number of discussions of the city’s future were published in the architectural press: A.E. Richardson, ‘London of the Future’, *Architectural Review* 70.418 (September 1931), p. 59; ‘A London Planning Board’, *Architectural Review* 73.436 (March 1933), pp. 108-114; Alwyn R. Dent, ‘What Central London Needs’, *Architectural Review* 73.436 (March 1933), pp. 110-112; Edward Shanks, ‘The New London’, *Architectural Review* 73.437 (April 1933), pp. 143-144; Thomas Adams, ‘Replanning of Built Areas in London’, *Journal of the RIBA* 40.9 (11 March 1933), pp. 314-355; W.R. Davidge, ‘The Planning of London, Past and Present’, *Journal of the RIBA* 41.9 (10 March 1934), pp. 429-458; S.D. Adshead, ‘London Under Statutory Planning’, *Journal of the RIBA* 43.14 (23 May 1936), pp. 748-753. [↑](#footnote-ref-157)
158. Marjorie Pentland, ‘Housing’, *Town Planning Review* 16.2 (December 1934), p. 145. [↑](#footnote-ref-158)
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161. HC Deb 10 Nov. 1932, vol 270, col. 631-635.

     URL: http://hansard.millbanksystems.com/commons/1932/nov/10/international-affairs#S5CV0270P0\_19321110\_HOC\_284 [accessed 18/02/2013]. For some background to this speech see Grayzel, *At home and under fire: air raids and culture in Britain from the Great War to the Blitz*, pp. 162-168. [↑](#footnote-ref-161)
162. Spaight, *Air Power and the Cities*, p. 5. [↑](#footnote-ref-162)
163. For Britain at Geneva see Carolyn Kitching, *Britain and the Geneva Disarmament Conference: A Study in International History* (Basingstoke, 2003). For pacifism and anti-war movements in Britain between the wars see, Grayzel, *At Home and Under Fire: Air Raids and Culture in Britain from the Great War to the Blitz*, ch. 6; Overy, *The Morbid Age: Britain Between the Wars*, ch. 6; Martin Ceadel, *Pacifism in Britain, 1914-1945: the defining of a faith* (Oxford, 1980). [↑](#footnote-ref-163)
164. Matless, *Landscape and Englishness*, p. 212. [↑](#footnote-ref-164)
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166. Robert Wohl, *A Passion for Wings: Aviation and the Western Imagination, 1908-1918* (New Haven; London, 1994); Robert Wohl, *The Spectacle of Flight: Aviation and the Western Imagination, 1920-1950* (New Haven; London, 2005). [↑](#footnote-ref-166)
167. Kitty Hauser, *Shadow sites: Photography, Archaeology, and the British Landscape, 1927-1955* (Oxford, 2007), p. 16. The sense of vulnerability was reflected in literature of the period. Leo Mellor has discussed the ‘complex ways in which aeriality, as a way of considering self and cityscape’ became a tool in texts of 1939. He identifies in diverse texts from Virginia Woolf and Louis MacNeice a key common characteristic: fearfulness. The narrative viewpoint is used to both accentuate and explain the episodic fear which arrives ‘in waves or flashes and then apparently vanishing’, Mellor, *Reading the Ruins: Modernism, Bombsites and British culture*, p. 32. The works referred to are Virginia Woolf, *Between the Acts* (London, 1941), and Louis MacNeice, *Autumn Journal* (London, 1939). [↑](#footnote-ref-167)
168. Gerald Heard, ‘The Architecture of the Future’, *Architectural Review* 72 (July 1932), pp. 1-2. [↑](#footnote-ref-168)
169. John Gloag, ‘The Next Third’, *Architectural Review* 75 (May 1934), p. 187. [↑](#footnote-ref-169)
170. Liddell Hart, *Paris, or the Future of War*, p. 47. [↑](#footnote-ref-170)
171. ‘A London Planning Board’, *Architectural Review* 73 (March 1933), pp. 108-114. [↑](#footnote-ref-171)
172. Frank Pick, ‘The organisation of transport’, *Town Planning Review* 17.1 (June 1936), p. 36. [↑](#footnote-ref-172)
173. *Ibid*., pp. 35, 40. [↑](#footnote-ref-173)
174. A.E. Richardson, ‘London of the future’, *Architectural Review* 70 (September 1931), p. 59. [↑](#footnote-ref-174)
175. Liddell Hart, *Paris, or the Future of War*, p. 42. [↑](#footnote-ref-175)
176. Charles Marriott, ‘Contemporary London Buildings’, *Journal of the RIBA* 41 (December, 1933), pp. 113, 109. Electricity and its material infrastructure of pylons and cables was a symbol of the transformation of the countryside as well as the city, Matless, *Landscape and Englishness*, p. 44. [↑](#footnote-ref-176)
177. Spaight, *Air Power and the Cities*, p. 125. [↑](#footnote-ref-177)
178. Kenneth Hewitt, 'Place Annihilation: Area Bombing and the Fate of Urban Places', *Annals of the Association of American Geographers* 73 (1983), pp. 260, 257-258. [↑](#footnote-ref-178)
179. Wing-Commander C.H.K. Edmonds, ‘Air Strategy’, *Journal of Royal United Service Institution* (1924), pp. 197-8, quoted in Spaight, *Air Power and the Cities*, p. 124. [↑](#footnote-ref-179)
180. *Ibid*., p. 125. [↑](#footnote-ref-180)
181. Liddell Hart, *Paris, or the Future of War*, p. 41 [↑](#footnote-ref-181)
182. Sherry, *The Rise of American Air Power: The Creation of Armageddon*, p. 22. For a full account of the links between civil and military aviation in Britain in the period see Edgerton, *England and the Aeroplane*. [↑](#footnote-ref-182)
183. For the general impact of war on industrial geographies and architectures see Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, ch. 4. [↑](#footnote-ref-183)
184. Spaight, *Air Power and the Cities*, p. 153. [↑](#footnote-ref-184)
185. TNA: MT 50/2, letter from Maurice Hankey to Hugh Trenchard, May 1924. For the establishment of the Sub-Committee and their first report which emphasised the ‘moral effect’ and the inevitability of civilian casualties see Grayzel, *At Home and Under Fire: Air Raids and Culture in Britain from the Great War to the Blitz*, pp. 124-138. [↑](#footnote-ref-185)
186. TNA: MT 50/2, minutes of meeting held at Committee of Imperial Defence, 5 June 1924, p. 3. [↑](#footnote-ref-186)
187. TNA: MT 50/2, minutes of meeting held at Committee of Imperial Defence, 5 June 1924, p. 2. [↑](#footnote-ref-187)
188. TNA: MT 50/2, letter from Walter Nicholson to Air Raid Precautions Department and Electricity Commission, August 1924, p. 1. [↑](#footnote-ref-188)
189. TNA: MT 50/2, letter from Walter Nicholson to Air Raid Precautions Department and Electricity Commission, August 1924, p. 3. [↑](#footnote-ref-189)
190. TNA: MT 50/2, Electricity Commission headed memorandum, 3November1924, p. 1. [↑](#footnote-ref-190)
191. The vague phrase ‘out of all proportion greater’ was established by the Air Staff and accepted as a way of explaining the importance of the ‘moral effect’ in discussions of air raid precautions, see CAB 24/175, Committee of Imperial Defence, Sub-committee on Air Raid Precautions Report, July 8 1925, p. 6. [↑](#footnote-ref-191)
192. W. Holford, ‘The Next Twenty Years’, *Journal of the RIBA* 46 (5 December 1938), p 171. [↑](#footnote-ref-192)
193. Patrick Hamilton, *Hangover Square* (4th edn, London, 2001), p. 101. [↑](#footnote-ref-193)
194. Grayzel, *At Home and Under Fire: Air Raids and Culture in Britain from the Great War to the Blitz*, p. 201. [↑](#footnote-ref-194)
195. The Air Raid Precautions Committee was established by May 1924, John Baker Baron Baker, *Enterprise versus Bureaucracy: The Development of Structural Air-Raid Precautions during the Second World War* (Oxford, 1978), p. 1. [↑](#footnote-ref-195)
196. HC Deb 16 April 1935, vol. 300, col. 1670.

     URL: http://hansard.millbanksystems.com/commons/1935/apr/16/air-defence-measures#S5CV0300P0\_19350416\_HOC\_121 [accessed 25 Jan 2012]. [↑](#footnote-ref-196)
197. Terence H. O'Brien, *Civil Defence* (London, 1955), pp. 92-93. [↑](#footnote-ref-197)
198. TNA: CAB 24/255, R.R. Scott, Air Raid Precautions Memorandum, June 1935. [↑](#footnote-ref-198)
199. Joseph S. Meisel, 'Air Raid Shelter Policy and its Critics in Britain before the Second World War', *Twentieth Century British History* 5 (1994), p. 304; *The Times*, 11 July 1935, p. 9. For a discussion of press response to the circular see Grayzel, *At Home and Under Fire*, pp. 201-205. [↑](#footnote-ref-199)
200. An outline of the aims of passive defence is given in TNA: HO 211/1, Structural Precautions Committee, ‘Notes Prepared in the Air Raids Precautions Department, Home Office’, 10 February 1936. [↑](#footnote-ref-200)
201. Martin Chick, 'The Political Economy of Nationalisation: The Electricity Industry', in Robert Millward and John Singleton eds, *The Political Economy of Nationalisation in Britain, 1920-1950* (Cambridge, 1995), p. 270. For an extensive analysis of the electricity industry before 1945 see Leslie Hannah, *Electricity Before Nationalisation: A Study of the Development of the Electricity Supply Industry in Britain to 1948* (London, 1979). [↑](#footnote-ref-201)
202. Chick, 'The Political Economy of Nationalisation: The Electricity Industry', pp. 262-263. [↑](#footnote-ref-202)
203. Leslie Hannah, 'A Pioneer of Public Enterprise: The Central Electricity Board and the National Grid, 1927-1940', in Barry Supple ed., *Essays in British Business History* (Oxford, 1977), p. 207, see also Hannah, *Electricity Before Nationalisation*, pp. 105-149. [↑](#footnote-ref-203)
204. Hannah, 'A Pioneer of Public Enterprise', p. 210. [↑](#footnote-ref-204)
205. TNA: MT 50/2, Second conference held at Savoy Court, 3 January 1935. The minutes from the previous conference are available in MT 50/2, Conference held at Savoy Court, 8 October 1934. [↑](#footnote-ref-205)
206. TNA: MT 50/2, Second conference held at Savoy Court, 3 January 1935, p. 2. [↑](#footnote-ref-206)
207. TNA: POWE 12/521, letter from A. Johnston (ARP Department) to A.E. Marson (Electricity Commission) 6 September 1937. [↑](#footnote-ref-207)
208. TNA: POWE 12/521 minute sent to J. Kennedy 6 September 1937. [↑](#footnote-ref-208)
209. Hannah, *Electricity Before Nationalisation*, p. 289. [↑](#footnote-ref-209)
210. *Ibid*., pp. 249, 291. [↑](#footnote-ref-210)
211. TNA: MT 50/2, J. Kennedy, Protection of Electric Supply Services against Air Raids, 27 July 1934, p. 1. [↑](#footnote-ref-211)
212. TNA: CAB 24/255, R.R. Scott, Air Raid Precautions, June 1935, p. 1. [↑](#footnote-ref-212)
213. Ibid., p. 2. [↑](#footnote-ref-213)
214. Lindsey Dodd and Marc Wiggam, 'Civil Defence as a Harbringer of War in France and Britain During the Interwar Period', *Synergies* 4 (2011), p. 144. [↑](#footnote-ref-214)
215. TNA: CAB 24/255, R.R. Scott, Air Raid Precautions, June 1935, p. 6. [↑](#footnote-ref-215)
216. ‘Bradford Workers Sent Home’, *Manchester Guardian*, 26 February 1936, pp. 11, 14. [↑](#footnote-ref-216)
217. TNA: MT 50/2: C. Hurcomb letter to J. Snell, 5 March 1936, p. 1. [↑](#footnote-ref-217)
218. Correspondence available in MT 50/2. [↑](#footnote-ref-218)
219. The full transcript of the three day hearing can be found in TNA: POWE 12/456. [↑](#footnote-ref-219)
220. HC Deb 25 June 1936, vol. 313, col. 1962

     URL: http://hansard.millbanksystems.com/commons/1936/jun/25/electricity-supplies [accessed 03/04/2013]; a clipping of Errington’s question was also held in TNA: MT 50/2. [↑](#footnote-ref-220)
221. TNA: POWE 12/456: minutes of meeting of investigation committee, 8 July 1936, p.2. [↑](#footnote-ref-221)
222. TNA: POWE 12/456: Electricity Commission, ‘Precautions at Generating Stations’ memo, 17 August 1936, p. 1. [↑](#footnote-ref-222)
223. Hannah, *Electricity Before Nationalisation*, p. 289. [↑](#footnote-ref-223)
224. POWE 12/456: Letter from Wedmore of the ERA to the Electricity Commission, 23 October 1936, p. 1. [↑](#footnote-ref-224)
225. *Things to Come*, directed by William Cameron Menzies (London Film Productions, United Kingdom, 1936). [↑](#footnote-ref-225)
226. Virilio, *War and Cinema: The Logistics of Perception*, p. 58. [↑](#footnote-ref-226)
227. William Courtenay, ‘R.A.F. Bombers to Blow Up “Power Station”’, *The Evening Standard*, 27 February 1936. [↑](#footnote-ref-227)
228. An annotated clipping of the report was kept in TNA: MT 50/2. [↑](#footnote-ref-228)
229. F. A. de V. Robertson, ‘Remarkable Flying in Linked Aeroplanes’, *Manchester Guardian*, 29 June 1936, p. 10. The display was performed despite a protest in the Commons a few days before about the depiction of the bombing of an undefended village, ‘Air Bombing of “Natives”’, *Manchester Guardian*, 26 June 1936, p. 11. [↑](#footnote-ref-229)
230. The Air Ministry’s recalculations are set out in more detail in O'Brien, *Civil Defence*, p. 96. [↑](#footnote-ref-230)
231. *Ibid*., p. 95. [↑](#footnote-ref-231)
232. In December 1936 the Association of Municipal Corporation requested 100 per cent grants for A.R.P. expenditure from the Home Secretary, O’Brien, *Civil Defence*, p. 92. [↑](#footnote-ref-232)
233. TNA: CAB 24/260, Statement relating to Defence, 3 March 1936, pp. 2, 4. The ‘Statements relating to defence’ for the period of 1935-39 can be found in TNA: HO 186/151. [↑](#footnote-ref-233)
234. *Ibid*., p. 4. [↑](#footnote-ref-234)
235. The historiography is large. See for example Brian Bond, *British Military Policy between the Two World Wars* (Oxford, 1980); Donald Cameron Watt, *How War Came: The ImmediateOorigins of the Second World War, 1938-1939* (London, 1989). An extended discussion of the historiography can be found in Edgerton, *Warfare State: Britain, 1920-1970*, pp. 15-20. [↑](#footnote-ref-235)
236. Edgerton, *Warfare State: Britain, 1920-1970*, p. 21. [↑](#footnote-ref-236)
237. TNA: CAB 24/260, Statement relating to Defence, 3 March 1936, pp. 11-12 [↑](#footnote-ref-237)
238. Bialer, *The Shadow of the Bomber: The Fear of Air Attack and British Politics, 1932-1939*, p. 125. See also the influential J. B. S. Haldane, *A.R.P* (London, 1938). [↑](#footnote-ref-238)
239. TNA: CAB 24/268, ‘The Preparedness for war of Great Britain in relation to certain other powers by May 1937, February 1937, pp. 21-39. [↑](#footnote-ref-239)
240. TNA: CAB 24/268, Thomas Inskip, ‘Memorandum by the Minister for Co-ordination of Defence’, 11 February 1937, p.2. ARP is discussed in Appendix B of the report. [↑](#footnote-ref-240)
241. TNA: CAB 24/268, ‘The Preparedness for war of Great Britain’, Appendix B, pp. 1, 5. [↑](#footnote-ref-241)
242. TNA: CAB 24/273, CID, Sub-committee on the protection of vital services, interim report, December 1937, p. 1. [↑](#footnote-ref-242)
243. *Ibid*., p. 3. [↑](#footnote-ref-243)
244. *Ibid*., p. 4. [↑](#footnote-ref-244)
245. *Ibid*., p. 3. [↑](#footnote-ref-245)
246. *Ibid*., p. 5. [↑](#footnote-ref-246)
247. *Ibid*., p. 18. [↑](#footnote-ref-247)
248. *Ibid*., p. 4. [↑](#footnote-ref-248)
249. The links between air raids and citizenship are a key theme in Grayzel, *At Home and Under Fire: Air Raids and Culture in Britain from the Great War to the Blitz*. See also Lucy Allwright, ‘The War on London: Defending the City From the War in the Air, 1932-1943’, PhD thesis (University of Warwick, 2011), pp. 78-90. [↑](#footnote-ref-249)
250. For British pacifism see Ceadel, *Pacifism in Britain, 1914-1945: the defining of a faith*. [↑](#footnote-ref-250)
251. Biddle, *Rhetoric and Reality in Air Warfare*, pp. 109-110. [↑](#footnote-ref-251)
252. Ceadel, 'Popular Fiction and the Next War, 1918-39', pp. 178-179. [↑](#footnote-ref-252)
253. ‘Journal’, *Journal of the RIBA*, 45.16 (27 June 1938), p. 780. [↑](#footnote-ref-253)
254. The papers of the structural precautions committee are in TNA: HO 211/1-6. British architects generally took a more central role in debates over the protection of civilians from air raids, than elsewhere in Europe where these discussions were also being held, Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, p. 161. [↑](#footnote-ref-254)
255. Thomas Scott, ‘Air Raid Precautions as a Problem for the Architect’, *Journal of the RIBA* 45.16 (27 June 1938), pp. 783, 786. [↑](#footnote-ref-255)
256. Eric Bird, ‘Some General Principles of Structural A.R.P.’, *Journal of the RIBA* 45.16 (27 June 1938), pp. 788-789. [↑](#footnote-ref-256)
257. ‘Journal’, *Journal of the RIBA* 45.16 (27 June 1938), p. 779. [↑](#footnote-ref-257)
258. Scott, ‘Air Raid Precautions as a Problem for the Architect’, *Journal of the RIBA* 45.16 (27 June 1938), p. 785. [↑](#footnote-ref-258)
259. There were however significant disputes amongst architects about the shelter policy, with many arguing that deep shelters were required for the public. The most significant alternative scheme was Berthold Lubetkin’s deep shelter design for the Labour-controlled Finsbury Borough Council, for these debates see Meisel, 'Air Raid Shelter Policy and its Critics in Britain before the Second World War', pp. 311-313; John Allan, *Berthold Lubetkin: architecture and the tradition of progress* (London, 1992), pp. 352-363. [↑](#footnote-ref-259)
260. Wesley K. Wark, 'British Intelligence on the German Air Force and Aircraft Industry, 1933-1939', *The Historical Journal* 25 (1982), p. 643. There is a large historiography on the Munich crisis in Britain including David Faber, *Munich: the 1938 appeasement crisis* (London, 2008); Gerald Geunwook Lee, '"I see dead people": Air raid phobia and Britain's behaviour in the Munich Crisis', *Security Studies* 13 (2004), pp. 230-72; Igor Lukes and Erik Goldstein, eds, *The Munich Crisis, 1938: Prelude to World War II* (London, 1999). [↑](#footnote-ref-260)
261. TNA: MT 50/56, Committee of Imperial Defence, ‘Review of Precautionary Measures (Civil Defence) Taken During the Czechoslovakian crisis, September 1938’, 14 November 1938, p. 7. [↑](#footnote-ref-261)
262. *Ibid*., pp. 4-5. [↑](#footnote-ref-262)
263. Stirling Everard, *The History of the Gas Light and Coke Company, 1812-1949* (London, 1949), p. 355. [↑](#footnote-ref-263)
264. O'Brien, *Civil defence*, p. 113. [↑](#footnote-ref-264)
265. John Baker, *Enterprise Versus Bureaucracy*, p. 4. [↑](#footnote-ref-265)
266. Meisel, 'Air Raid Shelter Policy and its Critics in Britain before the Second World War', p. 306. [↑](#footnote-ref-266)
267. Baker, *Enterprise versus Bureaucracy*, p. 4. [↑](#footnote-ref-267)
268. Overy, *The Twilight Years: The Paradox of Britain between the Wars*, p. 345. [↑](#footnote-ref-268)
269. *Ibid*., p. 348. [↑](#footnote-ref-269)
270. TNA: CAB 24/268, ‘The Preparedness for War of Great Britain in Relation to Certain other Powers by May, 1937’, February 1937; O’Brien, *Civil Defence*, p. 116. [↑](#footnote-ref-270)
271. Bialer, *The Shadow of the Bomber: The Fear of Air Attack and British Politics, 1932-1939*, p. 142. See also T. Aldgate, 'British Newsreels and the Spanish Civil War', *History* 58 (1973), pp. 60-63; for news reels during the war across Europe see Oliver Dumoulin, 'A Comparative Approach to Newsreels and Bombing in the Second World War: Britain, France, Germany', in Richard Overy, Claudia Baldoli, and Andrew Knapp eds, *Bombing, States and Peoples in Western Europe 1940-1945* (London, 2011), pp. 298-314. [↑](#footnote-ref-271)
272. Biddle, *Rhetoric and Reality in Air Warfare*, p. 126. [↑](#footnote-ref-272)
273. Non-government organisations who pressed for air rearmament above the other forces also contributed to this, most notably the Air League, and the Air Raid Defence League, Bialer, *The Shadow of the Bomber: The Fear of Air Attack and British Politics, 1932-1939*, p. 142. [↑](#footnote-ref-273)
274. Meisel, 'Air Raid Shelter Policy and its Critics in Britain before the Second World War', p. 304. [↑](#footnote-ref-274)
275. O'Brien, *Civil Defence*, pp. 156, 116-117. [↑](#footnote-ref-275)
276. *Ibid*., pp. 116-117. [↑](#footnote-ref-276)
277. Lucy Allwright, ‘The War on London’, pp. 76-77. [↑](#footnote-ref-277)
278. *Ibid*., p. 156. [↑](#footnote-ref-278)
279. Herbert Morrison, ‘Road Architecture – The need for a Plan’, *Journal of the RIBA* 46 (20 March 1939), pp. 508, 506. [↑](#footnote-ref-279)
280. ‘ARP – The informal meeting’, *Journal of the RIBA* 46 (9 January 1939), p. 240. [↑](#footnote-ref-280)
281. Sidney V. Pearson, *London's Overgrowth and the Causes of Swollen Towns* (London, 1939), p. 9. [↑](#footnote-ref-281)
282. W. Holford, ‘The Next Twenty Years’, *Journal of the RIBA* 46 (5 December 1938), p 171. [↑](#footnote-ref-282)
283. The article was anonymous, part of a series ‘prepared by an authority on air bombardment with the advice of a number of experts’, ‘A Realistic Plan for ARP’, *Picture Post*, Saturday 21 January, p. 54. [↑](#footnote-ref-283)
284. *Ibid*., pp. 54-55. [↑](#footnote-ref-284)
285. *Ibid*., pp. 56-58. [↑](#footnote-ref-285)
286. These ideas discussed in a review of architectural developments in Europe in American journal *Architectural Record*, ‘What does military design offer the architecture of peace?’, *Architectural Record* 85.1 (January 1939), pp. 50-56. [↑](#footnote-ref-286)
287. Sir Alexander Rouse’s remarks are quoted at the opening of a meeting on Town Planning and Air Raids by the Basingstoke Town Planning Department, Hampshire Record Office: 12M75/DDC398, ‘Town Planning and Air-Raid Protection’ issued by the Town Planning Department, Basingstoke, 28th September 1939, p. 1. [↑](#footnote-ref-287)
288. The proceedings of a meeting between a Committee of the Town Planning Institute, the ARP Department, and the Ministry of Health held in January 1937 are quoted in *ibid*., pp. 1-2. [↑](#footnote-ref-288)
289. Mervyn O’Gorman, ‘A Square Deal for London Traffic’, *Journal of the RIBA* 46 (3 April 1939), p. 550. [↑](#footnote-ref-289)
290. *Ibid*., p. 553. [↑](#footnote-ref-290)
291. ‘A.R.P. Handbook No. 5 review’, *Journal of the RIBA*, 46 (14 August, 1939), p. 834. [↑](#footnote-ref-291)
292. Haldane, *A.R.P*. Haldane was one of an increasing number of scientists addressing the question of defence from air attacks. A number of articles were published in the prestigious science journal *Nature* in this period, and were part of broader debates about science in war. [↑](#footnote-ref-292)
293. ‘A.R.P. – The Informal Meeting’, *Journal of the RIBA* 46 (9 January 1939), p. 239. [↑](#footnote-ref-293)
294. Biddle, *Rhetoric and Reality in Air Warfare*, p. 57. [↑](#footnote-ref-294)
295. The papers relating to these discussions are found in TNA: HO 186/149. [↑](#footnote-ref-295)
296. TNA: HO 186/149, Minutes of meeting held on 19 July 1939 at Ministry of Transport, pp. 3-5. [↑](#footnote-ref-296)
297. TNA: HO 186/149, Lord Ashfield, ‘Use of the Board’s Tube Railways in a National Emergency’, 21 June 1939, pp. 1-2. [↑](#footnote-ref-297)
298. TNA: HO/186/149, Minutes of meeting held on 19 July 1939 at Ministry of Transport, p. 5. [↑](#footnote-ref-298)
299. Meisel, 'Air Raid Shelter Policy and its Critics in Britain before the Second World War', p. 317. [↑](#footnote-ref-299)
300. Grayzel, *At Home and Under Fire*, p. 147. [↑](#footnote-ref-300)
301. Civil Defence Act, 1939, Section V. Point 36. [↑](#footnote-ref-301)
302. Civil Defence Act, 1939, Section V. Point 38-39. [↑](#footnote-ref-302)
303. Civil Defence Act, 1939, Section V. Point 39. In special circumstances the grant could be extended to 85%, O'Brien, *Civil Defence*, p. 222. [↑](#footnote-ref-303)
304. For criticism of ARP preparations by opposition see Labour Party, *A.R.P.: Labour's Policy* (London, 1939). [↑](#footnote-ref-304)
305. Grant, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68*, pp. 4-5. [↑](#footnote-ref-305)
306. HC Deb 4 April 1939, vol. 345 cols 2633-752

     URL: http://hansard.millbanksystems.com/commons/1939/apr/04/civil-defence-bill#S5CV0345P0\_19390404\_HOC\_345 [accessed 04/04/2013]. [↑](#footnote-ref-306)
307. *Ibid*. [↑](#footnote-ref-307)
308. O'Brien, *Civil Defence*, p. 224. [↑](#footnote-ref-308)
309. Baker, *Enterprise versus Bureaucracy*, p. 6. For the foundation of the Civil Defence Research Committee see Andrew Brown, *J.D. Bernal: The Sage of Science* (Oxford, 2005), pp. 168-175. [↑](#footnote-ref-309)
310. Baker, *Enterprise versus Bureaucracy*, p. 6. [↑](#footnote-ref-310)
311. For an insightful analysis of the literature of a ‘prolonged 1939’ see Mellor, *Reading the Ruins: Modernism, Bombsites and British culture*, pp. 31-46. [↑](#footnote-ref-311)
312. Baker, *Enterprise versus Bureaucracy*, p. 8. [↑](#footnote-ref-312)
313. O’Brien characterises the two conditions of ‘stand-to’ and ‘stand-by’, O'Brien, *Civil defence*, p. 294. [↑](#footnote-ref-313)
314. George H. Quester, *Deterrence before Hiroshima. The Airpower Background of Modern Strategy* (New York, London, 1966), p. 109. [↑](#footnote-ref-314)
315. The notion of the ‘twilight war’ referred to both the moment before the night of war, and the imposition of blackouts in cities, O'Brien, *Civil Defence*, p. 294; Quester, *Deterrence before Hiroshima*, p. 105. [↑](#footnote-ref-315)
316. While still a significant number it was some way short of the 3,500,000 people the government had planned to move, and indeed it was some time before the shortfall in take-up was realised, Richard M. Titmuss, *Problems of Social Policy* (2nd edn, Westport, 1971), p. 101. [↑](#footnote-ref-316)
317. *Ibid*., p. 104. For full table of variations see Appendix 4 in *ibid*., p. 552. [↑](#footnote-ref-317)
318. *Ibid*., p. 102. [↑](#footnote-ref-318)
319. ‘Evacuation Begins’, *Manchester Guardian*, 1 September 1939, p. 8. [↑](#footnote-ref-319)
320. ‘Children of London Leave Home’, *Manchester Guardian*, 3 September 1939, p. 9. [↑](#footnote-ref-320)
321. Tom Harrisson, *Living Through the Blitz* (London, 1976), p. 44. [↑](#footnote-ref-321)
322. TNA: CAB 24/282 Memorandum by Lord Privy Seal on ‘Camps for War and Peace Purposes’, January 1939. [↑](#footnote-ref-322)
323. The architectural problem of the camps was discussed in the *Architectural Review* and the *Journal of the RIBA*. The *Architectural Review* noted how standardisation, a feature of modern architecture had been used effectively to build many camps at short notice across the country, see ‘Evacuation Camps’, *Architectural Review* 87 (March 1940), pp. 101-103; see also ‘Camps for Peace and War’, *Journal of the RIBA* 46 (14 August 1939), pp. 929-936. Modernist architects were employed to design and build many of these camps, Cohen, *Architecture in Uniform*, pp. 108-111. [↑](#footnote-ref-323)
324. TNA: CAB 24/282 Memorandum by Lord Privy Seal on ‘Camps for War and Peace Purposes’, January 1939, pp. 3-4. [↑](#footnote-ref-324)
325. O'Brien, *Civil Defence*, p. 295. [↑](#footnote-ref-325)
326. ‘Postscript 1942’, *Architectural Review* 92, (October 1942), p. 96. [↑](#footnote-ref-326)
327. Melitta Schmideberg, ‘Some Observations on Individual Reactions to Air Raids’, *The International Journal of Psycholanalysis*, vol. 23, parts 3 and 4, 1942, quoted in Adam Phillips, 'Bombs Away', *History Workshop Journal* 45 (1998), p. 196. [↑](#footnote-ref-327)
328. Calder, *The People's War: Britain 1939-1945* set the terms of the history of the home front, but they have been refined by Sonya O. Rose, *Which People's War?: National Identity and Citizenship in Britain 1939-1945* (Oxford, 2003). For the ‘Blitz’ in particular see Charles Whiting, *Britain Under Fire : The Bombing of Britain's Cities, 1940-45* (London, 1986); Angus Calder, *The Myth of the Blitz* (London, 1992, first published 1991); Malcolm Smith, *Britain and 1940: History, Myth and Popular Memory* (London, 2000). [↑](#footnote-ref-328)
329. Claudia Baldoli and Matt Perry, 'Bombing and Labour in Western Europe, from 1940-1945', *Labour History Review* 77 (2012), p. 3; Smith, *Britain and 1940: History, Myth and Popular Memory*; Mark Connelly, *We Can Take It! Britain and the Memory of the Second World War* (Harlow, 2004). [↑](#footnote-ref-329)
330. J.P. Reemstma, *Krieg is ein Gesellschaftzustand. Reden zur Eröffnung der Ausstellung “Vernichtungskrieg. Verbrechen der Wechmacht 1941-1944”*, ed. Hamburger Institut für Sozialforschung (Hamburg, 1998), pp. 8-13, quoted in Dietmar Süβ, 'Wartime Societies and Shelter Politics in National Socialist Germany and Britain', in Richard Overy, Claudia Baldoli, and Andrew Knapp eds, *Bombing, States and Peoples in Western Europe 1940-1945* (London, 2011), p. 23. [↑](#footnote-ref-330)
331. Calder, *The People's War: Britain 1939-1945*, p. 137. [↑](#footnote-ref-331)
332. *Ibid*., p. 89. [↑](#footnote-ref-332)
333. *Ibid*., p. 236. For a statistical account of the bombing of Britain in the Second World War, including civilians killed and injured, estimated tonnage of bombs and major raids see appendices in O'Brien, *Civil Defence*, pp. 677-684. [↑](#footnote-ref-333)
334. For London and the Blitz see John Philip Ray, *The Night Blitz, 1940-1941* (London, 1996). [↑](#footnote-ref-334)
335. Calder, *The People's war: Britain 1939-1945*, p. 236. [↑](#footnote-ref-335)
336. Peter Galison also highlights the defence interests in grid systems in the U.S, Galison, 'War Against the Center', pp. 27-28. [↑](#footnote-ref-336)
337. For civilian morale in Southampton see Brett A. Chisnall, ‘A Study of Morale in Portsmouth, Southampton and Plymouth in Wartime Britain, 1939-1945’, PhD thesis (University of Canterbury, 1991). [↑](#footnote-ref-337)
338. Bernard Knowles, *Southampton: The English Gateway* (Tiptree, 1951), p. 17. Knowles gives a full account of the town’s earlier history, pp. 17-88. For a recent collection of essays on the role of Southampton in British imperialism and social and cultural history, see Miles Taylor, ed., *Southampton: Gateway to the British Empire* (London, 2007). [↑](#footnote-ref-338)
339. Knowles, *Southampton: The English Gateway*, p. 18. For a general comparison of London and Southampton during the Second World War see John Hovey, *A Tale of Two Ports: London and Southampton* (London, 1990). [↑](#footnote-ref-339)
340. TNA: CAB 24/256, Sub-Committee on Imperial Defence, ‘Re-orientation of the Air Defence System of Great Britain’, 16 July 1935, p. 28. [↑](#footnote-ref-340)
341. Knowles, *Southampton: The English Gateway*, pp. 93-94. [↑](#footnote-ref-341)
342. Titmuss, *Problems of Social Policy*, p. 551. [↑](#footnote-ref-342)
343. Knowles, *Southampton: The English Gateway*, pp. 109-110 [↑](#footnote-ref-343)
344. Southampton City Archive Service [hereafter SCAS]: Water committee, 28 Nov, 1939. [↑](#footnote-ref-344)
345. SCAS: D/SWA 4/16, C.A. Bradley, ‘Southampton Corporation Waterworks. Emergency Water Supplies’, c. 1942, p. 1, Water Committee, 22 March 1938; Knowles, *Southampton: The English Gateway*, p. 110. [↑](#footnote-ref-345)
346. SCAS: ARP Committee minutes, 19 December 1939. [↑](#footnote-ref-346)
347. SCAS: Letter from John Anderson, quoted in the Emergency Committee minutes, 16 August 1940. [↑](#footnote-ref-347)
348. For a full description of the effects of the attacks see Knowles, *Southampton: The English Gateway*, pp. 151-61. Official war-time reports to the Local Authority are contained in the Council Minutes, 1940-1941 volume, pp. 278-287. [↑](#footnote-ref-348)
349. Knowles, *Southampton: The English Gateway*, pp. 175-176, ‘Report of the Waterworks Engineer’ in Emergency Committee minutes, 20 Dec., 1940, p. 287. [↑](#footnote-ref-349)
350. SCAS: Emergency committee minutes, 7 Sept., 1940, p. 1107. [↑](#footnote-ref-350)
351. SCAS: D/SWA 4/16: Bradley, ‘Southampton Corporation Waterworks’, p. 1. [↑](#footnote-ref-351)
352. SCAS: Emergency Committee minutes, 22 Feb., 1941, p. 529, SCAS: TC BOX 194/2: Corporation Report on Preparedness for Attack, 1942, p. 39. [↑](#footnote-ref-352)
353. For ‘trekking’ in Southampton see Tom Harrison, *Living Through the Blitz* (London, 1976), pp. 152-153. [↑](#footnote-ref-353)
354. SCAS: Emergency committee minutes, 10 August, 1941, p. 1013. [↑](#footnote-ref-354)
355. SCAS: TC BOX 194/2: Corporation Report on Preparedness for Attack, 1942, p. 7. [↑](#footnote-ref-355)
356. SCAS: D/Z 809/36, Southampton Corporation Waterworks Department, ‘Air Raid Precautions. Water Supply, Advice to Households’ leaflet, March 1940. [↑](#footnote-ref-356)
357. Originals of some of these posters can be found in SCAS: TC BOX 195/12. [↑](#footnote-ref-357)
358. Philip Ziegler, *London at War, 1939-1945* (London, 1995), p. 210. [↑](#footnote-ref-358)
359. SCAS: TC BOX 194/2: Corporation Report on Preparedness for Attack, 1942, p. 40. [↑](#footnote-ref-359)
360. TNA: HO 186/2353, Report on Water Supply in London Civil Defence Region, April 1945, p. 2. [↑](#footnote-ref-360)
361. Chick, 'The Political Economy of Nationalisation: The Electricity industry', p. 273. [↑](#footnote-ref-361)
362. For a discussion of the decision to nationalise see John F. Wilson, 'The Motives for Gas Nationalisation: Practicality or Ideology?', in Robert Millward and John Singleton eds, *The Political Economy of Nationalisation in Britain 1920-1950* (Cambridge, 1995), pp. 144-163. [↑](#footnote-ref-362)
363. *Ibid*., p. 144. [↑](#footnote-ref-363)
364. *Ibid*., p. 149. [↑](#footnote-ref-364)
365. TNA: POWE 29/47, ‘Regional Gas Engineering Advisers’, 29 August 1942, p. 1. [↑](#footnote-ref-365)
366. TNA: POWE 29/47, letter from Oliver Lyttleton to C. H. Chester, 17 December 1940. [↑](#footnote-ref-366)
367. TNA: POWE 29/47, ‘Regional Gas Engineering Advisers’, 29 August 1942, p. 1. [↑](#footnote-ref-367)
368. Details of the London Regional Gas Centre are given in a short document in TNA: POWE 29/47, ‘London Regional Gas Centre’, March 1942, pp. 1-3. [↑](#footnote-ref-368)
369. W.M. Ogden, ‘The Distribution of Gas’, *Architectural Review* 101 (April 1947), p. 131. [↑](#footnote-ref-369)
370. Wilson, ‘The Motives for Gas Nationalisation’, p. 152; Political and Economic Planning, *Report on the gas industry in Great Britain: a survey of current trends and problems of the industry, with proposals for its future development* (London, 1939). [↑](#footnote-ref-370)
371. Wilson, ‘The motives for gas nationalisation’, p. 152 [↑](#footnote-ref-371)
372. Ogden, ‘The Distribution of Gas’, p. 129. [↑](#footnote-ref-372)
373. Everard, *The History of the Gas Light and Coke Company, 1812-1949*, pp. 362-363. [↑](#footnote-ref-373)
374. *Ibid*., p.359-360; TNA: HO 186/2353, Everard ‘Note on Gas Industry London Civil Defence Region, 1939-1945’, pp. 27-33. [↑](#footnote-ref-374)
375. Everard, *The History of the Gas Light and Coke Company, 1812-1949*, pp. 355-357. [↑](#footnote-ref-375)
376. Everard ‘Note on Gas Industry London Civil Defence Region, 1939-1945’, pp. 27-33. [↑](#footnote-ref-376)
377. M. Hartland Thomas, ‘The Gasworks in the Landscape’, *Architectural Review* 101 (April 1947), pp. 149-150. [↑](#footnote-ref-377)
378. *Housing Problems*, directed by Arthur Elton and Edgar Anstey (British Commercial Gas Association, 1935). [↑](#footnote-ref-378)
379. TNA: POWE 44/4, letter from Herbert Morrison to Hugh Gaitskill and his reply, 7 January 1948. [↑](#footnote-ref-379)
380. Wilson, ‘The Motives for Gas Nationalisation’, pp. 160-161. [↑](#footnote-ref-380)
381. HO 186/2353, ‘Electricity Supply’, 30 April 1945, pp. 1, 2, 4. [↑](#footnote-ref-381)
382. London Metropolitan Archives [hereafter LMA]: LCC/CE/WAR/2/59, Correspondence between London water companies, the Gas, Light and Coke Co. and LCC in the Spring of 1940. [↑](#footnote-ref-382)
383. Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, p. 44. For a comparative discussion of blackout in Britain and Germany see Marc Wiggam, 'The Blackout and the Idea of Community in Britain and Germany', in Richard Overy, Claudia Baldoli, and Andrew Knapp eds, *Bombing, States and Peoples in Western Europe, 1940-1945*, pp. 43-58, (London, 2011), pp. 43-58. [↑](#footnote-ref-383)
384. Dietmar Süss, ‘Wartime Societies and Shelter Politics in National Socialist Germany and Britain’, p. 24. [↑](#footnote-ref-384)
385. Thomas Pynchon, *Gravity's Rainbow* (3rd edn, London, 2000), p. 3. [↑](#footnote-ref-385)
386. H. Austen Hall, letter to the editor, *Journal of the RIBA* 46 (7 November 1938), p. 43. [↑](#footnote-ref-386)
387. S. Bylander, letter to the editor, *Journal of the RIBA* 46 (21 November 1938), p. 100. [↑](#footnote-ref-387)
388. TNA: HLG 7/42, John Anderson letter to Walter Elliot, 28 November 1938. [↑](#footnote-ref-388)
389. TNA: HLG 7/42, W. M. Browing, ‘Memorandum’, 3 November 1938 [underlined in original]. [↑](#footnote-ref-389)
390. LMA: LCC/CE/WAR/1/7, Town Planning and Building Regulation Committee, 18 July 1938. [↑](#footnote-ref-390)
391. LMA: LCC/CE/WAR/1/7, E.P. Wheeler, ‘Report by the Architect to the Council’, 15 July 1938, pp. 1-3. [↑](#footnote-ref-391)
392. LMA: LCC/CE/WAR/1/7, Committee of Imperial Defence ARP meeting, 18 December 1934. [↑](#footnote-ref-392)
393. LMA: LCC/CE/WAR/1/7, correspondence between A. Steele-Perkins and T. Pierson-Frank, 22-23 November 1935. [↑](#footnote-ref-393)
394. LMA: LCC/CE/WAR/1/7, note from ARP department, 28 April 1938. [↑](#footnote-ref-394)
395. LMA: LCC/CE/WAR/1/14, Bressey report quoted in LCC Highways Committee meeting, 10 February 1939, p. 1. [↑](#footnote-ref-395)
396. LMA: LCC/CE/WAR/ 1/14, LCC Highways Committee, 10 February 1939, pp. 1-4. [↑](#footnote-ref-396)
397. LMA: LCC/CE/WAR/ 1/14, Thames Tunnel Report by Chief Engineer, 24 July 1939, pp. 1-2. [↑](#footnote-ref-397)
398. John Gregg, *The Shelter of the Tubes: Tube Sheltering in Wartime London* (Harrow Weald, 2001), pp. 22-24. [↑](#footnote-ref-398)
399. TNA: HO 186/321, ‘Use of tube stations as shelters’, note by the London Passenger Transport Board, 25 September 1940. [↑](#footnote-ref-399)
400. TNA: HO 186/321, ‘Note for the use of the Minister in his Editorial Conference’, c. September 1940, p. 1. [↑](#footnote-ref-400)
401. For a comparison of the way shelters were policed in Britain and Germany see Dietmar Süss, ‘Wartime Societies and Shelter Politics in National Socialist Germany and Britain’, pp. 23-42. [↑](#footnote-ref-401)
402. Directive policy papers from the Committee can be found in TNA: HO 200/2. [↑](#footnote-ref-402)
403. TNA: HO/186/639, see letters held in this file. [↑](#footnote-ref-403)
404. TNA: HO 186/639, London Civil Defence Region Group 3, ‘Report to Regional Commissioners on high explosive bomb incident at Bank Tube Station, City of London, on 11 January 1941, pp. 1-5. [↑](#footnote-ref-404)
405. TNA: HO 200/2, ‘New Tube Shelters’, pp. 1-2. [↑](#footnote-ref-405)
406. TNA: HO 200/4, ‘Report on the New Tube Shelters and their use by the Public’, 22 April 1943, p. 1. [↑](#footnote-ref-406)
407. Gregg, *The Shelter of the Tubes: Tube Sheltering in Wartime London*, p. 75. [↑](#footnote-ref-407)
408. Dietmar Süss, ‘Wartime Societies and Shelter Politics in National Socialist Germany and Britain’, p. 33. [↑](#footnote-ref-408)
409. TNA: HO 200/4, ‘Report on the New Tube Shelters and their use by the public’, 22 April 1943, pp. 2-7. [↑](#footnote-ref-409)
410. Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, p. 173. [↑](#footnote-ref-410)
411. Gregg, *The Shelter of the Tubes: Tube Sheltering in Wartime London*, pp. 59-63. [↑](#footnote-ref-411)
412. TNA: HO 200/4, ‘Report on the New Tube Shelters and their use by the public’, 22 April 1943, p. 4. [↑](#footnote-ref-412)
413. TNA: HO 200/2, letter to Minister of Home Security from London Appreciation Society, 21 September 1942. [↑](#footnote-ref-413)
414. For an international study of the impact of the Second World War on architecture see Jean-Louis Cohen, *Architecture in Uniform: Designing and Building for the Second World War*. [↑](#footnote-ref-414)
415. *Architectural Review*, 90.534 (July 1941), pp. 1-44. [↑](#footnote-ref-415)
416. ‘Foreword’, *Architectural Review* 90.535 (July 1941), p. 2. [↑](#footnote-ref-416)
417. Leo Mellor has written about the importance of surrealism to literary response to air war, Mellor, *Reading the Ruins: Modernism, Bombsites and British culture*, ch. 3. [↑](#footnote-ref-417)
418. ‘The Architecture of Destruction’, *Architectural Review* 90.535 (July 1941), pp. 25-30. [↑](#footnote-ref-418)
419. *Ibid*., p. 25; see also Rose Macaulay, *Pleasure of Ruins* (London, 1953). [↑](#footnote-ref-419)
420. J. M. Richards and John Summerson, *The Bombed Buildings of Britain. A Record of Architectural casualties: 1940-41* (Cheam, 1942). Richards’s writing was part of a broader interest in the ruins of British cities, and London in particular which saw a number of publications in this period, including James Pope Hennessy and Cecil Beaton, *History Under Fire. 52 photographs of air raid damage to London buildings, 1940-41* (London, 1941). These two books are discussed in detail in Mark B. Pohlab, 'The Appreciation of Ruins in Blitz-Era London', *London Journal* 30 (2005), pp. 1-24. See also Hauser, *Shadow Sites: Photography, Archaeology, and the British Landscape, 1927-1955*, pp. 231-237. [↑](#footnote-ref-420)
421. Patrick Wright, *On Living in an Old Country* (2nd edn, Oxford, 2009), p. 45. [↑](#footnote-ref-421)
422. For the National Building Record see Hauser, *Shadow Sites: Photography, Archaeology, and the British Landscape, 1927-1955*, pp. 217-220. [↑](#footnote-ref-422)
423. J.M. Richards, ‘The Architecture of Destruction’, *Architectural Review* 94 (July 1943), p. 23. [↑](#footnote-ref-423)
424. ‘The Architecture of Destruction’, *Architectural Review* 90.535 (July 1941), p. 25. [↑](#footnote-ref-424)
425. Pohlab, 'The Appreciation of Ruins in Blitz-Era London', p. 21. [↑](#footnote-ref-425)
426. Paul Fussell argues this in the context of the First World War, Paul Fussell, *The Great War and Modern Memory* (3rd edn, Oxford, 2000); the attempt to poeticise the Second World War is perhaps best encapsulated in the 1941 Humphrey Jennings film *Words for Battle*, in which Laurence Olivier reads passages from the canon of English literature and figures these alongside a speech by Winston Churchill and Abraham Lincoln’s Gettysburg Address, *Words for Battle*, directed by Humphrey Jennings (Crown Film Unit, 1941). [↑](#footnote-ref-426)
427. ‘Editorial’, *Architectural Review* 89 (January-February 1941), p. 26. [↑](#footnote-ref-427)
428. J. M. Richards, *Memoirs of an Unjust Fella* (London, 1980), pp. 148-157. [↑](#footnote-ref-428)
429. *Ibid*., pp. 102-3. [↑](#footnote-ref-429)
430. J.M. Richards, ‘The Architecture of Destruction’, *Architectural Review* 94 (July 1943), p. 23. [↑](#footnote-ref-430)
431. Calder, *The Myth of the Blitz*, p. 36. [↑](#footnote-ref-431)
432. Adam Piette, *Imagination at War: British Fiction and Poetry, 1939-1945* (London, 1995), pp. 39-46. For more on writers’ responses to fire in Britain see Mellor, *Reading the Ruins: Modernism, Bombsites and British culture*, ch. 2. [↑](#footnote-ref-432)
433. Pohlab, 'The Appreciation of Ruins in Blitz-Era London', p. 2; Hennessy and Beaton, *History Under Fire. 52 Photographs of Air Raid Damage to London Buildings, 1940-41*. [↑](#footnote-ref-433)
434. Pohlab, 'The Appreciation of Ruins in Blitz-Era London', p. 2. [↑](#footnote-ref-434)
435. Hauser, *Shadow Sites: Photography, Archaeology, and the British Landscape, 1927-1955*, p. 243. [↑](#footnote-ref-435)
436. Mellor, *Reading the Ruins: Modernism, Bombsites and British Culture*, p. 47. In Germany, where the destruction was on a different scale, this depiction was even more difficult to the point of silence and paralysis, as W.G. Sebald wrote, ‘The death by fire within a few hours of an entire city, with all its buildings and its trees, its inhabitants, its domestic pets, its fixtures and fittings of every kind, must inevitably have led to overload, to paralysis of the capacity to think and feel in those who succeeded in escaping’, Sebald, *On the Natural History of Destruction*, p. 25. [↑](#footnote-ref-436)
437. G.S. Kallmann, ‘The Wartime Exhibition’, *Architectural Review* 94 (October 1943), pp. 99, 104. Kallmann’s article is discussed in relation to other wartime exhibitions in Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, pp. 333-345. [↑](#footnote-ref-437)
438. Kallmann, ‘The Wartime Exhibition’, p. 96. [↑](#footnote-ref-438)
439. This site was popular with the Ministry of Information due to its size and location, and had previously hosted an exhibition by the International Artists Federation. [↑](#footnote-ref-439)
440. *The Life and Death of Colonel Blimp*, directed by Michael Powell and Erich Pressburger (United Artists, 1943); Mellor, *Reading the Ruins: Modernism, Bombsites and British Culture*, pp. 184-185. Ruins also played an important in German film after the Second World War, see Eric Rentschler, 'The Place of Rubble in the *Trümmerfilm*', in Julia Hell and Andreas Schönle eds, *Ruins of Modernity* (Durham, N.C., 2010), pp. 418-438. [↑](#footnote-ref-440)
441. This description captions a photograph on the contents page of *Architectural Review* 94. 562 (October 1943), p. 89. [↑](#footnote-ref-441)
442. Kallmann, ‘Wartime Exhibition’, pp. 105, 100. [↑](#footnote-ref-442)
443. Naomi Stead, 'The Value of Ruins: Allegories of Destruction in Benjamin and Speer', *Form/Work: An Interdisciplinary Journal of the Built Environment* 6 (2003), p. 52. Speers ‘Theory of Ruin Value’, devised and explained to Hitler in 1934, was later discussed in his 1970 memoirs Albert Speer, *Inside the Third Reich: memoirs* trans. Richard and Clara Winston, (London, 1970). [↑](#footnote-ref-443)
444. The attachment of a melancholic valorisation to ruins of a last society is the central feature of German Namibian exaltations of ruins of the colonial state, George Steinmetz, 'Colonial Melancholy and Fordist Nostalgia', in Julia Hell and Andreas Schönleeds, *Ruins of Modernity*, pp. 294-320, (Durham, N.C., 2010), pp. 294-320. [↑](#footnote-ref-444)
445. Speer, *Inside the Third Reich: memoirs*, p. 97. [↑](#footnote-ref-445)
446. Julia Hell, 'Imperial Ruin Gazers, or Why Did Scipio Weep?', in Julia Hell and Andreas Schönle eds, *Ruins of Modernity*, pp. 169-192, (Durham, N.C., 2010), pp. 186-187. [↑](#footnote-ref-446)
447. Richards, ‘The Architecture of Destruction’, *Architectural Review*, 90 (July 1941), p. 25. [↑](#footnote-ref-447)
448. ‘Building technique in War-Time’, *Journal of the RIBA* 47 (20 May 1940), p. 163. [↑](#footnote-ref-448)
449. Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, pp. 12, 16. [↑](#footnote-ref-449)
450. ‘What Architecture Can Do’, *Journal of the RIBA* 46 (16 October 1939), p. 995. [↑](#footnote-ref-450)
451. Philip Larkin, ‘A Stone Church Damaged by a Bomb’, in Philip Larkin, *Collected Poems* (2nd edn, London, 2003), p. 164. [↑](#footnote-ref-451)
452. This is an idea Larkin developed further in his later poem ‘Church Going’, in Larkin, *Collected Poems*, pp.58-59. [↑](#footnote-ref-452)
453. George Orwell, ‘You and the Atom Bomb’, *Tribune* 19 October 1945. Available online at http://theorwellprize.co.uk/george-orwell/by-orwell/essays-and-other-works/you-and-the-atom-bomb [accessed 10/07/2013]. [↑](#footnote-ref-453)
454. Galison, 'War Against the Center', p. 28. [↑](#footnote-ref-454)
455. Virilio, *War and Cinema: The Logistics of Perception*, p. 88. [↑](#footnote-ref-455)
456. For utopianism and pragmatism see Matthew Hollow, 'Utopian Urges: Visions for Reconstruction in Britain, 1940-1950', *Planning Perspectives* 27 (2012), pp. 569-585; Catherine Flinn, '“The City of Our Dreams”? The Political and Economic realities of Rebuilding Britain's Blitzed Cities, 1945-1954', *Twentieth Century British History* ADVANCE ACCESS (2011); Nick Tiratsoo, 'The Reconstruction of Blitzed British cities, 1945-55: Myths and Reality ', *Contemporary British History* 14 (2000), pp. 27-44; for case studies of particular schemes see Bullock, *Building the Post-War World: Modern Architecture and Reconstruction in Britain*; Esher, *A Broken Wave: the Rebuilding of England 1940-1980*; Junichi Hasegawa, *Replanning the Blitzed City Centre: A Comparative Study of Bristol, Coventry, and Southampton, 1941-1950* (Buckingham, 1992); and for a comprehensive bibliography see Larkham and Lilley, *Planning the City of Tomorrow: British Reconstruction Planning, 1939-1952 : An Annotated Bibliography*. [↑](#footnote-ref-456)
457. An exception, which considers both the memory of bombing in the Second World War and the fear of nuclear war, is Stefan Goebel, 'Commemorative Cosmospolis: Transnational Networks of Remembrance in Post-War Coventry', in Stefan Goebel and Derek Keene eds, *Cities Into Battlefields: Metropolitan Scenarios, Experiences and Commemorations of Total War* (Farnham, 2011), pp. 163-184. [↑](#footnote-ref-457)
458. For discussion on the question of modernity in reconstruction see Becky Conekin, Frank Mort, and Chris Waters, eds, *Moments of Modernity: Reconstructing Britain, 1945-1964* (London, 1999). [↑](#footnote-ref-458)
459. Recent work has stressed the prominent role of the Cold War in the immediate post-war years, see for example Anne Deighton, 'Britain and the Cold War, 1945-1955', in Melvyn P. Leffler and Odd Arne Westad eds, *The Cambridge History of the Cold War* (Cambridge, 2010), pp. 112-132. [↑](#footnote-ref-459)
460. David Edgerton, 'War, Reconstruction, and the Nationalization of Britain, 1939-1951', *Past and Present* Supplement 6 (2011), p. 32. [↑](#footnote-ref-460)
461. Grant, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68*, p. 13. [↑](#footnote-ref-461)
462. For a geographical-historical overview of war and city planning see Ashworth, *War and the City*. [↑](#footnote-ref-462)
463. David Edgerton, *Britain's War Machine* (2nd edn, London, 2012), p. 299. [↑](#footnote-ref-463)
464. About 230 plans are known of, Peter J. Larkham, 'Selling the Future: Images in UK Post-War Reconstruction Plans', in Iain Boyd Whyte ed. *Man-Made Future: Planning, Education and Design in Mid-Twentieth Century Britain* (London, 2007), p. 99. [↑](#footnote-ref-464)
465. Joseph Rykwert, *The Seduction of Place. The History and Future of the City* (2nd edn, Oxford, 2004), p.174. [↑](#footnote-ref-465)
466. Patrick Abercrombie, *Greater London Plan 1944* (London, 1945), p. 38. [↑](#footnote-ref-466)
467. Grant, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68*, p. 20. [↑](#footnote-ref-467)
468. J.M. Richards, ‘A Theoretical Basis for Physical Planning, Part 2’, *Architectural Review* 91 (February and March 1942), p. 68. [↑](#footnote-ref-468)
469. *Royal Commission on the Distribution of the Industrial Population*, (London, 1940, reprinted 1963), pp. 186-187. [↑](#footnote-ref-469)
470. Mark Clapson, *Invincible Green Suburbs, Brave New Towns. Social Change and Urban Dispersal in Postwar England* (Manchester, 1998), pp. 37-38. [↑](#footnote-ref-470)
471. Edgerton, *Warfare State: Britain, 1920-1970*, pp. 108-144. [↑](#footnote-ref-471)
472. Abercrombie, *Greater London Plan 1944*, p. 22. For a discussion of the complex meanings contained within the zoning proposals of the earlier *County of London Plan* see Mort, ‘Fantasies of Metropolitan Life’, especially pp. 135-146. [↑](#footnote-ref-472)
473. Clapson, *Invincible Green Suburbs, Brave New Towns*, p. 38. [↑](#footnote-ref-473)
474. Patrick Abercrombie, *Town and Country Planning* (London, 1933), pp. 61-64. [↑](#footnote-ref-474)
475. W. Loftus Hare, ‘The Green Belt: Its Relation to London’s Growth’, *Journal of the RIBA* 44 (8 May 1937), p. 677-685. [↑](#footnote-ref-475)
476. Quoted in Kathleen A. Tobin, 'The Reduction of Urban Vulnerability: Revisiting 1950s American Suburbanization as Civil Defence', *Cold War History* 2 (2002), p. 21. [↑](#footnote-ref-476)
477. Abercrombie, *Town and Country Planning*, p. 139. [↑](#footnote-ref-477)
478. Abercrombie, *Greater London Plan*, pp. 4-5, 7, 12. [↑](#footnote-ref-478)
479. Deighton, 'Britain and the Cold War, 1945-1955', p. 119. [↑](#footnote-ref-479)
480. There are reports on Manchester, Birmingham, Glasgow, Sheffield, Nottingham, Liverpool and Southampton in TNA: HO 357/10. See also TNA: CAB 121/272, Chiefs of Staff Committee, Joint Technical Warfare Committee, ‘Scale of Attack on Certain Cities’, 16 February, 1946. [↑](#footnote-ref-480)
481. Hennessy, *The Secret State: Whitehall and the Cold War*; Grant, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68*; Matthew Grant, 'Civil Defence Gives Meaning to Your Leisure: Citizenship, Participation and Cultural Change in Cold War Recruitment Propaganda, 1949-1954', *Twentieth Century British History* 22 (2011), pp. 55-78; Stafford, '“Stay at Home”: The Politics of Nuclear Civil Defence, 1968–83', pp. 383-407. [↑](#footnote-ref-481)
482. Peter Hennessy, *The Secret State: Preparing for the Worst, 1945-2010* (2nd edn, London, 2010), p. 208. [↑](#footnote-ref-482)
483. For a general criticism of this type of analysis see C. Wright Mills, *The Causes of World War Three* (New York, 1958), pp. 40-42. [↑](#footnote-ref-483)
484. Fred Iklé quoted in E. P. Thompson, 'Folly's Comet', in E. P. Thompson ed. *Star Wars* (Harmondsworth, 1985), p. 166 [↑](#footnote-ref-484)
485. *Ibid*., p. 166 [↑](#footnote-ref-485)
486. Thompson, *Zero Option*, p. 15. [↑](#footnote-ref-486)
487. *Ibid*., pp. 13, 10. [↑](#footnote-ref-487)
488. There is an echo here of the war rehearsals carried out in popular fiction both before and after the Second World War which familiarised people to war scenarios of air raids and urban destruction before it had happened, Ruthven, *Nuclear Criticism*, pp. 42-43. [↑](#footnote-ref-488)
489. Sherry, *The Rise of American Air Power: The Creation of Armageddon*, p. xi. [↑](#footnote-ref-489)
490. This draws on the recent argument made by Jeff Hughes in his, 'What is British Nuclear Culture? Understanding *Uranium 235*', *The British Journal for the History of Science* 45 (2012), pp. 495-518. [↑](#footnote-ref-490)
491. TNA: HO 357/10, ‘Draft terms of reference and composition’, 17 August 1948. [↑](#footnote-ref-491)
492. John Baylis, *Ambiguity and Deterrence. British Nuclear Strategy 1945-1964* (2nd edn, Oxford 2006), p. 71. [↑](#footnote-ref-492)
493. TNA: HO 357/10, Working Party on the Effects of Air Attack, ‘Distribution of Assumed Atomic and H.E. Attack on London’, 11 December 1948, p. 1. [↑](#footnote-ref-493)
494. The working party estimated that the Soviet Union would be unlikely to have the capabilities to launch such an attack with nuclear weapons before 1957, and insisted that the risk of such an attack would, by 1957, be a real one, TNA: HO 357/10, Home Office, Civil Defence Joint Planning Staff, Working Party on the Effects of Air Attack, ‘The Effects of an Air Attack on London’, 1 July 1949, pp. 1-2. [↑](#footnote-ref-494)
495. Davide Deriu, 'The Ascent of the Modern *Planeur*: Aerial Images and Urban Imaginary in the 1920s', in Christian J. Emden, Catherine Keen, and David Midgley eds, *Imaging the City, Volume 1* (Oxford, 2006), p. 207. [↑](#footnote-ref-495)
496. Saint-Amour, 'Applied Modernism: Military and Civilian Uses of the Aerial Photomosaic', pp. 241-269, see also Paul K. Saint-Amour, 'Modernist Reconnaissance', *Modernism/modernity* 10 (2003), pp. 349-80. [↑](#footnote-ref-496)
497. Matless, *Landscape and Englishness*, p. 212 [↑](#footnote-ref-497)
498. For a discussion of the problems of discussing ‘British nuclear culture’ see the special issue of *The British Journal for the History of Science*, ‘British Nuclear Culture’ 45, (2012), pp. 479-719, especially Jonathan Hogg and Christopher Laucht, 'Introduction: British Nuclear Culture', *The British Journal for the History of Science* 45 (2012), pp. 479-493; and Hughes, 'What is British Nuclear Culture? Understanding *Uranium 235*', pp. 495-518. [↑](#footnote-ref-498)
499. Sebald, *Austerlitz*, pp. 23-24. [↑](#footnote-ref-499)
500. Virilio, *War and Cinema: The Logistics of Perception*, p. 55. [↑](#footnote-ref-500)
501. For a discussion of the horrified gaze in Sebald’s writing that draws on Walter Benjamin’s angel of history and asks questions about the aestheticisation of destruction in his lectures on air war, see Julia Hell, 'The Angel's Enigmatic Eyes, or The Gothic Beauty of Catastrophic History in W.G. Sebald's "Air War and Literature"', *Criticism* 46 (2004), pp. 361-392. [↑](#footnote-ref-501)
502. ‘Studies in Urban Theory II. Ebenezer Howard and the Garden City Movement’, *Town Planning Review* 19 (Summer, 1947), pp. 123-143. Morris was also cited by Lewis Mumford in a commentary on reconstruction planning, Matless, *Landscape and Englishness*, p. 217. [↑](#footnote-ref-502)
503. Kitty Hauser has argued that the ideal modernist landscape in this period was a *tabula rasa*, Hauser, *Shadow Sites: Photography, Archaeology, and the British Landscape, 1927-1955*, p. 142. [↑](#footnote-ref-503)
504. Caption to the picture of Cittadella di Torino, *Architectural Review* 98 (November 1945). [↑](#footnote-ref-504)
505. ‘Evacuation in Peace-time’, *Architectural Review* 87 (April 1940), pp. 155-156. [↑](#footnote-ref-505)
506. TNA: HO 357/10, Working Party on the Effects of Air Attack, ’Casualties in Houses and Shelters from an Atomic bomb air burst at a height of a 1/8 mile over a British city’, 10 February 1949. [↑](#footnote-ref-506)
507. TNA: HO 357/10, Working Party on the Effects of Air Attack, ‘Distribution of Assumed Atomic and H.E. Attack on London, 11 December 1948, p. 4. [↑](#footnote-ref-507)
508. Ellen Shoshkes, *Jaqueline Tyrwhitt: A Transnational Life in Urban Planning and Design* (Farnham, 2013), pp. 57-58. Otto Neurath had been part of the Vienna Circle was spent much of the war in Britain, see Nancy Cartwright, *Otto Neurath: Philosophy Between Science and Politics* (Cambridge, 1996). Jean-Louis Cohen cites Constantinos Doxiadis as a key proponent of visual statistics, Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, p.329. In 1954 Doxiadis was a co-founder of the *Ekistics* journal with Jaqueline Tyrwhitt. [↑](#footnote-ref-508)
509. Otto Neurath, 'Visual Education: Humanisation versus Popularisation', in Marie Neurath and Robert S. Cohen eds, *Otto Neurath. Empiricism and Sociology* (Boston, 1973), p. 240. [↑](#footnote-ref-509)
510. TNA: HO 357/10, Working party on effects of Air Attack, ‘Casualties from a Random Attack on London’, c. September 1949, p. 7. [↑](#footnote-ref-510)
511. Reports on Manchester, Birmingham, Glasgow, Sheffield, Nottingham and Southampton in HO 357/10. [↑](#footnote-ref-511)
512. TNA: CAB 121/272, Joint Technical Warfare Committee, ‘Matters of Fact Relating to Atomic Energy’, 30 January 1946, p. 8. [↑](#footnote-ref-512)
513. TNA: CAB 121/272, Joint Technical Warfare Committee, ‘Likely morale effect of atomic bombs’, 12 January 1946, p. 1. [↑](#footnote-ref-513)
514. *Ibid*., p. 1. [↑](#footnote-ref-514)
515. TNA: CAB 121/272, Joint Technical Warfare Committee, ‘Likely morale effect of atomic bombs’, 12 January 1946, p. 5. [↑](#footnote-ref-515)
516. TNA: HO 322/99, Sir Frank Newsom quoted in minutes of Conference on Reorganisation of Civil Defence Services on 11 June 1948, p.13. [↑](#footnote-ref-516)
517. Tobin, 'The Reduction of Urban Vulnerability: Revisiting 1950s American Suburbanization as Civil Defence', p. 26; see also Matthew Farish, 'Another Anxious Urbanism: Simulating Defense and Disaster in Cold War America', in Stephen Graham ed. *Cities, War, and Terrorism: Towards an Urban Geopolitics* (Oxford, 2004), pp. 93-109. [↑](#footnote-ref-517)
518. Galison, 'War Against the Center', p. 15. [↑](#footnote-ref-518)
519. For a mirror process of zoning for defence and development see *ibid*. [↑](#footnote-ref-519)
520. TNA: HO 357/10, Second Meeting of the Working Party on the Effects of Air Attack, 21 October 1948, p. 3. [↑](#footnote-ref-520)
521. TNA: HO 322/99, Civil Defence 2nd Echelon Forces Memorandum by the Planning Division, 19 December 1946, p. 4. There are echoes of this in a 1956 *Guide to Urban Dispersal* produced in the U.S. which proposed that satellite towns be built outside a ring of safety limiting urban growth, Galison, 'War Against the Center', pp. 24-25. [↑](#footnote-ref-521)
522. TNA: HO 228/12, Scientific Adviser’s Office, ‘The Zoning of Towns for Fire Susceptibility’, 27 January 1949, p. 4. [↑](#footnote-ref-522)
523. *Ibid*., p. 5. [↑](#footnote-ref-523)
524. TNA: HO 228/12, Scientific Adviser’s Office, ‘The Zoning of Towns for Fire Susceptibility’, 27 January 1949, p. 2. [↑](#footnote-ref-524)
525. *Ibid*., p. 3. [↑](#footnote-ref-525)
526. Abercrombie, *Greater London Plan 1944*, p. 30 [↑](#footnote-ref-526)
527. TNA: HLG 90/145, Official Committee on the Evacuation of Government Departments – Consideration of New Towns, 26 June 1949, p.1. [↑](#footnote-ref-527)
528. TNA: CAB 124/938, Extract of minutes from the Lord President’s Committee Meeting on 17 Jan., 1947, p. 1. [↑](#footnote-ref-528)
529. Table with a list of nine atomic bomb aiming points and reasons why they were chosen is given HO 357/10. [↑](#footnote-ref-529)
530. TNA: HO 357/10, Working Party on the Effects of Air Attack, ‘Distribution of Assumed Atomic and H.E. Attack on London, 11 December 1948, p. 2. [↑](#footnote-ref-530)
531. TNA: HO 205/296, O.C. Allen letter to Minister of Home Security, 11 April 1944, pp. 3-4. [↑](#footnote-ref-531)
532. TNA: HO 205/296, Electricity Commission letter to Ministry of Home Security, 26 April 1944. [↑](#footnote-ref-532)
533. See correspondence in TNA: HO 205/296, especially between O.C. Allen and the Electricity Commission. [↑](#footnote-ref-533)
534. TNA: HO 205/296, Correspondence between Barclay and Allen, 10-13 October 1944. [↑](#footnote-ref-534)
535. TNA: HO 205/296, K. A. L. Parker letter to C. J. Hornsby, 10 October 1945. [↑](#footnote-ref-535)
536. TNA: HO 205/296, Electricity Commission letter to Civil Defence Department, 13 December 1945, p. 2. [↑](#footnote-ref-536)
537. See handwritten notes between officials in December 1945 in TNA: HO 205/296. [↑](#footnote-ref-537)
538. TNA: HO 205/296, I.B. MacDonald Ross letter to Electricity Commission, 8 February 1946, p. 2. [↑](#footnote-ref-538)
539. Hannah, *Electricity Before Nationalisation*, p. 313. [↑](#footnote-ref-539)
540. *Ibid*., pp. 316-317. [↑](#footnote-ref-540)
541. *Ibid*., pp. 321-323. [↑](#footnote-ref-541)
542. TNA: HO 205/296, Electricity Commission letter to Civil Defence Department, 27 March 1946, p. 1, Minutes of Civil Defence Committee meeting, 6 April 1944, p. 1. [↑](#footnote-ref-542)
543. TNA: HO 205/296, Electricity Commission letter to Civil Defence Department, 27 March 1946, p. 1. [↑](#footnote-ref-543)
544. TNA: HO 205/296, Electricity Commission letter to Civil Defence Department, 27 March 1946, p. 1, Minutes of Civil Defence Committee meeting, 6 April 1944, p. 1. [↑](#footnote-ref-544)
545. TNA: HO 205/296, Note to Edmunds, 1 April 1946, p. 1. [↑](#footnote-ref-545)
546. *Ibid*., p. 1. [↑](#footnote-ref-546)
547. *Baylis, Ambiguity and Deterrence*, p. 45. [↑](#footnote-ref-547)
548. TNA: HO 205/296, Note from Edmunds to Allen, 18 April 1946, p. 2. [↑](#footnote-ref-548)
549. TNA: HO 205/296, Letter from Home Office to Electricity Commission, 4 April 1946, Baylis, *Ambiguity and Deterrence*, p. 53. [↑](#footnote-ref-549)
550. TNA: HO 205/296, Letter from C. H. Sykes of the Air Ministry to Electricity Commission, 24 March 1946, pp. 1-2. [↑](#footnote-ref-550)
551. TNA: HO 205/296, Letter from O.C. Allen to Edmunds, 26 June 1946, p. 1. [↑](#footnote-ref-551)
552. This memo also included the map below, TNA: CAB 129/12, Memorandum from the Air Ministry to the Cabinet, 19 July, 1946, p. 1. My thanks go to Stephen Murray for showing me this paper. [↑](#footnote-ref-552)
553. TNA: HO 205/296, Extract from minutes of the meeting of the Defence Committee on 7 August 1946, pp. 1-2. [↑](#footnote-ref-553)
554. TNA: HO 205/296, Location of Power Stations memorandum by the Home Secretary, 10 October 1946. The impact of the US Bombing Survey of pictures of the future of industry in the US is discussed in Galison, 'War Against the Center', pp. 6-31. [↑](#footnote-ref-554)
555. Hollow, 'Utopian Urges: Visions for Reconstruction in Britain, 1940-1950', pp. 576-577. [↑](#footnote-ref-555)
556. Saint-Amour, 'Applied Modernism: Military and Civilian Uses of the Aerial Photomosaic', p. 257. [↑](#footnote-ref-556)
557. TNA: HO 205/296, Location of Power Stations memorandum by the Home Secretary, 10 October 1946. [↑](#footnote-ref-557)
558. TNA: HO 357/10, Working Party on the Effects of Air Attack, ‘Distribution of Assumed Atomic and H.E. Attack on London’, 11 December 1948, p. 4. [↑](#footnote-ref-558)
559. TNA: CAB 129/12, Memorandum from the Air Ministry to the Cabinet, 19 July, 1946, p. 1. [↑](#footnote-ref-559)
560. Derrida, 'No Apocalypse, Not Now (Full Speed Ahead, Seven Missiles, Seven Missives)', p. 23. [↑](#footnote-ref-560)
561. *Ibid*., p. 23. [↑](#footnote-ref-561)
562. TNA: HO 205/296: Appendix A of note by the Air Ministry 16 July 1946. [↑](#footnote-ref-562)
563. As Peter Galison has said in relation to the U.S., ‘Bombing the Axis economy and dispersing the American one were reflections of one another’, Galison, 'War Against the Center', pp. 12, 20. [↑](#footnote-ref-563)
564. TNA: HO 205/296, Note from O.C. Allen to Home Secretary, 1 November 1946. [↑](#footnote-ref-564)
565. *Ibid*. [↑](#footnote-ref-565)
566. Baylis, *Ambiguity and Deterrence*, pp. 36-37. [↑](#footnote-ref-566)
567. Clement Attlee, quoted in Hennessy, *The Secret State: Preparing for the Worst, 1945-2010*, p. 48. [↑](#footnote-ref-567)
568. Baylis, *Ambiguity and Deterrence*, pp. 149-150, 106. [↑](#footnote-ref-568)
569. TNA: HO 205/296, Note from O.C. Allen to Home Secretary, 1 November 1946. [↑](#footnote-ref-569)
570. My thanks again go to Stephen Murray for sharing his knowledge about Bankside, TNA: CAB 129/18, ‘Power station at Bankside’, memorandum by the Secretary of State for Air, 31 March 1947, pp. 1-2. [↑](#footnote-ref-570)
571. TNA: CAB 128/9, Conclusions of a Meeting of the Cabinet, 1 April, 1947, p. 237. [↑](#footnote-ref-571)
572. TNA: CAB 195/5, Cabinet Secretary’s notes, 1 April, 1947, p. 189. [↑](#footnote-ref-572)
573. This was presumably a reference to the appointment of the Barlow Commission. [↑](#footnote-ref-573)
574. TNA: CAB 134/316, Minutes of the meeting of the Home Defence Committee, 24 November 1947, pp. 1-6. [↑](#footnote-ref-574)
575. TNA: CAB 134/316, Minutes of the meeting of the Home Defence Committee, 24 November 1947, Albert Speer interrogation quote included as an annex to the papers of the meeting, p. 6. [↑](#footnote-ref-575)
576. Hannah, *Electricity Before Nationalisation*, p. 345 [↑](#footnote-ref-576)
577. Grant, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68*, p. 26. [↑](#footnote-ref-577)
578. ‘Introduction’, *Architectural Review* 97 (April 1945), p. 95. [↑](#footnote-ref-578)
579. Lord Forrester, ‘Industry and its Environment’, *Architectural Review* 97 (April 1945), p. 110; Shoshkes, *Jaqueline Tyrwhitt: A Transnational Life in Urban Planning and Design*, p. 43. [↑](#footnote-ref-579)
580. Hugh Quigley, ‘The Grid and Siting of Power Stations’, *Architectural Review* 97 (April 1945), p. 96. [↑](#footnote-ref-580)
581. Thomas Sharp, ‘Power, People and Plans’, *Architectural Review* 97 (April 1945), p. 117. [↑](#footnote-ref-581)
582. See especially Marianna Dudley, 'A Fairy (Shrimp) Tale of Military Environmentalism: The “Greening” of Salisbury Plain', in Chris Pearson, Peter A. Coates, and Tim Cole eds, *Militarized Landscapes: From Gettysburg to Salisbury Plain* (London, 2010), pp. 135-149. [↑](#footnote-ref-582)
583. Adam Piette, *The Literary Cold War, 1945 to Vietnam* (Edinburgh, 2009), p. 4. For alternative explorations of nuclear sites in the U.S.A. see Jonathan Veitch, 'Dr Strangelove’s Cabinet of Wonder. Sifting through the Atomic Ruins at the Nevada test site', in Julia Hell and Andreas Schönle eds, *Ruins of Modernity* (Durham, N.C., 2010), pp. 321-338; Vanderbilt, *Survival City: Adventures Among the Ruins of Atomic America*. [↑](#footnote-ref-583)
584. Similarly, Holger Nehring has written that the Cold War in academic history risks reducing its warlike character to a metaphor that elides the military, Nehring, 'What was the Cold War?', pp. 924-925. [↑](#footnote-ref-584)
585. TNA: HO 205/296, Panel A. Industrial Expansion of the Trafford Park Industrial Site, Stretford, Manchester, August 1946, p. 1. [↑](#footnote-ref-585)
586. TNA: HO 205/296, Letter from Air Vice-Marshall Williams to Brigadier General C. C. Lucas, Home Office (Civil Defence), 16 September 1946, p. 2. [↑](#footnote-ref-586)
587. TNA: CAB 134/316, Memorandum by the Home Office, Shelter Policy, 16 October 1946, p. 1. [↑](#footnote-ref-587)
588. TNA: HO 205/296, Letter from Scottish Home Department to O.C. Allen, 1 December 1947. [↑](#footnote-ref-588)
589. Paul Lashmar and Andrew Mullins, ‘Churchill Protected Scottish Peer Suspected of Spying for Japan’, *The Independent*, 24 August 1998. URL: http://www.independent.co.uk/news/churchill-protected-scottish-peer-suspected-of-spying-for-japan-1173730.html [accessed 26/10/2012].Despite his continuing work for Japan Lord Sempill retained his place in the Lords and his spying was not revealed until his files were released to the National Archives in 2002, see TNA: KV 2/871. [↑](#footnote-ref-589)
590. TNA: HO 205/296, Letter from A. J. Aglen at Scottish Home Department to J. A. Drew in Cabinet Office, 25 April 1946, p. 1. [↑](#footnote-ref-590)
591. Gregg, *The shelter of the Tubes: Tube Sheltering in Wartime London*, p. 76 [↑](#footnote-ref-591)
592. TNA: HO 205/296, Letter from A. J. Aglen at Scottish Home Department to J. A. Drew in Cabinet Office, 25 April 1946, p. 1. [↑](#footnote-ref-592)
593. *Architectural* Review 97 (April 1945), pp. 95-156. [↑](#footnote-ref-593)
594. For rural depopulation see Valerie Wright, 'The Prevention of Rural Depopulation: Housing and the Scottish Women's Rural Institutes, c. 1917-39', *Twentieth Century British History* 23 (2012), pp. 336-358. More generally see Teitelbaum and Winter, *The Fear of Population Decline*. [↑](#footnote-ref-594)
595. George Scott-Moncrieff, ‘Highland Heritage’, *Architectural Review* 97 (April 1945), p. 122. See for example Ben Anderson, 'A Liberal Countryside? The Manchester Ramblers' Federation and the 'Social Readjustment' of Urban Citizens, 1929-1936', *Urban History* 38 (2011), pp. 84-102, and David Pomfret, 'The City of Evil and the Great Outdoors: The Modern Health Movement and the Urban Young, 1918-1940', *Urban History* 28 (2001), pp. 405-427. [↑](#footnote-ref-595)
596. Rose, *Which People's War?: National Identity and Citizenship in Britain 1939-1945*, p. 216. [↑](#footnote-ref-596)
597. For an overview of camouflage in the First World War see Hanna Rose Shell, *Hide and Seek: Camouflage, Photography, and the Media of Reconnaissance* (New York, 2012), ch. 2. [↑](#footnote-ref-597)
598. *Ibid*., p. 164. [↑](#footnote-ref-598)
599. For a comparative overview of these nations approaches to camouflage see Cohen, *Architecture in Uniform: Designing and Building for the Second World War*, pp. 187-215. [↑](#footnote-ref-599)
600. Cohen, *Architecture in Uniform*, p. 190. Artists did, however, continue to have a significant role, see Henrietta Goodden, *Camouflage and art: Design for Deception in World War 2* (London, 2007), which focuses on the connections became camouflage and the Royal College of Art. [↑](#footnote-ref-600)
601. Hugh B. Cott, ‘Camouflage in War’, *Journal of the RIBA* 47 (15 July 1940), p. 218 [↑](#footnote-ref-601)
602. Michael T. Saler, *The Avant-Garde in Interwar England: Medieval Modernism and the London Underground* (2nd edn, New York; Oxford, 2001), p. 12. [↑](#footnote-ref-602)
603. Hugh Casson, ‘The Aesthetics of Camouflage’, *Architectural Review* 96 (September 1944), p. 66. [↑](#footnote-ref-603)
604. This was particularly the case for modernists, but more generally the self-image of architects as technicians as well as artists was demonstrated by the Architects Registration Acts of 1931 and 1938, which meant that anyone using the title ‘architect’ needed certain qualifications, Jeremy Melvin, *FRS Yorke and the Evolution of English Modernism* (Chichester ; Hoboken, NJ, 2003), pp. 13-14. For the ‘two cultures’ debate see Guy Ortolano, *The Two Cultures Controversy: Science, Literature and Cultural Politics in Postwar Britain* (3rd edn, Cambridge, 2011). [↑](#footnote-ref-604)
605. Cohen, *Architecture in Uniform*, p. 202. [↑](#footnote-ref-605)
606. Numbered series available in HO 217/2. [↑](#footnote-ref-606)
607. TNA: HO 217/2, Memorandum on the Siting Layout and Design of New Buildings in Relation to their Concealment from Aerial Observation. [↑](#footnote-ref-607)
608. Casson, ‘The Aesthetics of Camouflage’, p. 64. [↑](#footnote-ref-608)
609. P. Sargant Florence, ‘The Technique of Industrial Location’, *Architectural Review* 93 (March 1943), p. 64. [↑](#footnote-ref-609)
610. Lord Forrester, ‘Industry and its Environment’, p. 110. [↑](#footnote-ref-610)
611. Peter Hall, 'Geography: Descriptive, Scientific, Subjective and Radical Images of the City', in Lloyd Rodwin and Robert M. Hollister eds, *Cities of the Mind: Images and Themes of the City in the Social Sciences* (New York; London, 1984), pp. 25-26. [↑](#footnote-ref-611)
612. Geoffrey A. Jellicoe, ‘Power Stations in the Landscape’, *Architectural Review* 97 (April 1945), p. 114. [↑](#footnote-ref-612)
613. John Piper remarked in 1943 that: ‘Wartime camouflage, the painting of buildings for self-concealment, has produced some effective results which might well be retained after the war for their beauty’, ‘Colour and Display’, *Architectural Review* 94 (December 1943), pp. 169-171. [↑](#footnote-ref-613)
614. D.A. Low and J.M. Lonsdale, 'Introduction: Towards the New Order 1945-63', in D.A. Low and Alison Smith eds, *History of East Africa, volume III* (Oxford, 1976), pp. 12-16. [↑](#footnote-ref-614)
615. Lewis Mumford, *Programme for Survival* (London, 1946), pp. 50-51. [↑](#footnote-ref-615)
616. *Ibid*., pp. 6-7. [↑](#footnote-ref-616)
617. Lewis Mumford, *The Culture of Cities* (7th edn, London, 1953), p. 292. [↑](#footnote-ref-617)
618. *Ibid*., pp. 283-299. Mumford presents a reformulation of Patrick Geddes’ argument in Patrick Geddes, *Cities in Evolution: An Introduction to the Town Planning Movement and to the Study of Civics* (London, first published 1915, this issue 1997). [↑](#footnote-ref-618)
619. Paul Fussell has argued that the British image of the pastoral was profoundly troubled by the First World War, see Fussell, *The Great War and Modern Memory*, ch. 7. [↑](#footnote-ref-619)
620. The ‘open space’ was often gained through the displacement of indigenous populations, Joseph Morgan Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Athens, Ohio, 2007), pp. 27-28. For France, see also Benjamin Claude Brower, *A Desert Named Peace: The Violence of France's Empire in the Algerian Sahara, 1844-1902* (New York; Chichester, 2009). [↑](#footnote-ref-620)
621. Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, p. 8. For a recent historiographical overview of empire and science see Joseph Morgan Hodge, 'Science and Empire: An Overview of the Historical Scholarship', in Brett M. Bennett and Joseph Morgan Hodge eds, *Science and Empire: Knowledge and Networks of Science Across the British Empire, 1800-1970* (Basingstoke, 2011), pp. 3-29. See also David C. Engerman and Corinna R. Unger, 'Introduction: Towards a Global History of Modernization', *Diplomatic History* 33 (2009), p. 375-85. [↑](#footnote-ref-621)
622. Low and Lonsdale, 'Introduction: Towards the New Order 1945-63', pp. 1-63; Michael P. Cowen and Robert W. Shenton, 'The Origin and Course of Fabian Colonialism in Africa', *Journal of Historical Sociology* 4 (1991), pp. 143-174. [↑](#footnote-ref-622)
623. Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, p. 13. [↑](#footnote-ref-623)
624. Gabrielle Hecht recent analysis of history of uranium production has shown how colonialism was central to the nuclear age, see Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, Mass., 2012). [↑](#footnote-ref-624)
625. See Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950* (Chicago, Ill., 2011), Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, pp. 90-116. [↑](#footnote-ref-625)
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627. Satia, 'The Defense of Inhumanity: Air Control and the British Idea of Arabia', pp. 16-51. [↑](#footnote-ref-627)
628. Ortolano, *The Two Cultures Controversy*, p. 194. [↑](#footnote-ref-628)
629. TNA: CAB 134/316, Home Defence Committee, Civil Defence Policy Report, 7 October 1947, p. 2. [↑](#footnote-ref-629)
630. TNA: CAB 134/316, Home Defence Committee, Civil Defence, 7 October, 1947, pp. 1-6. [↑](#footnote-ref-630)
631. TNA: CAB 134/316, Home Defence Committee, Civil Defence, 7 October, 1947, p. 5. [↑](#footnote-ref-631)
632. For the area bombing debate see Paul Crook, 'Science and War: Radical Scientists and the Tizard area Bombing Debate in Britain', *War and Society* 12 (1994), pp. 69-101. In contrast to the images put forward by C.P. Snow in 1960 about Cherwell and Tizard, Solly Zuckerman wrote in his memoirs that Tizard was not ideologically opposed to area bombing on humanitarian grounds. Zuckerman recalled that Tizard and his colleague Patrick Blackett simply doubted the ability of Bomber Command to achieve the results Cherwell imagined, Solly Zuckerman, *From Apes to Warlords: The Autobiography (1904-1946)* (London, 1978), pp. 145-146. [↑](#footnote-ref-632)
633. Ronald W. Clark, *Tizard* (Gillingham, 1965), p. 396. [↑](#footnote-ref-633)
634. *Ibid*., pp. 278-385. [↑](#footnote-ref-634)
635. TNA: CAB 131/7, Draft Statement of Defence 1949, p. 13. [↑](#footnote-ref-635)
636. Edgerton, *Britain's War Machine*, p. 177. [↑](#footnote-ref-636)
637. Clark, *Tizard*, p. 378. [↑](#footnote-ref-637)
638. Imperial War Museum Archives, London [hereafter IWML]: HTT 579, Henry Tizard, ‘Some thoughts on the Problem of British Security’, 1945, pp. 3-4. [↑](#footnote-ref-638)
639. TNA: CAB 134/316, Home Defence Committee, Civil Defence, 7 October 1947, pp. 4-5. [↑](#footnote-ref-639)
640. TNA: CO 537/2667, note from Tizard to Rees-Williams, 2 February 1948. [↑](#footnote-ref-640)
641. TNA: CO 537/2667, minute from Tizard to Minister of Defence, 25 November 1947, p. 1. [↑](#footnote-ref-641)
642. Ortolano, *The Two Cultures Controversy*, p. 162. [↑](#footnote-ref-642)
643. TNA: CO 537/2667, minute from Tizard to Minister of Defence, 25 November 1947, p. 1. [↑](#footnote-ref-643)
644. TNA: CO 537/2667, minute from Tizard to Minister of Defence, 25 November 1947, p. 2. [↑](#footnote-ref-644)
645. See the special issue of *Contemporary European History*, ‘Transnational Co-Operation in Food, Agriculture, Environment and Health in Historical Perspective, *Contemporary European History* 20, 3 (August, 2011), pp. 247-380. [↑](#footnote-ref-645)
646. Cornelia Knab and Amalia Ribi Forclaz, 'Transnational Co-Operation in Food, Agriculture, Environment and Health in Historical Perspective: Introduction', *Contemporary European History* 20 (2011), p. 254. [↑](#footnote-ref-646)
647. The intensity of the battle for food during the Second World War, generally overlooked, has been discussed in Lizzie Collingham, *The Taste of War: World War Two and the Battle for Food* (London, 2012) [↑](#footnote-ref-647)
648. Anna-Katharina Wöbse, ''The world after all was one': The International Environmental Network of UNESCO and IUPN, 1945-1950', *Contemporary European History* 20 (2011), p. 338, [↑](#footnote-ref-648)
649. Ibid., p. 341. See for example William Vogt, *Road To Survival* (London, 1949), Henry Fairfield Osborn, *Our Plundered Planet* (London, 1948). [↑](#footnote-ref-649)
650. Fred Charles Iklé, *The Social Impact of Bomb Destruction* (Norman, Ok., 1958), p. 151. [↑](#footnote-ref-650)
651. TNA: CO 537/2667, minute from A. Creech Jones to the Prime Minister, 17 December 1947, p. 1. [↑](#footnote-ref-651)
652. TNA: CO 537/2667, minute from Andrew Cohen, 2 December 1947. [↑](#footnote-ref-652)
653. TNA: CO 537/2667, minute from A. Cohen to Seel, Lloyd, and Rees-Williams, 13 February 1948, p. 2. [↑](#footnote-ref-653)
654. TNA: CO 537/2667, note from Tizard to Rees-Williams, 2 February 1948. See also more general correspondence in this file. [↑](#footnote-ref-654)
655. TNA: FO 371/69017, minute from the Prime Minster, Dispersal of Population and Industry Throughout the Commonwealth’, 23 February (1948), pp. 1-2. [↑](#footnote-ref-655)
656. IWML: HTT 592, Henry Tizard, ‘British Association for the Advancement of Science – Presidential address’, September 8, 1948 (subsequently published in October), p. 2. [↑](#footnote-ref-656)
657. *Ibid*., p. 10. [↑](#footnote-ref-657)
658. Clark, *Tizard*, p. 371; IWML: HTT 592, Henry Tizard, ‘British Association for the Advancement of Science – Presidential address’, p. 7. [↑](#footnote-ref-658)
659. Bernal and Zuckerman joined the staff at the Combined Operation’s Headquarters, under Lord Mountbatten, as Scientific Liaison Officers in 1942, before Bernal went to Canada and Zuckerman to North Africa, Zuckerman, *From Apes to Warlords: The Autobiography (1904-1946)*, pp. 151-165; Andrew Brown, *J.D. Bernal: The Sage of Science* (Oxford, 2005), p. 193 [↑](#footnote-ref-659)
660. Edgerton, *Warfare State: Britain, 1920-1970*, p. 115. [↑](#footnote-ref-660)
661. J.D. Bernal, ‘Architecture and Science’, *Journal of the* *RIBA* 44 (26 June 1937), p. 806, J.D. Bernal, ‘The Organisation of Building Science Research’, *Journal of the* *RIBA* 53 (April 1946), pp. 236-239. [↑](#footnote-ref-661)
662. Royal Commission on Population, *Royal Commission on Population. Report. 1949* (London, 1949), p. 1. [↑](#footnote-ref-662)
663. *Ibid*., pp. 122, 123, 127. [↑](#footnote-ref-663)
664. Under Secretary of State for Commonwealth Relations in the House of Commons, 18 June 1948, quoted in *ibid*., p. 127. [↑](#footnote-ref-664)
665. *Ibid*., p. 134. [↑](#footnote-ref-665)
666. TNA: CAB 131/8, Cabinet Defence Committee, Minutes of Meeting, 24 July 1950, p. 6. [↑](#footnote-ref-666)
667. Population, *Royal Commission on Population. Report. 1949*, pp. 123-124. [↑](#footnote-ref-667)
668. *Ibid*., p. 126. [↑](#footnote-ref-668)
669. TNA: CO 537/2667, telegram from High Commissioner in Australia, 16 January 1948. [↑](#footnote-ref-669)
670. Fussell, *The Great War and Modern Memory*, p. 231. [↑](#footnote-ref-670)
671. For an overview of the intellectual history of agriculture and development in colonialism before the twentieth century see Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, pp. 24-53. [↑](#footnote-ref-671)
672. Richard H. Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (New Haven; London, 2000), p. 232. [↑](#footnote-ref-672)
673. *Ibid*., pp. 22-23. [↑](#footnote-ref-673)
674. Nicole Sackley, 'The Village as Cold War Site: Experts, Development, and the History of Rural Reconstruction', *Journal of Global History* 6 (2011), p. 485. [↑](#footnote-ref-674)
675. Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World*, pp. 221-224. [↑](#footnote-ref-675)
676. Joseph Chamberlain quoted in *ibid*., p. 256. [↑](#footnote-ref-676)
677. See Elizabeth Darling, '“Into the World of Conscious Expression”: Modernist Revolutionaries at the Architectural Association, 1933-1939', in Iain Boyd Whyte ed., *Man-Made Future: Planning, Edcuation and Design in Mid-Twentieth Century Britain* (London, 2007), pp. 157-173; Mary O. Ashton, '“Tomorrow Town”: Patrick Geddes, Walter Gropius and Le Corbusier', in Volker Welter and James Lawson eds, *The City After Patrick Geddes* (Oxford, 2000), pp. 191-209. [↑](#footnote-ref-677)
678. Kenneth Watts, *Outwards from Home: A Planner's Odyssey* (Lewes, 1997), pp. 55-57. [↑](#footnote-ref-678)
679. RIBAA: TyJ/4/3, Evidence before Scott Committee; TyJ/4/4, Evidence to Reith Committee, TyJ/5/5, Maps and background work for the Barlow Report, the Scott Report and the Beveridge Report produced by APRR. [↑](#footnote-ref-679)
680. See *Architectural Review* 101, (April 1947), pp. 117-156; and *Architectural Review* 97 (April 1945), pp. 95-128. Former student Kenneth Watts recalls in his memoirs that Rowse founded the APRR in 1936 after discussions with Alexander Carr-Saunders, but Ellen Shoshkes argues that Tyrwhitt founded the APRR in 1940, Watts, *Outwards from Home: A Planner's Odyssey*, p. 56; Ellen Shoshkes, 'Jaqueline Tyrwhitt: a founding mother of modern urban design', *Planning Perspectives* 21 (2006), p. 183. [↑](#footnote-ref-680)
681. Shoshkes, 'Jaqueline Tyrwhitt: a founding mother of modern urban design', p. 179. She has addressed this with her recent biographical monograph, Shoshkes, *Jaqueline Tyrwhitt: A Transnational Life in Urban Planning and Design*. [↑](#footnote-ref-681)
682. Michiel Dehaene, 'Surveying and Comprehensive Planning: The “Co-Ordination of Knowledge” in the Wartime Plans of Patrick Abercrombie and Max Lock', in Iain Boyd Whyte ed. *Man-Made Future: Planning, Education, and Design in Mid-Twentieth Century Britain* (London, 2007), pp. 39-40. Geddes’ most influential work was his frequently reprinted 1915 book, Geddes, *Cities in Evolution: An Introduction to the Town Planning Movement and to the Study of Civics*. For his influence see Rubin, 'The Changing Appreciation of Patrick Geddes: A Case Study in Planning History', pp. 349-366; and Volker Welter and James Lawson, *The City After Patrick Geddes* (Oxford, 2000). [↑](#footnote-ref-682)
683. Ashton, '“Tomorrow Town”: Patrick Geddes, Walter Gropius and Le Corbusier', p. 191. [↑](#footnote-ref-683)
684. Shoshkes, 'Jaqueline Tyrwhitt: A Founding Mother of Modern Urban Design', pp. 180-181 [↑](#footnote-ref-684)
685. Letters of appointment for various positions in RIBAA: Tyrj/1/3; TyJ1/4/13, TyJ/1/4/14; TyJ/1/5; notes and manuscripts for botanical lectures in TyJ/1/2 and TyJ/1/3. [↑](#footnote-ref-685)
686. Shoshkes, 'Jaqueline Tyrwhitt: A Founding Mother of Modern Urban Design', pp. 180, 184-5. [↑](#footnote-ref-686)
687. *Ibid*., p. 183; Helen E. Meller, *Patrick Geddes: Social Evolutionist and City Planner* (London, 1990), p. 333. [↑](#footnote-ref-687)
688. Watts, *Outwards from Home: A Planner's Odyssey*, p. 54. [↑](#footnote-ref-688)
689. RIBAA: TyJ/4/4, APRR evidence to Lord Reith’s Committee on New Towns, February 1946, p. 8. [↑](#footnote-ref-689)
690. RIBAA: TyJ/4/4, APRR evidence to Lord Reith’s Committee on New Towns, February 1946, p. 9. [↑](#footnote-ref-690)
691. This is also reflected in the smaller area case studies they conducted, see RIBAA: TyJ/6/6, APRR Outline Regional Plan for the Lea Valley (1950), TyJ/3/6, Survey of St. Albans. [↑](#footnote-ref-691)
692. See for example Guy Chapman, *Culture and Survival* (London, 1940); Mark Abrams, *The Population of Great Britain: Current Trends and Future Problems* (London, 1945). [↑](#footnote-ref-692)
693. RIBAA: Tyj/4/3, Evidence before the Scott Committee concerning rural reconstruction (c. 1942). See also RIBAA: TyJ/4/3, Memorandum on the ‘Rural Settlement’, February 12 1942. [↑](#footnote-ref-693)
694. This was a focus of a conference jointly organised by the APRR, RIBA and the Institute of Sociology in 1946, ‘Recreating Rural Society. Enfeebled Community Life of the Village’, *Manchester Guardian*, January 14, 1946, p. 3. [↑](#footnote-ref-694)
695. See especially RIBAA: TyJ/5/6, APRR Broadsheet No. 14, Health and Education. Planning for Health Part One, this ed. July 1945; and RIBAA: TyJ/5/6, APRR Broadsheet No. 19, Planning for Health, March 1945. [↑](#footnote-ref-695)
696. The same approach informed their proposal to turn the entire British countryside into a National Park with networks of footpaths, hostels and campsites, ‘One Big National Park?’, *Manchester Guardian*, July 6 1943, p. 4. [↑](#footnote-ref-696)
697. Georg Simmel, 'The Metropolis and Mental Life', in Donald Levine ed. *On Individuality and Social Forms: Selected Writings of Georg Simmel* (Chicago; London, 1971), p. 327. [↑](#footnote-ref-697)
698. *Ibid*., p. 331. [↑](#footnote-ref-698)
699. RIBAA: TyJ/5/6, APRR Broadsheet No. 19, Planning for Health, March 1945, p. 1. [↑](#footnote-ref-699)
700. RIBAA: TyJ/5/7, APRR Report No. 20 (preliminary), Health and the Future, November 1942, p. 2. [↑](#footnote-ref-700)
701. Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, p. 17. [↑](#footnote-ref-701)
702. Rowse is discussed in a number of essays in Iain Boyd Whyte, ed., *Man-Made Future: Planning, Education and Design in Mid-Twentieth-Century Britain* (London, 2007) [↑](#footnote-ref-702)
703. Quoted in Watts, *Outwards from Home: A Planner's Odyssey*, p. 55. [↑](#footnote-ref-703)
704. *Ibid*., pp. 55-56. A. M. Carr-Saunders, *The Population Problem: A Study in Human Evolution*; A. M. Carr-Saunders, *World Population: Past growth and Present trends* (Oxford, 1936). See also Henry Phelps Brown, ‘Saunders, Sir Alexander Morris Carr- (1886–1966)’, rev. *Oxford Dictionary of National Biography*, Oxford University Press, 2004; online edition, January 2008. URL: http://www.oxforddnb.com/view/article/32308 [accessed 1 Dec 2012]. [↑](#footnote-ref-704)
705. Karl Mannheim, *Man and Society in an Age of Reconstruction: Studies in Modern Social Structure* (London, 1997). [↑](#footnote-ref-705)
706. Watts, *Outwards from Home: A Planner's Odyssey*, pp. 57-58. [↑](#footnote-ref-706)
707. RIBAA: TyJ/5/7, E.A.A. Rowse, APRR, ‘Proportion of Population to Potential: A Programme for the Reconstruction of the British Commonwealth of Nations’, July 1943. [↑](#footnote-ref-707)
708. *Ibid*., pp. 9, 22. Oswald Spengler was also cited by Mumford in *Programme for Survival* as an example of the worst-case scenario, see Spengler, *The Decline of the West*. [↑](#footnote-ref-708)
709. RIBAA: TyJ/5/7, E.A.A. Rowse, APRR, ‘Proportion of Population to Potential’, pp. 13, 10. [↑](#footnote-ref-709)
710. *Ibid*., pp. 10, 13. [↑](#footnote-ref-710)
711. Jaqueline Tyrwhitt quoted in Shoshkes, *Jaqueline Tyrwhitt: A Transnational Life in Urban Planning and Design*, p. 74. [↑](#footnote-ref-711)
712. *Ibid*., pp. 19-20. [↑](#footnote-ref-712)
713. Clive B. Fenton, 'PLAN. A Student Journal of Ambition and Anxiety', in Iain Boyd Whyte ed. *Man-Made Future: Planning, Education and Design in Mid-Twentieth Century Britain* (London, 2007), p. 183. [↑](#footnote-ref-713)
714. TNA: CO 537/2667, telegram from High Commissioner in Australia, 16 January 1948. [↑](#footnote-ref-714)
715. It was in 1948 that the term ‘Cold War’ began to appear in government minutes, becoming the accepted phrase in 1949, Ritchie Ovendale, *The English-Speaking Alliance. Britain, the United States, the Dominions and the Cold War, 1945-51* (London, 1985), p. 273. [↑](#footnote-ref-715)
716. Paul Lashmar and James Oliver, *Britain's Secret Propaganda War* (Stroud, 1998), pp. 24, 26. [↑](#footnote-ref-716)
717. TNA: CAB 131/11, meeting of Commonwealth Defence Ministers, 6 Mar., 1951. [↑](#footnote-ref-717)
718. Ovendale, *The English-Speaking Alliance. Britain, the United States, the Dominions and the Cold War, 1945-51*, p. 276. [↑](#footnote-ref-718)
719. Susan L. Carruthers, *Winning Hearts and Minds: British Governments, the Media and Colonial Counter-Insurgency 1944-1960* (London, 1995). [↑](#footnote-ref-719)
720. For the background to this phrase see Richard Stubbs, *Hearts and Minds in Guerrilla Warfare: The Malayan Emergency, 1948-1960* (2nd edn, Singapore, 2004), pp. 1-9. For more on the use of propaganda as part of a counter-insurgency strategy in Malaya seeCarruthers, *Winning Hearts and Minds*, ch. 2. [↑](#footnote-ref-720)
721. Carruthers, *Winning Hearts and Minds*, p. 116. [↑](#footnote-ref-721)
722. Sackley, 'The Village as Cold War Site: Experts, Development, and the History of Rural Reconstruction', pp. 497-498. [↑](#footnote-ref-722)
723. Mark Crinson, *Modern Architecture and the End of Empire* (Aldershot, 2003), p. 16. [↑](#footnote-ref-723)
724. *Ibid*., p. 43. [↑](#footnote-ref-724)
725. For an overview of the work of their practice in Ghana see Stephen Hitchins, ed., *Fry Drew Knight Creamer: Architecture* (London, 1978), pp. 99-130. See also Rhodri Windsor Liscombe, 'Modernism in Late Imperial British West Africa. The Work of Maxwell Fry and Jane Drew, 1945-56', *Journal of the Society of Architectural Historians* 65 (2006), pp. 188-215. [↑](#footnote-ref-725)
726. Fry’s admiration for her was reflected by the dedication of his 1969 book *Art in a Machine Age* ‘in gratitude and affection’, to Tyrwhitt, see Maxwell Fry, *Art in a Machine Age: A Critique of Contemporary Life Through the Medium of Architecture* (London, 1969). [↑](#footnote-ref-726)
727. This list includes William Holford in Australia, Brazil and Africa; Patrick Abercrombie in Hong Kong and Eithiopia and Wells Coates in Canada, while Lutyens’s New Delhi had established a precedent. [↑](#footnote-ref-727)
728. Crinson, *Modern Architecture and the End of Empire*, p. 132. See also the three books they wrote which became standard texts: Maxwell Fry and Jane Drew, *Tropical Architecture in the Dry and Humid Zones* (London, 1964); Maxwell Fry and Jane Drew, *Tropical Architecture in the Humid zone* (London, 1956); Jane Drew, Maxwell Fry, and Harry L. Ford, *Village Housing in the Tropics* (London, 1947). [↑](#footnote-ref-728)
729. Liscombe, 'Modernism in Late Imperial British West Africa. The Work of Maxwell Fry and Jane Drew, 1945-56', p. 194; this is also Crinson’s argument, see Crinson, *Modern Architecture and the End of Empire*, pp. 136-137. For a broader African perspective on this see Ambe J. Njoh, 'Urban Planning as a Tool of Power and Social Control in Colonial Africa', *Planning Perspectives* 24 (2009), pp. 301-317, and for an in-depth case study of one colonial city see William Cunningham Bissell, *Urban Design, Chaos, and Colonial power in Zanzibar* (Bloomington, Ind., 2011). [↑](#footnote-ref-729)
730. Liscombe, 'Modernism in Late Imperial British West Africa. The Work of Maxwell Fry and Jane Drew, 1945-56', p. 192. For the Tema village plan see Hitchins, ed., *Fry Drew Knight Creamer: Architecture*, p. 120. The planning of the Tema New Town was later criticised by the UN Building Research Unit as ‘inadequately researched in terms of its specifically African context and too heavily based on lessons from the English new towns’, Crinson, *Modern Architecture and the End of Empire*, p. 131. [↑](#footnote-ref-730)
731. See for example Julian Huxley, *TVA. Adventure in Planning* (Cheam, 1943), Huxley also produced a special issue of the *Architectural Review* on the TVA in 1943, *Architectural Review* 93 (June 1943), pp. 138-166. The scheme was highlighted in the introduction to the APRR electricity special issue, *Architectural Review* 97 (April 1945), pp. 95-128; Arthur Geddes, ‘Regional Planning and Geography in the United States’, *Town Planning Review* 18 (July 1938), pp. 41-47; Charles McCarthy, ‘TVA and the Tennessee Valley’, *Town Planning Review* 21 (July 1950), pp. 116-130. [↑](#footnote-ref-731)
732. H. A. N. Brockmam, 'Introduction', in Stephen Hitchins ed. *Fry Drew Knight Creamer: Architecture* (London, 1978), p. 7. [↑](#footnote-ref-732)
733. Wöbse, ''The world after all was one': The International Environmental Network of UNESCO and IUPN, 1945-1950', p. 339. For many of those who had been involved in PEP and APRR in Britain, UNESCO represented moment of genuine post-war optimism about a scientific humanism, Shoshkes, *Jaqueline Tyrwhitt: A Transnational Life in Urban Planning and Design*, p. 97. [↑](#footnote-ref-733)
734. Arthur Geddes, ‘Regional Planning and Geography in the United States’, p. 47. In Patrick Geddes view of history a geotechnic era would follow the palaeotechnic and neotechnic, see Geddes, *Cities in Evolution*. [↑](#footnote-ref-734)
735. Lewis Mumford, 'Introduction', in Jaqueline Tyrwhitt ed. *Patrick Geddes in India* (London, 1947), p. 7. [↑](#footnote-ref-735)
736. Nicole Sackley has recently made this point in the context of U.S. development projects in India in the early Cold War, Nicole Sackley, 'Village Models: Etawah, India, and the Making and Remaking of Development in the Early Cold War', *Diplomatic History* 37 (2013), pp. 749-778. [↑](#footnote-ref-736)
737. Liscombe, 'Modernism in Late Imperial British West Africa. The Work of Maxwell Fry and Jane Drew, 1945-56', p. 193. [↑](#footnote-ref-737)
738. Lionel Wigmore, *Struggle for the Snowy. The Background of the Snowy Mountains Scheme* (London, 1968), p. 22. [↑](#footnote-ref-738)
739. Wayne Reynolds, 'Rethinking the Joint Project: Australia's Bid for Nuclear Weapons, 1945-1960', *The Historical Journal* 41 (1998), p. 859. [↑](#footnote-ref-739)
740. Wayne Reynolds, 'Atomic War, Empire Strategic Dispersal and the Origins of the Snowy Mountain Scheme', *War and Society* 14 (1996), pp. 134, 138. [↑](#footnote-ref-740)
741. J.B. Chifley, ‘Foreword’, in *Architectural Review* 104 (July 1948), p. 1; Bryan Westwood, ‘An English Architect Visits Australia’, *Architectural Review* 104 (July 1948), p. 40. [↑](#footnote-ref-741)
742. Nelson Lemmon, Snowy Mountains Hydroelectric Power Bill 1949, Second Reading, 26 May 1949.

     URL:http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22hansard80%2Fhansardr80%2F1949-05-26%2F0081%22 [accessed 01/12/2012]; Wigmore, *Struggle for the Snowy. The Background of the Snowy Mountains Scheme*, p. 158. [↑](#footnote-ref-742)
743. Nelson Lemmon, Snowy Mountains Hydroelectric Power Bill 1949, Second Reading, 26 May 1949: http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22hansard80%2Fhansardr80%2F1949-05-26%2F0081%22 [accessed 01/12/2012]. [↑](#footnote-ref-743)
744. Reynolds, 'Atomic War, Empire Strategic Dispersal and the Origins of the Snowy Mountain Scheme', pp. 121-144. See also Wayne Reynolds, *Australia's bid for the Atomic Bomb* (Carlton South, 2000). [↑](#footnote-ref-744)
745. Wigmore, *Struggle for the Snowy. The Background of the Snowy Mountains Scheme*, p. 101. [↑](#footnote-ref-745)
746. Nelson Lemmon, Snowy Mountains Hydroelectric Power Bill 1949, Second Reading, 26 May 1949. URL:http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22hansard80%2Fhansardr80%2F1949-05-26%2F0081%22 [accessed 01/12/2012]. [↑](#footnote-ref-746)
747. *Ibid.* [↑](#footnote-ref-747)
748. *Ibid.* [↑](#footnote-ref-748)
749. Robert Coggins, *The Snowy Mountains Scheme* Vol. 1 Longmans Australian Geographies (Adelaide, 1956), p. 33. [↑](#footnote-ref-749)
750. Clark, *Tizard*, p. 395. [↑](#footnote-ref-750)
751. Reynolds, 'Rethinking the Joint Project: Australia's Bid for Nuclear Weapons, 1945-1960', p. 856; Clark, *Tizard*, pp. 394-395; Lorna Arnold, *A Very Special Relationship: British Atomic Weapon Trials in Australia* (London, 1987), pp. 23-24. [↑](#footnote-ref-751)
752. Tizard visited Woomera on 3 Dec. 1948, the itinerary of his November 1948-January 1949 trip is held in IWML: HTT 477. [↑](#footnote-ref-752)
753. Reynolds, 'Rethinking the Joint Project: Australia's Bid for Nuclear Weapons, 1945-1960', pp. 860-864. [↑](#footnote-ref-753)
754. IWML: HTT 477, Lecture to Members of Australian Institute of Mining and Metallurgy, 22 November 1948; Notes of discussion at Wentworth House with officers of Division of Industrial Development, 22-23 November 1948. [↑](#footnote-ref-754)
755. IWML: HTT 477, Tizard, Australian Notes; HTT 477, Tizard quoted in notes of discussion at Wentworth House, 23 November 1948, pp. 8-9. [↑](#footnote-ref-755)
756. IWML: HTT 477, Tizard, Australian Notes, pp. 2-3. [↑](#footnote-ref-756)
757. Clark, *Tizard*, p. 368. [↑](#footnote-ref-757)
758. Wigmore, *Struggle for the Snowy. The Background of the Snowy Mountains Scheme*, pp. 165-166. [↑](#footnote-ref-758)
759. Stanley Amour, Defence Preparations Bill 1951, Second Reading, 14 July, 1951.

     http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22hansard80%2Fhansards80%2F1951-07-14%2F0067%22 [accessed 06/12/2012]. [↑](#footnote-ref-759)
760. Coggins, *The Snowy Mountains Scheme*, p. 34. [↑](#footnote-ref-760)
761. For an account of the test see Arnold, *A Very Special Relationship: British Atomic Weapon Trials in Australia*, pp. 33-53. [↑](#footnote-ref-761)
762. Reynolds, 'Rethinking the Joint Project: Australia's Bid for Nuclear Weapons, 1945-1960', pp. 864-865. [↑](#footnote-ref-762)
763. Mumford, *Programme for Survival*, p. 51. [↑](#footnote-ref-763)
764. Vladimir Nabokov, *Transparent Things* (2nd edn, London, 2011), p. 1. [↑](#footnote-ref-764)
765. Macaulay, *Pleasure of Ruins*, pp. 453-455. [↑](#footnote-ref-765)
766. Mellor, *Reading the Ruins: Modernism, Bombsites and British culture*, p. 188. This is also something Kitty Hauser observes in her work on aerial photography Hauser, *Shadow Sites: Photography, Archaeology, and the British Landscape, 1927-1955*. [↑](#footnote-ref-766)
767. Macaulay, *Pleasure of Ruins*, p. 455. [↑](#footnote-ref-767)
768. Nabokov, *Transparent Things*, p. 2. [↑](#footnote-ref-768)
769. W. G. Sebald, 'Air War and Literature: Zürick Lectures', in *On the Natural History of Destruction* (London, 2003), p. 53. [↑](#footnote-ref-769)
770. Hell, 'The Angel's Enigmatic Eyes, or The Gothic Beauty of Catastrophic History in W.G. Sebald's "Air War and Literature"', pp. 361-392. [↑](#footnote-ref-770)
771. *Ibid*., p. 366; Hell offers the most sustained and considered analysis of Sebald’s essay. A recent history by Jörg Arnold has argued that air war, in contrast to the images of amnesia and silence Sebald presents, played a large role in public memory cultures in Germany, East and West, see Jörg Arnold, *The Allied Air War and Urban Memory: The Legacy of Strategic Bombing in Germany* (Cambridge, 2011), p. 15. For the question of literary polemic as a mode of historical writing see the forthcoming PhD thesis by Tom Dowling (University of Sheffield), ‘In Spite of History: New Leftism in Britain 1956 – 1979’. [↑](#footnote-ref-771)
772. Martin Heidegger, *Introduction to Metaphysics* trans. Gregory Fried and Richard Polt, (New Haven; London, 2000), p. 12. [↑](#footnote-ref-772)
773. Sebald, *Austerlitz*, p. 3. [↑](#footnote-ref-773)
774. Hell, 'The Angel's Enigmatic Eyes, or The Gothic Beauty of Catastrophic History in W.G. Sebald's "Air War and Literature"', pp. 361, 364. [↑](#footnote-ref-774)
775. Ruthven, *Nuclear Criticism*, p. 4. [↑](#footnote-ref-775)
776. C. Wright Mills, *The Causes of World War Three*, p. 1. [↑](#footnote-ref-776)
777. Richard Overy, 'Introduction', in Richard Overy, Claudia Baldoli, and Andrew Knapp eds, *Bombing, States and Peoples in Western Europe, 1940-1945* (London, 2011), p. 1. [↑](#footnote-ref-777)
778. Spaight, *Air Power and the Cities*, pp. 138-139. [↑](#footnote-ref-778)
779. For a discussion of destruction as inherent in modernism see Vladimir Paperny, 'Modernism and Destruction in Architecture', in Julia Hell and Andreas Schönle eds, *Ruins of Modernity* (Durham, N.C., 2010), pp. 41-57; Goldhagen, Legault, and Casciato, eds, *Anxious Modernisms: Experimentation in Postwar Architectural Culture*; and for a case study of reaction against modernism in Britain see Simon Gunn, 'The Rise and Fall of British Urban Modernism: Planning Bradford, circa 1945-70', *Journal of British Studies* 49 (2010), pp. 849-869. [↑](#footnote-ref-779)
780. Derrida, 'No Apocalypse, Not Now (Full Speed Ahead, Seven Missiles, Seven Missives)', pp.20-31. [↑](#footnote-ref-780)
781. Albert Einstein, *The New York* Times, May 25 1946, p. 5, quoted in John Canaday, 'Fetch-Lights and Grocery Lists: Metaphors and Nuclear Weapons', in Robert A. Jacobs ed. *Filling the Hole in the Nuclear Future: Art and Popular Culture Respond to the Bomb* (Lanham, MD, 2010), p. 26. [↑](#footnote-ref-781)
782. Donald MacKenzie makes a similar point in relation to the development of the concept of missile accuracy in the Cold War, Donald MacKenzie, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance* (2nd edn, Cambridge, Mass.; London, 1993), p. 3. [↑](#footnote-ref-782)
783. C. Wright Mills, *The Causes of World War Three*, p. 42. [↑](#footnote-ref-783)
784. E. P. Thompson, 'Outside the Whale', in *The Poverty of Theory and other essays* (London, 1978), p. 214. This withdrawal was repeated in American academic and literary circles. Adam Piette argues that it was marked by ‘the dominance of New Critical psychologism and libertarian individualism. The shift to the right, towards Freud, towards neurosis and personalism, and into apolitical small questions’, Piette, *The Literary Cold War, 1945 to Vietnam*, p. 61. [↑](#footnote-ref-784)
785. Thompson, 'Outside the Whale', p. 213. [↑](#footnote-ref-785)
786. Edgerton, *Warfare State: Britain, 1920-1970*, p. 226. [↑](#footnote-ref-786)
787. *Ibid*., pp. 225-226; Thompson, 'The Perculiarities of the English', in *The Poverty of Theory and Other Essays*, pp. 245-301.The two famous examples criticised by Thompson and Edgerton are Perry Anderson, 'Origins of the Present Crisis', *New Left Review* 23 (1964), pp. 26-53; and Tom Nairn, 'The English Working Class', *New Left Review* 24 (1964), pp. 43-57. For a recent analysis of the development of ‘declinism’ and its significance in British history see Ortolano, *The Two Cultures Controversy*, ch. 5. [↑](#footnote-ref-787)
788. D.A. Low and J.M. Lonsdale, 'Introduction: Towards the New Order 1945-63', in D.A. Low and Alison Smith eds, *History of East Africa, volume III* (Oxford, 1976), p. 12. [↑](#footnote-ref-788)
789. Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*, p. 19. [↑](#footnote-ref-789)
790. Derrida, 'No Apocalypse, Not Now (Full Speed Ahead, Seven Missiles, Seven Missives)', p. 23. [↑](#footnote-ref-790)
791. Ruthven, *Nuclear Criticism*, p. 43. [↑](#footnote-ref-791)
792. Thompson, *Zero Option*, p. 23. [↑](#footnote-ref-792)
793. Elaine Scarry, *Thinking in an Emergency* (New York; London, 2011), pp. 3-15. [↑](#footnote-ref-793)
794. *Ibid*., pp. 17-18. [↑](#footnote-ref-794)
795. *Ibid*., pp. 52-53. Scarry quotes *The 1971 Conception of Swiss Civil Defence* (Bern), pp. 24, 29, italics are Scarry’s. [↑](#footnote-ref-795)
796. In 1988, the Swiss populace devoted 901,000 days to rehearsing their nuclear war jobs, a decade later in 1998 600,000 days, *ibid*., pp. 54-55. [↑](#footnote-ref-796)
797. Scarry, *Thinking in an Emergency*, pp. 52, 57. [↑](#footnote-ref-797)
798. Dudziak, *War Time: An Idea, its History, its Consequences*, p. 4. [↑](#footnote-ref-798)
799. ‘Foreword by the editor’, *Architectural Review*, 90 (July 1941), p. 1. [↑](#footnote-ref-799)
800. Thompson, *Zero Option*, p. 30. [↑](#footnote-ref-800)
801. For a discussion Liddell Hart’s influence on military thought see Brian Bond, *Liddell Hart: A Study of his Military Thought* (London, 1977). [↑](#footnote-ref-801)
802. B.H. Liddell Hart, *The Memoirs of Captain Liddell Hart. Volume I* (London, 1965), pp. 139-140. [↑](#footnote-ref-802)
803. Liddell Hart, *Paris, or the Future of War*, p. 10. [↑](#footnote-ref-803)
804. B.H. Liddell Hart, *When Britain Goes to War* (London, 1935), p. 49. [↑](#footnote-ref-804)
805. Paul Fussell, 'Thank God for the Atom Bomb', in *Thank God for the Atom Bomb and Other Essays* (New York, 1988), p. 13. [↑](#footnote-ref-805)
806. *Ibid*., p. 19. [↑](#footnote-ref-806)
807. *Ibid*., p. 27. [↑](#footnote-ref-807)
808. *Ibid*., p. 35. [↑](#footnote-ref-808)
809. Research into civil defence in the USA and Britain has shown how defence was made personal rather than collective, and has interesting links to consumerism, see Oakes, *The Imaginary War: Civil Defense and American Cold War culture*, and Sarah Lichtman, 'Do-It-Yourself Security: Safety, Gender and the Home Fallout Shelter in Cold War America', *Journal of Design History* 19 (2006), pp. 39-55. For Britain see Grant, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68*. [↑](#footnote-ref-809)
810. Stephen Graham, *Cities Under Seige: The New Military Urbanism* (London, 2011). [↑](#footnote-ref-810)
811. Many of the key voices are collected in Graham, *Cities, War, and Terrorism: Towards an Urban Geopolitics*. [↑](#footnote-ref-811)
812. Stephen Graham, 'Cities as Strategic Sites: Place Annihilation and Urban Geopolitics', in Stephen Graham ed. *Cities, War, and Terrorism: Towards and Urban Geopolitics* (London, 2004), p. 38. [↑](#footnote-ref-812)
813. Galison, 'War Against the Center', p. 30. [↑](#footnote-ref-813)
814. Graham, *Cities Under Seige: The New Military Urbanism*, p. xxi. [↑](#footnote-ref-814)
815. Graham quotes Foucault to describe this as a boomerang effect, whereby ‘new military urbanism feeds on experiments with styles of targeting and technology in colonial war-zones, such as Gaza or Baghdad’, which are then transposed onto the cities of ‘capitalist heartlands of the North’, *ibid*., pp. xvi-xvii. [↑](#footnote-ref-815)
816. The idea of the networked city, densely packed with layer upon layer of material and cyber infrastructure has become a dominant concern in approaches to contemporary urbanism, see for example Maria Kaika and Erik Swyngedouw, 'Fetishizing the Modern City: The Phantasmagoria of Urban Technological Networks', *International Journal of Urban and Regional Research* 24 (2000), pp. 120-138; Graham and Marvin, *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*; Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford, 2005). [↑](#footnote-ref-816)
817. Matthew Gandy, 'Cyborg Urbanization: Complexity and Monstrosity in the Contemporary City', *International Journal of Urban and Regional Research* 29 (2005), p. 28. [↑](#footnote-ref-817)
818. *Ibid*., p. 36. [↑](#footnote-ref-818)
819. *Ibid*., p. 38. [↑](#footnote-ref-819)
820. Grayzel, *At Home and Under Fire: Air Raids and Culture in Britain from the Great War to the Blitz*, p. 320. [↑](#footnote-ref-820)
821. For biopolitics see Foucault, *Security, Territory, Population: Lectures at the College de France, 1977-78*, Foucault, *The Birth of Biopolitics: Lectures at the College de France, 1978-79*. [↑](#footnote-ref-821)
822. Paul Virilio, *City of Panic* trans. Julie Rose, (Oxford, 2007), p. 68. [↑](#footnote-ref-822)
823. Simmel, 'The Metropolis and Mental Life', p. 333. [↑](#footnote-ref-823)
824. *Ibid*., pp. 333-334. [↑](#footnote-ref-824)
825. George Orwell, ‘You and the Atom Bomb’, *Tribune* 19 October 1945. [↑](#footnote-ref-825)
826. Michel Foucault, quoted in Colin Gordon, 'Governmental Rationality: An Introduction', in Graham Burchell, Colin Gordon, and Peter Miller eds, *The Foucault Effect: Studies in Governmentality* (Chicago, 1991), p. 5. [↑](#footnote-ref-826)
827. Josephine Herbst, quoted in Piette, *The Literary Cold War, 1945 to Vietnam*, p. 212. [↑](#footnote-ref-827)