GENTLEMANLY PROFESSIONALS WITHIN THE CIVIL SERVICE: SCIENTISTS AS INSIDERS DURING THE INTERWAR PERIOD

Philip Chaston

A thesis submitted for the degree of Doctor of Philosophy

Centre for the History of Science

The University of Kent at Canterbury

October 1997

ABSTRACT

In this thesis I examine the relationships between the scientific adviser and the civil service during the interwar period, with particular emphasis upon the gentlemanly status and values that eased the entrance of outsider scientists into the world of professional administration. I study how gentlemanly values became a constituent of professional identity for the scientist through inculcation in the public school system and how they formed a shared system of values and assumptions that allowed professional elites to communicate with each other. This gentlemanly culture formed the foundation for the personal networks of scientists and administrators that directed interwar scientific research.

Chapter Two examines how gentlemanly values moulded the professional identity of the elite scientist by following the careers of selected scientists through their public schools. Chapter Three extends this analysis to their lives at Oxbridge and widens the discussion to show how gentlemanly values moulded the professional demands of the scientific community during the First World War. This study of gentlemanly professionalism is completed in Chapter Four through a) examining how the Athenaeum Club was able to adapt to the rise of a professionalised society by offering a private site for meetings amongst the metropolitan professions and b) through a prosopographical study of declared members of the Athenaeum Club in the Royal Society of London to construct a picture of part of the scientific elite.

The last four chapters contain case studies that present gentlemanly values and the Athenaeum Club within the context of interwar politics and the civil service. Chapters Seven and Eight examine the professional conflicts between the Medical Research Council and the Royal Colleges through the meetings at the Athenaeum Club that negotiated the establishment of the Radium Beam Therapy Research Board. Chapters Nine and Ten examine the workings of the Tizard Committee and the development of radar within their political context. The shared values of the scientists and their rift with Professor Lindemann stemmed from his unwillingness to respect and conform to the professional practices demanded from committee members.

ACKNOWLEDGEMENTS

I would like to thank the following for their advice and encouragement during the long drawn out process of completing this thesis:-

My supervisor, Dr. Crosbie Smith, for his support and patience in commenting upon the chapters and drafts of this project;
Professor M. P. Crosland, Dr. A. Johns and Mr. R. G. A. Dolby for timely interjections during the course of this project, but especially Dr. Ben Marsden for his incisive criticisms which strengthened and focussed more than one chapter.
Mrs. Trish Hatton, Dr. Jon Agar, Dr. Yakup Bektas, Elizabeth Pidoux, Dr. Ian Higginson, Michael Neal and David Cowie for maintaining an atmosphere of collegiality and intellectual encouragement during my three years of permanent residence at the Unit/Centre for the History of Science.
The archivists and librarians of the UKC Templeman Library, especially Kate Bould; the Public Record Office at Kew; the Cambridge University Library; and the Imperial War Museum.
I would also like to acknowledge the support of my family and friends in Epsom for providing the necessary enthusiasm for liquid refreshment and non-league football that functioned as an excellent counterfoil to more weighty matters.

I would like to thank the following institutions for permission to quote from the copyrighted documents upon which this thesis is based: the Rutherford Papers held in the Cambridge University Library; the Medical Research Council for its archives held in the Public Record Office; the Tizard Papers held in the Imperial War Museum; and the archives of the Public Record Office itself.

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Chapter One

INTRODUCTION: THE GENTLEMAN OF SCIENCE IN THE TWENTIETH CENTURY

This thesis sits comfortably in the interdisciplinary atmosphere of the history of science and draws upon the strength of arguments and texts from other historical fields. The most important derivation from these historical sources is the concept of the gentleman of science, a term usually applied to earlier periods of history but which is also, I would argue, a useful descriptive term for members of the scientific elite during the first half of the twentieth century. Its application derives from recent work in general narratives that have modified our perceptions of continuity and change in British history since the Industrial Revolution. The historical arguments that underpin this concept, its utility in studying the scientific profession during the twentieth century and its consequences for our perceptions of British science form the subject of this Introduction.

British history in the twentieth century is one of unremitting decline. From the position of a military superpower that dominated the global economy at the turn of the century, Britain has been reduced to a disadvantageous position in comparison to the other advanced industrial economies of the northern hemisphere. This decline is relative and comparative, both in contemporary and in historical terms, but the analysis of this phenomenon has become sharply debated over recent years. Historians cannot deny that militarily, diplomatically and demographically, Britain wields far less influence over the globe in 1997 than it did at the Diamond Jubilee of

Queen Victoria in 1897. As a consequence of this, Peter Clarke notes that, "The history of twentieth-century Britain...threatens to become a history of decline, centred on the question: where did it all go wrong?"[1] The question of decline dominates twentieth-century British history and sketches, through an inverted Whiggish narrative, the inevitable decay of Britain from the weary titan to a small island.

A comparison can be drawn with the postwar histories of the Second and Third Reichs. By assuming a model of normal modernisation amongst the countries of Western Europe leading to liberal democracy, social historians of Germany have constructed a *Sonderweg*, a 'special path' for Germany that lends a Whiggish inevitability to its descent into the Nazi Dictatorship. This "specific path of modernization" argues that:

> far more so than was the case in western societies, pre-industrial, pre-capitalist, and pre-bourgeois authoritarian and feudal traditions survived in a society which was never truly bourgeois, existing in a relationship of tension with a modern, dynamic capitalist economy and finally exploding into violent protest when that economy collapsed in crisis.[2]

The importance of this approach to history is its similarity to histories of British decline. These have purported to explain the causes of British decline through the strength of a pre-industrial and anti-modern *ancien*

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1 Peter Clarke, *Hope and Glory: Britain 1900-1990*, London: The Penguin Press, 1996, p. 3.

2 Ian Kershaw, *The Nazi Dictatorship: Problems and Perspectives of Interpretation*, London: Edward Arnold, 1989 [1985], pp. 18-19. For further information about the concept of the *Sonderweg*, see Jurgen Kocka, "German History before Hitler: The debate about the German *Sonderweg*", *Journal of Contemporary History*, vol. 23, (1988), pp. 3-16.

regime that shaped the institutions, culture and direction of British capitalism throughout the twentieth century. As long as this *ancien regime* remained in existence, decline was inevitable.

The two historians who have popularised and promoted the cultural causes of decline are Martin J. Wiener and Corelli Barnett. Both have argued that English culture constructed a "cultural cordon sanitaire encircling the forces of economic development - technology, industry, commerce".[3] Their books have argued that Britain was ruled by a gentrified bourgeois elite which idealised rural society and actively constrained urbanisation and industrialisation. This elite was educated in the public schools and directed towards gentlemanly professions that inculcated service and independence from salaried work at the expense of efficiency, expertise and specialisation. The entrepreneurial skills of the manufacturing industry in the North of England were replaced by metropolitan professionals as the dynamo in the direction and rate of economic growth. These social and cultural changes took place during the latter half of Queen Victoria's reign and restrained the potential economic growth of Great Britain. In a comparison of the modernisation processes in Britain and Germany, Wiener stated that the aristocratic elites retained a dominant role in politics and culture in both countries. In his simplistic and reductionist comparison, Britain adopted liberalism and capitalism but rejected industrialisation while Germany embraced industrialisation and rejected liberal capitalism. The result of one was decline, the other fascism.[4]

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[3] Martin J. Wiener, *English Culture and the Decline of the Industrial Spirit, 1850-1980*, Harmondsworth, Middlesex: Penguin Books, 1985 [1981], p. ix.
[4] *Ibid.*, pp. 3-22.

This 'cultural critique' of British economic performance has come under sustained attack since the publication of Wiener's book in 1981.[5] The institution on which this debate centres is the public school. After the Arnoldian reforms of the mid-Victorian period, these educational establishments became the training grounds for the professional classes. They turned their pupils into gentlemen. For Wiener, the standards of the gentleman were the primary cause for moves by managers and entrepreneurs away from profit-seeking and the maximisation of productivity. The encouragement of amateurism and public service replaced the mid-Victorian emphasis on utilitarianism and realism that drove the motor of industrialism. The economy was restructured through a gentlemanly "consensus of outlook and behavior.....that was based on the cultural dominance of Whitehall".[6] Both civil servants and directors now belonged to companies and ministries that had been remodelled along the lines of gentlemen's clubs. With their ethic of service and their paternalistic sense of responsibility for their workers, these gentlemen sought stability and secure profits through a regulated economy and industrial cartels. Therefore, slow economic growth could be attributed to "a pattern of industrial behavior suspicious of change, reluctant to innovate, energetic only in maintaining the status quo".[7]

Wiener also attributed the division between pure and applied science (or disinterested and useful knowledge) to gentrification. In this argument, he

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[5] W. D. Rubinstein, *Capitalism, Culture and Decline in Britain, 1750-1990*, London: Routledge, 1993, pp. 16-23. Rubinstein uses the term 'cultural critique' to unite and polemicise the works of Anthony Sampson, Martin J. Wiener and Corelli Barnett as one school of declinist historiography.

[6] *Ibid.*, p. 151.

[7] *Ibid.*, p. 154.

was drawing upon the writings of Corelli Barnett. Barnett argued that Arnoldian ideals of pacifism and gentlemanly behaviour had transformed the elite as part of a greater change in 'national character', brought about by romanticism and evangelical Protestantism. From the artisanal class upwards, polite respectable actions became the norm. In the public schools, an academic syllabus "inoculated" pupils against the world by promoting conformity and conservatism whilst stifling innovation. 'Old boys' behaved with an "inculcated expectation of common standards of gentlemanly decency and respect for the rules".[8] However, this lack of utilitarianism was the foundation of Barnett's depiction of British culture as anti-modern and anti-industrial. The consequences of this culture included a failure to develop science-based industries. British industries were "a working museum of industrial archaeology" and British laboratories "were German technological provinces".[9] Science formed a small part of this 'cultural critique' which concentrated upon economic performance. The conclusions of Barnett and Wiener were that British science was pure, anti-industrial and far less capable of achieving success than its American or German counterparts.

This portrayal of "an anti-scientific, anti-technological and anti-industrial culture" has been attacked by economic historians and historians of technology.[10] This criticism of the 'cultural critique' has concentrated upon the feasibility of placing economic performance in a cultural context. Economic historians have explored the empirical evidence underpinning

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[8] Corelli Barnett, *The Collapse of British Power*, London: Alan Sutton Publishing Ltd., 1993 [1972], p.37; Corelli Barnett, *The Audit of War: The Illusion and Reality of Britain as a Great Nation*, London: MacMillan, 1986; Corelli Barnett, *The Lost Victory: British Dreams, British Realities, 1945-1950*, London: MacMillan, 1995.

[9] *Ibid.*, pp.87-88.

[10] David Edgerton, "Myths of Decline", *Prospect*, no. 11 (1996), pp. 28-31, 29.

the assertions that cultural assumptions influence entrepreneurial behaviour to such an extent that they slowed British economic growth after all other factors have been taken into account. Some have even concluded the opposite:

> What was wrong with British industry after (indeed, before) 1850 was not a poverty of entrepreneurial (or industrial) spirit, but a surfeit. There were too many fiercely independent, aggressively competitive firms coming into existence... [11]

But most agree that cultural explanations are insufficient to explain comparative rates of economic performance, and that, "Such accounts as those of Barnett or Wiener run the danger of using explanatory sledgehammers to crack rather modest nuts".[12]

Those who do not completely disagree with cultural explanations of economic behaviour have taken issue with the portrayal of English culture and the public schools as detrimental to the process of modernisation. Rubinstein has claimed that public schools might actually benefit business through the contacts fostered by 'old boy' networks and that statistical analysis of their alumni does not support the 'cultural critique'.[13] He also argues more problematically that British elites were more rationalised and more predisposed to scientific exploration than their counterparts on the

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11 Peter L. Payne, "Entrepreneurship and British Economic Decline" in Peter Payne, W. D. Rubinstein and Harold James, eds., *British Culture and Economic Decline*, London: George Weidenfeld and Nicolson Ltd., 1990, pp. 25-58, 33.

12 Harold James, "The German Experience and the Myth of British Cultural Exceptionalism" in *ibid.*, pp. 91-128, 124.

13 W. D. Rubinstein, *op cit.*, p. 128.

continent or in America. Questioning the 'cultural critique' has also been stimulated by the empirical research of historians of technology. The general conclusions of David Edgerton, who has popularised the inadequacies of the declinists' "lurid historical fantasies", are that:

> As the richest country in Europe until the 1960s, Britain spent the most on invention, innovation and R & D. Its higher education was peculiarly committed to science and technology, and its businesses and government had a very high representation of scientists and engineers.[14]

The 'cultural critique' has been consistently and emphatically rejected by historians since empirical evidence has not supported its claims.

It is from the responses to the 'cultural critique' that a new picture of the scientific profession in the twentieth century takes shape. Gary Werskey has drawn the stereotype of a Cambridge 'pure' scientist: a member of an aristocratic elite, imbued with pre-industrial and anti-modern values, but competing with his peers in a high mathematical culture.[15] Werskey draws a picture of the scientific elite at the Cavendish Laboratory similar to the 'cultural critique'. The elite's inbuilt preference for an aristocratic value-system and ruralised life-style as opposed to the managerial ethos and the urban world, was attributed to the educational system of the public schools. This interpretation obscures the historical role of these educational institutions and in order to analyse their role with greater

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14 David Edgerton, "Myths of Decline", p. 31.

15 Gary Werskey, *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*, London: Free Association Books, 1988 [1978].

clarity, one has to take on board the redefinition of the British gentleman offered by new studies of British capitalism.

P. J. Cain and A. G. Hopkins have studied British imperialism over a period of three centuries from its incipient expansion in the seventeenth century to the Commonwealth. Following Rubinstein and drawing upon his research, they conclude that the Industrial Revolution has dominated interpretations of British and imperial history to the detriment of the role played by the financial and service sectors of the economy. In particular, the City of London and its leaders have been a centre of economic dynamism that grew into the linchpin of a global financial system during the nineteenth century.[16] Their explanatory concept of 'gentlemanly capitalism' was constructed to explain how dynamic capitalists could gain from profitable opportunities yet retain high social status and links with the political rulers in the aristocracy. This gentlemanly order exercised a collective self-fashioning that combined the ideological components of chivalrous behaviour and classical models to incorporate the Arthurian knight within the ethos of public service derived from Athens and Rome. This order derived its wealth from financial activities and disparaged the provincial, manufacturing cultures of Britain's industrial economy. Its disdain for 'trade' and promotion of the City's interests shaped the 'official mind' of Parliament and Whitehall. With this concept they have outlined a new history of the British elites, focused upon the public schools and the professional classes of London's service economy.[17]

16 Peter Clarke, *op cit.*, pp. 7-13.

17 P. J. Cain and A. G. Hopkins, *British Imperialism: Crisis and Deconstruction 1914-1990*, London: Longman Group UK Ltd., 1993, pp. 298-300.

The public schools were renewed by the reforms of the mid-Victorian period. Most professionals, civil servants and City financiers shared a public school education and were oriented by this towards "the security offered by bureaucratic and professional employment".[18] This redefinition of the gentleman originated from the changes in education at the public schools. Pupils learned classical and chivalrous codes of behaviour in the classroom and as part of the pupils' way of life, especially in the constraints of the boarding school. The pupils imbibed the conservative, monarchist and imperialist values that the public schools celebrated. Moreover, they graduated with a sense of public service that could be gratified in the pursuit of a higher duty. Alumni tended to work for the Empire, for God, or for some professional ideal, which they had constructed in personal terms from a combination of their educational experiences and the requirements of their profession. This gentlemanly order of professionals incorporated the vast majority of the middle classes, but it did not include the rural lifestyle of the declining squirearchy or the conspicuous consumption of cosmopolitan plutocracy.[19]

'Gentlemanly professionalism' was a corollary of 'gentlemanly capitalism'. Its historian, Harold Perkin, also drew upon the work of W. D. Rubinstein in his study of professionalisation within modern English society since 1880.[20] Perkin concluded, like Cain and Hopkins, that the professions shared the same characteristics as their financial counterparts: a public school education, a metropolitan elite and an ethos of public service.

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[18] *Ibid.*, p. 25.

[19] David Cannadine, *Aspects of Aristocracy: Grandeur and Decline in Modern Britain*, London: Yale University Press, 1994, pp. 37-54.

[20] Harold Perkin, *The Rise of Professional Society: England since 1880*, London: Routledge, 1980.

However, Perkin had to explain why professionalisation grew in Britain and how it became the motor of an expanding service economy. He argued that British society was undergoing a historical transformation from a tripartite class structure to one of competing professional hiearchies. Every profession was vying with each other to increase their respective income, status and power. The gentlemanly professional served the 'want' for which he was trained and this was often cast in an idealistic mould. As the twentieth century matured, the gentlemanly professional sought a secure position in state employment rather than through the maintenance of private clients. This reflected the increasing demands from the professions for the state to employ their members because of the 'need' that they served. An example of this process is the medical profession which has changed from a community of gentlemanly practitioners with private practices to salaried general practitioners dispensing universal health care.

Locating science within the world of gentlemanly professionalism is problematic because it is not a single field of knowledge like law or soldiering that can be translated into a number of identifiable services within familiar institutions. The solicitor and the barrister serve clients within an institutionalised legal system through a defined body of knowledge, law; the soldier, sailor or airman are identified through their roles on land, sea or air to which they bring learned qualities of leadership and strategy. Unlike other traditional professions, science is far more diffuse in terms of knowledge or institutions but it does contain at least two characteristics that mark it off as a twentieth-century profession. From the Edwardian period, scientific publicists asserted that the application of

scientific knowledge was necessary for the country's future economic and military wellbeing. Their call for state funding of scientific research and pensions for researchers sits well with Perkin's system of professions competing for income, status and power.[21] British science was also characterised by a united, institutionalised profession at an elite level. The Royal Society in London provided a reward system of honours for all aspects of science through its positions, medals and lectures. Moreover, the aristocratic roots of this institution fostered a long association with the governing classes comparable with the elite structures of traditional professions like the law or medicine. This historical antecedent provides one explanation for the close identification between elite recognition through a fellowship of the Royal Society and the resulting recognition through the general honours system. Scientists competed for the rewards that the elite of the professional classes hungered: membership of an order, a knighthood or even a peerage as well as consideration for positions of public service. The 'professionalisation' of the honours system lends weight to the argument that competing professional hierarchies were merging into a governing elite at the top, known after the Second World War as the 'Great and the Good'.[22]

Scientists participated in the world of 'gentlemanly professionalism'. Were they emissaries of Progress, forced to engage with political and financial masters who lived in the past? Or, like Werskey argued, were they part of that past - blind seekers of scientific truths who formed an aristocracy of

[21] When applying Perkin's model to the scientific 'profession', it could be examined as a collectivity of underdeveloped professions in a multiplicity of disciplines who invest and promote the shared cultural authority of science in return for gaining more professional and financial security.

[22] Peter Hennessy, *Whitehall*, London: HarperCollins Publishers, 1990, pp. 540-541.

knowledge and looked down upon the demands of 'trade' and the working classes? These questions reflect the 'cultural critique' which utilises an artificial dichotomy between the modern and the traditional to separate the forces of continuity and change. Cain and Hopkins constructed their concept of gentlemanly capitalism to bridge this divide:

> We have used the term ['gentlemanly capitalism'] to represent a hitherto neglected theme in the historical transformation of British society, a process which we regard less as an exchange of 'tradition' for 'modernity' than as a selective amalgamation of elements inherited from the past with introductions from the continously evolving present.[23]

And within their approach, they detailed how gentlemen redefined themselves:

> But gentlemen looked forward as well as back. They invoked the past to fashion a morality for the present, not only to counter the encroachments of industry and democracy but also to legitimise their own innovating activities.[24]

The demonstration of the principle that an adherence to gentlemanly values involved a continual exercise in redefining and inventing traditions in response to the demands of modernity is sound. This principle represents an analytical advance upon the romanticised elite culture of

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[23] P. J. Cain and A. G. Hopkins, *op cit.*, p. 298.
[24] *Ibid.*, p. 25.

Barnett and Wiener where ideals motivated the highminded behaviour of the "latter-day White Knights riding out in wartime Britain to combat evil with the flashing sword of moral indignation".[25] However, Cain and Hopkins placed too much emphasis on the aristocratic antecedents of gentlemanly values and exaggerated the ideological influence of the City. Rubinstein's studies of public school alumni showed no bias against business or manufacturing and suggested a shift of landowners' sons into business and of businessmen's sons into the professions.[26] Instead of following these historiographical examples and defining gentlemanly values in terms of romanticism, chivalry or public service, it is better to study these values and codes of conduct as cultural resources for constructing a professional identity, governing professional interactions and managing conflict within and between professional communities when they arose. This still leaves the problem of defining gentlemanly values and behaviour during the twentieth century.

Instead of retaining this aristocratic hangover when studying the gentleman, Jeffrey Richards has persuasively argued that English society has been dominated by a middle-class value-system derived from early Victorian evangelicalism.[27] Central to this value-system was the elevation of gentlemanly conduct to an ideal that governed the behaviour of all the middle-class, especially professionals who relied upon this perceived status to reinforce their cultivated representation of expertise. This value-system, subject to permutations and social change, promoted conformity amongst those who identified with the 'respectable' and the 'genteel' until

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25 Corelli Barnett, *The Audit of War*, p. 15.

26 W. D. Rubinstein, *op cit.*, pp. 121-127.

27 Jeffrey Richards, *Visions of Yesterday*, London: Routledge & Kegan Paul, 1973, pp 7-15.

the onset of the permissive society. The public schools became the socializing institutions for an ethic that moulded the majority of all professionals and dominated their elites. Moreover this ethic was diffused through its reproduction in grammar schools and its articulation through popular films, books and magazines.[28] These gentlemanly values and attitudes are the entry point for examining the gentlemanly professional and his position within the social structure.

The concept of 'gentlemanly professionalism' also allows greater understanding of the curious mixture of traditionalism and the modern, conservatism and radicalism that characterised the scientific profession during this period. The drastic restructuring of many scientific disciplines was accompanied by the incorporation of the majority of the profession into the middle-class. In the thirties, Sir James Jeans represented the more elderly gentleman of science who publicised progress in astronomy as a form of educational service while living the life of a leisured private researcher in deepest Surrey. Baron Rutherford of Nelson was the dynamic peer who had presided over powerful advances in the knowledge of physics and promoted science through his political and administrative contacts but relaxed on driving holidays and reading dime-penny novels. Or Sir Henry Tizard, doyen of the scientific civil service, who would go fishing in his spare time and kept his family at arm's length in Fareham, a small town on the south coast. All three examples demonstrate that contextualising the life or the thought of a man of science during the era of gentlemanly professionalism is far removed from the shared culture of the mid-Victorian period. For every Joseph Needham or J.B.S. Haldane,

[28] Jeffrey Richards, *Happiest Days: The public schools in English fiction*, Manchester: Manchester University Press, 1988.

combining high science with high culture, there were far more Rutherfords and Tizards. To comprehend their culture, their values and their attitudes, requires an understanding of the middle-class with its public schools. its professional base, its morality and encoded snobbery. This also goes some way towards explaining one of the most striking peculiarities of twentieth century Britain: the incorporation of increasingly powerful professions into the existing political and socio-economic structure. Men of science were rewarded with honours from the Monarch as well from as the Royal Society.

Connotations of professionalism and expertise were amenable to the representations of effortlessness and natural authority that accompanied the image of the gentleman. Acquiring specialised knowledge through a long period of education or apprenticeship was conducive to the ideology of 'character' - a diffuse set of values that conferred gentlemanly status when inculcated but which could not be learned as a set of specific skills or theories. As particular knowledge communities were transformed by the processes of professionalisation during the late Victorian period, their identities, roles and skills drew upon pre-existent representations of gentlemanly professionalism in law, medicine or perhaps in science's case, geology. Authority and status depended upon a mixture of acquired professional knowledge and hierarchical deference. When a particular profession gained greater power and income, it did so by becoming more respectable and more middle-class in the identity of its practitioners and the gentlemanly image these portrayed to a wider public. By conforming their goals to the class structures and cultural uniformities of Britain's stratified society, individual professionals found that career advancement

and upward social mobility were mutually reinforcing objectives.

An analysis of the relationship between the rules, values and codes that embodied the professional gentleman and the historical evidence organised and marshalled in narratives requires a return to the practices disclosed by the texts. The purpose of this thesis is to investigate the constellation of gentlemanly values and codes of conduct as they existed and changed during the period of the two World Wars and how they helped the professional scientist in his dealings with his peers in the civil service. In order to do this one must show that important members of the scientific profession were inculcated with the values of the public schools, the nurseries of the professional classes, during their period of educational and professional socialization at school and university. Then one must study the arenas in which gentlemanly values and practices were most clearly and distinctly articulated. Given the complex links between government and science, conflict within and between these spheres forms the most favourable setting for studying scientists as gentlemanly professionals.

The role of scientists within government during the interwar period was complex and varied and their interaction with other professional communities in Whitehall cannot be reduced to that mythical monolith of the gentlemanly order, the 'Establishment'. Rubinstein describes it as a "matrix" and as a "coherent system" that includes the Conservative Party, the City, the Church of England, the professions and the universities, harking back to the certainties of the nineteenth century.[29] However,

[29] *Ibid.*, p. 73.

Anthony Sampson, the systematizer of British institutional power, rejected the concept of the 'Establishment', arguing that, "The conspiratorial notions of a single 'Establishment' which holds them [Britain's institutions] all together is all too untrue".[30]

An overall description of the interaction between scientists and Whitehall was provided by Alexander King, who was the first secretary of the Advisory Council on Scientific Policy during the 1940s. He described the relationships between science and government as a form of village community comprised of face-to-face encounters. His text stated:

> ...up to the Second World War, the size of the British science system was small enough for internal adjustments and policy direction to be in the hands of a few, outstanding personalities belonging to the same coterie. Coherence and mutual understanding were probably achieved rather effectively, if utterly informally, through frequent, easy, but often unplanned contacts between the leading figures of the Royal Society, the research council secretaries, and senior civil servants, all of whom were habitues of the Athenaeum Club.[31]

This picture is reinforced by episodes within the biographies of Baron Rutherford of Nelson and Sir Henry Tizard, where the Athenaeum Club

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30 Anthony Sampson, *The Changing Anatomy of Britain*, London: Hodder and Stoughton, 1982, p. 420. Peter Hennessy describes the term as "a fluid mercurial concept, infuriating in its imprecision" and comments that every sport and profession has one. Peter Hennessy, *op cit.*, pp. 540-546, 541.

31 Alexander King, *Science and Policy: The International Stimulus*, London: Oxford University Press, 1984, p. 11.

functions as a site for private lunches whose participants aimed to influence the outcome of committee meetings or planned the agenda of a scientific lobby. The Athenaeum Club was an important resource for this 'village community' of the interwar period.[32]

However, private lunches and clandestine meetings in a clubbable atmosphere do not provide the sources for studying the scientific professional in action. Codes of conduct and values are articulated more clearly when they become issues themselves between scientific professionals and other parties. Therefore, the proper arena involves conflict and controversy. The two case-studies within this thesis involve battles within civil service committees between professional scientists and their opponents who do not feel bound by codes of conduct because they place a greater priority on their perceived interests above and beyond conforming to expected standards of behaviour. The tacit standards that govern the membership of these committees form focal points for wider divisions between professions and political camps. In the first case-study which examines the machinations leading up to the establishment of the Radium Beam Therapy Research Board, Sir Walter Fletcher, Secretary of the Research Council and Lord Dawson, President of the Royal College of Physicians, battle for professional control of the institutions supervising the science of radium. Questions of conduct are contextualised in this wider story of professional friction. The second case-study examines the work of the Tizard Committee on radar and the discord between its members and Frederick Lindemann over air defence. Both case-studies demonstrate whether these rules of conduct aided or hindered a resolution to the

[32] David Wilson, *Rutherford: Simple Genius*, London: Hodder and Stoughton, 1983, pp. 480-482; R. W. Clark, *Tizard*, London: Methuen & Co. Ltd., 1985, pp. 116-118.

conflict and allow the historian to clarify the role of the scientist as a gentlemanly professional through his interaction with oppositional forces.

Chapter Two

THE START OF THE GENTLEMANLY PROFESSIONAL: REFLECTIONS ON PUBLIC SCHOOLS AND ENTRY INTO THE SCIENTIFIC WORLD

2.1 Introduction

> There is one feature of Rutherford's life that appears completely inexplicable: how did this brash, noisy, flamboyant, pure scientist, hailing from the backwoods of New Zealand, mesh in so perfectly with the quiet, unostentatious public-school men at the Athenaeum and on the fringes of Whitehall who controlled the first government support for science and who founded and formed those institutions by which public money is still channelled into research.[1]

Wilson answers this question by arguing that Rutherford was a capable committee member who, in his role as "a man you could do business with", set the tone on committees and discreetly steered their discussions towards his own conclusions by "the force of his argument."[2] Wilson, as a biographer, prefers the psychological conclusion that Rutherford's character was sufficient to ensure his success in the 'politics of science'. An alternative viewpoints asks whether these public-school men recognised Rutherford as an embodiment of 'character', that moral internalisation of gentlemanly values, and accepted him as a viable candidate for membership of their

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1 David Wilson, *Rutherford: Simple Genius*, London: Hodder & Stoughton Ltd., 1983, p. 453.
2 *Ibid.*

government committees on the grounds that he was one of their own, despite his colonial background. With Rutherford and Tizard as examples, the biographical backgrounds of interwar scientists have concentrated upon their scientific careers and achievements while merely recounting their education as a series of anecdotes.[3] Principally, the influence of the public school system on scientists has attracted no attention from historians, unlike studies on the role of science in the public school.[4] To remedy that omission, this chapter is focused upon the careers of three prominent scientists who attended prestigious public schools, emphasising how their education moulded their identity and shaped their subsequent vocation. The three subjects are Lord Rutherford of Nelson, Sir Julian Huxley and Sir Henry Thomas Tizard.

The study of public schools and their pupils can founder on the mythical representations of themselves that these institutions promoted. At the turn of the century, many public schools invented traditions for themselves which legitimated their authority and emphasised their longevity. They made the same claims individually and collectively. Each school encouraged customs and practices amongst its pupil population that emphasized the peculiar identity of the school and expressed its historical character. The term, 'public school spirit', especially, evoked a unifying mystique, bestowing educational

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3 *Ibid*, pp. 13-49. Wilson concentrates on Rutherford's educational achievements, devoting four pages to his time at Nelson College in New Zealand. R. W. Clark, *Tizard*, London: Methuen & Co. Ltd., 1965, pp. 7-9. The details of Tizard's educational career at the school of Westminster in this biography are derived from the unpublished and unfinished manuscript of the scientist's autobiography.

4 A. J. Meadows and W. H. Brock,"Topics Fit For Gentlemen: The Problem of Science in the Public School Curriculum" in Brian Simon and Ian Bradley, eds., *The Victorian Public School: Studies in the Development of an Educational Institution, A Symposium*, Dublin: Gill and MacMillan Ltd., 1975, pp. 95-114.

superiority upon these schools because of their embodiment of indefinable English qualities that were inculcated into their pupils and formed the foundation for educating gentlemen. Defining themselves and their pupils as a type, the public schools were taken at face value by left-wing polemicists who utilised this simplistic description to construct an aristocratic bogeyman. The public schools were fingered as one of the primary causes of Britain's decline because they instilled into their pupils an antipathy for manufacturing and technology that shaped their post-educational choices in career and politics. The pitfall for historians is the acceptance of these claims as fact and, as a consequence, viewing the public school system as an educational engine which mysteriously manufactured fantastic conspiracies of old-boy networks -- all under the mask of the 'Establishment'.

Before examining the experiences of these three subjects, it is necessary to recount what the public schools were and what their educational system actually entailed. Public schools moulded their pupils on two levels, through education and inculcation. Knowledge and codes of behaviour were learned "either through the overt values taught in the classroom or through more subtle factors of socialisation and peer group attitude formation".[5] For example, the jingoistic values that motivated public school alumni to voluntarily enlist in Kitchener's army were learned through the teaching of imperialism and nationalism by teachers in collective rituals like celebrating the Diamond Jubilee of Queen Victoria and in the more commonplace routines of the classroom and the military corps. Underlying and reinforcing

5 W. D. Rubinstein, *Capitalism, Culture and Decline in Britain, 1750-1990*, London: Routledge, 1993, p. 111.

the dominant value system acquired in the public schools before the First World War were the attitudes and orientations that marked all of their alumni. An old boy could be recognised by his speech patterns, by the expectations of his status and by the codes of behaviour that had been inculcated through playing games and living within a hierarchical and competitive community of boys, divided amongst rival houses. This chapter outlines the educational importance of the public school and then examines the subject scientists to see how far they were shaped by their time within their respective institutions.

2.2 Education at the Public Schools

The gentleman functioned as an ideal in morality and action for the public schools. Cardinal Newman, Thomas Arnold, Anthony Trollope and other Victorian authors provided exemplars or rules for the behaviour of a gentleman.[6] Their criteria for the type included educational achievement, sporting prowess, chivalric behaviour and moral action. This resulted in contradictory stereotypes of the gentleman: the educated, philanthropic clergyman as opposed to the plainspeaking huntsman who could ride all day yet never read a book. These contradictions were unified by the propagandists for the "public school spirit" who promoted education through the classics, sport through the cult of athleticism, chivalric behaviour through the general codes of conduct and moral action through chapel and philanthropy.

It is notable that Arnold rejected chivalric imagery and the importance of

6 Philip Mason, *The English Gentleman: The Rise and Fall of an Ideal,* London: Andre Deutsch, 1982, pp. 12-13.

games in his reformation at Rugby.[7] Under his administration, this public school was reoriented towards a new market, the middle classes. Their sons would be assured of a Christian education and would learn to compete with each other through the innovation of examinations, learn to emulate a moral role-model, their housemaster, and enter a community of boys within the school which would transmit the desired values and attitudes. Arnold wished to educate his pupils and cure them of their tendency to sin. He therefore intended to inculcate values of service through teaching the classics and the Bible. Arnold recast the gentlemanly concepts of honour and courage within an evangelical forge, creating a new template that married the gentleman to respectability. Hard work, educational achievement and service to an ideal were values that professionals, industrialists, merchants and other members of the middle-classes demanded in the education of their children.[8] The diffusion of Arnoldian ideas and the explosion of growth in the number of public schools reflected the moral pressure of this new middle-class educational constituency.

The public schools were originally confined to the Clarendon Nine as defined by the Public Schools Commission of 1868 which examined the chartered and charitable foundations that provided secondary education in England. Given the number of new foundations in mid-Victorian Britain the headmasters of the more prominent schools met to establish the Headmasters' Conference, an institution where inclusion was often the

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[7] T. W. Bamford, "Thomas Arnold and the Victorian Idea of a Public School" in Brian Simon and Ian Bradley eds., *The Victorian Public School*, pp. 58-71.

[8] J. R. de S. Honey, "Tom Brown's Universe: The Nature and Limits of the Viictorian Public Schools Committee" in *Ibid.*, pp. 19-33.

defining criterion for a public school. The Public School Yearbook was also published as a guide to the public schools and as a marketing tool to attract the sons of increasingly wealthy professional parents. The public school was promoted as a 'type', a description that concealed the differences between each school. Oundle School, for instance, was an establishment that, promoted the natural sciences and modern languages while Eton was noted for its individualism and historical peculiarities.

The inculcation of public school attitudes was built into the social structure of the school which promoted conformity to the pressures of the peer group. Each school was a corporate institution and was divided into a number of houses that would compete with each other academically and in games. Pupils entered as boarders and the school exerted strong social pressure on the pupil to conform to the rules and unwritten codes that governed the communities of the school and the house. Each house was often distinguished by a distinctive mode of dress, peculiar customs and a system of colours awarded for sporting prowess. Each starting boy was assigned to a house and had to learn its rituals and its practices as rapidly as possible in order to demonstrate his loyalty to the group. Authority, on the other hand, was delegated by the house-masters to a self-regulating system of prefects who formed the plateau of a hierarchy of power, defined by age and ability, that regulated all pupils from the Head Boy to the lowliest fag.[9]

[9] Vivian Ogilvie, *The English Public School*, London: B. T. Batsford Ltd., 1957, pp. 180-192; Ian Weinberg, *The English Public Schools: The Sociology of Elite Education*, New York: Atherton Press, 1967, pp. 41-49.

With the adoption of an Arnoldian system, the culture of each school was soon oriented towards a new set of attitudes that guaranteed order. The rapid turnover in generations of pupils allowed this culture to establish itself within a decade at Rugby. This culture ensured that its inhabitants conformed to unwritten codes of conduct and etiquette that would mark off each pupil, by house and by school, from outsiders. Since power and responsibility had been delegated to the prefects, there was a strong incentive for the senior boys to keep order in the schools. Their personal power was reinforced by the aesthetic and social pressure to conform. New aesthetic standards of 'good form', 'fair play' and 'the good loser' or displays of 'character' and 'manliness' took hold in the classroom and on the playing field. This etiquette became instinctive and second nature for the pupils, as opposed to more formal sets of values, and was inculcated during a process of socialisation. This fostered a corporate loyalty towards the house and the school to which the boy belonged:

> All [of] these characteristics promoted a powerful esprit de corps. Everything combined, by precept or example, to instil the sense of belonging to a community and a pride in it. The school songs which became another essential piece of equipment voiced a romantic attachment to the "old place", a filial affection that often lasted through life.[10]

In thought and deed the public schoolboy was recognisable by his speech

[10] Vivian Ogilvie, *op cit.*, p. 182.

and his behaviour. These manners were the cues which allowed the public schoolboy to play out his role and represent himself correctly in the company of his social equals.[11]

The Arnoldian process had also recognised the moral potential of certain facets of the pupils' culture such as games which were transformed from anarchic displays of brutality into rule-bound displays of brutality. They were no longer perceived as dangerous and immoral activities that ought to be outlawed but as moral and healthy sports that deserved to be encouraged. This Arnoldian mould was modified by the development of "muscular Christianity" and its emphasis upon the cult of athleticism during the last quarter of the nineteenth century. The educational purpose of the schools was modified "to train the body and will, as well as the mind".[12] Thus a "new aristocracy" of gentlemen, speaking in a standard form of English, was born.[13] These were not just Arnold's Christian *gentlemen, fed a diet of* classics "leavened by Christianity", *but hardened individuals who had been* imbued with 'character'.[14] Public school education had become a form of training: psychological, physical and moral.

The attitudes and etiquette of the public school boy included a conscious awareness of his own social status as compared to individuals from other

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11 Rupert Wilkinson, *The Prefects: British Leadership and the Public School Tradition*, London: Oxford University Press, 1964.

12 Mark Girouard, *The Return to Camelot: Chivalry and the English Gentleman*, London: Yale University Press, 1981, p. 170.

13 J. R. de S. Honey, *Tom Brown's Universe: The Development of the Victorian Public School*, London: Millinton Books, 1977, p. 229.

14 *Ibid.*, p. 228. Philip Mason, *op cit.*, p. 170. "Hardiness, self-composure, coolness in the face of pain and danger, confidence in one's own decisions - these were qualities required by the imperial class which a growing empire demanded."

social groupings like servants and tradesmen. Yet social status was the one feature of the public schools that their propagandists never recognised or discussed. Their task was to portray and define the products of the public schools within the traditional gentlemanly discourse, as modified by Arnold and the movement for 'muscular Christianity'. J. E. C. Welldon, the headmaster of Harrow, publicised the values of the public schools, both in Britain and abroad. He emphasised the importance of obedience, the overriding responsibilities that duty demanded, the requirements of honour and truthfulness, the virtues of courage and the moral dignity of courtesy and manners. Of all of these, Welldon wrote of the primacy of honour:

> A man's sense of honour, the consciousness of his obligation to do all and more than all that can be rightly expected of him, is a conspicuous feature in noble English character. It is the distinguishing mark of a gentleman. To violate it is in common parlance, 'bad form'.[15]

The gentleman, for example, was expected to stand out from the rank and file through "a dignified bearing and an aura of command."[16] All public schoolboys would be able to lead their platoon, their company or their nation, having imbibed the qualities of leadership from their experiences in the rugby field or through service to their house. Welldon argued that local identification with their house or their school would be widened upon maturity to take in the

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15 J. E. C. Welldon, "The Training of an English Gentleman in the Public Schools", *Nineteenth Century and After,* vol. 60 (1906), pp. 396-413, p. 404.

16 Rupert Wilkinson, *op cit.*, pp. 13-14.

Empire through personal service within the army or the imperial civil service.

The public schools laid the educational foundations for a new elite that governed Great Britain for the first half of the twentieth century. Members of this elite were often called the "empire-builders", because of their overwhelming representation as district officers, army officers and colonial civil servants in films and fiction. With their "sort of slightly contemptuous, but entirely friendly, kindness towards strange foreign people", they reinforced assumptions of imperial superiority and were a strong cultural influence at home and abroad.[17] Although the cultural critics of the Left polemicised and satirised the public schools as the symbols of a class-ridden society on the grounds of one education for the rich, another for the poor, the genre of public school fiction dominated magazines for boys from the eighteen-eighties onwards. The stories of Talbot Baines Reeds and Frank Richards in *The Boys' Own Paper* and *Magnet*, provided role-models, inculcated these values and moulded generations of schoolboys from all classes. This literature was taken up by a newly literate audience who had attended the schools provided by the Education Act of 1870 and read periodicals that promoted the life and morals of the middle class. The eruption of patriotic fervour and military voluntarism during the beginning of the Great War took commentators by surprise after the industrial disputes of the Edwardian period, but its enthusiasm can be partially explained by the consequences of this literary phenomenon.[18] The value-system of the public schools,

17 Bernard Darwin, *The English Public School*, London: Longmans, Green and Co., 1929, p. 27.
18 M. Pugh, *State and Society: British Political and Social History, 1870-1992*, London: Edward Arnold, 1994, pp. 146-147.

standardised and popularised, was to retain its influence, unscathed by war or depression, until the classless myths of the Second World War. In the words of Jeffrey Richards, the influence of the public schools can be analysed as:

> the twin process of the maintenance of the existing hierarchy and class system with everyone in his place, and the absorption of a set of elite role models and values, which between them ensured social cohesion and relative stability for a hundred years.[19]

The existence of such a public school culture contributed to the culture of gentlemanly professionalism during the interwar period. This interwar culture was expressed through etiquette and behaviour amongst the professional middle-classes and was primarily associated with the civil service and the Empire. Conservative apologists would often invoke the public schools as a defence for the existing social structure and elite against the dangers of democracy or bolshevism but the professional and the commercial classes were united by their mode of speech (the Queen's English), their need for respectability and their codes of behaviour. Labour, Liberal and Conservative frontbenchers, predominantly professional in their backgrounds, were loyal to their party but united by their shared emphasis on gentlemanly behaviour. By extension, professional scientists conformed to this gentlemanly role and those who were educated at a public school practiced these manners from

[19] Jeffrey Richards, *Happiest Days: The public schools in English fiction*, Manchester: Manchester University Press, 1988, p. 20.

their teenage years.

2.3 Scientists within the Public School

Ernest Rutherford was born to a large pioneer family at Nelson in New Zealand in 1871 but this location did not appear conducive to imbibing the culture of a public school. However he was awarded a scholarship to Nelson College in 1886 and, since his family resided at Havelock, entered as a boarder. Nelson College had been modelled on Eton when it was founded in 1856.[20] The individualistic ethos that was associated with Eton was accentuated in this school since the total of eighty pupils lacked the critical mass to impose the same pressures for conformity that were institutionalised in English public schools. Rutherford's headmaster was W. J. Ford, a Cambridge M. A. who had taught classics at Marlborough and ran Nelson along Arnoldian lines.[21] Nelson contained many of the features of the public school including games, education in the classics and prizes. Rutherford also participated in the activities of the Officers Training Corps, rising to the rank of sargeant. According to Wilson, he "received a sound and very broad education" but "had at this stage shown no particular interest in science".[22] However the mere presence of Rutherford at an antipodean descendant of Eton is not sufficient evidence that he experienced the inculcation of public school customs and manners like his contemporaries in England.

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20 "Nelson College epitomised the high aims of the earliest New Zealand colonists in education. It was founded in 1856, just fifteen years after they had arrived in the new country, *yet it was planned to be an imitation of Eton College both institutionally and architecturally.*" Wilson, *op cit.*, p. 32.(my italics)

21 *Ibid.*, p. 34.

22 *Ibid.*, p. 38. Nelson's science lessons were taught in a Chemistry Room converted from a bathroom and a bootroom but a laboratory was not built until 1890, a year after Rutherford had left.

In his account of a weekend cricket match between a team of Nelson boys, stiffened by the second master William Littlejohn, against Ford and his English friend, written many years after the events as a memoir, Rutherford revealed his utilisation of this public school culture and his nativist sympathy for the Scot. Ford and his friend "plainly forgot all obligations of sportsmanship towards their opponents" and tried to score as many runs as possible. Rutherford, drawing upon the classical texts that also informed gentlemanly behaviour in England, significantly identified Littlejohn, his Scottish science master, as "the true hero of the occasion." Littlejohn bowled for over an hour and "attacked with the light of battle in his eyes" although he was "not much of a bowler." Rutherford as a spectator witnessed the defeat of Littlejohn and his team and recalled that Littlejohn had left "an enduring impression of high courage and resource under difficulties" but "in this case virtue was not rewarded." Littlejohn embodied classical virtue, a concept that was often utilised to articulate the principles of gentlemanly behaviour. His role was that of the 'good loser', the man who tries his hardest to win the game and never gives in despite the paucity of his bowling skills. Courage and resource are often described as defining characteristics for the concepts of 'manliness' and 'character'. By selecting these attributes in a teacher as part of a game of cricket, Rutherford was clearly reconstructing his hero and role-model from the cultural resources supplied by the public school. Ironically, the dastardly opponent was a public school master and Oxbridge classicist whilst the hero was a Scottish graduate and a science teacher. Rutherford's sympathies were moulded by his awareness of his Scottish ancestry and Ford's unsportsmanlike behaviour which did not live up to

expected standards of 'fair play'.[23]

The other two members of this biographical study belonged to a later generation. Huxley entered the College at Eton at the turn of the century after passing the entrance examination while Tizard became a Queen's Scholar in Westminster, in 1900.[24] The reforms at Eton under the new Governing Body established in 1872 had initiated an entrance examination for the College that embodied the Victorian enthusiasm for 'merit'. Subsequently, to become a Colleger was a mark of educational excellence and academic promise. At Westminster the reform movement was half-hearted and depended upon the enthusiasm of a reforming headmaster, William Gunion Rutherford. His plan to convert Westminster into a day school that would take in the sons of metropolitan professionals was thwarted by the governing body. He broke the monopoly of Queen's Scholars on the monitorial system and hoped to destroy their corporate existence entirely by deriding their "ordinary ability that the recognition of it as deserving of reward tends to lower the intellectual ability of the whole school."[25] However his own efforts in raising the standards of teaching persuaded the Governing Body that the Queen's Scholars were fulfilling expectations of intellectual promise. Both the College at Eton and the Queen's Scholars at Westminster became a small body of pupils of exceptional intellectual promise identified through winnowing entrance examinations. Donning the identity of the Colleger or the Queen's Scholar was an acceptance of membership in an educational elite. Both boys

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23 Rutherford Papers PA305A, Notes on W. S. Littlejohn.

24 R. W. Clark, *op cit.*, 1965, p. 7; Sir Henry Tizard, *Autobiography*, pp 17-32. Tizard Papers HTT 713.

25 John Carleton, *Westminster School: A History*, London: John Carleton, 1965, p. 74.

after preparatory schooling, were coached by their ambitious families for entrance to these prestigious communities which guaranteed a good education and a promising career. Both were recipients of the Arnoldian reforms that had reshaped the public schools for a professional clientele by emphasising education and examinations.

Both the Collegers and the Queen's Scholars were collective bodies, aware of their own prestige within their respective school communities. Their identity was based upon their historical role because their educational achievements reflected the original function of the school. The Eton Colleger was aware that his historical ancestors were the original recipients of Henry IV's charity at the start of Eton's foundation in 1439. Such an identity was reinforced by the privileges that their members enjoyed. Huxley joined the line of Collegers that witnessed Queen Victoria's coffin as it was driven into St. George's Chapel in Windsor Castle.[26] The Queen's Scholars (or King's Scholars as they became on the accession to the throne of King Edward VIII) were allowed to acclaim the monarch on his entry into Westminster Abbey.[27] Huxley said farewell to one monarch and Tizard greeted another.

Both were active participants in the rituals of royal culture and this bolstered their acceptance of the monarch, the political culture and the social status quo as the legitimate system. In his memoirs Huxley moved on from his own reminiscence of Queen Victoria's funeral to an anecdote about the unveiling of the T. H. Huxley statue in 1901 and the Duke of Edinburgh's opening of

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[26] Julian Huxley, *Memories*, London: George Allen & Unwin Ltd., 1970, p. 42.
[27] John Carleton, *op cit.*, pp. 108-109.

Huxley Wing in the late 50s. Whereas the Prince of Wales "regretfully declined" to unveil this statue in 1901 because of T. H. Huxley's unorthodox reputation even after death, the Duke of Edinburgh provided the required royal seal of approval at this later display.[28] An earlier royal slight was overturned by T. H. Huxley's induction into the 'architectural' establishment.

The King's Scholars enjoyed a number of ancient privileges concerning the monarchy and Parliament. Tizard was one of the group that shouted ""Vivat Rex Edwardus" on the coronation of King Edward VII. He was also allowed to visit Strangers Gallery at the House of Commons in the late afternoon if he was wearing his school gowns. Tizard was affected as Clark records that he "enjoyed this [coronation] as throughout his life he was to enjoy the splendour and colour of materially useless but spiritually uplifting ceremonies"[29] and the scientist himself wrote that, "Westminster was a splendid school for boys of sensibility. We had history all around us, history made and in the making."[30] Such ceremonies allowed Huxley and Tizard to feel that they were part of their collegiate bodies within the greater corpus of the nation and served as part of their education in the legitimacy of monarchy and empire.

Public schools not only educated their pupils in the values of imperialism and respectability, but also imparted the customs and etiquette that defined the naturalised gentlemanly professional. Both collegiate bodies were structured and hierarchical with a system of customs and rituals to define and place

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28 Julian Huxley, *op cit.*, p. 42.
29 Ronald Clark, *op cit.*, p. 7.
30 Sir Henry Tizard, *Autobiography*, p. 30.

each boy in the relationships of power within the school. Huxley had to begin his school career in the Long Chamber where he acted as a fag to the sixth form. As soon as he arrived, his inferior status was brought home to him by his duties as a fag which included running errands, making toast or completing any task that his fag-master desired. Moreover in Long Chamber the junior boys had to close the curtains and fetch the water. The community was presided over by a captain who could punish transgressors of the laws of the Long Chamber with a syphon, an unusual type of cane. Huxley records that his first year at Eton "wasn't very happy."[31] His contemporary in College was Henry Moseley, a future physical chemist, who described the experience in a letter to his mother as an "absurd fag plan" that involved responding to any sixth-form boy who called 'Here'.[32] After two terms the pupil was able to move into his own room in Passages and leave this junior community behind.

Once in Passages the pupil entered the middle ranks of the school where gradations of privilege marked out the senior from the more junior. Huxley had no difficulty in adapting to the mores of the Collegers and directed his loyalties towards the group. He became firm friends with Moseley, who shared his interest in birdwatching and they would go on ornithological expeditions together.[33] Both played in the games that allowed the houses and the College to compete with each other and allowed each pupil to demonstrate their sporting prowess. Amongst the Oppidans, the name for the majority of Etonian pupils who did not belong to College, athletic ability was

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[31] Julian Huxley, *op cit.*, p. 39.

[32] J. L. Heilbron, *H. G. J. Moseley: The Life and Letters of an English Physicist, 1887-1915*, London: University of California Press, 1974, p. 15.

[33] *Ibid.*, pp. 14, 145.

often the passport to securing popular status with one's peers since triumph on the playing fields contributed to the reputation of one's house.[34] Huxley was not immune to the 'fever' of athleticism. When he attained his College Field (the Eton name for Colours) he "was so childishly proud of it" that he wore the purple and white blazer, scarf and cap whilst out cycling during the next Christmas holidays and practised hurdling and high-jumping in his vacations.[35] Moseley as a rower was quite anxious to gain his boats (the college colours for the rowing teams) and made anxious references to this in his letters before recounting that J. R. Somers-Smith, the captain of the Boats, who was "generally considered to be quite unfit for his post" had finally "woken up to a sense of his duties."[36] Both were aware of the status that accrued to those who gained their colours and systematically worked to achieve this. Neither had any difficulty in conforming to the pressures that College placed upon its pupils to assimilate.

Tizard's school career proceeded along similar lines at a different but equally antiquarian institution. Indeed, he did not share the amenities that a reforming Eton had placed at the disposal of its pupils. The King's Scholars were divided into four elections and the Seniors. Each election was only allowed to speak to other pupils in the same election or the elections above and below them. The Junior had to learn the language of the Scholars within the first fortnight and obey the "innumerable small rules" that governed the hierarchy

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[34] The Oppidans were the pupils who did not belong to College. The name derived from their original habitation within the town. There were over nine hundred Oppidans and approximately seventy Collegers.

[35] Julian Huxley, *op cit.*, p. 47.

[36] J. L. Heilbron, *op cit.*, pp. 151, 160-161.

of the elections. Fagging was accepted and the beatings by the monitors were "frequent". The King's Scholars also maintained a more independent existence from the life of Westminster than the Collegers did at Eton. Whereas the headmaster of Eton, Edmond Warre, promoted athleticism and encouraged the Volunteers, William Rutherford at Westminster tried to prohibit the practice of rowing. Games and a cadet corps were only instituted under Rutherford's successor, Dr. James Gow, after 1901. This cultural invasion of athleticism and militarism did not impinge upon Tizard's schooling and he did not experience a competitive atmosphere similar to Eton.[37]

Unlike Huxley, Tizard had begun at Westminster as a normal fee-paying pupil on a mathematical scholarship and had belonged to the house known as Rigaud's. He had initially failed the entrance examination known as the Challenge to become a King's Scholar and did not enter an election until 1900, a year after he entered the school. Compared with the Collegers, the King's Scholars were far more exclusive, forming a "small and academically aristocratic" world. The forty members regarded themselves as "the senior branch of the school" and maintained their exclusivity through social distance as well as superior examination results. They lived in a cold dormitory divided into cubicles and all the boys had to share one cold shower or cold baths. Like Huxley and Moseley, Tizard found his first two terms as a fag to be "miserable" since they were treated as "the scum of the earth" and suffered rituals of "mental cruelty".[38] His school life progressively became more

[37] John Carleton, *op cit.*, pp. 80-82.

[38] Sir Henry Tizard, *Autobiography*, pp. 21-22. "Another custom was this. In Play term the dormitory was half gutted to make room for a stage and auditorium. The juniors had to crawl under the stage while the older boys waited with knotted towels to greet them as they emerged."

pleasant and accumulated more privileges as his career progressed but because he entered in a mid-term election, he remained as a junior for one year longer than normal and found this "very galling".[39] Tizard had conformed to the culture of the King's Scholars by the time of his departure and meted out the same pain to fags as he had endured as a junior.[40]

Huxley found the scientific facilities at Eton to be extensive. The school had laboratories and employed three science masters in chemistry, physics and biology. As a member of College, Huxley only took Biology as a school subject because he did not expect to study it after he had left Eton since he was preparing for a secure professional career in the Civil Service.[41] He was taught by M. D. "Piggy" Hill, and attributes his choice of career to this biologist's "genius as a teacher" which resulted in the pupil's understanding of "the excitement of Zoology". He was encouraged to pursue his interests in biology and devoted much of his free time to bird watching or drawing and dissecting in the laboratory.[42] Huxley's subsequent and eminent career as a zoologist was triggered by the intellectual cradle of Eton's College and the enthusiasm of his teacher. On the other hand, Tizard's choice of science was disapproved of at Westminster. At Rigaud's he had studied mathematics, science and divinity, with sets for modern languages and Latin. Westminster had only one science master, E. C. Sherwood, who specialised in chemistry, and had arrived at the school in 1901. Tizard recalled that his science lessons involved "pouring the fluid of electricity from one tin can to another

39 *Ibid.*, p. 23.
40 Ronald Clark, *op cit.*, p. 7. Sir Henry Tizard, *Autobiography*, p. 22.
41 Julian Huxley, *op cit.*, p. 45.
42 *Ibid.*, pp. 45-46.

"and that there "was no-one to give...any real inspiration" to study the subject. To pursue his interest in physics, Tizard had to supplement his science lessons by reading the *Proceedings of the Royal Society*.[43] The teachers were unable to give Tizard any advice about where to pursue university education in physics whereas Huxley could use his family contacts to enter the examination for a Magdalene scholarship at Balliol College, Oxford. Tizard believed that he should have been directed to Cambridge, but the housemaster of the King's Scholars, the Reverend A. G. S. Raynor, was a classicist, who disliked the presence of boys studying a modern syllabus. Tizard was the first of these and Raynor told him not to expect the usual scholarship to Christchurch or Trinity because these were not available to "scientists". These adverse conditions reinforced Tizard's interest in science and his self-identification as a scientist in a world of classicists.

2.4 Conclusion

These individual examples do not allow generalisations about the question of whether a public school education aided or hindered those pupils who sought a scientific career. It does not provide resources for Corelli Barnett or his critics in their debates about the contribution of education to elite culture and relative decline. This chapter demonstrates that if a scientist was educated at a public school, he was marked by the experience. Such arguments are confirmed if one looks at scientists who were educated at a public school but who rebelled against the loyalties to King and Empire. Gary Werskey's collective biography of scientific socialists includes three of this ilk and

[43] Sir Henry Tizard, *Autobiography*, pp. 25-26.

compares them with two other scientists of working class background. Joseph Needham, J. D. Bernal and J. B. S. Haldane all attended public school and Oxbridge. Haldane succeeded where Huxley and Moseley failed in becoming Captain of the School and a member of the exclusive club, 'Pop' at Eton.[44] Their positions at Cambridge and their scientific reputations assured them elite recognition through Fellowships of the Royal Society, despite their membership or association with the Communist Party of Great Britain. Hyman Levy and Lancelot Hogben never saw an opportunity in their careers to ascend the ladder and join the scientific elite. Their bearing and education did not mark them out as gentlemanly professionals. Even if scientists adopted political ideologies opposed to the dominant socio-economic system in Great Britain, their education at a public school and Oxbridge was sufficient to assure their entrance into elite institutions within the scientific world. The mannerisms and attitudes of an old boy marked him for life, whatever his beliefs.

[44] Gary Werskey, *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*, London: Free Association Books, 1988 [1978], p. 54.

Chapter Three

GENTLEMANLY VALUES AND SCIENCE DURING THE TWENTIETH CENTURY

3.1 Introduction

The last chapter established that certain eminent scientists of the interwar period had been educated at a public school and shaped by its values. Although they had chosen their future careers in science by the time they reached Oxbridge, the public school was far less important than the university in the professional training and career orientation of the majority of scientists. This chapter examines how the values and codes of conduct instilled by the public school were reinforced by university education and utilised within science. This is initially achieved by following the careers of the three subjects from the previous chapter into Edwardian academia. The focus of this chapter is then widened by studying the death of Henry Moseley at Gallipoli in 1915 and his posthumous transfiguration by eminent members of the scientific profession into a symbol of waste for the war effort. His death provides an appropriate chronological pause to analyse the disillusionment with the Edwardian values of imperialism and chivalric duty as mediated through the public school. The movement from the individual career to the experience of the wider profession is completed by an analysis of the articulated professional aims of men of science under the radicalising pressures of the First World War which demonstrates how public school values were both utilised, transformed and attacked in their campaign.

3.2 The Gentlemanly Education of Scientists within the University

Jerome Ravetz was one of the first contemporary theorists to include gentlemanly values within his historical sociology of science. He argued that scientific work between 1789 and 1945 was debated amongst small networks and autonomous communities of gentlemen located primarily in the departments and laboratories of universities.[1] Apart from the implicit assumption that the gentleman was a member of the aristocracy or upper middle class who had devoted his career and substantial financial resources towards science, Ravetz's concept of the academic gentleman was moulded by traditional representations of gentlemanly behaviour:

> Because of the nature of their work and its investigation, its institutional context and the social basis of recruitment, most of the members of such [scientific] communities would be gentlemen, who could be motivated to act by goals more *refined* than the mere acquisition of wealth or power.[2]

In an argument similar to Corelli Barnett's, Ravetz defined gentlemanly behaviour as a form of idealistic action. His gentleman of science was motivated by a moral ideal of pure science which was aesthetically more pleasing than the pursuit of profits or political power and incorporated the traditional gentlemanly myth of antipathy to 'trade' and industrialism in "the mere acquisition of wealth".

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[1] Jerome R. Ravetz, *Scientific Knowledge and its Social Problems*. Oxford: Oxford University Press, 1972 [1971], p. 41.

[2] *Ibid.*, pp. 40-41. (The italics are mine).

Yet Michael Sanderson's historical survey of the links between British universities and industrial firms proved that academic science was increasingly oriented to the needs of British industry and that a large proportion of science graduates gained employment in the private sector after the First World War.[3] It is hard to reconcile his findings with Ravetz's generalised picture of the academic scientist, working in his laboratory for an ideal of pure science and limited to an audience of his professional peers. Sanderson does not exaggerate the importance of science in British universities and he argues that some, especially Oxbridge colleges, were most effective in reorienting students from a commercial or industrial background towards the professions. In this role, they were complementing the institutional aims of the public school.[4]

Sanderson argues that one partial cause for this professional bias was the representation of business and commerce as an unsuitable career by academics and he quotes literary texts like *Tom Brown's Schooldays* as evidence of a hostile attitude towards industry.[5] However utilising hostile images of the businessman in literature as effective proof of a cultural hostility to modernisation and technology has been undermined by Harold

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3 Michael Sanderson, *The Universities and British Industry, 1850-1970*, London: Routledge & Kegan Paul, 1972, pp. 243-313. Science graduates had to choose a career in industry, teaching or academia which lent an air of insecurity to this choice of profession.

4 *Ibid.*, pp. 54, 60.

5 *Ibid.*, pp. 51-52.

James's comparison of literary Luddism in British and German fiction.[6] Moreover Sanderson had shown, previous to this, that public school alumni would fill science and engineering courses at Oxbridge if these were available. When Oxford University established its engineering department in 1907, the thirty students who took its courses per annum were "mostly public school boys".[7] Another Edwardian innovation was the Cambridge Appointments Association which aimed to marry prospective commercial and industrial employers with jobseeking graduates. The result was "a marked improvement in channelling [graduates] into business careers around 1900 and up to the war" dispelling any argument of an anti-industrial bias in attitudes or career choice amongst Cambridge academics and public school alumni.

The motivation for the majority of graduates seeking a career in the professions was not an engrained hostility to a commercial or a scientific life but a search for security and stable employment. The traditional professions guaranteed a prosperous income and middle-class status after further education whereas employment in commerce or industry (where science graduates were increasingly employed) did not contain similar incentives.[8] One example is Julian Huxley who was originally preparing to enter the Civil

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6 Harold James, "The German Experience and the Myth of British Cultural Exceptionalism" in Bruce Collins and Keith Robbins, eds., *British Culture and Economic Decline*, London: Weidenfeld and Nicolson, 1990, pp.91-128; See also Neil McKendrick, "'Gentlemen and Players' Revisited: the gentlemanly ideal, the business ideal and the professional ideal in English literary culture" in N. McKendrick and R. B. Outhwaite, *Business Life and Public Policy: Essays in Honour of D. C. Coleman*, Cambridge: Cambridge University Press, 1986, pp. 98-136.

7 Michael Sanderson, *op cit.*, p. 39.

8 W. D. Rubinstein, *Capitalism, Culture and Decline in Britain, 1750-1990*, London: Routledge, 1993, p. 125.

Service at Eton and only took up zoology because of the influence of his teacher.[9] Any interpretation of gentlemanly professionalism and science has to include these arguments which indicate that the subject was greeted with indifference rather than hostility. T. H. Huxley had written about this indifference and Peter Alter, author of a general study on late -Victorain British science, concluded that "appreciation of science and the social standing of scientists were low in Britain".[10] There was no cultural bias against science except one of apathetic neglect.

This attitude of indifference to the choice of a scientific subject at university can be tested by studying the experience of scientific students within the context of the Oxford college and the Cavendish Laboratory. The scientific students would find that the values and attitudes learned at public school would be reinforced through life in the college and laboratory. Huxley, Moseley and Tizard went up to Oxford as public school men who behaved and expected to be acknowledged as gentlemen now that they had attained their majority. Rutherford began work in the Cavendish Laboratory under the tutelage of Professor "J. J." Thomson and adapted his colonial mores to metropolitan needs.

The pupils had spent their entire education at public school being taught that their loyalties were towards the communities within which they lived: the intimate world of the College or the Queen's Scholars, the communal

9 Julian Huxley, *Memories*, London: Penguin Books Ltd., 1972 [1970], p. 45. "...the Civil Service then appeard to be my future career."

10 Peter Alter, Translated by Angela Davis, *The Reluctant Patron: Science and the State, 1850-1920*, Oxford: Berg, 1987, p. 217.

universe of Eton and Winchester, the abstract cosmos of Britain and the Empire. These interdependent rings formed the boundaries and building blocks of their identity. As Rupert Wilkinson has argued:

> ...he [the public schoolboy] followed group opinion, but he did so at least partly because group opinion and group taste represented the community and its traditions. These traditions he largely internalized: they became internal obligations. The public schoolboy felt *obliged* to co-operate as an act of 'good taste', just as he felt *obliged* to honour the community.[11]

Once they had left the school many public schoolboys maintained a sense of belonging that was directed to new educational institutions like the Oxbridge colleges. These tended to harden the values and manners that the public schools had inculcated into their pupils:

> Above all, the Trinity man, like the Etonian and most undergraduates, took care to avoid 'bad form', 'snobbishness', and excessive commitment of any kind; in a word, he strove to conform. "Nothing astonished me more than the uniformity of ideas and behaviour among my fellow undergraduates." Thus the distinguished historian E. L. Woodward, who came up in 1908, writing about ordinary old school boys, "numb to all intellectual interests", "bothered by public opinion [and]

11 Rupert Wilkinson, *The Prefects: British Leadership and the Public School Tradition*, London: Oxford University Press, 1964, p. 61. (My italics)

frightened by originality"...[12]

The culture of the public school was reproduced amongst the undergraduates of the university colleges who upheld the same standards of etiquette, played the same competitive games in intercollegiate competitions and demonstrated the same sensitivity to their reputation in the collegiate community as they did in the public school.

Moseley was an excellent example of a scientific student conforming to the expectations of his peer group within his college. In a letter to his sister from Balliol College in Oxford, Moseley described his activities in the Officer Training Corps:

> But of exercise I have had little lately, excepting such as my military duties demand. I am an antimilitarist for myself at any rate, by conviction, a soldier by necessity. I can find no sound argument with which to confute the advocate of universal service, and I am therefore forced either to appear military myself or to argue on what seems to be a losing side.[13]

Moseley did not sympathise with the militaristic arguments put forward for conscription but felt impelled to take up military training because his public school education ensured a predisposition towards fulfilling the expectations

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[12] J. L. Heilbron, *H. G. J. Moseley: The Life and Letters of an English Physicist, 1887-1915*, London: University of California Press, 1974, p. 28.
[13] *Ibid.*, p. 167.

demanded by his patriotic colleagues in his college. Such a response was by no means inevitable since Huxley remembered his time at Oxford as an opportunity for intellectual exploration and Tizard "held aloof" from the Officers Training Corps since Westminster had not equipped him for participation in these exercises. He preferred less militaristic activities.[14]

Huxley remembered his time at Balliol as one of intellectual exploration marred only by the untimely death of his mother. He lost touch with former school friends from Eton who joined "the smart and rather rowdy set" but made up for this by participating in the Oxford Bach Choir and the weekly debates of the Brackenbury Society.[15] Huxley's Balliol idyll was complete with bicycling, punting and walking amongst his student peers whilst parental contacts introduced him to "senior acquaintances" including the Haldanes.[16] At night, the promising biology student would leave these respectable activities behind him and indulge in "roof-climbing", clambering over the tops of Oxford dwellings and colleges in the company of a friend and leaving evidence of their path - they set the hands of Trinity College's clock in the wrong position.[17] This dangerous leisure pursuit had to be undertaken "in darkness and silence, for fear of the college authorities or the police", adding to its challenging and competitive nature. Roof-climbing was an illicit competition which Balliol students undertook to test their courage and strength. Huxley's own admiration for his more courageous predecessors was a testament to this:

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14 R. W. Clark, *Tizard*, London: Methuen & Co. Ltd., 1965, p. 21.
15 Julian Huxley, *op cit.*, p. 59.
16 *Ibid.*, p. 60.
17 *Ibid.*, p. 66.

> There was a particularly nasty bit at the back of Balliol Hall where one had to put one's leg round a corner, trusting that the foot would encounter a projecting water-spout. The man who first surveyed this route must have been a cool and daring fellow.[18]

While Huxley climbed on the roof of Magdalen College, Tizard slept underneath, tired out from the games which he had studiously avoided at Westminster. Tizard found that Magdalen was a college specializing for the "idle rich", with cliques of Old Etonians and Old Wykehamists dominating the social scene.[19] Tizard was one of the poorest students in a college where these cliques determined the standards of conspicuous consumption and a social hierarchy based upon one's strength in rowing. Magdalen "was known for its exploits on the river" and "Magdalen men themselves had an air of conscious superiority over the other colleges".[20] In this athletic atmosphere, Tizard tried to compete by taking up football, hockey and rowing but was unable to make the college teams and gave up after becoming a symbol of abuse for a rowing coach. He took up tennis, golf, bicycling, and walking instead while condemning the air of sporting superiority affected by Magdalen men as "superficial".[21] Tizard was divided from many other members of his college because he lacked the money and the talent to compete with their sporting way of life. However he competed. failed, and then found other social pursuits within this context of college life.

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[18] *Ibid.*
[19] Sir Henry Tizard, *Autobiography*, Tizard Papers HTT713, p. 35.
[20] *Ibid.*
[21] *Ibid.*

Tizard and Huxley encountered no hostility or adverse reaction to their chosen academic subjects of science during their course of study. Both led a normal life as students, participating fully in the facilities that collegial life offered them and a public school education had prepared them for, but they did not leave with a sense of loyalty to their former colleges or school. Huxley became a Fellow of New College, Oxford after the First World War and did not evince any special affection for his old college.[22] Tizard chose to promote Imperial College where he was Rector during the nineteen-thirties. Moreover, they did not consider a commercial career but aimed for a position within academic science. Their professional career paths were oriented towards research and an academic position complemented the professional bias of their education at public school. Huxley and his Balliol contemporary, Henry Moseley, concentrated on pure research in "scientific birdwatching" and nuclear physics respectively.[23] Moseley could rely upon his inherited wealth and detailed the formula known as Moseley's Law as an unofficial researcher in Professor Townsend's laboratory at Oxford. Huxley quickly opted to move from a poorly paid lectureship in Balliol to the far wealthier Chair of Biology at the Rice Institute in Houston, Texas, when he was offered the post. Tizard continued his scientific studies in physics at Berlin. All three were dedicated to advancing their career within the scientific profession through further research and study.

This professional bias also affected Rutherford's choice of career and research before and after his arrival in England. After passing his first degree

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22 Julian Huxley, *op cit.*, pp. 114-147.
23 *Ibid.*, p. 79.

in New Zealand, Rutherford followed the popular route of science graduates into teaching but found the job of teaching physics in a secondary school "a very miserable occupation" and ventured into the insecure world of scientific research overseas. He continued his research programme investigating radio waves when he first came to the Cavendish Laboratory at Cambridge University.[24] Rutherford's move into Roentgen rays (X-rays) after a few months was partially determined by the failure of his research programme into a radio wave detector although he had hoped to benefit financially from its application. It was unable to provide him with a long-term series of experiments in pure research and investigation into its applications was undermined by the large amount of capital required. Lord Kelvin had advised that one hundred thousand pounds was a reasonable sum.[25] Rutherford was more successful in his initial research than Marconi but the only profitable application he could imagine was:

> If I could get an appreciable effect at ten miles, I would probably be able to make a considerable amount of money out of it, *for it would be one of great service* to connect lighthouses and lightships to the shore so that signals would be sent at any time.[26]

The contrast with the commercially minded Guglielmo Marconi is enlightening. Rutherford did not have the commercial skills or the social

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[24] David Wilson, *Rutherford: Simple Genius*, London: Hodder and Stoughton, 1983, p. 61.
[25] *Ibid.*, p. 91.
[26] *Ibid.*, p. 95. (My italics)

contacts necessary to raise the finance for the development of the wireless telegraph. He did not patent his scientific research which was more advanced than Marconi's efforts and chose to follow an experimental programme in X-rays which incorporated the advantages of scientific fashionability and conformed to the Cavendish 'school of research' under Thomson. Rutherford had already dealt himself one favourable hand in leaving New Zealand and chose to abandon a potentially profitable technology to secure his professional position in the Cavendish.

3.3 Scientific Service during the Great War

> The theory before the war started was that the UK wasn't going to make the same mistake as in the First World War when some of our most brilliant scientists went in and were shot almost immediately.
>
> Lord Penney[27]

The beginning of the First World War demonstrated that many scientists subscribed to the values of patriotism and militarism that moulded the concept of duty in the service of the country. The historian Trevor Wilson stated that "budding men of science showed the same readiness for combatant service as budding men of letters". Thirty-five Fellows of the Royal Society and fifty-five members of the Royal Institute of Chemistry died in

[27] P. Hennessy, *Whitehall,* London: Secker & Warburg, 1989, *p. 88.*

active combat.[28] Two of Huxley's biology teachers at Oxford, J. W. Jenkinson and Geoffrey Smith, fell - the latter's "brilliant career was cut short when he was killed on the Somme".[29] Huxley himself had returned to Texas in September 1914 after the suicide of his brother Trev and embarked upon a bout of soul-searching:

> Meanwhile I did a lot of thinking, and decided that I ought to go home next year and do something about the war. So long as I was resident in the USA, I was not liable to be called up, but I felt that to go on like this was shirking my duty.[30]

Tizard and Moseley enthusiastically returned from their sojourns in Australia to join up, cutting short their tour with the British Association for the Advancement of Science. Tizard "was one of those who leapt to arms unbidden".[31] Moseley was so enthusiastic about his forthcoming military training that he read War Office manuals and practised the Morse code.[32] Service to one's country was the culmination of the values and attitudes that the public school had taught to its pupils. Their shared education led to a zealous embrace of military service. Private obligations of duty were combined with social pressure to join up. This expectation overrode the weak

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28 Trevor Wilson, *The Myriad Faces of War: Britain and the Great War, 1914-1918*, Cambridge: Polity Press, 1986, p. 632; M. Sanderson, *op cit.*, p. 218. "The assumption underlying this prodigal dissipation of university talent in the volunteering period before conscription was clearly that the war was to be a short, sharp one and would not require the careful husbanding of scientific talent for developments that would take years rather than months."

29 Julian Huxley, *op cit.*, p. 115.

30 *Ibid.*, p. 101.

31 Ronald Clark, *op cit.*, p. 23.

32 J. L. Heilbron, *op cit.*, p. 250.

professional call of science. Moseley was unwilling to accept a scientific appointment in the military. His concept of duty demanded active service at the front and he did not believe that scientific research could contribute to the war effort.[33] Huxley, unfit for frontline service, eventually found a niche in the Intelligence corps and Tizard gained a position as a scientific officer in the Royal Flying Corps. Only Moseley was killed: as a radio officer in the Dardanelles on 10th August 1915 when the Turks overran his position.

Moseley's death was not celebrated by those scientist-obituarists as an example of their own willingness to sacrifice their lives for their country. It was condemned as a waste:

> It is a national tragedy that our military organisation at the start was so inelastic as to be unable, with few exceptions, to utilise the offers of services of our scientific men except as combatants in the firing line. Our regret for the untimely end of Moseley is all the more poignant that we cannot but recognise that his services would have been far more useful to his country in one of the numerous fields of scientific enquiry rendered necessary by the war than by exposure to the chances of a Turkish bullet.[34]

Rutherford adopted a number of proteges in his long scientific career and

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[33] E. Ray Lankester, "Henry Gwyn Jeffries Moseley", *Philosophical Magazine*, Series 6, vol. 31 (1916), pp. 173-176.

[34] E. Rutherford, "Henry Gwyn Jeffries Moseley", *Nature*, vol. 96 (1915), p. 34.

Moseley was one of the first to enjoy this close, personal tie. Moseley's death coincided with a rising tide of protest in the scientific community at the inability of the government to organise and marshal its scientific resources.[35] Obituaries of his gallant sacrifice and role as a "brilliant physicist" appeared in the national newspapers. The obituary in the Manchester Guardian, penned by Rutherford, appeared on Wednesday, September 8th, 1915. This was the day after the opening of the BAAS meeting in Manchester and the same newspaper contained Professor Arthur Schuster's presidential speech and a report on the wounding of Schuster's son. Readers of the newspaper read the anxieties of the scientific community concerning the failure of the authorities to apply science to problems raised by the war and the obituary of Moseley. Whether any scientist had the connections to manipulate the agenda of the Manchester Guardian is unknown, but this formed one of the first articulated links between the late Moseley and the more general claims of scientists.[36]

Moseley's death became emblematic of the 'lost generation' of scientists for both the scientific and the historical communities.[37] This representation of Moseley is hinted at in these obituaries but the process whereby it was popularised, accepted and utilised within the scientific community remains a problem that requires research. Rutherford's tentative patriotism in the

35 Ian Varcoe, "Scientists, Government, and Organised Research in Great Britain, 1914-1916: The Early History of the DSIR", *Minerva*, vol. 8 (1970), pp. 192-216.

36 [E. R.], "Lieut. H. G. J. Moseley: A Brilliant Physicist", *Manchester Guardian*, September 8th, 1915.

37 Reginald Pound, *The Lost Generation*, London: Constable & Co., 1964, p. 177; Michael Sanderson, *The Universities and British Industry, 1850-1970*, London: Routledge & Kegan Paul, 1972, p. 218; Arthur Marwick, *The Deluge: British Society and the First World War*, London: The MacMillan Press Ltd., 1965, p. 228; J. D. Bernal, *The Social Function of Science*, London: George Routledge & Sons Ltd., 1939, p. 171; M. Sanderson, *op cit.*, p. 218.

obituary he wrote on Moseley for *Nature* was the only articulation of the public school values in the whole episode and the message concerning waste was also included:

> Scientific men of this country have viewed with mingled feelings of pride and apprehension the enlistment in the new armies of so many of our most promising young men of science - with pride for their ready and ungrudging response to their country's call, and with apprehension of irreparable losses to science.[38]

This continued emphasis upon science and the narratives of Moseley's brilliance in his experimental results formed part of a process of myth construction. Moseley's choice of dying for his country as a higher duty than working in the application of scientific knowledge to the war effort was neglected and ironically reversed after his death to strengthen the professional ideals of science and its claims for political and cultural importance. The potential of Moseley and the 'career cut short' became components of this new myth. If he was to discover Moseley's Law in his short research career then think about what he might have achieved. "The premature death of a young man of such brilliant promise was everywhere recognised as an irreparable loss to science."[39] The theme of scientific sacrifice pervaded this myth and formed part of a wider campaign within the scientific community to gain recognition from the government.

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[38] E. Rutherford, *op cit.*, p. 33.

[39] Sir Ernest Rutherford, "Henry Gwyn Jeffries Moseley (1887-1915)", *Dictionary of National Biography (1912-1921)*, London: Oxford University Press, 1927, p. 390.

The choice of Moseley as scientific hero reflected the personal relationships he cultivated with the small 'village community' that formed the scientific elite in England and the position of most scientists away from the Front. His father had been a close friend of E. Ray Lankester and his mother maintained a cultured social round of dinner parties and gatherings that included many of the leading scientific lights at Oxford. By moving to Manchester and taking a position under Rutherford, he was adopting as a patron one of the leading physicists in England whose star was rapidly ascending into the firmament. Moseley had been friendly with Huxley at Eton and Oxford but the trip to attend the British Association meeting being held in Australia during the summer of 1914 introduced him to Tizard and the elite. Tizard was lucky to sail on the prearranged boat from Britain via Cape Town where he met Sir James Jeans, Sir Thomas Holland, Sir Oliver Lodge and, most importantly of all, Rutherford. This latter friendship was cemented by the adhesive qualities of the game of deck-tennis where Tizard served as Rutherford's partner.[40] Moseley sailed via Canada and joined up with this social gathering in Australia itself. There is no record that Tizard and Moseley knew each other at Oxford, but given the small number of academic scientists there, it is unlikely that they had never met previous to this. However Tizard's new friendship with Rutherford was a link with the 'scientific establishment' and by the end of the trip, he returned to England with Moseley and shared a cabin with him. Both joined forces in attempting to lobby the War Office to gain their preferred positions.[41] After this BAAS meeting, Tizard and Rutherford

40 Ronald Clark, *op cit.*, p. 21.

41 J. L. Heilbron, *op cit.*, pp. 115-116; Ronald Clark, *op cit.*, p. 23. Sir Henry Tizard, *Autobiography*, pp. 73-77.

maintained their close friendship for twenty-three years until the latter's death.[42]

The First World War triggered a profound disillusionment with the values of athleticism and militarism amongst the junior officers recruited from public school alumni and this combined with a more general backlash against the promises of the war, following the lowering of political expectations during the mass unemployment of the nineteen-twenties. A rash of memoirs in 1928 denounced the idealism of the Edwardian period and argued that the government had not played fair with the veterans. However, many scientists held positions within the institutions that coordinated and conducted research for the armed forces. The common feature of the careers of such individuals as Tizard, Professor A. V. Hill, Sir Alexander Watson-Watt and P. M. S. Blackett was their shared military experience as officers and researchers. They did not share this disillusionment with those junior officers who had served at the Front and felt no compunction in progressive research towards their country's defence. Nor did this disillusionment divide them along political lines since Tizard had no difficulty with working under a Labour government while Blackett was a noted socialist when he served on the Tizard Committee supervising radar for the Chamberlain administration. For the scientists employed by the armed forces, duty transcended formal political beliefs.

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[42] David Wilson, *op cit.*, pp. 341, 489.

3.4 The "Classics-Science" Controversy

The *laissez-faire* approach of the British government to science proved inadequate to the scientific demands of the First World War.[43] The organisation of science undertook a "quantitative leap" as the resources of the universities were devoted to the war effort.[44] Complementing this infusion of state funds and rise in status was the "arousal of science" - organised demands for greater recognition of science as a profession. Intimations of a greater desire for professional recognition had already been demonstrated in the programme of 'Science and the State' in the pages of *Scientific Progress*. This called for greater financial assistance from the state, salaries (euphemistically called pensions) for scientists and a National Union of Scientific Workers.[45] Such programmes formed part of a wider professionalising movement amongst scientists to correct their lower status in the wider community:

> Their pursuit of social legitimation and acceptance as a profession with economic and social privileges was expressed most clearly in the creation of large professional associations, encompassing all scientists, which functioned as pressure groups.[46]

The British Science Guild, founded by Sir Norman Lockyer in 1903, was the first of these but the First World War added to the list, including the Institution

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43 Peter Alter, *op cit.*, pp. 246-248.
44 *Ibid.*, p. 250; M. Sanderson, *op cit.*, pp. 214-242.
45 'Science and the State', *Scientific Progress*, vol. ix (1914-1915), pp. 197-208.
46 Peter Alter, *op cit.*, p.231.

of Professional Civil Servants, the National Union of Scientific Workers and the British Association of Chemists.

This professionalising agenda was taken up by spokesmen from all parts of the scientific community after the outbreak of war ranging from obscure engineers to the most famous fictional promoter of science, H. G. Wells. Their aim was widened from lobbying the government to raising the political and cultural island of science from the Sargasso sea of indifference affecting the state and populace. L. A. Legros, President of the Institution of Automobile Engineers, hammered home this message in his address which was sympathetically reproduced in the columns of *Nature*:

> Never...in the history of engineering has the ignorance of science by the politicians, the military and the other authorities, been so openly displayed as in the early stages of the war and never has it proved so costly in time, in life and in substance.[47]

Scientists and their propagandists insisted that the poor conduct of the war could be blamed upon the scientific ignorance of the governing elite: the politicians, the civil servants and the generals. H. G. Wells was at the forefront of this charge: "Our lawyers and politicians had failed lamentably from want of scientific and practical knowledge, but they could not be exterminated."[48] Wells was gracious enough to concede that his favoured solution for social problems, the complete eradication of the irrational and

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47 "University and Educational Intelligence", *Nature*, vol. 98 (1916), p. 182.

48 "Science in Education and the Civil Service", *Nature*, vol. 97 (1916), pp. 230-231, 231.

degenerate peoples who stood in the way of progress, might be too extreme in this particular instance.[49]

Their concept of science and its application in the political sphere was drawn up in Social Darwinist terms. This complex of biological and progressivist ideas had influenced intellectuals across the whole political spectrum for over thirty years. The war added a sense of urgency. Although eminent men of science like Sir Norman Lockyer had argued that science was essential to the continued prosperity and well-being of the Empire, they had tended to perceive the process of competition between nations in terms of economics rather than war. But as Sir E. A. Schafer declared, "it [science] is necessary for our prosperity - nay, for the continuance of our very existence".[50] However, their claims for science were socially universal rather than limited to any specific facet of society. Science was of "all-pervading existence" and "the very warp and woof of the web of human existence".[51] Integral to every aspect of human life, science was the motor of progress in advancing civilisation and human knowledge.

This was not the cosmopolitan and rational project of progress that the Enlightenment and its nineteenth century liberal descendants had subscribed to. Competition between nations and cultures was the driving force of competition and the development of scientific research and its application to

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[49] John Carey, *The Intellectuals and the Masses: Pride and Prejudice among the Literary Intelligentsia, 1880-1939*, London: Faber & Faber Ltd., 1992, pp. 118-134.

[50] Sir Edward Schafer, "Science and Classics in Modern Education", *Nature*,vol. 97 (1916), pp. 251-252, 252.

[51] Professor D. Fraser Harris, "The Man of Science in the Community of To-day", *Nature*, vol. 99 (1917), pp. 236-238, 237.

industrial, commercial and martial problems. Some included moral and cultural progress in this programme. The Great War was legitimated in scientific terms as a moral crusade as well as a biological struggle. These ideas developed during wartime and bound science into a nationalist straitjacket. Science in Germany was "science prostituted" and "malevolent only when divorced from common sense and common morality by the obsessions of self-hypnotised Prussians". At the same time the cultural neutrality of science was maintained. It was misused in Germany because of "Teutonic brutality".[52] The traits of the race concerned determined the use of science. Most of these scientists subscribed to an anthropological conceptualisation of science and traced the roots of natural philosophy back to the primitive yearnings of individual men to explore and control their environment. Thus science became a fundamental part of human culture and the dynamo of progress due to its force as a biological urge. Accusations of science as inhumane and artificial could be counterattacked by claims of science's cultural primacy.

This anthropological conceptualisation of science translated into political flexibility. Men of science could cite this concept to legitimate their interference and concern with any aspect of public life. However the danger of dissipating their energies by invoking the name of science at every political campaign was avoided. Their political agenda crystallised around their professional concerns of finance, state recognition and education. The process of radicalisation, whereby frustration and grievances started to fuel

[52] *Ibid.*

political action, was accelerated by the war. The Association of Public School Science Masters (APSSM), the British Science Guild and prominent individuals formed the "Neglect of Science" Committee which considered the case for educational reform. Their radicalisation meant reformation, not revolution, and they used their claims about science to demand state recognition and finance. Radicals like Professor H. H. Turner, in his Presidential address to the APSSM at Eton on January 3rd 1917 proposed a Research Civil Service to provide careers for investigators. It would establish a structure parallel to the existing Civil Service and initiate much needed scientific surveys throughout the Empire.[53] Professor D. Fraser Harris, a supporter of nationalistic science, suggested a Ministry of Science in his address to the Nova Scotian Institute of Science. This would have "just as much prestige accorded it as the War Office, the Foreign Office or the Home Office". Its purpose was to promote and administer the interests of science and ensure that "scientific men would be known, encouraged, subsidised, promoted, rewarded and pensioned".[54]

Like many other professional groups at this time, scientists perceived the State to be the financial and institutional guarantor of their professional status. The state would secure their positions, their research and their public prestige. Their utterances concerning the relationship between the state and science dovetail with Perkin's social ideal of professionalism. In his model the professional must "live by persuasion and propaganda by claiming that their

[53] C. L. Bryant, "The Association of Public School Science Masters", *Science Progress*, vol. 11 (1916-1917), pp. 657-663; "Science in Public Schools", *Nature*, vol. 98 (1917), p. 400.
[54] Professor D. Fraser Harris, *op cit.*, p. 237.

particular service is indispensible to the client or employer and to society or the state."[55] There were continual demands by men of science for state funding in order to safeguard the future of the nation. As Harris declaimed, "For why should State recognition, promotion and rewarding be reserved for sailors, soldiers, diplomatists and lawyers?"[56] Implicit within this question was his belief that "State recognition" guaranteed professional status. He optimistically declared that science "is within a very little of even being a profession".[57]

Harris and Turner represented, in an extreme form, the concerns of the "Neglect of Science" Committee.[58] This body recognised the isolated and marginalised position of their disciplines in the culture and educational system of the nation. Its perception of the political system was sociological and educational which explained the commitment to long-term and gradualist reform. Their goal was to ensure that the administrative, political and military elites inclined towards the sciences rather than the classics. To this end, the Committee wished to replace classical studies with scientific studies in the public schools and reform entrance examinations into universities and the civil service so that science students could receive marks equal to the classicists. Its long-term aims were gradual because it wished to increase the

55 Harold Perkin, *The Rise of Professional Society: England since 1880*, London: Routledge, 1989, p. 6.

56 Professor D. Fraser Harris, *op cit.*, p. 237.

57 *Ibid.*

58 Even more extreme was Professor Frederick Soddy who declared, "We seek at this supreme crisis of our national history a man of clear vision and firm purpose who, taking all branches of knowledge for his province, will assign to each its true place and function in the education and training of all classes of the people. Such a man and such a purpose have yet to be achieved." This Bonapartist view of science was propagated in "Science as 'Cinderella'", *Nature*, vol. 97 (1916), p. 475; M. Sanderson, *op cit.*, pp. 234-235.

influence and diffusion of science which would eventually create a sympathetic constituency amongst politicians and the civil service. It was politically astute in marrying the universal claims of science to the single issue of elite education which could form a focus for its lobbying.

This educational "reformation" required the formulation of certain arguments, derived from earlier incarnations of the same argument which compared science favourably with the classics and which were acquired from earlier Victorian incarnations of the debate in William Whewell's work and the debates on liberal education. The positions within this debate had been sketched out and reinforced since the 1860s when scientists first campaigned to place science on the curriculum of the public schools. J. E. C. Welldon summed up the drawbacks of a scientific education from a classical point of view in his Edwardian writings. In doing so he summarised the common arguments and themes that had characterised the whole debate from its inception. His main claim for the classics was grounded in the primacy of language.

> The reason why language is perhaps the supreme instrument of culture, why it disciplines the mind, like nothing else can, for the purposes of life, is that, as being itself a human product, it offers problems which are not absolutely determinable, but evoke and exercise the same balanced judgment as is needed in the daily affairs of life.[59]

[59] J. E. C. Welldon, "The Training of an English Gentlemen in the Public Schools", *Nineteenth Century and After*, vol. 60 (1906), pp. 396-413, 397.

The classicists believed that their subject inculcated humanistic values. For Welldon, the advantages of the classics were educational and utilitarian. It was the best subject for teaching self-discipline, one of the foundational values of the public school. It also provided the best framework for understanding and applying common sense since the problems of language and the problems of life were bound together by their humanist qualities. They were both cultural, indeterminable and required some form of value-judgement as a solution. The exercise of some form of aesthetic criteria in a value-judgement was the human element that distinguished language (including the classics) from the sciences. Science, on the other hand:

> if, indeed, science be taken to mean not only the so-called natural sciences, or the investigation of the properties and resources of the physical world, but as it strictly should mean, all forms of exact observation and reflection.... but the fault of exact science as an educational instrument is that it is exact; it largely deals with certainties rather than probabilities, it can establish its results beyond dispute.... but human life is not made up of certainties. Such questions as arise in it can seldom, if ever, be settled absolutely; they demand the balance of opposing considerations, and if the balance on the whole inclines one way, it might easily, in the majority of cases, incline the other.[60]

[60] *Ibid.*, pp. 406-407.

Scientists were unwilling to ignore the well-argued opposition of the classicists and felt it necessary to respond to these claims. The implication was that the sciences were educationally inferior, separated and isolated from human culture. Scientific educationalists like Arthur Smithells and Richard Gregory argued for the humanisation of science as part of mainstream culture which involved the reform of science education itself.[61]

The "Neglect of Science" Committee published a memorandum establishing a general framework for science education in February 1916 and held a meeting at Burlington House on May 4th with leading luminaries from art, literature, commerce and science to construct an agenda for action. This memorandum included a syllabus entitled 'Science For All' which wished to place the sciences within a general curriculum, without displacing the "'humanistic' studies". The relationship between the two areas of study would be "complementary".[62] When individual members addressed more practical issues they were less compromising and more disparaging. Lord Rayleigh, the President of the meeting at Burlington House, began by calling the system, whereby most schoolboys were taught the classics "an absurdity".[63] It was Schafer however who articulated the agenda of the scientist and set out arguments against the classics in his speech for the first resolution at the meeting.

Schafer demanded that the sciences should replace the classics in the

61 "Science in Public Schools", p. 400.
62 C. L. Bryant, "The Association of Public School Science Masters", p. 659.
63 "Science in Education and the Civil Service", p. 230.

preparatory and public schools. His speech was a point-by-point refutation of arguments that the classicists had made against the scientific reformers. For instance, he used Shakespeare as an example to prove that a classical education was unnecessary for expressing oneself clearly and artistically. What Schafer did do was retranslate the accusations that the classicists had made into counter-accusations that employed broadly similar arguments and threw it back at them. For example, classicists accused scientists of being specialists and thus unable to appreciate the broad expanse of culture, divorced from their human roots because of the narrowness of their expertise. Schafer, in turn, argued that classical learning should be regarded as a specialism and studied in higher education through scientific methods. He denied the advantages of the classics as a generalist education and articulated the advantages of science as such. Schafer's style of argument stemmed from two interdependent needs. Scientists had to argue on the same grounds on the classicists if they were to win over the audiences who had the power to initiate educational reform. Schafer therefore had to argue that science could contribute more to the educational system of the public school than the classics had.[64]

This was done through the process of character formation. The classics inculcated clear and precise diction in speech and writing according to its teachers. The morals and exemplars of the texts provided gentlemanly role-models for the pupils. The classics therefore claimed some role in the class distinctions and gentlemanly values that the public schools provided. Schafer

64 Sir Edward Schafer, "Science and Classics in Modern Education", p. 237.

had to articulate a concept of science that encapsulated these moral advantages. Harking back to the universalist concept of science explored earlier, scientists attributed its unity to the scientific method. It was the attributes of the scientific method that guaranteed character. In 'Science For All', the "imaginative power" that required continuous "accurate observation, with constant recourse to nature for observation" in experimentation was motivated by a love of and search for truth. Science education had three utilitarian advantages. It allowed men:

> (a) to understand how the forces of nature may be employed for the benefit of mankind, (b) to appreciate the sequence of cause and effect in governing their own lives and (c) to see things as they really are and not to distort them into what they may wish them to be.[65]

These three advantages were complementary to education at the public school. Learning science imbued the pupil with a sense of mission. Science "for the benefit of mankind" was the type of idealistic concept of service that appealed to the moralistic foundations of the public school. As a keynote of science education, it set a moral tone and provided a justification for the choice of science. Appreciating the sequence of cause and effect in governing one's own life implied the teaching of self-discipline, self-reliance and responsibility. The ability of science education to inculcate a sense of manliness was completed by the exhortation that the pupil would see things as they really are, not as they wish to be. The rational objectivity of science

[65] C.L. Bryant, "The Association of Public School Science Masters", p. 659.

and its attachment to the truth was harnessed to the honour of the schoolboy where "If a boy says that a thing is so; it is so".[66] Science would never teach a schoolboy to lie or act deceitfully since its primary goal was to serve the truth.

The syllabus of the "Neglect of Science" Committee claimed that the virtues of science ensured that public schoolboys would continue to be taught the values and the bearing of a gentleman. The reformers did not hide their wish to reform the educational system of the elite but, due to their universalist conception of science and their need to change all schools, both independent and state financed, were unwilling to develop and articulate class distinctions in their syllabus. 'Science For All' was an agenda for a democracy and the moral advantages of science education accrued as much to the pupil at the public school as at the local elementary or village school. This agenda was shaped by the discourse on public school education because this set the terms in which arguments concerning the wider aims of education were discussed.

The "classics-science controversy" provides an excellent window into the strategies men of science used to promote their interests by incorporating the concepts and values of the public school into their addresses for a wider audience. Yet the public school discourse haunted the language that men of science used and shaped the institutions that they worked in. Another example during wartime was the speech of Richard Gregory, the assistant

[66] J. E. C. Welldon, "The Training of an English Gentleman in the Public Schools", p. 402.

editor of *Nature*, entitled 'Science for the Rank and File' in his address to the APSSM at Eton. He drew a distinction between the majority of pupils, the "rank and file" who should be taught science as part of a liberal education, and those destined for "scientific or industrial careers" who should learn science as a vocation.[67] This title was coined during a time of war when the military machine was perceived to be divided between a gentlemanly officer class and the working class "rank and file". Applying this division to science education implied that men of science were gentlemenly professionals, comparable to officers because of their education and occupying the same social position above the masses.

The themes which stoked the ire of the scientific community continued to exercise a hold in peacetime. Their political agenda had been met by a Commission on Scientific Education under Sir J. J. Thomson, a Machinery of Government Commission under Lord Haldane and the establishment of the Department of Scientific and Industrial Research in 1916. Although their expectations were not fully met, the stimulus of war fell away and the scientific community did not make a concerted effort to establish an effective lobbying system. However, their professional concerns were repeatedly voiced during the nineteen-twenties even in minor debates.

During 1924, the correspondence columns of *Nature* became a curious battleground over the use of the word scientist under the heading 'The Word

[67] "Science in Public Schools", p.400.

"Scientist" or its Substitute'.[68] The majority of the correspondents discussed the etymological qualities of the word, holding forth that it was a viable hybrid or an unnatural combination. They were also divided over the common or rare usage of the word. The usefulness of this debate for the historian lies in the opportunity it gave for men of science to air their prejudices. The older generation like E. Ray Lankester, Sir D'Arcy W. Thompson and Oliver Lodge opposed the word on the grounds that it was "a charlatan's device"[69] , "has been in low-born company"[70] and had "an alien significance".[71] All three were aware of the public impact that a change of nomenclature might entail and were decidedly unsympathetic. All three believed that this word undermined the public status of their role in terms of their knowledge and gentlemanly position. A scientist was neither a gentleman nor an expert, whereas a man of science was. On the other hand, those who promoted the new/old word viewed it as an additional tool to present a united culture of science to the public and enforce its claim of professional status. Clifford Allbutt argued that historically "in England there has been a certain prejudice against science as a *profession*".[72] Those who opposed it like J. H. Fowler granted that the word had "a professional air, as if the man who so described himself were claiming as an *ex cathedra* authority for his utterances".[73] However the professional connotation was "not always complimentary". R. A.

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[68] These letters are not included in Sydney Ross, "Scientist: The Story of a Word", *Annals of Science*, vol. 18 (1962), pp. 65-85. He argues that the term scientist remained a colloquialism until 1910 and that the phrase 'man of science' was used in formal discourse. This series of letters seems to indicate the word's colloquial use survived the First World war and that its switch to formal discourse involved a generational change in the scientific community.

[69] "The Word 'Scientist' or its Substitute", *Nature*, vol. 114 (1924), pp. 823-825, 823.

[70] *Ibid.*, p. 824.

[71] *Ibid.*

[72] "The Word 'Scientist' and its Substitute", *Nature*, vol. 114 (1924), pp. 897-898, 897.

[73] "The Word 'Scientist' and its Substitute", p. 824.

S. Paget linked the suffix -ist with "one who is an expert on the theory as well as the practice of the art which he practices".[74] This division lay between the older and the younger generation of scientists, the gentlemen of the late Victorian periods and the rise of the more specialized professional in Edwardian England. It was not a firm division but telling enough to demonstrate generational differences on the role of the man of science. On a final note, the debate left an echo of the continual striving by men of science to displace the classics from their superior position in the curriculum. The word scientist was never used because men of science:

> feared to offend classical taste. No scientist ever puts his pen to paper without casting a fearful glance over his shoulder to see whether a classic should be looking on....But to suggest to a scientist that he is guilty of a classical lapse is more mortifying to him than to tell him that he should have said "napkin" instead of "serviette".[75]

The author of this letter could only compare the behaviour of a scientist with the social distinctions that divided the middle classes through tacit codes of conduct like manners. The inferiority of science to the classics was linked to the differences in the social graces that divided the lower middle class from the middle class. For many, the scientist was the black-coated worker of the professional world.

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74 "The Word 'Scientist' and its Substitute", p. 897.

75 "The Word 'Scientist' or its Substitute", *Nature*, vol. 115 (1925), p. 85. Class distinction was partially based upon the correct usage of language in etiquette: naplin instead of serviette and so on.

3.5 Conclusion

Socialization through the public schools and at Oxford had prepared Rutherford, Tizard and Huxley for a professional or an academic career. They had learned the values of the professional middle-classes and fulfilled their sense of duty through service during the First World War.[76] Their subsequent careers reflected the additional avenues for career advancement that the War opened up for the scientific community, especially in government itself. Rutherford was appointed Cavendish Professor of Physics in 1918 and had already led the Anglo-French expedition to the United States of America in 1917 to share the results of wartime research.[77] This expedition was a precursor of Rutherford's interwar role as an unofficial scientific adviser to the British government.[78] Major Henry Tizard was involved with aeronautical research at Martlesham and applied the organisational skills acquired there on a larger scale as Controller, Research and Experiments in the newly formed Air Ministry. His immediate postwar career combined academic research with a consultancy from the Asiatic Petroleum Company investigating the internal combustion engine, mirroring the wartime links between the universities and industry.[79] When he was asked by Sir Frank Heath to join the DSIR in 1920, Tizard began a career with the civil service that would survive for thirty years and a rectorship of Imperial College.[80] Huxley did not enter the civil service but plyed his trade as a scientific popularist to good effect in his alliance with H. G. Wells and Gip Wells on the

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[76] Rutherford was involved on sonar research with the Admiralty. David Wilson, *op cit.*, pp. 372-376.
[77] *Ibid.*, pp. 376-382.
[78] *Ibid.*, pp. 453-495.
[79] Ronald Clark, *op cit.*, p. 53.
[80] *Ibid.*, pp. 55-57.

book, "The Science of Life". In 1927, confronted with a choice between his academic position and the demands of this project, Huxley resigned his chair at King's College, London. Even Huxley, whose work entailed no contact with industry, felt confident enough to resign his academic position without jeopardising his future career or potential earnings. From then on, he earned his money through articles, lectures and books, serving science through his popularisations.[81]

This conservative, professional world was defined by those who had inhabited its boundaries and then departed. The most unorthodox example was the figure of J. B. S. Haldane within the spires of Cambridge. His behaviour had never marked him out as a gentleman since he delighted in uttering shocking statements at dinner parties or other gatherings of "polite society".[82] In the twenties Haldane was associated with the radical intellectuals who opposed the political, moral and sexual status quo. His victory in maintaining his academic post in the face of dismissal for gross immorality became a *cause celebre* for young intellectuals. He became the centre of a circle of unorthodox dons and students, a subculture set apart from the norm of stifling and stuffy Cambridge conformity. Even scientists who were isolated from the circles of power like Haldane established or entered organisations to push forward their political agenda. Haldane had advanced his scientific career during the nineteen-thirties but in his disillusionment with the political and scientific 'establishments', eventually moved left to support the Communist Party.

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81 Julian Huxley, *op cit.*, pp. 149, 191.
82 Gary Werskey, *op cit.*, p. 82.

The themes of public school values, gentlemanly professionalism and the rise of professional society have all contributed to the argument that science was not a monstrous sport of modernity but a typical profession that was moulded by the forces playing out across British society during this period. Because of its low status, the rhetoric of "public science" was always one of justification to attract potential patrons. It demonstrated that science supported accepted values and lobbied government to gain socio-economic or educational functions which the professional knowledge of scientists could explain whilst defining their social role and status against other cultural elites.[83] Frank Turner's model of "public science" corresponds closely with the actions of scientists in the "classics-science" controversy where they shaped accepted values of the public school to the ends of a science education and defined their own preferred cultural and educational role against the dominance of the classicists. If a scientist was educated at public school or Oxbridge, he would enter a conservative profession that articulated many of the values and attitudes he had learned in house and college.

[83] Frank M. Turner, "Public Science in Britain, 1880-1919", *Isis*, vol. 71 (1980), pp. 589-608.

Chapter Four

SCIENTISTS AS INSIDERS: GENTLEMANLY SCIENCE AND THE ATHENAEUM CLUB

4.1 Introduction

Scientists learned the values and obligations of gentlemanly professionalism within the competitive environment of school and university. These ties and manners became increasingly important to the scientist during the interwar period as the industrial and state research structures of the First World War acquired permanence and compelled the scientist to interact more frequently with other professionals. First of all, this chapter examines the role of the elite scientist within the worlds of government and science through one of the institutions that facilitated their mutual exchanges and communications within the world of gentlemanly professionalism - the Athenaeum Club. Known as the "Valhalla for the eminent", this club acted as a symbol of professional meritocracy and functioned as a private space for negotiations between professional representatives.[1] When scientists reached the pinnacle of their career, recognition of their eminence beyond the scientific world was often symbolised through membership of the Athenaeum Club. Their public identification as a scholar and a gentleman was achieved through the symbol of a prestigious club with distinguished membership, bringing to fruition the years of training in education and the profession.

The more subjective studies of individual scientists in earlier chapters have

[1] David Anderson, "Club of the British Immortals", *New York Times Magazine*, 2 August 1944.

shown the importance of the values and culture imbibed at the public school. Did these examples typify the educational experience and career structure of an elite scientist or was their public school and Oxbridge education exceptional? A prosopographical study in the second half of the chapter examines this question by studying those members of the Royal Society of London who declared their membership of the Athenaeum Club. This sample does not attempt to draw a complete picture of the metropolitan scientific elite but merely to provide a more general background within which the structural elements that indicate the strength of gentlemanly professionalism within the scientific profession can be examined more rigorously.

4.2 The Political World of Gentlemanly Professionalism

Post-Edwardian British society included an inbuilt 'corporate bias' that restructured politics, professions and institutions into organised bodies that could represent their interests more effectively within a democratic state.[2] Between, beyond and within these formal structures of the democratic state were the networks, the committees, the negotiations and the shadowy lobbying campaigns that provided the lubricating grease for the dynamic operations of this system. The result was the "informal involvement of powerful interest groups in government decision making".[3] In order to bring pressure to bear on the state, actors within this machine had to represent an organisation of some description. For example, in the corporate economy trade unions and employers associations were represented collectively with

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2 Keith Middlemas, *Politics in Industrial Society: The British Experience since 1911*, London, Deutsch, 1979; Peter Hennessy, *Whitehall*, London: Fontana Press, 1990 [1989], p. 80.

3 Harold Perkin, *The Rise of Professional Society: England since 1880*, London: Routledge, 1989, p. 290.

the government acting as arbiter and judge on their disputes. Professions who also wished to make their voice heard came under the same pressure to combine.

Industrial relations was the sphere where this 'corporate bias' was visibly evident for science. At the National Physical Laboratory in 1917, the scientific workers organised themselves and signed a petition to demand better working conditions and a rise in wages which their director, Sir Richard Glazebrook, supported. However Sir Frank Heath:

> the D.S.I.R.'s top man,....claimed in 1917 that his hands were tied - *unless* the N.P.L. scientists were prepared to form themselves into a trade union. Then, Heath explained. it would be perfectly appropriate for his department to set up the appropriate machinery and get down to the serious business of negotiation.[4]

The government constructed channels of negotiation that required the scientific workers to organise themselves into a trade union or a professional association and appoint or elect a negotiator. One should differentiate between this type of structured negotiation amongst separate interests and the elite processes of policy making that combined the structures of an informal corporatism with the utilisation of more fluid networks. Scientific policy and the research within its confines was a patchwork quilt of

[4] Gary Werskey, *The Visible College: A Collective Biography of British Scientists and British Socialists*, London: Free Association Books, 1988 [1978], p. 51.

government bodies, intermediary associations, universities and interested outside parties that all competed for finance and power in promoting their projects, their disciplines and their political agendas.[5]

The lifestyle of the professionals who sat on government committees and established these networks included clubs, dinners, sports and associations which provided space and codes of conduct where all manner of business could be negotiated under the cloak of leisure. Membership of that more peculiar grouping, the "great and the good", was established by expert service on the various government bodies that dealt with technical issues.[6] Eminent scientists were always in demand to sit on a Commission in their realm of speciality. For example, Sir William Dampier acted as a member of the departmental committee of the Home Office on the Lighting of Factories and Workshops, chairmen of the two Committees on Agricultural Machinery, a nominated member of the Agricultural Wages Board and Secretary of the Agricultural Research Council. Only at the last appointment in 1931 did he become a "temporary civil servant" at the age of 63 and gained a knighthood for his "official agricultural work".[7]

The geographical and institutional centre of these political and professional networks was 'clubland', the colloquial term for St. James's parish in Westminster. 'Clubland' was located within a 'circle of power' that

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5 Ian Varcoe, *Organizing for Science in Britain: A case-study*, Oxford: Oxford University Press, 1974 provides a general overview of the DSIR after the First World War and the diversity of institutions under its wings.

6 Peter Hennessy, *op cit.*, pp. 546-574.

7 Sir William Dampier, *Cambridge and Elsewhere: The Memories of Sir William Cecil Dampier, Sc.D., F.R.S., formerly Whetham*, London: John Murray, 1950, p. 108.

encompassed Buckingham Palace, the Houses of Parliament and Whitehall. This spatial grouping incorporated the monarchy, the administrative centres of Whitehall and the political heart of the state, comprising the Houses of Parliament and Downing Street. As the informal corporatisation of the state proceeded, the centralised 'corridors of power' began to resemble a village community where an elite of civil servants and politicians shared a common educational and social background of upper-middle-class or aristocratic origins, attendance at a revered public school and graduation from the universities of Oxford or Cambridge.[8]

'Clubland' constituted an 'informal annexe' to this central structure where the political and administrative elites could meet their counterparts from the separate social worlds of the universities, literature and science. The informal and private setting of the club, shielded from the eyes of the public domain, was a primary factor in the association of the 'Establishment' with secrecy. By the eighteen-eighties, 'clubland' was recognised in the media as a separate and demarcated region with the invention of words like 'clubdom' to denote the domain of the clubs and 'clubocracy' to describe "the class who are members of a club."[9] The Athenaeum Club was the most eminent and respectable of this group, providing a home for the elites of the old and new professions.

The growth of 'clubland' ended with the outbreak of the First World War. This

8 Harold Perkin, *op cit.*, pp.71-72, 84.

9 "Club", *The Oxford English Dictionary*, Second Edition, Vol. III, Edited by R.W.Burchfield, Oxford: Clarendon Press, 1991, p. 370; R. Nevill, *London Clubs: Their History and Treasures*, London: Chatto & Windus, 1911, pp. 1-2.

precipitate halt led contemporaries to emphasize the War as the cause of the decline of 'clubland' in the nineteen-twenties. The War destroyed many potential club members, but for the club secretaries, its most insidious effect was the alterations it made to the patterns of leisure amongst the middle class. As metropolitan communities were disrupted, individuals tended to retreat into their suburban homes and domestic atmosphere. This 'suburban retreat' was continually reinforced during the interwar period by the arrival of a mass society and a mass media. The cinema, the radio, and eventually television encouraged new patterns of leisure and consumption based upon the home or the immediate locality.[10] These changes can be charted through the fortunes of the 'clubland' evening newspapers, which had a circulation of between 20,000 and 30,000, but wielded "a quite disproportionate political influence" as "organs of opinion".[11] The *Westminster Gazette* stopped in 1921 and the *Pall Mall Gazette* in 1923.[12] These developments were not expected after the conflict as the club secretaries had looked forward to a period of renewed growth.

The most important of the gentlemen's clubs in this era of decline was the Athenaeum. In Victorian London it was "the haven for London's literati" and the social arena for the metropolitan intelligentsia, bestowing gentlemanly status and character upon its members.[13] These Victorian intellectuals were

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10 Martin Pugh, *State and Society: British Political and Social History, 1870-1992*, London: Edward Arnold, 1994, pp. 194-204.

11 Colin Seymour-Ure, "The Press and the Party System between the Wars" in Gillian Peele and Chris Cook eds., *The Politics of Reappraisal, 1918-1939*, London: The MacMillan Press Ltd., 1975, pp. 232-257, 238.

12 *Ibid.*, p. 234.

13 Adrian Desmond, *Huxley: The Devil's Disciple*, London: Michael Joseph Ltd., 1994, p. 226.

a "self-described meritocracy", kept at arm's length from the social elites, but inclusive enough to incorporate Bishops and secular radicals in their preferred club through the processes of "'ruling-class egalitarianism'".[14] Natural philosophy formed an important part of this group and the club played an important role for Charles Darwin and Thomas Huxley in their attempts to raise the influence of the 'scientific priesthood'. Darwin entered under the patronage of Charles Lyell and, in turn, sponsored the candidacies of Joseph Hooker and Huxley.[15] They, in similar fashion, utilised the club for their own coterie, the X-Club. Francis Galton, Herbert Spencer, Hooker, Huxley and William Spottiswoode were all members of the Athenaeum. The club's usefulness for the X-Club was enhanced by its location just around the corner from the Royal Society which was housed in Burlington House. These scientific publicists were advancing a professional campaign that would enhance their role in the Royal Society and the British Association for the Advancement of Science whilst simultaneously confirming the advantages of Athenaeum membership for politicking scientists.[16]

The small, educated community of the Victorian intellectual was gradually undermined by the expansion of cultural professions like the schoolteacher,

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14 Stefan Collini, *Public Moralists: Political Thought and Intellectual Life in Britain, 1850-1930*, Oxford: Oxford University Press, 1991, pp.15-16.

15 Adrian Desmond and James Moore, *Darwin*, London: Penguin Books, 1992, pp. 253-254, 260, 664-6.

16 R. M. MacLeod, "The X Club: A Social Network of Science in Late-Victorian England", *Notes and Records of the Royal Society of London*, vol. 24 (1970), pp. 305-322; J. V. Jensen, "The X Club: Fraternity of Victorian Scientists", *British Journal of the History of Science*, vol. 5 (1970), pp. 63-72; R. Barton, "'An Influential Set of Chaps': The X-Club and Royal Society Politics, 1864-85", *British Journal of the History of Science*, vol. 23 (1990), pp. 53-81.

and the academic till it lost its cohesiveness, its authority and its audience.[17] This community had provided the base of the Athenaeum's membership but the club survived its dissolution. The continued existence of the Athenaeum depended upon the broadly based constituencies from which it recruited its members. "Every Prime Minister down to Mr. Baldwin (with the exception of Mr. Gladstone and Mr. Bonar Law), all the Lord Chancellors, all the Archbishops, and most of the Judges and Bishops have thus joined the club."[18] Many were elected under Rule XII which allowed the executive committee to elect as extraordinary members Princes of the Blood Royal, Cabinet Ministers, Bishops, the Speaker of the House of Commons and Judges. Twelve members were also annually elected under Rule II for achieving eminence in the arts, the sciences, literature or administration.[19] From 1832, when Rule II was first instituted, the committee of the Athenaeum intended to police entrance into their club and ensure that the leaders of culture, politics and the professions in their metropolis were not excluded. With these rules, the Athenaeum guaranteed the renewal of its membership and never became the prisoner of one cultural clique, one political party or

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17 T. W. Heyck, *The Transformation of Intellectual Life in Victorian England*, London: Croom Helm, 1982; John Baxandale and Christopher Pawling, *Narrating the Thirties: A Decade in the Making: 1930 to the Present*, London: MacMillan Press Ltd., 1996, pp. 4-5.

18 Henry R. Tedder, "The Athenaeum: A Centenary Record", *The Times*, 16 February 1924. The Reverend F.G. Waugh summarised the number of members and their professions in 1884 as follows:- "Law: Judges, 58; Q.C.'s, 35; barristers, 215 - total, 308. Divinity: Bishops, 36; clergy (including 19 dignitaries), 112 - total, 148. Medicine; M.D.'s and surgeons, 82. Making a total for the three professions 538. Universities: Oxford 382; Cambridge, 339; Scotch, 65; Dublin, 49; London, 35 - total, 870. Professors, 74; Societies, Fellows of (chiefly F.R.S.) 269; Royal Academicians, 32; civil engineers, 39; librarians 5; naval officers, 10; military officers, 67; peers, 82; lords (sons of peers), 11; Privy Councillors, 110; honourables 31; baronets, 59; knights, titular, 131; M.P.'s, 59; esquires including those without sffix indicative of degrees, societies, etc.) 760 - total number 1364. The maximum of ordinary members is 1200."; N. Cowell, *The Athenaeum: 1824-1974*, London: Heinemann Educational Books Ltd., 1975, p. 47.

19 Humphry Ward, *History of The Athenaeum: 1824-1925*, London: The Athenaeum, 1925, pp. 115-116; N. Cowell, *op cit.*, pp. 165-169.

representative of one profession.

This was a direct consequence of the aim of the club to incorporate 'the Great and the Good' within its walls. The leaders of most of the professions within the capital perceived membership of the club as a public recognition of their status by their professional peers. Therefore, the increasing specialisation of professions and the prestige of the club formed a virtuous circle of mutual reinforcement. As an example, one can cite the colonisation of the Athenaeum by the X-Club as part of the latter's strategy to increase their perceived influence and prowess amongst the scientific community. Since the club included the elite of the old professions and the leaders of the new, the official 'Establishment' and its opposing intellectual authorities, it functioned as an arena where conflicts and disagreements, negotiations and contests could take place without the knowledge of the press. Since all the professions and the literary coteries found the club indispensable as a space where all sides could meet as equals under the mask of club etiquette, the existence of the Athenaeum was guaranteed.

The Athenaeum responded to the demands of its members for changes that would reflect their wish to use the club as a networking environment with a number of incremental steps. Entrance to the club had always been restricted to members except for special occasions like a *conversazione* when the rules governing entry were relaxed. Proposals to allow strangers to dine in the Coffee-Room were defeated on three occasions in 1892, 1902 and 1908 with

declining majorities.[20] This grassroots pressure was finally achieved in 1914, with 'strangers' allowed entry for lunch and dinner, probably because members found the club indispensable for entertaining their guests during wartime.[21] This weakening of the strict rules governing entry was never reversed. By 1926, guests were also being admitted for tea in the Coffee-Room. These small changes were effectively transforming the role of the club. Instead of acting as a social centre for its members, the club was becoming a space which members could utilise. They could display their membership to guests, increasing their prestige, and use the privacy that the club provided to conduct business.

There was a continual demand amongst members for accommodation as an increasing number lived outside London and viewed the club as a resort for sleep when business kept them late in the capital. The Attic Storey was built in 1898 and contained rooms for the Secretary and the Librarian plus ten bedrooms for the women servants. Maids now lived in the club in a restricted upper storey where they could not disturb the activities of the members. The demand for bedrooms led to the establishment of a special Committee which recommended an additional storey, paid for by an increase in the annual subscription to fifteen guineas in its report of 1927. To accomplish this, the club was closed for six months while the staff bedrooms were converted for the use of members.[22] Even this proved insufficient to satisfy the pent-up

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[20] N. Cowell, *op cit.*, pp. 97-98. Members had been allowed to bring a male guest every Monday evening meeting under a resolution passed on 22 November 1825 but this was revoked on 12 March 1833. p. 117.

[21] *Ibid.*, p. 118.

[22] *Ibid.*, pp. 30-31, 133.

demand. Number 6, Carlton Gardens was acquired in 1936 and was partially used as a Ladies Annexe.[23] This "provided five reception rooms, four Members' bedrooms, ten maid-servants' bedrooms [accommodating two maids in each room]...spacious dining-room...and large comfortable drawing-room..."[24] Sometimes these facilities could be "occasionally overtaxed."[25]

Formal identification with the club, reaffirmed through collective participation in annual rituals like the elections, were no longer important to the membership. However the facilities which eased the discomforts of metropolitan life retained a hold:

> The utility of the merely physical advantages that a Club can make available in rest, food, drink, facilities for entertaining and so forth, can easily be indicated. 'So forth' includes the Club's barber and the bedrooms on the top floor, the telephone, the possibility of cashing a cheque, and of writing and receiving letters which will be forwarded to absent members.[26]

These facilities allowed the member to retain an address in the capital without having to maintain a flat since the expenses of a stay in London were defrayed by the members' bedrooms in the club.

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[23] This was a male-dominated world and women were barred from entering the club or becoming members. When the admission of females to the Athenaeum was allowed, the committee decided that a separate space was required so that the rules maintaining the traditional rooms of the club as a male preserve were not undermined. This change was also accorded a lower priority than the need for additional bedrooms for the membership and residential staff.

[24] *Ibid.*, pp. 120-121.

[25] *Ibid.*

[26] *Ibid.*, p. 35.

The local practices of the Athenaeum incorporated the norms and values of gentlemanly behaviour mediated through a distorting lens of puritanical respectability. The members maintained a formal and correct atmosphere in the club except in the rooms set aside for cards and billiards. Members retained their privacy, talking only to those whom they counted as friends or reading the newspapers. In order to talk to a member it was customary to send a servant with his card on a tray, "asking if he might have the privilege, and refusals were not unknown".[27] The privacy of the individual was paramount and conversations were conducted in hushed tones outside of the Coffee-room and other social areas. When members took lunch, dinner or tea they were accustomed to sit in their familiar cliques. As the author of the *Nature* review commented:

> One knows where among the many tables one's friends are likely to be found - where men of science mostly sit, or where the artists or the critics; or the august corner where statesman consort together, and eat and drink like common men.[28]

Reflecting the professional society within which it was situated, the club adhered to the wishes of that profession most concerned with morality, the Lords Spiritual. The Athenaeum Sabbath demanded the removal of all games, including chessmen, so that no labour would be undertaken by the members on the seventh day. Sunday billiards was "tolerated" from 1927 after the Archbishop of Canterbury, a member of the General Committee,

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[27] *Ibid.*, p. 54.

[28] [D.W.T.], "The Centenary of the Athenaeum", *Nature*, vol. 117 (1926), pp. 814-818, 818.

queried the resolution removing the prohibition before assenting to the relaxation.[29] The Athenaeum remained a bastion of Victorian traditionalism in its rules throughout the interwar period.

Like the public school, the club incorporated obligatory practices that governed the internal relationships amongst its members and recognised an overt value system of conservatism, which all members had to respect. This conservatism expressed itself in an allegiance to the dominant morals of family values, patriotism and imperialism. The large number of bishops and clergy who were members guaranteed that those regarded as deviants would not be considered suitable for entry. The career of Bertrand Russell acted as a barometer for this value system and demonstrated a definite parallel between his membership of the Athenaeum and his acceptability to the government and the authorities of Cambridge University. His expulsion and reinstatement at the Athenaeum effectively highlighted its role as a retreat for the officially recognised professional and cultural elite and how entrance to the club was a recognition by one's peers that 'eminence' had been achieved. It either preceded or followed on from professional approval, a perquisite for membership of the club since it was these networks that assured entry.

In 1908, Russell was elected to the Royal Society through the efforts of Alfred North Whitehead, for "his contribution to logic and mathematics".[30] In the spring of 1909 he was elected to the Athenaeum and, in the following year,

29 N. Cowell, *op cit.*, p. 35.

30 Caroline Moorhead, *Bertrand Russell: A Life*, London: Sinclair-Stevenson, 1992, p. 153.

was appointed Lecturer in Logic and Principles of Mathematics at Trinity College, Cambridge. As Russell's profile increased in his particular discipline, he was serially rewarded over three years, with membership of the institutions from which the 'intellectual establishment' was constituted. His adulterous affair with Lady Ottoline Morrell which began in 1911 was treated as a minor indiscretion but did not impede the course of his career since he became a Fellow of Trinity in 1915.

As a left-liberal, Russell took a principled stand against the War as president of the Cambridge branch of the Union of Democratic Control and, after 1916, by joining the No Conscription Fellowship. His stance alienated the conservative Fellows of Trinity. After declaring that he had written an anonymous pamphlet calling for the release of Ernest Everett, a teacher and conscientious objector from Liverpool, through a letter in *The Times*, he was charged under the Defence of the Realm Act by the authorities who were wary of his influence. He stood trial on 5 June 1916 and faced a period of sixty-one days in jail until his supporters paid the fine of one hundred pounds. This public display of opposition to the War moved the Master, Vice-Master and eight Fellows to vote for his expulsion from the College and, in turn, a Special Meeting of the General Committee of the Athenaeum expelled him on 18 July 1916.[31] Private indiscretions like adultery and homosexuality were apt to go unnoticed if discreet, but Russell's blatant opposition to war and accepted patriotism led his enemies to campaign for his removal from all positions of authority.

[31] N. Cowell, *op cit.*, pp. 137-138; Caroline Moorhead, *op cit.*, pp. 253-256; Ronald Clark, *Bertrand Russell and his world*, London: Thames and Hudson, 1981, pp. 51-53.

Just as Russell was removed from the club as his acceptability to his intellectual peers plummetted, so his reinstatement followed on from his rehabilitation. He became a Fellow of Trinity in 1944 and a regular broadcaster for the public face of the government, the B.B.C..[32] Recognition of his cultural authority came with his appointment as Reith Lecturer in 1948 and, abetted by his anti-communism, he was crowned with the Order of Merit in 1949.[33] He was re-elected under Rule II in 1952 by the General Committee of the Athenaeum who seemed to be unaware of his earlier expulsion.[34] Russell's career was one of violent swings out of and into intellectual respectability. This particular case was peculiar because of the heightened air of repression under wartime conditions and Russell's courting of publicity in order to further the cause of conscientious objection. It did indicate that the Master of Trinity College, Cambridge, had sufficient political capital to engineer Russell's expulsion from the club and suggested that the links between Cambridge and the Athenaeum were far stronger than has previously been realised.

The official recognition of the increasing importance of the professions and their colonisation of the Athenaeum was celebrated by the establishment of a new honour, the Order of Merit. The Order had only one rank - Member, and was "awarded in recognition of eminent services rendered in the armed forces, or towards the advancement of art, literature and science".[35] Entrance to the Order was "a personal award from the sovereign" and

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[32] Caroline Moorhead, *op cit.*, pp. 448, 456-457; Ronald Clark, *op cit.*, pp. 90, 93.
[33] Caroline Moorhead, *op cit.*, p. 466; Ronald Clark, *op cit.*, p. 96.
[34] N. Cowell, *op cit.*, pp. 137-138.
[35] *Honours and Titles*, London: HMSO, 1992, p. 73.

remained distinct from the politicised bias of all other honours.[36] Edward VII specifically created the Order to distinguish the style of his reign from that of his mother, Queen Victoria, and inject professional values into the honours system. The Order was based on meritocratic values. It bestowed no title and all members were equal in rank.[37] Kings and Queens would often use it to honour unorthodox individuals including Alfred Russel Wallace in 1908, Lord Haldane in 1915 after he was ostracised in the anti-German campaigns and George Bernard Shaw, who declined the trophy.[38] The importance and power of these professional elites was visible to the King by the turn of the century. The Athenaeum was chosen as the suitable site to celebrate this meritocratic order. It was founded in July 26, 1902 and as eleven of the twelve founding members were members of the club, the Committee invited all of those honoured to a celebratory dinner on July 25. The dinner included the Lords Lister, Kelvin, Rayleigh, Kitchener and Roberts, the President of the Royal Society, Sir William Huggins and was presided over by the senior trustee of the club, Lord Avebury.[39] One hundred and fifty members of the club joined the dinner and reception, rendering the occasion an unprecedented collection of 'the great and the good'. As A.J. Balfour commented, "never in the history of the great metropolis - probably never in the history of this country - had there been gathered in the room of that size such a body of undiluted distinction."[40] The scientific community was well

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[36] Michael De-La-Noy, *The Honours System*, London: Allison & Busby, 1985, p. 76.

[37] *Ibid.*, p. 11.

[38] *Ibid.*, pp. 76-77.

[39] Other *eminences grises* at the dinner included Lord Roberts, Lord Kitchener,Admiral Keppel, Admiral Seymour, John Morley, the Lord Chancellor, Lord Goschen and the Prime Minister, A. J. Balfour.

[40] Humphry Ward, *op cit.*, pp. 92-93; N. Cowell, *op cit.*, pp. 133, 155.

represented with the peers of natural philosophy and the President of the Royal Society, a position permanently represented in the Order. Given this mingling of the political and professional elites, the dinner can be viewed as a symbol of the unspoken compact between the governors and the leaders of the professional classes. Edward VII's proposal was enthusiastically taken up by the professional elites as an opportunity to cement their ties with the monarchy and the establishment. This marriage of a modernising monarch and professionals thirsty for tradition shows that the Athenaeum played a crucial role as the site for the consummation of their ties.

4.3 A Prosopographical Study of Scientific Clubmen

Prosopography or collective biography has as "its aim...[the] study [of] the features of a group by means of a comparative analysis of their lives".[41] This methodology has been a model for historians of science ever since Robert Merton republished his ground-breaking study, *Science, Technology and Society in Seventeenth-Century England* in 1970.[42] Recent works that incorporate or base their conclusions upon this approach include Steven Shapin's study of phrenology in Edinburgh and Arnold Thackray's analysis of the coterie that established the British Association for the Advancement of Science.[43] In their joint article on the subject, both historians argued that

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41 J. E. McGuire, "Newton and the Demonic Furies: Some Current Problems and Approaches in the History of Science", *History of Science*, vol. 11 (1973), pp. 21-48, 23; Lewis Pyenson, "'Who were the Guys': Prosopography in the History of Science", *History of Science*, vol. 15 (1977), pp. 155-188; Jack Morrell and Arnold Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, Oxford: Clarendon Press, 1981.

42 R. K. Merton, *Science Technology and Society in Seventeenth-Century England*, New York: Harper and Row, 1970 [1938].

43 Steven Shapin and Arnold Thackray, "Prosopography as a Research Tool in History of Science: The British Scientific Community, 1700-1900", *History of Science*, vol. 12 (1974), pp. 1-28; Steven Shapin, "Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh", *Annals of Science*, vol. 32 (1975), pp. 219-243.

prosopography, if it was open to a sophisticated, contextual model that posed narrow and clear questions, could establish lines of causation "between action and context".[44] In this argument, the advantages of prosopography are fairly clear. Whether the subject is a small elite like the *Gentlemen of Science* or a large body like Lewis Namier's study of the parties in the House of Commons during the eighteenth century, the methods involved are liable to emphasize prickly particularities as exceptions to the more general features of the sample. Examining a scientist through a prosopographical model enables the historian to work with a greater awareness of individual agency and social structure which, in turn, opens up the 'cluster of influences' that mould an individual throughout his or her life and allows the observer to study how the individual utilised these to further his or her interests.[45]

There were three criteria which determined the inclusion of a particular individual within this prosopographical sample. First of all, they were Fellows of the Royal Society of London, a traditional signifier of elite status and respectability within the scientific community. The Royal Society was "peculiarly responsible for acting as an intermediary between the Government and science" and its Fellows formed a scientific contingent within the 'Great and the Good'.[46] Secondly, they declared their membership of the

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[44] *Ibid.*, p. 3.

[45] Lawrence Stone, "Prosopography", *Daedalus*, vol. 100 (1971), pp. 46-80, 65; S. Lukes, "Power and Structure" in Steven Lukes, *Essays in Social Theory*, London: The MacMillan Press Ltd., 1977, pp. 3-29.

[46] Marie Boas Hall, *All Scientists Now: The Royal Society in the Nineteenth Century*, Cambridge: Cambridge University Press, 1984, p.165; Dorothy Stimson, *Scientists and Amateurs: A History of the Royal Society*, New York: Henry Schuman Inc., 1948, p. 246. "For in the interim between the two Wars, relations between the [Royal] Society and the government had been steadily growing closer as the Society gained in strength and as it developed its main function, the furtherance of science".

Athenaeum in the *Royal Society Yearbook*. The Athenaeum's dual role as a gentleman's club and as a backroom for civil service lobbying demonstrated that membership could be an indicator of allegiance to the values of gentlemanly professionalism and an informal involvement with governmental machinery. Thirdly, all biographical details were taken from the *Dictionary of National Biography*. All individuals in this collection are listed in a standard format that details their origins and their careers, simplifying the task of the collective biographer and diminishing the danger of misinterpreting individual features despite the particular emphases of the obituarist. One hundred and ninety-eight Fellows of the Royal Society fit these criteria in the period, 1915 to 1950, and their membership of these two associations suggested a greater probability of their participation in the complex politics of science and government.

Five characteristics were chosen to categorise the individuals within this group. These were the schooling of the individual, their university education, their career, the honours they received, and their father's occupation. Each of these characteristics is in turn broken down into categories. Each characteristic is defined and reasons are given for its utilisation. The results of the prosopographical analysis are displayed and discussed with reference to the themes of this thesis.

SCHOOLING

Schooling gives an indication of an individual's socioeconomic background and the culture into which he was educated. The public school system

educated a large proportion of middle class children and the model was widely copied amongst the grammar schools and minor independents. The general categories of independent and local schools masked a wide range of diversity following the powers granted to counties and boroughs by the Education Act of 1870. Local schools were partially financed by the state or the local authority and they provided a gateway of opportunity which children of the skilled working class could enter. However the educational systems of Great Britain were divided along class boundaries with opportunities for advancement rapidly vanishing down the social scale. Analysis of the educational experiences within this sample would provide indicators on their social origins and their career structure comparative to other professions.

TYPE OF SCHOOLING	NUMBER AT SCHOOLS	PROPORTION OF SAMPLE
Public	80	40%
Grammar	35	18%
Academy	10	5%
High School	7	4%
Independent	35	18%
Apprentice	1	0%
Tutor	2	1%
Unknown	5	2%
Local	23	12%

Public and grammar schools, the training grounds of the professional classes, educated 58% of this sample and combined with the Scottish Academies (5%), the fee-paying Independents (18%) and the rare Tutor (1%), indicated that the middle-class families provided the dominant number of these scientists. The large number of public and grammar schools also suggested that the inculcation of public school values dominated the educational experience of a large proportion of this sample.[47] Scotland provided a special case because one single school, the Edinburgh Academy, educated 3% of the entire group, a record that only University College School in London rivalled.[48] The claims by Martin Wiener and Corelli Barnett that public schools were hostile environments for the education of science were not substantiated in this sample.

UNIVERSITY EDUCATION

The characteristic of university education reflected the traditional and central dominance of Oxbridge. Professional training in science and engineering required a university degree before further research could be undertaken. Each individual's first degree in science was the only educational qualification measured because British universities rarely offered postgraduate degrees until after World War I leaving the first degree as a reliable indicator of where an individual undertook his initial scientific training. The categories included

[47] The definition of the public school that is used here is wider than the narrow label that was often only applied to independent boarding schools and my definition includes day schools like University College School. Graham Kalton, 'Appendix A' in *The Public Schools: A Factual Survey*, London: Longmans Green and Co. Ltd., 1966, pp. 143-145.

[48] Eight members of this group (Sir John Rose Bradford, Baron Lindley, Sir G.I. Taylor, Sir Walter Morley Fletcher, Sir Edward Albert Sharpey-Schafer, Herbert John Gough, Sir Edward James Salisbury and Sir Francis Martin Rouse Walshe) were educated at University College School.

Oxbridge (which was undifferentiated), the Scottish universities, the provincial universities, military institutions, universities in the dominions and all institutions of further education in the metropolis. This inbuilt geographical bias reflected the spatial hierarchy of status amongst universities in Great Britain and the separate system of Scottish universities. Apart from London and Oxbridge, the category of provincial universities included all universities in England, Wales and Ireland.

TYPE OF UNIVERSITY	NUMBER AT UNIVERSITY	PROPORTION OF SAMPLE
Oxbridge	90	45%
London	37	19%
Scottish	22	11%
Provincial	23	12%
Military	7	4%
Dominions	4	2%

The military category includes the Royal Military Academy and the Royal Naval College at Devonport.

The importance of further education in the process of training which transformed a student into a scientist is confirmed by the 94% who were educated after school. The predominance of the elite universities was obvious and the comfortable fit between the 45% who went to Oxbridge and

the 40% who went to public schools supported the argument that the socialisation process of the elite involved these two systems. The percentages of the rest buttress the metropolitan and English bias within this sample. However, in order to stress the ascendancy of Oxbridge, it was only necessary to note that the twenty-six students or 13% of the sample who attended Trinity College, Cambridge were more than all the students who attended the Scottish universities or the provincial universities.

CAREER

The careers of these scientists were fragmented by the lack of a single career path as employment opportunities encompassed the separate spheres of government, the universities and industry. While academic posts as Professors and Lecturers combining research and teaching were the model of a scientific career, government service and industry allowed scientists in the appropriate disciplines to combine posts or reorient their careers as appropriate. This reflected the increasing financial and institutional involvement of the state and industry in science especially after the First World War.[49] This characteristic included all paid positions that each individual scientist undertook during their entire career. The academic sector was defined as a post in any university and government service as a post within the civil service or within an institution financed by the state directly or indirectly through a mediating body like the research councils. An industrial post was self-employment or any salaried position within a company. If an

[49] Peter Alter, Translated by Angela Davis, *The Reluctant Patron: Science and the State in Britain, 1850-1920*, Oxford: Berg,1987; Michael Sanderson, *The Universities and British Industry*, London: Routledge and Kegan Paul, 1972, pp. 243-275.

individual were to hold a post in more than one of these categories consecutively or in combination, then they were entered in a composite category reflecting the meanderings of their career.

TYPE OF CAREER	NUMBER IN THIS CAREER	PROPORTION OF SAMPLE
Academic	64	32%
Government Service	11	5%
Academic/Govt.	69	35%
Medical	12	6%
Academic/Industrial	12	6%
Industrial	11	6%
Law/Politics	4	2%
Govt./Industrial	4	2%

The tripartite model of involvement within the worlds of academe, industry or government service accounted for 89% of the sample and validated its potential for analysing the careers of scientists during this period. The sample was predominantly employed in the universities or government with only two private researchers amongst this group.[50] The importance of universities as institutions for secure employment and research in the scientific profession

[50] Sir James Jeans and Redcliffe Nathan Salaman were private researchers and Sir Thomas Ralph Merton maintained a private physical laboratory while Professor of Spectroscopy at Oxford from 1920 -1969.

was recognised by this sample since over three-quarters (76%) held an academic post at some point during their career. The importance of government service was highlighted by the 45% who entered this sector whilst commerce came a poor third at 17%. While the boundary between academe and government service was extremely permeable, that between academe and commerce only accounted for 6% of this group and the boundary between government service and commerce seems to have been even more insurmountable with only 2% of this group spanning both worlds. Individuals who worked in all three worlds were rare. The preponderance of academe in partnership with the state could reflect an academic and administrative bias built into the sample through the utilisation of an Athenaeum membership biased towards the professions. The sample was too small to construct any arguments concerning the attitudes of scientists to industry and did not substantiate the traditional 'big picture' of pure science untainted by industrial work.

HONOURS

The characteristic of 'Honours' described the recognition of the elite status of men of science by themselves and in the wider community. This was the only characteristic which provided a measurable indication of the political and cultural acceptability of science. Honours external to the scientific community during the interwar period meant the honours system, those distinctions bestowed by the monarch. For the purposes of this group, three were chosen: the knighthood, the hereditary peerage and the Order of Merit. The knighthood signified membership of a recognised gentlemanly elite and the

peerage conferred ascension into the traditional hereditary ruling class. A hereditary peerage far surpassed a knighthood in formal and informal status. The Order of Merit was an innovative honour, limited to a small number of men and women and bestowed personally by the monarch on elitist and meritocratic grounds.

Within the scientific community, honouring professional advancement took two forms. Medals were rewarded for outstanding scientific work or in recognition of a distinguished career. Professional leadership and eminence was more often recognised by appointment or election to a leading post in scientific societies and professional associations. Examples of the diversity amongst the scientific organisations incorporated into this study include the obscure Association of Economic Biologists, the local South-Eastern Union of Scientific Societies and the respectable Royal Astronomical Society. The British Association for the Advancement of Science and its constituent sections were excluded on the grounds that it was a unique body representative of the whole of the scientific community rather than specific professions. Medals of the Royal Society were generally rewarded to its own membership and the bias towards this organisation was partially rectified by analysing medals from all other organisations in one category. The honour of "Scientific Presidency" included all scientific organisations listed except for the Royal Society in order to give an accurate measure of honours received outside of the elite scientific institution.

TYPE OF HONOURS	HONOURS REWARDED	PROPORTION OF SAMPLE
Knighthood	133	67%
Peerage	9	5%
Royal Society Medal	75	38%
Scientific Presidency	122	62%
Other Medals	65	33%
Order of Merit	13	7%
Baronetcy	8	4%
None	12	6%

The high proportion of knighthoods amongst this group demonstrated that this sample did not go unrecorded or unrecognised. However the low status of science was inferred since few of the sample received the highest honours as only 5% became peers and 4% gained a baronetcy. The proviso that these honours might not have been rewarded for contributions to science must also be taken into account. With their links to industry and government service, scientists could have been rewarded for their services in their areas and 20% had served in some capacity during both World Wars. Only 7% received the Order of Merit and this was always awarded to the Presidency of the Royal Society. For honours internal to the scientific community, most members of this sample (62%) had been honoured with a leading post in a scientific organisation. The diversity of the organisations to which these individuals belonged demonstrated the diverse and fractured nature of the

scientific empire. The number of medals awarded by the Royal Society (38%) outweighed the number of medals from other organisations confirming that the reward of Royal Society medals was heavily biased toward Fellows of the Royal Society. These scientists did not suffer from a signal lack of honours and only 6% within this sample were rewarded with nothing but few received the highest honours which the nation could confer.

FATHER'S OCCUPATION

The final characteristic was the profession or the occupation of the father. This characteristic was an indication of the socioeconomic status of the individual's family background and provided a useful guide to their social location. This sample cannot answer the general questions posed by Wiener and Barnett but it can provide an indication of the social backgrounds for a sample of elite scientists. Were they scions of the professions or of businessmen? Was science a vehicle of social mobility or the pampered resort for sons of the upper middle classes?

FATHER'S CAREER	NUMBER IN SAMPLE	PROPORTION OF SAMPLE
Religious Position	14	7%
Commercial	52	26%
Academic	11	6%
Medical	15	8%
Engineer	6	3%
Officer	6	3%
Farmer	11	6%
Other Professional	28	14%

The second category includes all self-employed or salaried positions in commerce, retail, industry and general management. The Skilled Worker/Clerk category includes small retailers.

SOCIAL POSITION OF FATHER	NUMBER IN SAMPLE	PROPORTION OF SAMPLE
Commercial Middle Class	52	26%
Professional Middle Class	80	40%
Farmer	11	6%
Lower Middle/Skilled Working Class	36	18%
Rest	19	10%

Nearly three-quarters of this sample were from a middle class background and the majority of these hailed from the professions. Science was an occupation which the sons of professionals, industrialists and merchants chose as a secure career. Part of this stemmed from their ability to draw on inherited capital.[51] It is impossible from this sample to draw the conclusion that science was an attractive escalator for upward social mobility, but during a time of incipient class war and great social inequality, the fact that nearly a fifth of this particular segment of the scientific elite came from the poorer and disadvantaged sections of society speaks for itself.

4.4 Conclusion

The outstanding feature of this group in the composite picture drawn up by this prosopographical analysis was the predominance of middle class professionalism. Most members of this group came from middle class backgrounds, were educated at public schools or grammar schools, attended university to pass a degree in a scientific subject and finally filled an academic post of some description. This small elite sample followed the norms of a professional career and this was indicated through comparison with Harold Perkin's analysis. He analysed the permanent secretaries of the Civil Service, the Presidents of Professional Institutions, Senior Judges and the Editors of national newspapers and periodicals. This analysis covered the late Victorian and the Edwardian periods rather than the interwar period and although the comparison was not like for like, the characteristics of public schools and Oxbridge that were utilised, were either the same or broadly

51 Gary Werskey, *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*, London: Free Association Press, 1988 [1978], p. 22.

similar.[52] The results were grouped into four tables dealing with the Senior Judges, the Professional Presidents, the National Newspaper/ Periodical Editors and the Civil Service Permanent Heads and these tables were conventionally arranged into three columns: the relevant category, and the percentage results arranged into two periods, 1880-1899 and 1900-1919.[53]

SOCIAL ORIGINS OF SENIOR JUDGES	PROPORTION OF SAMPLE 1880-1899	PROPORTION OF SAMPLE 1900-1919
Upper Class	50.00%	54.60%
Public/Private School	76.50%	75.00%

SOCIAL ORIGINS OF PROFESSIONAL PRESIDENTS	PROPORTION OF SAMPLE 1880-1899	PROPORTION OF SAMPLE 1900-1919
Middle Class	64.60%	56.30%
Upper Class	32.90%	42.50%
Private/Grammar Schools	76.50%	65.00%
Elementary Schools	14.60%	16.70%
Universities	44.90%	34.50%

[52] Harold Perkin, *The Rise of Professional Society: England since 1880*, London: Routledge, 1989, pp. 87-91; Other comparable statistics in reference to the entrance examinations for the civil service can be found in J. Wertheimer, 'Science and Modern Languages in Civil Service Examinations', *Nature*, vol. 99 (1917), p. 74.

[53] The associations or institutions involved included the Institute of Chartered Accountants, the Royal College of Physicians, the Royal College of Surgeons, the Institute of Civil Engineers, the Institute of Mechanical Engineers, the Law Society and the Royal Institute of British Architects.

SOCIAL ORIGINS OF NATIONAL NEWSPAPER AND PERIODICAL EDITORS	PROPORTION OF SAMPLE 1880-1899	PROPORTION OF SAMPLE 1900-1919
Middle Class	55.80%	55.10%
Upper Class	32.40%	28.60%
Public/Private Schools	66.50%	65.90%
Clarendon Schools	50.00%	34.10%
Universities	64.80%	51.70%

The universities referred to in this table were mostly Oxford and Cambridge.

SOCIAL ORIGINS OF CIVIL SERVICE PERMANENT HEADS	PROPORTION OF SAMPLE 1880-1899	PROPORTION OF SAMPLE 1900-1919
Public/Private Schools	87.00%	80.00%
Eton/Harrow	47.80%	20.00%
Oxbridge	47.50%	57.20%
Middle Class	26.30%	48.00%
Upper Class	71.90%	48.00%

These results demonstrated the predominance of the Oxbridge universities and the public schools. Their influence reached its greatest extent in the Civil Service where the upper class dominated and the public schools educated a

staggering 87% of the permanent heads between 1880 and 1899. In comparison to these professional groups, the proportion of scientists who were educated at public or grammar school was almost the same at 63% as the professional presidents and the editors. The middle class backgrounds of the professional presidents and the editors at 56% and 55% respectively was less than the sample where two-thirds grew up in the professional and commercial middle classes. With these illustrated correspondences, the sample stood out from other professions because of its social background which was predominantly middle class or working class, but did not draw upon the aristocracy. The educational experience of a public or grammar school was supplemented by a far greater emphasis on university education and science, unlike these other professions, provided some meritocratic opportunities for upward social mobility.

Many individual members of this sample, including Lord Rutherford and Sir Henry Tizard, were 'insiders' who worked within the civil service and understood its needs and systems. Their training through school and university entailed the inculcation of gentlemanly codes of conduct and imperialist values that facilitated their entry as advisors and administrators into these administrative and social circles. The majority of scientists remained 'outsiders' who organised themselves into lobbying groups and professional associations in order to attack their low status in the civil service and raise their political profile.[54] Two of the most prominent were Hyman

54 Gary Werskey, "British Scientists and 'Outsider' Politics, 1931-1945", *Science Studies*, vol.1 (1971), pp. 67-83; Gary Werskey, "Nature and Politics between the Wars", *Nature*, vol. 224 (1969), pp. 462-472.

Levy and Lancelot Hogben, communist scientists of working class background, whose careers suffered or stood still as they promoted scientific socialism during the interwar period.[55] Their campaigns culminated in the movement for the 'social relations of science', institutionalised as the British Association's Division for the Social and International Relations of Science in 1937. This movement encompassed Werskey's socialists 'outsiders' and moderate scientific liberals like Julian Huxley, Sydney Chapman and Sir Richard Gregory who were all included in the prosopographical sample. Beyond the insiders in government, many scientists were politicised into liberal or socialist groupings which voiced their demand for a more scientific society.[56]

[55] Gary Werskey, *The Visible College*, pp. 101-131.

[56] Robert E. Filner, "The roots of political activism in British science", *Bulletin of the Atomic Scientists*, vol. 32 (1976), pp. 25-29; P. G. Werskey, "The Perennial Dilemma of Science Policy", *Nature*, vol. 233 (1971), pp. 529-532; M. D. King, "Science and the Professional Dilemma" in Julius Gould, ed., *Penguin Social Services Survey 1968*, London: Penguin, 1968, pp. 34-73; R. MacLeod and K. MacLeod, "The Social Relations of Science and Technology 1914-1939" in Carlo M. Cipolla, ed., *The Fontana Economic History of Europe. Volume 5: The Twentieth Century-1*, Hassocks, Sussex: The Harvester Press, 1977, pp. 301-363; Neal Wood, *Communism and British Intellectuals*, London: Victor Gollancz, 1959, pp. 121-151; William McGucken, *Scientists, Society and State: The Social Relations of Science Movement in Britain, 1931-1947*, Columbus, Ohio: Ohio State University Press, 1984.

Chapter Five

"A QUESTION OF CONFIDENCE": PROFESSIONAL CONDUCT AND THE 'RADIUM PROBLEM' IN THE 1920S

5.1 Introduction

The supply and utilisation of radium was forcefully contested amongst scientists, physicians and surgeons during the interwar period, especially between the Medical Research Council (MRC) and the professional practitioners of the Royal Colleges. This case-study examines the conflict between the Presidents of the Royal Colleges, Lords Dawson and Moynihan, and Sir Walter Fletcher, Secretary of the MRC, in order to draw out the gentlemanly obligations and cultural assumptions that precipitated their vitriolic exchange. Their hostility involved 'insider' scientists and shaped two important discussions on radium policy in the civil service: the establishment of the subcommittee on radium supply in 1928 and the unofficial flurry of meetings at the Athenaeum Club in 1933 which were instrumental in establishing the Radium Beam Therapy Research Board.[1] Both episodes have been analysed in passing as parts of larger studies on the role of Lord Rutherford in politics and the development of radiology during the interwar period.[2]

The history of interwar medicine has concentrated upon the fractious and

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1 "National Radium: The Annual Reports", *British Medical Journal*, vol. ii [October 21, 1933], pp. 746-748, 748.

2 David Wilson, *Rutherford: Simple Genius*, London: Hodder & Stoughton, 1983, pp. 480-482; David Cantor, "The MRC's support for experimental radiology during the interwar years" in Joan Austoker and Linda Bryder, eds., *Historical Perspectives on the Role of the MRC: Essays in the History of the Medical Research Council of the United Kingdom and its predecessor, the Medical Research Committee, 1913-1953*, Oxford: Oxford University Press, 1989, pp. 181-204.

complex relationships between clinicians and men of science, clinical practice and laboratory research, the Royal Colleges and the universities or the MRC. "Revisionist historians" who have examined the "peculiarly difficult passage of continental experimental science, notably physiology, into the British medical curriculum" have portrayed a conflict between clinicians and scientists over the field of education:

> Anti-vivisectionist sentiments, the natural theological tradition, and a long-established preference for anatomy over physiology, meant that many British clinicians snubbed the attempt to introduce the experimental sciences to medical students and denied the claim that these disciplines had relevance to the practice of medicine.[3]

David Cantor, the historian of radiology during the interwar period, fits into the schematic of the revisionists with his description of the conflicts between the investigators of the MRC and the clinicians of the Royal Colleges.[4]

5.2 The 'Radium Problem' in the 1920s

Radium was first revealed to the world in 1898 by Henri Becquerel and Pierre and Marie Curie as part of their researches into the phenomenon of radioactivity. It was identified as one of the substances that imparted

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[3] Christopher Lawrence, "Incommunicable Knowledge: Science, Technology and the Clinical Art in Britain 1850-1914", *Journal of Contemporary History*, vol. 20 (1985), pp. 503-520, 504.

[4] David Cantor, *The definition of radiobiology: The Medical Research Council's support for research into the biological effects of rediation in Britain, 1919-1939*, Unpublished PhD thesis. Lancaster University, 1987.

radioactivity to Czechoslovakian pitchblende, the other being polonium.[5] After Roentgen's announcement, X-rays were applied to medical problems and interested parties soon extended the exploration of these therapeutic possibilities to radioactive substances so that by the turn of the century, radium "was already being used for the treatment of superficial malignant growths".[6] The story of radium's medical application is described as one of gradual extension and "disrepute". Its lack of use in the last few years preceding the Great War was attributed in 1928 by Professor G. E. Gask, Director of the Surgical Unit at Saint Bartholomew's Hospital, to a failure by practitioners to apply the practices of clinical science. "For the most part accurate details of the exact nature of the disease treated, the method of application, and the dosage were lacking."[7] Gask was reading the standards of interwar radium therapy back into the period before the War.

Radium had been acquired for military purposes and was released to the Medical Research Committee in 1919. As a radioactive substance with a half-life of over one thousand years, radium was the only element which disintegrated over a long period. The gamma rays that radium emitted had a greater penetrating power than X-rays due to their shorter wavelength and this property was considered to hold great promise for the treatment of deep-seated tumours untreatable by the surface application of rays.[8] The gas radon, a byproduct of radium emission, was also useful as a

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[5] Professor Sidney Russ, "The Experimental Basis of Radium Therapy in Cancer", *British Medical Journal*, vol. i [May 5, 1928], pp. 903-904, 903.

[6] *Ibid.*

[7] G. E. Gask, "An Address on Radium in the Treatment of Malignant Disease", *British Medical Journal*, vol. i [April 28, 1928], pp. 843-847, 843.

[8] "The Value of Massive Radiation: Final Report of the Conference on Radium", *The Lancet*, vol. 224 [January 7, 1933], pp. 44-47, 44.

shortlived and more portable tool for the treatment of malignant disease, a medical term to describe the diverse forms of cancer. The five grammes available were concentrated at the Middlesex Hospital in order to establish the usefulness of radium in combating cancer. Radium was scarce and expensive but five grammes, nine percent of the country's total supply in 1922, demanded strong justification for its concentration in one experimental programme.[9] This justification was not forthcoming and dispersal amongst metropolitan and regional hospitals followed. This radium was supervised by the MRC's Radiology Committee which wished to pursue the effectiveness of radium in curing tumours.

Cancer was increasingly invading the public realm. There were reports of a rising mortality rate and the establishment of the British Empire Cancer Campaign in 1923 as a rival to the Imperial Cancer Research Fund propelled public awareness.[10] Funding required a greater public profile and the reported increase in the mortality rate of cancer by twenty percent since 1901 led to the raising of questions in Parliament.[11] The elevation of cancer to the level of a 'problem' had repercussions for the status of radium in the clinical sphere. The use of radium had been opposed by some surgeons who attacked its effectiveness as a therapeutic agent.[12] However public anxiety and pressure from other constituencies of

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9 David Cantor, "The MRC's support for experimental radiology during the interwar period", p. 184. The five grammes of radium cost £72500 at £14500 per gram. Prices of radium had fallen from £36 per milligram in 1914 to £22 per milligram in 1922. However, "the huge cost of radium ensured supplies were limited. Indeed, so scarce was radium that no other comparable quantity of it was available for purely research purposes."

10 Joan Austoker, *A History of the Imperial Cancer Research Fund, 1902-1986*, Oxford: Oxford University Press, 1988, pp. 78-90.

11 David Cantor, "The MRC's support for experimental radiology during the interwar period", p. 185.

12 "The Demand For Radium", *The Lancet*, vol. 215 [July 21, 1928], pp. 127-128. "Indeed it may be said that for ten years after the introduction of the treatment the large majority of the medical profession was sceptical of the value of radium in malignant treatment."

clinicians had directed the MRC's research programme with radium towards clinical rather than experimental research. Therefore radium therapy became the dominant area of clinical research in cancer during the nineteen-twenties and a contested area within the community of surgeons.[13]

Traditional methods for the palliation and cure of cancer had been predominantly surgical. Success depended upon the operability of the tumour and if this did not meet the criteria of the surgeon, his diagnosis and inability to act was usually a death sentence for the patient. Radium was considered to be a promising therapeutic approach because it could be applied to inoperable tumours and shrink them down to managable size. It also reduced the need for traditional surgical methods with some cancers. Surgeons who cooperated with the MRC like H. S. Souttar or G. E. Gask devised new methods of utilising radium or imported techniques from long-standing centres on the continent. By the late nineteen-twenties the accepted methods were the surface application of the substance or its insertion into needles which were then placed around an internal tumour through a technique known as the 'surgery of access' in order to bathe it in a uniform radiation.[14] Carcinomas of the tongue, breast and rectum were accessible to this form of treatment whereas brain tumours, cancer of the oesophagus and other internal organs remained inaccessible. Such techniques required the combined skills of physics and surgery since

[13] David Cantor, "The MRC's support for experimental radiology during the interwar period", pp. 185-189.

[14] G. E. Gask, "An Address on Radium in the Treatment of Malignant Disease", p. 844. "The needle consists of a sealed glass tube in which is placed the required amount of radium, the tube is inserted into a container made of some metal, such as platinum, silver or aluminium." J. Joly of Trinity College, Dublin did write to claim priority on the use of needles in radium therapy, stating that the technique had been used in Ireland since 1914. J. Joly, "Radium and Cancer", *British Medical Journal*, vol. ii [December 29, 1928], p. 1367.

surgeons had to calculate the dosage of radium required as well as placing the needles in the correct position to ensure that the tumour received a uniform radiation. Its advocates were quick to compare the success of these new techniques with the traditional operations. "If, therefore, a method other than operation is adopted, it will not find itself in competition with any very efficient means of treatment, and the results will be bad indeed if they are worse than those of operation."[15] The MRC had to popularise the effectiveness of radium amongst a sceptical audience of surgeons whilst policing the boundaries of radium units to promote expertise in its use.[16] This campaign was successful as an increasing number of surgeons adopted the techniques of radium therapy leading to greater pressure on resources and increasing controversy about claims to expertise by many of these converts.[17]

This pressure upon such scarce resources led to demands for rationalisation in the supply of radium. From 1928, concerned clinicians were including plans for the national supply and distribution of radium in their articles.[18] *The Lancet* publicised this concern: "Taking our own country as an example, there is no doubt that we are under-supplied with radium for medical purposes..." The cause was due to "the increased confidence now being placed in radium, and [the Ministry of Health] are also aware that in the not very distant future pressure may be put upon

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15 Geoffrey Keynes, "Radium Treatment of Primary Carcinoma of the Breast", *British Medical Journal*, vol. ii [July 21, 1928], pp. 108-111, 111.

16 Such fears were not unwarranted since rare and dangerous scientific machinery like X-ray equipment had been supervised by, amongst others, an honorary dentist and a theatre beadle. Christopher Lawrence, *op cit.*, 514.

17 "Radium For Cancer", *The Lancet*, vol. 214 [May 12, 1928], pp. 973-974.

18 G. E. Gask, "An Address on Radium in the Malignant Treatment of Cancer", p. 847; "League of Nations: An Inquiry into the Radiotherapy of Cancer", *The Lancet*, vol. 215 [July 7, 1928], pp. 34-35; Spencer Mort, "Radiotherapy of Cancer", *The Lancet*, vol. 215 [July 21, 1928], p. 147; "The Demand For Radium", p. 128.

those in authority to assist in procuring it in response to urgent requiral."[19] The Government was viewed as the only authority that could resolve the problem of supply. The radium lobby began by targeting the duty payable on imported radium through parliamentary questions and public articles. After an article in *The Lancet* the Treasury waived the tariff payable on radium imports for six months and this waiver remained intact until the establishment of the National Radium Trust.[20] The subject was prioritised by the Ministry of Health in May 1928 and after consultation with interested departments, a solution to departmental overlapping was found through the establishment of a Committee on Radium as a Sub-Committee of the Committee on Civil Research.[21] The Committee's report led directly to the foundation of the National Radium Fund where any money raised through public funding would be matched pound-for-pound by a contribution from the Government up to a maximum of one hundred thousand pounds.

The year 1928 could be highlighted as an 'annus mirabilis' for all forms of radiotherapy since the scattered local centres experimenting with radium and X-rays were replaced by a national system of supply and records, whilst the amount of radium held in the country soared overnight. This encouragement for the foundation of new institutions was sponsored by the Government, responding to public demands. Not only was the money raised supplemented by the Government, but the resulting bodies which held and dispensed this resource were set up by Royal Charter as the

19 "The Demand Of Radium", p. 127.

20 "Radium for Cancer", p. 973; "Annotations", *The Lancet*, vol. 214 [May 19, 1928], p. 1028; "Import Duty on Radium Compounds", *The Lancet*, vol. 216 [February 16, 1929], p. 369; "Duties on Radium Compounds", *The Lancet*, vol. 216 [Feb ruary 23, 1929], p. 421.

21 The correspondence concerning the establishment of the Radium Sub-Committee can be found in PRO FD 1/4454 marked "British Radium Supply".

National Radium Trust and the Radium Commission.[22] The Mount Vernon Hospital, which specialised in the care of patients suffering from tuberculosis, was allowed by Act of Parliament, to change its terms of reference, to the care of patients suffering from malignant disease. This hospital became a centre for radiotherapy and combined with the Radium Institute to form the National Post-Graduate School of Radiotherapy.[23] By 1930, the Radium Commission had identified and loaned radium to a number of centres covering a large proportion of the British Isles. Its conditions for the loan were determined by the desire to promote expertise in the use of radium and the need for a standardised statistical collection of all cases treated. All centres had to employ a Radium Officer to supervise radiotherapy and had to use summary cards of all cases with an efficient follow-up system in order to determine the efficacy of radium therapy.[24] This system continued to expand during the five years of this study, establishing both national and regional centres for the deployment of radium therapy and playing a central role in the development of radium beam therapy.

All actions concerning radium took place within a public domain. The subject was discussed amongst interested actors within their various institutional and professional fora: the Medical Research Council, the interinstitutional conferences, the hospitals and the professional journals

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22 The body was called the National Radium Trust rather than the Royal Radium Trust because the Government wished to emphasise the national and popular contribution to this appeal which would be used for the welfare of the entire country. For this reason the body was placed under a Royal Charter, signifying 'establishment' approval whilst guaranteeing independence from the Government.

23 "The Mount Vernon Hospital", *The Lancet*, vol. 223, [July 16, 1932], p. 143; "The Teaching of Radium Therapy: The Mount Vernon and Radium Institute", *The Lancet*, vol. 218 [April 5, 1930], p. 783; "A Course in Radium", *The Lancet*, vol. 218, [June 28, 1930], pp. 1413-1414.

24 F. G. Spear and K. Griffiths, *The Radium Commission: A Short History of its Origin and Work, 1929-1948*, London: His Majesty's Stationary Office, 1951, pp. 40-43, 48-52.

of *The Lancet*, the *British Medical Journal* and the *Journal of Radiology*. That the issue burst the boundaries of professional interest and attracted greater prominence was demonstrated by the attention of *The Times* and the regularity which parliamentary questions on radium were tabled. Medical journalists were already writing newspaper articles on radium as a new cure for cancer that rendered surgery obsolescent and that thousands of people were dying because there were insufficient stocks of the element to treat those suffering from malignant disease.[25] These "propagandists" excited concern amongst cautious experts who responded through letters and articles. These claims were described as "mischievous claptrap" and as a "fog of misrepresentation".[26]

The representation and reception of the knowledge of radium within the public realm is beyond the scope of this case-study. The importance of the public pressure upon the actors involved is a factor that needs to be borne in mind. That a large part of the literate public was aware of the claims made for radium in the treatment of malignant disease is without question. Public awareness was raised by the fundraising drives for the purchase of radium by hospitals and charities.[27] The bequests of money for the purchase of radium were publicised, especially if the donation came from a reputable source.[28] The public donations to the appeal for the National Radium Trust overran the government target of £100,000 by some

25 Malcolm Donaldson, "Radium and Cancer", *British Medical Journal*, vol. ii [December 1, 1928], p. 1008.

26 "Radium, Cancer, and the Public", *British Medical Journal*, vol. ii [December 1, 1928], pp. 999-1000.

27 "Increasing Demand for Radium Treatment", *The Lancet*, vol. 215 [Dec.ember 1, 1928], p.1122.

28 "Gift for the Purchase of Radium", *The Lancet*, vol. 215 [December 1, 1928], p. 1114; "Gifts for the Purchase of Radium", *The Lancet*, vol. 215 [December 29, 1928], p. 1369; "Gifts of Radium to Hospitals", *The Lancet*, vol. 217 [August 17, 1929], p. 359; "Gift of £50,000 for Radium for Hospitals in London", *British Medical Journal*, vol. ii [December 8, 1928], p. 1063. The last donation was offered by Sir Otto Beit.

£50,000. The status of the Radium Appeal was enhanced through its link with the King Edward Hospital Fund and by representing the donation as a thanksgiving for King George V's recovery from a serious illness. Public concern over malignant disease was expressed through the press and through their charitable gifts. The respectability of radium as a subject worthy of concern was guaranteed by the linkage of the cause with the leadership role of the monarchy in the charitable sphere. As such it was a subject worthy of *The Times*, the voice of the upper middle class .

5.3 The Royal Colleges and the Medical Research Council

This section examines the Royal Colleges of London and the 'inner world' of the research agencies. Through a series of articles on the role of laboratories, one can analyse their differing conceptions of science and how this affected the relationship between the Royal Colleges and the MRC. Finally, by studying the establishment of the Radium Committee as a subcommittee of the Committee of Civil Research, one can view how the government machinery dealt with a problem, rendered urgent by public pressure, that required the importation of experts.

According to Gerald Geison, the Royal College of Physicians and the Royal College of Surgeons were dominated by an Oxbridge elite. These licensing bodies ensured that their elites would conform to the ideal gentlemanly type, distinguishable by background, education, wealth, bearing and character:

> Although the ultimate motive was scarcely less pragmatic, medical education of the ancient universities was

> distinguished by its classical emphasis. Among the Anglican elite, it was a self-serving article of faith that only a classical education guaranteed learning, culture and character; and it was largely because they satisfied this condition that Oxford and Cambridge men enjoyed their special privileges in the Royal College of Physicians...[29]

The medical professions were subjected to the same process of gentlemanly professionalisation that transformed all the other ancient professions during the latter half of the nineteenth century. Examinations and educational standards were instituted to quantify and improve standards of medical practice. The establishment of such reforms is comprehensible when "considered in terms of their [the doctors'] cultivation of respectability and intellectuality, their professional organisation, their praise of meritocracy and their apparent aloofness from the struggle for income".[30] Christopher Lawrence has identified a strand of the metropolitan medical profession who incorporated and maintained the gentlemanly values of the Oxbridge medical elite of the nineteenth century in their practices. They worked in the voluntary hospitals of London but moved in the social circles of 'society' which provided their fee-paying clients. These clients chose their doctors on the criteria of gentlemanly suitability rather than professional expertise. Such doctors disparaged specialisation and expertise while praising a classical and generalist education that imbued character. Their profession was an art. Clinical skill was an indefinable quality, imparted by experience and only available to

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[29] Gerald L. Geison, *Michael Foster and the Cambridge School of Physiology: The Scientific Enterprise in Late Victorian Society*, Princeton, New Jersey: Princeton Unversity Press, 1978, p. 28.

[30] Christopher Lawrence, *op cit.*, p. 503.

available to those who could fill the role of the gentleman. "It [clinical skill] was used to show that only the gentleman, broadly educated, and soundly read in the classics, could be equipped for the practice of medicine. The equation almost ran: perfect gentlemen alone made great clinicians."[31] Such attitudes were considered old-fashioned by the interwar period although many older practitioners were still capable of articulating such statements.

The domination of Cambridge amongst the medical elite was waning by the turn of the century. The Presidents of the Royal Colleges, with whom Sir Walter Fletcher had to negotiate, did not belong to the dreaming spires. For example, Baron Moynihan of Leeds, President of the Royal College of Surgeons, whose father was a decorated army captain, was educated at Christ's Hospital and the Royal Naval School in New Cross. From these minor public schools, he graduated to the Leeds Medical School, hoping to become an army doctor. He undertook professional training within hospitals and followed a career as a registrar and researcher before gaining a more prestigious position in Edwardian England as professor of clinical surgery at the University of Leeds. Keen to advance his profession. Moynihan established the *British Journal of Surgery* and founded the Association of Surgeons of Great Britain and Ireland in 1920. These professionals spoke with a gentlemanly voice; their identities conforming to the Oxbridge archetype. Moynihan viewed his medical skills as an art as well as a science, utilising the same discourse as his predecessors. His immodest ideal surgeon, possibly based upon himself, was "a handsome man of distinguished presence, a man of wide

31 *Ibid.*, p. 505.

knowledge and general culture, a man of great technical skill and sound judgement, and a man of compassionate heart".[32] The gentleman-surgeon would embody the qualities of dignity and character, a lack of specialisation and a chivalrous nature. Even during the interwar period, the medical elite subscribed to the professional values of the Victorians, denigrating newly established specialisms and the notion of the expert.

The civil service was far more variegated and plural than the medical profession. The First World War had vastly expanded its institutional watch over the country, so that individuals would now encounter the 'state' in a greater variety of forms (in both senses of the word), agencies, regulations and officials. As the upper reaches of the civil service were transformed from departmental clerks into a mandarin caste, so the permeable and porous membrane that allowed entrance to promising outsiders like William Beveridge or Walter Morley Fletcher sealed itself up after the war. The permanent secretaries, of a classical, generalist bent and public school, Oxbridge background ensured that the system would reproduce such a civil servant while downgrading the expert or scientific officer to a subordinate, or even better, advisory role. Such views on the superiority of the administrative class to the scientific officer remained extant even after the invasion of specialists during the Second World War. This is vividly depicted by the note, 'Points in favour of the Administrator, as contrasted with the Specialist', which was described by Peter Hennessy as the "one [file] that takes the prize for smugness, narrowness,

32 W. R. Le Fanu, "Berkeley George Andrew Moynihan", *The Dictionary of National Biography, 1931-1940*, London: Oxford University Press, 1949, pp. 633-635, 635.

arrogance and restrictive practice".[33] Its listing of the advantages of generalism *vis-a-vis* expertise was an amalgamation of the contributions of a majority of the permanent secretaries.

What distinguished minor departments and agencies like the Department of Scientific and Industrial Research (DSIR) or the Medical Research Council was their peculiar detachment from the heartlands of Whitehall geography. Neither body, nor their later companion, the Agricultural Research Council (ARC), were under the direct supervision of a Government Minister or the administrative class. All three were placed under the supervision of the Privy Council. Committees, chaired by the Lord President, maintained a watchful but intermittent eye over their activities. The DSIR was the most similar in structure to a government department. Its Secretary was appointed by the Lord President and, instead of functioning merely as a grant-making body, the department maintained a number of scientific establishments including the National Physical Laboratory. The Medical Research Council, on the other hand, administered far more grants and maintained far fewer permanent facilities. Its Secretary was not appointed by the Lord President and, because it was not a government department, it hired staff who were not civil servants. As an institution, it maintained close ties with the universities and hospitals which held its research units, infiltrating by

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[33] The note reads: " 'Wider viewpoints. Duty to keep in mind greater variety of considerations. The specialist's contribution to policy (if any) is confined to specialist considerations: administrator must take account of these and others too.'
'Greater versatility: must be capable of being switched from one job to another with quite different content.'
'More wear and tear. Takes main impact of Ministerial, Parliamentary and PAC [Public Accounts Committee] requirements. 'Cushions' and 'carries the can for' the specialists.'
'Recruitment is much more selective: the average AP entrant is a superior article to the average SO [Scientific Officer] entrant.'" Peter Hennessy, *Whitehall,* London: Fontana Press, 1990 [1989], p. 159.

stealth the existing framework of academic and clinical research.

The role of the expert within the civil service had been studied by the wide ranging review under Richard Burdon Haldane whose report was passed onto David Lloyd-George's office the week before Christmas in 1918. The Haldane Committee, otherwise known as the machinery-of-government inquiry, had recommended amongst its other radical changes, that the expert should have a voice in every Ministry through a centralised Ministry of Research. The general principle, upon which these proposals were built up, was the independence of specialists to administer their own affairs and to implement policy as and when it was required. Instead of Whitehall taming the lions of the professions, Haldane advocated Daniel entering the lions' den.[34] However these proposals were not taken up. The scientific research that government financed remained piecemeal but these research bodies gave the scientific and medical professions a unique voice in determining the flow of government funds for civil research. It was this voice that the scientific lobby had campaigned for before the First World War. In practice, the Lord President rarely chaired these committees and these research bodies were given a unique independence in policy terms.[35] Financially, of course, they danced to the tune of the stringent Treasury. Scientists always called for more money but, through their strategy of concentrating upon civil research while making little or no effort to demand a greater input into policy-making, they did little to elevate the role of the specialist and effectively guaranteed

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34 Peter Hennessy, *Whitehall*, London: Fontana Press, 1990, pp. 292-299; Philip J. Gummett, *Scientists in Whitehall*, Manchester: Manchester University Press, 1980, pp. 24-27.

35 The committee of the Privy Council that supervised the work of the MRC met once during the interwar period.

their marginalisation from the mainstream in Whitehall.[36]

The civil servants of the MRC and DSIR could not participate in the accepted career structure of the government ministries. The hegemony of the administrative class and their generalist ideology effectively left these two bodies as isolated institutions. The secretaries of the Medical Research Council, Sir Walter Morley Fletcher and Sir Edward Mellanby were specialists brought in from outside because of their reputations for combining research expertise with managerial capability. The same is true for their counterpart at the DSIR. Sir Henry Tizard returned to the civil service after a short time as a consultant in the petroleum industry.[37] This bureaucratic marginalisation was not recognised by these actors as such. They had no wish to invade the citadels of Whitehall, nor were they sympathetic to the calls for a rational and scientific civil service. These echoes of the pre-war mania for 'national efficiency' were continued by the scientific network in which Sir Richard Gregory played a key role.[38] This network spanned the lobbies of the British Science Guild and the Association of Scientific Workers for whom the staff of the MRC and DSIR was stony ground. The civil servants were more concerned with the need to build up a programme of research in their respective medical and scientific spheres. The leading civil servants in these government bodies had a wide latitude of action without the pressure of ministerial need or

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36 Peter Hennessy, *Whitehall*, pp. 291-299; Philip J. Gummett, *Scientists in Whitehall,* Manchester: Manchester University Press, 1980, pp. 22-28

37 Tizard's successor, Sir Frank Smith, could be described as a scientific civil servant since his career involved the supervision of government research as an Assistant at the National Physical Laboratory (1900-1920), as a Director of the Scientific Research and Experimental Department at the Admiralty (1920-1929) and as the Secretary of the DSIR (1929-1939). He then acted as a scientific advisor to Anglo-Iranian Oil and as a Director of the Birmingham Small Arms Company Ltd..

38 G. R. Searle, *The Quest for National Efficiency: A Study in British Politics and Political Thought, 1899-1914*, Oxford: Basil Blackwell, 1981.

parliamentary accountability and their expectation of a knighthood was a one-to-one bet.

These bodies can be viewed through Jennifer Beinart's concept of an 'inner world' which she used to analyse the problem-area of imperial sickness. The succession of committees, dealing with issues in this field, was her focus of study. Their day-to-day functioning was "an inner world, often remote from the realities of life and disease among millions of Britain's colonial subjects."[39] In the same vein, the MRC and its constituent committees would examine a programme of research, an issue or a problem without reference to "the social, economic and political problems."[40] The concept has two senses which are useful here. The first is the world of the civil service committee which abstracted a problem or a subject as a special area upon which it built its own expertise and *raison d'etre*. The committee drew its members into a temporary community that would meet at a designated time and place in order to change the world from behind closed doors. Its recommendations or decisions would have some consequence. The committee was not only focussed upon the 'inner world' as a subject but could also become an 'inner world' socially, with an internal existence that was no longer immediate to the context upon which it depended. Beinart's concept captures the institutional and social boundaries that gave a committee and its members freedom of action and additionally extends itself to a second sense specific to the interwar period. A committee of specialists would draw upon scientific and medical ideologies that purposefully excluded political, economic or social

39 Jennifer Beinart, "The inner world of imperial sickness: the MRC and research in tropical medicine" in Joan Austoker and Linda Bryder, eds., *Historical Perspectives on the Role of the MRC*, p. 110.
40 *Ibid.*

perspectives. This 'inner world' was ideological as well as institutional, since the remit of the research committee was focussed upon the development and application of scientific and medical knowledge.

The committee was a closed body with strict criteria for entry whose existence depended upon the administrative machinery that found it useful as a tool to explore an unknown, solve a problem or delay a decision. To study a committee therefore demands knowledge of the context which provided its justification, of the interests and strategies which it served and as a bureaucratic device which functioned as a space where groups could contest and cooperate before coming to some degree of resolution. One should differentiate between the shades of committee, from the temporary working body limited to the management of a department to the sometimes permanent and always prestigious Royal Commission.

Our concern is with the MRC committee of which three types can be discerned. The first was the interdepartmental committee, where the problem-area required the cooperation of two or more government departments. An example is the Colonial Medical Research Committee, sponsored by the Colonial Office and the MRC, which foundered due to the development of rival committees that included its remit.[41] The second was the standing specialist committee that drafted recommendations for a particular field of research and coopted specialists as members in order to ensure a dialogue between the government agency and the specialists within this concern. Such a committee could defuse potentially explosive

[41] *Ibid.*, pp. 114-115.

areas of conflict between the MRC and a particular profession. The MRC's Radiology Committee is a good example of this type. The third type was the external committee where the MRC was represented so that the originating group or groups could ensure a response to their proposals by the MRC in private. Examples include the Radium Beam Therapy Research Board and the Radium Conference of 1931-1933. All such committees could develop a corporate existence, with their own language and perspective that separated members from their respective groups and fostered a certain identification with the aims and proposals of the committee. Such an identification would depend upon the commitment of the member to the committee and its goals.

The 'inner world' of the MRC committee was bounded by the scientific policies put forward by the Secretary of the MRC, Sir Walter Morley Fletcher. Fletcher held decided views on the primacy of experimental science that directed his policies on medical research and brought him into disagreement and, on occasion, open conflict with the Royal Colleges. He wished to give the MRC a dominant role in coordinating medical research throughout the United Kingdom under his guiding hand. This reflected his own central position among "government, medical, academic and scientific circles" that had developed during the extraordinary situation of the First World War.[42] He was alert to the encroachment of government and private bodies onto the playing fields of medical research and argued that such enterprises should be channelled through the MRC. This led him into departmental battles with the Ministry

[42] Joan Austoker, "Walter Morley Fletcher and the origins of a basic biomedical research policy" in Joan Austoker and Linda Bryder, eds., *Historical Perspectives on the Role of the MRC*, pp. 23-24.

of Health and stormy relations with the British Empire Cancer Campaign.[43] Such hostilities were often initiated over Fletcher's unwillingness to consider clinicians as proper supervisors for research projects. "His views on medical research differed radically from the opinions of those in the daily routine of clinical medicine and the care of patients, and his vigorous criticisms and intolerance of medical practice did not endear him to many in Harley Street."[44]

His conception of science conformed to the professional ideal of mainstream science and indicated his membership of the scientific establishment. While attending the opening of the [Sir Patrick] Manson Lecture Theatre on November 20th 1930, Fletcher "spoke on the inspiration of Sir Patrick Manson" and on his position in "that wonderful galaxy" to which all eminent Victorian men of science eventually ascended to.[45] He carefully separated Manson's role as clinician from his role as man of science and implied that a clinical scientist was a contradiction in terms:

> He [Manson] showed that the clinician dealing with disease must be prepared himself, if he is to advance knowledge, to give his own time and to acquire his own skill in pursuing his observations by the technical methods of the laboratory and in testing his results by the method of experiment.

Fletcher clearly indicated that medical science was a moral enterprise that

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43 *Ibid.*, pp. 25, 28-29.
44 *Ibid.*, p. 24.
45 "The Hospital for Tropical Diseases. Opening of New Wards, Laboratories, and Manson Lecture Theatre", *The Lancet*, vol. 219, [November 29, 1930], pp. 927-928, 927.

could only produce knowledge through laboratory experiments. Manson was commemorated as a man of science because he embodied the values of science. He sacrificed his professional life, "giving up time from work of immediate profit in order to read and think, observe, describe, and experiment in his own laboratory." Near the end of his address, Fletcher clearly summed up these values as a "burning zeal and self-sacrificing altruism" that "made their professional practice the servant of their scientific work."[46] This address clarified his own allegiance to the idealistic rhetoric of pure science that represented professional scientific work as a moral service to expand the corpus of mankind's knowledge. Particular to Fletcher's own articulation of this professional ideology was an emphasis upon the importance of the laboratory and a moral privileging of scientific work over the quotidian practice of clinicians.

Fletcher was facing oppositional currents to his ambitions amongst the clinical community. Lord Moynihan, President of the Royal College of Surgeons was one of many amongst the community of eminent clinicians, both surgeons and physicians, who attacked Fletcher's aims and methods both directly and obliquely. One of the most successful strategies of these like-minded clinicians was the establishment of the British Empire Cancer Campaign in 1923 to solicit donations for scientific research into cancer under their direction rather than under the men of science (mainly physiologists) who dominated the halls of the MRC and the laboratories of the Imperial Cancer Research Fund.[47] This was made clear by the purposefully controversial speech of Moynihan while opening the Banting

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[46] *Ibid.*

[47] Joan Austoker, *History of the Imperial Cancer Research Fund, 1902-1986*, pp. 80-83.

Research Institute at the University of Toronto.[48] Through a historical and philosophical account of scientific methods, he asserted that Medicine was the "parent of all sciences" and that clinical science had greater status than laboratory experiments.[49] His philosophical justification, seeded with references to Poincare and Mach, depended upon a distinction between two types of scientific method, the inductive Hippocratic and the deductive Galenic. The Hippocratic method was one of observation and formed the basis of diagnosis, the art at the heart of the role of the physician. Moynihan articulated the procedures of diagnosis in a philosophical dissection of the medical profession while presenting an ideal archetype that could undertake this "scientific procedure of the most austere and arduous kind".[50] Diagnosis had to take account of the complexities of a medical case where the physician could not control the natural phenomena and had to weigh up a large number of factors in coming to a conclusion. From such arguments was he able to detail a clinical science based on the Hippocratic method and its methodological and practical superiority to Galenic experiments.

> Observation is, indeed, the first act in scientific procedure and the last act also. Experiment plays its most necessary part in intermediate stages, but is throughout subject both to initial direction and to final control, either to renunciation and acceptance.[51]

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48 Lord Moynihan, "The Work of Laboratories", *The Lancet*, vol. 219, [December 27, 1930], pp. 1103-1104, 1104. Lord Moynihan wrote, "to produce such an effect on him [Fletcher] and those like-minded with him was indeed my hope and firm intention, and I rejoice greatly at his unsolicited testimony to my success."

49 Lord Moynihan, "The Science of Medicine", *The Lancet*, vol. 219, [October 11, 1930], pp. 779-785.,779

50 *Ibid.*, p. 782.

51 *Ibid.*, pp. 781-782.

Surgeons and their science were accorded a philosophical primacy and an educational status that experimental investigators did not have "owing to the comparative simplicity of the arranged enquiry [the experiment]".[52]

This philosophical exposition was merely the foundation for Moynihan's controversial attack on the physiological community. He drew a distinction between experiments on humans and animals; one was an expression of clinical science, the other of physiology. He considered every operation to be an experiment and the observant surgeon could find some new anatomical phenomenon or improve a technique in even the simplest cases if he was sufficiently keen to utilise the Hippocratic method. Whereas the concentration of physiologists upon animal experiments had left a wide gulf between their research and the problems that the clinicians faced. Moynihan pessimistically argued that surgical progress was impeded by their lack of knowledge on anatomical functions as opposed to structures which Lord Lister had comprehensively opened up. For neglecting the needs of the surgeons, the physiologists were accused of "remoteness", "playing truant", of being "aloof", "laggard" and suffering from "somnolence".[53] Moynihan's remedies to this situation included Chairs of Human Physiology, new research institutes where clinicians and laboratory workers could labour together and a reform of the MRC. The MRC would be reorientated away from the biomedical sciences to the clinical sciences through increased clinical representation on the Council. Such utterances were designed to antagonise Fletcher.

Fletcher's relations with the clinical community were poor and veered

[52] *Ibid.*, p. 780.
[53] *Ibid.*, pp. 782-784.

between the hot wars of angry correspondence and the low intensity conflicts of mutual antagonism throughout the nineteen-twenties. This hostility provided part of the framework within which the developments of radium policy were mapped out. The cause lay in the different and irreconciliable goals of the College Presidents, Lords Dawson and Moynihan, and the Secretary of the MRC. The College Presidents sought a consultative role on the direction of scientific research in medicine equivalent to that of the Royal Society of London and the MRC.[54] Moreover, Moynihan "deeply resented" the lack of recognition of his research by the scientific community since he was never considered for membership of the Royal Society.[55] Such demands were anathema to Fletcher who would only support those clinicians, like Manson, who pursued orthodox research in laboratories in cooperation with a respectable institution like the Royal Society or the MRC. He had no difficulty in supporting such clinicians like Sir Thomas Lewis or the surgeons working with radium under the aegis of the MRC since they conformed to his definition of scientific practice.

This conflict was reflected in the concepts of science employed by these different professional communities to justify their practices. As explored above, Fletcher advocated a role for the clinician where normal science, viewed as laboratory experiments, was separated from professional practice. This was very different from Moynihan's definition which privileged practical surgery and diagnosis above experiment. Moynihan's definition fits the pattern of medical practitioners who wished to utilise

54 Christopher C. Booth, "Clinical Research", in Joan Austoker and Linda Bryder, eds., *Historical Perspectives on the Role of the MRC*, pp. 205-241, 216.
55 *Ibid.*, p. 214.

'science' as a vehicle for professional recognition and status amongst both the public and their academic peers.[56] Such rhetoric was bound to clash with the less elastic usage of the term by Fletcher and his supporters amongst the clinical community. Furthermore, both Moynihan and Fletcher incorporated their definitions into idealistic expressions of professional enterprises. Attacks on the central core of their professional identities would often result in personal hurt and hostility, especially for the more insecure Moynihan who was promoting his profession against a dominant scientific hegemony. This was reflected in the correspondence between the two, published in the pages of *The Lancet*, on Fletcher's reference to Moynihan's speech at the Manson opening as "that Irish mode of encouragement!"[57] This sparked a public spat that was characterised by Fletcher's attempt to defuse the conflict through wit and Moynihan's continual accusations of "misquotation", "irrelevancy" and Fletcher's temerity at excusing "himself as a humorist!"[58] The MRC and the Royal Colleges were contesting institutional powers, the development of the medical profession and the very definition of science as applied to medicine.

5.4 Dawson vs. Fletcher: The Professional Politics of Radium

The Conservative administration came under increasing public pressure to take steps to increase the stocks of radium in the country. During 1928

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[56] Christopher Lawrence, *op cit.*, pp. 504-505.

[57] "The Hospital for Tropical Diseases", p. 928. Fletcher's use of the phrase "Irish mode of encouragement" is a humorous aside to demonstrate that Moynihan was actually hindering science.

[58] The correspondence is found in "The Work of Laboratories", *The Lancet*, vol. 219 [December 6, 1930], p. 979; "The Work of Laboratories", *The Lancet*, vol. 219 [December 13, 1930], pp. 1022-1023; "The Work of Laboratories", *The Lancet*, vol. 219 [December 27, 1930], pp. 1103-1104. Quotations are from the last of these.

the Minister of Health, Neville Chamberlain, directed his Assistant Secretary, Michael Heseltine, to write to the MRC and relevant departments to test the waters concerning the establishment of an Interdepartmental Conference exploring the concept of a "national reserve" of radium.[59] Fletcher was enthusiastic and wrote back a fortnight later, stating that the idea had been discussed with the Lord President of the Council, Lord Balfour, and that this Conference should meet under the umbrella of the Committee of Civil Research. This would allow greater cooperation with the "Fighting Services" through the discussion of salient points with the Committee of Imperial Defence.[60] Fletcher's letter emphasized the problems of supply as the main reason for this committee, arguing that the British Empire had to find alternate suppliers within its own territories in order to end its reliance upon the Belgian Congo. Having consulted Lord Balfour, Tizard at the DSIR, the fourth Lord Rayleigh and Sir Maurice Hankey, the Cabinet Secretary, Fletcher was convinced that his proposal could effectively answer Chamberlain's query whilst bringing the question under the purview of the MRC and allied men of science.[61] The formal proposal for a sub-committee on radium came from the Ministry of Health but it originated with Fletcher whose own role was not publicised. No link could therefore be drawn between the MRC and this new sub-committee. Further evidence of Fletcher's influence is given in his chance meeting with Lord Rayleigh and conversation on radium supply (probably at the Athenaeum or Royal Society) followed by Rayleigh's importation as an eminent and independent expert to chair the

59 W. A. Robinson to Sir Walter Fletcher, May 2, 1928. PRO FD1/4454. Michael Heseltine was a "senior civil servant", who served as the Secretary of the Haldane Committee and stayed at the Ministry of Health "for the bulk of his career". Hennessy, *op cit.*, p. 294.

60 Sir Walter Fletcher to W. A. Robinson, May 16, 1928. PRO FD 1/4454.

61 Sir Walter Fletcher to Lord Balfour, May 16, 1928; W. A. Robinson to Sir Walter Fletcher, May 23, 1928; Sir Walter Fletcher to W. A. Robinson, May 24, 1928; W. A. Robinson to Sir Walter Fletcher, June 6, 1928. PRO FD 1/4454.

subcommittee.[62]

The Committee of Civil Research had been set up by Stanley Baldwin to investigate specialised problems.[63] By deploying the mask of research, this body could effectively depoliticise potential problems by removing the issue from the authority of a Ministry into the hands of experts and fostered cooperation between departments on certain matters. It had little power and was used as a vehicle to answer critics by indicating that something was being done while removing interested agencies from public view. Fletcher, Tizard, Sir Ernest Rutherford, President of the Royal Society and Lord Rayleigh in the Chair provided a strong contingent of men of science in this sub-committee with four out of the ten members. The Ministry of Health was only represented by Michael Heseltine and Sir George Newman, the Chief Medical Officer. Fletcher was assured of support in this venture.

The creation of this sub-committee allowed Ministers in the House of Commons to retreat behind a standard declaration that the matter had been referred to this committee and remained in abeyance until it reported.[64] The sub-committee sat for nine-and-a-half months from July 1928 to March 1929, and their report was published by the government after the Easter Recess in April 1929. The report considered the present situation concerning stocks of radium to be "quite inadequate even to

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62 Sir Walter Fletcher to W. A. Robinson, May 24, 1928.

63 Peter Hennessy, *Whitehall*, p. 82; Roy M. MacLeod and E. Kay Andrews, "The Committee of Civil Research: Scientific Advice for Economic Development, 1925-1930", *Minerva*, vol. 7 (1968-69), pp. 680-705.

64 "Supply of Radium", *The Lancet*, vol. 216 [February 2, 1929], p. 261; "The Purchase of Radium", *The Lancet*, vol. 216 [February 16 1929], p. 369.

cope with the most pressing needs."[65] In order to remove this inadequacy, the sub-committee proposed that additional stocks of radium should be purchased through funds provided by the government or from other sources. The radium purchased would be distributed and regulated by the Radium Commission while the money allocated or raised to purchase radium would be held by the National Radium Trust.

The conventions and etiquette that permeated the culture of the civil service remains underexplored. However, given the nature of these communications, it seems that they fell into a standard practice whereby reports could be informally circulated to chosen individuals whose discretion was relied upon to ensure that the contents remained 'confidential'. Lord Dawson had amicable relations with Fletcher and trusted him enough to send a copy of his report (the Dawson Report), which he wrote as chairman of the consultative council on medical and allied services in 1920. When he sent the report he made it quite clear that the report was "confidential" and "for your [Fletcher's] perusal."[66] The letter was marked in ink and underlined "Private". Fletcher acted according to Dawson's wishes and read the report privately before returning the document to its author because he was short of copies.[67] This favour was reciprocated by Fletcher's own letter to Dawson, enclosing the report of the sub-committee. Sir Humphrey Rolleston, a former President of the Royal College of Physicians stated that he had

65 "Radium", *The Times*, April 17, 1929.

66 Lord Dawson to Sir Walter Fletcher. May 17, 1920. PRO FD 1/3357.

67 Sir Walter Fletcher to Lord Dawson. May 28, 1920. PRO FD 1/3357. One could speculate that this was a polite strategy for explaining that the report was a loan rather than a gift.

also seen the report through another source.[68] Fletcher had to obtain "special permission" from Sir Maurice Hankey, the Cabinet Secretary for this "act of personal friendship" and had telephoned Dawson previous to this letter to ensure that Dawson would discuss the contents of the report with him "privately".[69] Before Fletcher could sanction this action, he had to believe that Dawson and he "had the same interests at heart", were bound by ties of friendship and could trust one another to treat the report in confidence, a euphemism for excluding all other individuals.

Dawson read the report and found that Fletcher's interests and his own were not the "same... at heart". Having seen that the report did not detail the ways of funding the purchase of radium, Dawson saw that the medical profession could mould a role for themselves on the radium bandwagon by taking a leading position in the organisation of funding. He was particularly concerned about two issues: the lack of consultation with the associations of the clinical professions and the failure to guarantee clinical representation on the governing bodies of the National Radium Trust and the Radium Commission. Instead of replying to Fletcher, Dawson used his position as President of the Royal Society of Medicine to show the report to eminent physicians in order to gain support. The result of this was a letter to the Prime Minister, Stanley Baldwin. The letter was circulated amongst physicians around the country garnering some twenty signatories.[70] Dawson, in his accompanying letter to Baldwin, warned of

[68] Sir Walter Fletcher to Lord Dawson. March 26, 1929. PRO FD 1/4454; Sir Walter Fletcher to Lord Dawson. April 10, 1929. PRO FD 1/4454.

[69] Sir Walter Fletcher to Lord Dawson. April 10, 1929. PRO FD 1/4454.

[70] The signatures included those of Dawson, Moynihan, John Rose Bradford, President of the Royal College of Physicians, Ewan J. Maclean, President of the British Medical Association, E. Farquhar Buzzard, Regius Professor of Physic, Oxford, and Humphry Rolleston, Regius Professor of Physic, Cambridge. Three taught clinical medicine and four worked in Belfast! None of the physicians working with radium therapy who had written research articles signed this letter.

"an atmosphere of suspicion that could easily be converted into antagonism" for which he blamed the "permanent officials" whilst excusing Neville Chamberlain from any culpability.[71] Dawson had already conversed with Baldwin, presumably to explain the situation and explore the ramifications of sending such a letter.[72] The strategem of dividing politician from permanent official was intended to remove the problem from the sphere of ministerial accountability and spare the Conservative administration political embarrassment. Given this approach, Baldwin could afford to take a supportive or, more likely, a neutral line. The letter politely requested that copies of the report should be sent to the corporate representatives of the "medical profession". The reason given was that no member of the sub-committee had "experience of medical practice or of the use of radium" and therefore the medical profession needed to be consulted. This was necessary to avoid "public controversy" and "the grave risk of losing the support and co-operation of those who are essential to the successful issue of any plan for extending the benefits of radium therapy".[73] This mobilisation of the medical profession reflected the watchfulness of their elite, alert to any trampling of their professional prerogatives and aware that the young Ministry of Health required constant lobbying to circumscribe its more radical proposals.

Fletcher discussed this development on the telephone with Michael Heseltine whilst routinely asking for some documentation.[74] The telephone was used for simple requests and also to confer in a private and informal conversation between two close colleagues when the

71 Lord Dawson to Stanley Baldwin. April 9, 1929. PRO FD 1/4454.
72 *Ibid.*
73 *Ibid.*, [Enclosed letter].
74 Michael Heseltine to Sir Walter Fletcher. April 11, 1929. PRO FD 1/4454.

developments required an urgent response. Heseltine had worked with Fletcher on the sub-committee and his personal addendum on "D's antics" contemptuously derided Dawson's description of "difficult" civil servants as "a horrid piece of journalese!"[75] Dawson's actions were frostily received at the Ministry of Health and Heseltine noted that Chamberlain was very unhappy with him. Fletcher came to the conclusion that he himself was included amongst the "difficult" and vigorously responded, beginning a run of letters between himself and Dawson that provide a window upon the gentlemanly values of professional and civil servants during this five year period.

As discussed earlier in the informal circulation of reports, relationships depended upon 'trust' and 'confidence'. As soon as Fletcher had read the letters, he wrote to Dawson, accusing him of "a personal breach of faith" but was willing to allow that his action was down to some "misunderstanding".[76] Dawson had already written to Fletcher on the same day, explaining the situation, and trying to persuade him that he had not overstepped the bounds of 'confidence'. According to Dawson, the report was only shown to the leaders of the medical profession (presumably Moynihan and Bradford, since Rolleston had already read it) who needed to be aware of the situation in order to sign a letter appealing for funds to purchase radium and the accompanying letter to the Prime Minister did not require any knowledge of the report.[77] Once he had read

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[75] *Ibid.* Higher civil servants drafted official letters and then wrote privately on the typescript in ink, more informal and friendly notes. One can surmise that officials wished to keep their friendships and favours private while also maintaining an information gap between themselves and the ordinary clerical stratum. In practical terms, such tactics kept information out of the gossip of the secretaries and clerks, reducing the potential for public leakages.

[76] Sir Walter Fletcher to Lord Dawson. April 10, 1929. PRO FD1/4454.

[77] Lord Dawson to Sir Walter Fletcher. April 10, 1929. PRO FD1/4454.

Fletcher's letter, Dawson was quick to define 'confidence' and the practices which it allowed.

> I have seen many such reports before and have been shown them by Cabinet Ministers in confidence. The word 'Confidential' on Government Reports is not meant to be as rigid as you seek to indicate. The word 'Confidential' is meant to avoid general knowledge, access to the Press etc.[78]

Dawson's definition was political. In his claim, the main source for reports in the past had been politicians who disseminated information privately which could be used and acted upon by individuals so long as it did not enter the public domain. This was a flexible approach that allowed informal linkages between the government and other groups. Fletcher's definition was based upon 'trust'. As he wrote to Buzzard later, Fletcher was very much an advocate of 'my word is my bond':

> But in official and in private life in this country a great deal of business is done, so to speak, 'on the nod', because white men trust each other, take a word for a bond, and assume that a warning will always be given before friendly relations and good faith are ruptured.[79]

Fletcher did not view 'confidence' as a standalone practice but as part of the general ties of trust that defined a gentleman.

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78 Lord Dawson to Sir Walter Fletcher. April 11, 1929. PRO FD1/4454.

79 Sir Walter Fletcher to E. Farquhar Buzzard. May 15, 1929. PRO FD1/4454.

It is quite clear that Fletcher believed officials, politicians, peers, men of science, other professionals and businessmen all acted according to certain rules. These rules, that an individual's word could be trusted or that friendship should be perceived as a moral bond as well as a meeting of mutual interests, derived from the public school and other collective institutions that inculcated gentlemanly behaviour. Such rules were bounded by the world within which Fletcher moved and worked. They applied to his equals and his peers, but not to the lower classes. Fletcher belonged to the upper reaches of the civil service and his social world included professors, the elite of the medical and scientific professions, and the higher administrative class of civil servants. They met at dinner parties and club luncheons, committee meetings and social occasions[80] -- the natural spaces of the upper middle class.

However these rules, if they can be called rules, were not overt constraints upon behaviour or regulations upon dress and speech (though such regulations were drafted and partially derived from expectations concerning gentlemanly behaviour), but tacit assumptions, often unconscious, that provided the base for a common subculture. Pierre Bourdieu warns the social scientist not to fall into the pitfall of constructing a rational model composed of rules:

> The language of rules and models, which seems tolerable when applied to 'alien' practices, ceases to convince as soon as one considers the practical mastery of the symbolism of

80 'Social occasions' include a variety of public events like the opening of the Manson Laboratory (mentioned earlier), commemorative affairs, funerals, meetings of professional bodies like the British Association for the Advancement of Science or the British Medical Association and so on.

> social interaction - tact, dexterity, or savoir-faire - presupposed by the most everyday games of sociability and accompanied by the application of a spontaneous semiology, i.e. a mass of precepts, formulae, and codified cues.[81]

As Steven Woolgar and others have argued in the construction and promotion of scientific methods and rules, it is the case that the principles articulated by the protagonists are usually constructed as statements of justification to vindicate actions that have already been taken. Applied to this particular situation, one could argue that the letters (particularly Dawson's) are utilising gentlemanly principles as legitimating devices for their particular course of action.[82] 'Trust' and 'confidence' were not principles which guided behaviour but rationalised concepts that justified certain reactions when particular expectations had not been met.[83]

When Dawson came to justify his circulation of the report, he was quick to indicate in the opening lines that he did not let "differences of opinion" colour his friendships.[84] He then proceeded to argue that the need to draft the letter to *The Times* on fundraising for radium required knowledge amongst the signatories that could only be acquired through reading the report. His justification was that the medical profession had not been consulted in the writing of the report and implied that Fletcher was guilty of

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81 Pierre Bourdieu, trans. by Richard Nice, *Outline of a Theory of Practice*, Cambridge: Cambridge University Press, 1977 [1972], p. 10.

82 Steven Woolgar, *Science, the very idea*, London: Tavistock Publications Ltd, 1988, p. 17. Rules are a "*post-hoc* rationalization of scientific practice".

83 Even here, one could argue that, although Fletcher expected his report to be returned, a different course of sction by Dawson such as forgetting to return the report, would have demanded a different response and/or accusation. An expectation allows a very wide range of responses.

84 Lord Dawson to Sir Walter Fletcher. April 11, 1929. PRO FD1/4454.

a breach of trust. This lack of consultation was "contrary to the public interest and a slur upon a learned profession".[85] Dawson had written to Fletcher in November 1928, asking for consultation and Fletcher had returned with "the fait accompli" of the report.[86] As soon as either protagonist had accused the other of breaching an unspoken trust and riding roughshod over the obligations of friendship, there began a spiral of accusation and counteraccusation designed to demonstrate that the blame lay with the other individual and the author was not guilty of such ungentlemanly conduct. Dawson was careful to avoid breaking his friendship with Fletcher, believing that their professional interests were the same. He downgraded the dispute. "No - we need not have differences on questions of honour - Our differences are differences of policy."[87] The central dispute between the two lay in the lack of consultation over the writing of the report.

Two aspects of this exchange of letters are of special interest. One is the perception of a profession through a gentlemanly patina. Both Dawson and Fletcher referred to the 'honour' of the medical profession. This term encompassed the prestige, status and continued independence of the profession. It was also Dawson's explanation for his actions. Fletcher wrote that the report concentrated upon the supply of radium to Great Britain and its distribution therein, but made no attempt to control how radium was used by the medical profession *in* clinical treatment. It was a research report, with six Fellows of the Royal Society, and the interests of research and treatment were the same given the remit of the sub-

85 *Ibid.*
86 *Ibid.* (Underlining in original).
87 *Ibid.*

committee. Moreover the profession was consulted through the MRC's Radiology Committee.[88] However, Dawson embodied the fears of many in the medical profession who feared state control and the end of their professional independence. He viewed medicine as an art that could only be exercised by free physicians, beholden only to their professional ideals and independent of any other interest. State control was an immoral device that would corrupt the profession and destroy its honour. Dawson transformed the subcommittee into a conspiracy. "Is it likely that a great profession will consent to be treated like so many schoolboys? And this Radium happening is only part of an increasing tendency to try and get the control of the medical profession into the hands of a narrow bureaucracy."[89] Dawson was wary of the Ministry of Health following the failure of the consultative committee that he chaired during the first half of the decade.[90] Fletcher dismissed this "tendency" as a "bogey" and a "fantasy". He explained to Dawson that he was just as anxious to protect the "honour" of the medical profession. Of course, Fletcher's "honour" was directed towards different ideals since he gave an explicit role to the "light of science". However, the term conveys a sense of status and influence. Fletcher defined his role at the MRC as one of increasing the influence of medicine in the sphere of government:

> So far from desiring to see Government control of 'medicine', I have tried for fifteen years, on the contrary, to make it the chief object of my working life to help to get for

88 Sir Walter Fletcher to Lord Dawson. April 13, 1929. PRO FD1/4454.

89 Lord Dawson to Sir Walter Fletcher. April 11, 1929. PRO FD1/4454.

90 Extract from Sir Walter Fletcher to Lord Balfour. May 1, 1929. PRO FD1/4454. "He [Dawson] continued at intervals to 'see red' about the iniquities of the Ministry of Health somewhere between 1919 and 1924, of which it appears they are not yet sufficiently purged."

> 'medicine' its proper share in the control of Government. But has your action helped to that end? How can the influence of the profession in Government circles be advanced by such methods as you have used? If the profession is to have any effective influence in guiding the power of bureaucracy, that can only be earned by absolute straight dealing and by close and patient study of the subject matters involved.[91]

This passage reveals how Fletcher could marry the ideals of science and medicine through the identity manufactured by a sense of belonging to the medical profession. Where he differed from Dawson was the central role he assigned to the state in advancing the interests of the medical profession and the progress of medical knowledge. Dawson was unwilling to move towards a future where physicians became salaried servants of the state, thus compromising their professional independence. He articulated a concept of the profession that dated back to the mid-Victorian era and in some cases earlier. He equated his professional ideals with the mid-Victorian fee-paying professional economy where service to the patient and service to the profession were one and the same. His professional ideals were dedicated to the service of the public, working towards a national health insurance scheme and state funding for health education, but his precondition was the continuation of the institutions and practices that guaranteed the professional independence of doctors from the state.[92] Both Dawson and Fletcher looked towards the state as the financial bedrock upon which their professional interests would be

[91] Sir Walter Fletcher to Lord Dawson. April 13, 1929. PRO FD1/4454.

[92] Lord Dawson, "One Hundred Years and After", *British Medical Journal*, vol. ii [July 30, 1932], pp. 183-189, 189.

promoted. From his vantage point within the civil service, Fletcher saw no conflict of interest between his position as a civil servant and his professional integrity as a member of the medical profession. His concept of the medical profession was wedded to his scientific ideals and his experience of the MRC as a civil service body that could fund pure research. Fletcher wanted doctors and surgeons working for the state since they would directly increase the influence of the medical profession in government. His proviso was that all actions had to be "earned by straight dealing" and a working knowledge of how the civil service operated. In Fletcher's eyes, this policy of honesty was a necessary consequence of the need to build up relationships of 'trust' with civil servants and their departments. The medical profession had to recognise the central authority of the state and embrace the gentlemanly values of the civil service in their relationships with it.

5.5 Conclusion

Once it had been established by Fletcher that Dawson's actions could be construed as a misunderstanding rather than as a deliberate attempt to undermine his own position, he was willing to bring the matter to a resolution. This was achieved through the affirmation of friendship. Both sides had been very careful in their letters to avoid personal abuse despite some intemperate language and eventually assuaged their accusations with an agreement that differences "of view" would not affect "the friendly personal relations" that both valued.[93] Fletcher explained to Dawson that the sub-committee was only concerned with the supply of radium which encompassed a number of "scientific problems". The sub-committee

[93] Sir Walter Fletcher to Lord Dawson. April 13, 1929. PRO FD1/4454.

proposed administrative machinery for the distribution of radium for medical purposes but expressly avoided ruling that the Commission should be controlled by the Government or any one profession. Fletcher was therefore willing to support Dawson in his wish to expand clinical representation on the Commission and in the formation of "a sort of informal Team Selection Committee of the kind you [Dawson] have often favoured before".[94] By agreeing to Dawson's strategy, Fletcher was effectively repudiating a decision of the sub-committee on which he was outvoted.[95] However, in these and subsequent letters, Fletcher was unwilling to forget Dawson's actions. Dawson had delayed the appeal while he mobilised the elite of the medical profession. He then refused to cooperate with the sub-committee or the Ministry of Health until given a firm assurance that a majority of the members of the Radium Commission would be clinical representatives.[96] Given Fletcher's poor opinion of the Royal Colleges and their governing role in the ICRF, it is quite probable that he considered Dawson's stance to be detrimental to medical research and a personal setback. However Dawson had the public support of *The Times* and, in his own words, of "some of the big contributors".[97]

The competence of the sub-committee and, by implication, Neville Chamberlain, was questioned by a leader article:

> It must be confessed that in this form the composition of the Radium Commission is hardly calculated to commend itself to the leaders of the medical profession, whose co-operation

94 Sir Walter Fletcher to Lord Dawson. April 17, 1929. PRO FD1/4454.
95 *Ibid.*
96 Lord Dawson to Sir Walter Fletcher. April 18, 1929. PRO FD1/4454.
97 *Ibid.*

> in this vital matter is all-important. Indeed, the whole recommendation about the Commission seems to go beyond the terms of reference assigned to the Sub-Committee, who did not apparently take any evidence from the Presidents of the Royal Colleges - that is, from the accredited leaders of the physicians and surgeons who are engaged in using radium in the treatment of cancer.[98]

The Times called for the Royal Colleges to have a "deciding voice" on the Commission.[99] Succumbing to the public pressure and financial veto exerted by the Royal Colleges, the Ministry of Health agreed to a majority of clinicians on the Commission. Thereafter, Dawson endeavoured to cooperate with the government by placing a letter in *The Times*, calling for funds for radium, and signed by a long list of eminent physicians.[100] The funds collected soon reached the target anticipated by the government. The Trust and Commission were established as viable, clinician-dominated bodies during the summer of 1929.[101] Fletcher was now far more wary of Dawson and suspicious of his actions in any negotiations that required privacy and confidentiality. In the long-term, this strained personal relationship was compounded by the political difficulties that Fletcher faced in his dealings with the Royal Colleges.

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98 "Radium", *The Times*, April 17, 1929.

99 *Ibid.*

100 "The National Radium Fund", *The Lancet*, vol. 216 [May 4, 1929], p. 937. The letter appeared in *The Times* on April 29, 1929.

101 "The National Radium Fund", *The Lancet,* vol. 216 [May 4, 1929], p. 937; "Radium Trust and Commission", *The Lancet*, vol. 217 [August 17, 1929], p. 346.

Chapter Six

"BEHIND CLOSED DOORS": THE ESTABLISHMENT OF THE RADIUM BEAM THERAPY RESEARCH BOARD

6.1 Controversy and 'Bomb' Therapy, 1928-1933

The informal negotiations between Radium Belge and the representatives of the British medical and scientific communities that took place at the Athenaeum Club during the spring of 1933 were a good example of the interactions between professional insiders that shaped formal scientific policy. These negotiations incorporated renewed hostility between Lord Dawson and Sir Walter Fletcher as they vied to institutionalise the influence of their respective bodies, the Royal Colleges and the MRC, in the new research organisation that would supervise beam therapy. This chapter concentrates upon their dispute as it was mediated through these meetings and organisational proposals before drawing out the structural elements within their respective social backgrounds and educational experiences that exacerbated the mutual antagonism of these two protagonists.

The financial drive of April and May 1929 increased the stocks of radium in the country and allowed the Radium Commission to allocate a large amount for the creation of a radium beam therapy unit at Westminster Hospital.[1] Beam therapy was championed by many surgeons who were dissatisfied with

[1] Francis Rock Carling, "Radium Teletherapy: Experience with a Temporary 'Bomb'", *British Medical Journal*, vol. i [May 11, 1929], pp. 845-848; "The Radium Commission", *The Lancet*, vol. 217 [October 5, 1929], p. 275; "The Radium Commission", *The Lancet*, vol. 217 [October 19, 1929], p. 832. The radium was loaned by the Union Miniere du Haut Katanga.

the incremental results from needling methods and radon seeds.[2] While the first 'bomb' was constructed in Great Britain in 1928,[3] research centres on the Continent had been using the technique for a number of years and this surgical lobby viewed the Westminster centre as the first step in the modernisation of British radium therapy.[4] The 'bomb' was the symbol that emphasized Britain's equality with American, French and Swedish rivals in the world of radium therapy and was represented as the Radium Commission's first success.[5] Controversy followed when the beam therapy research unit was closed down in May 1932 on the grounds that it was an

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2 The term 'beam therapy' did not really enter accepted usage until the establishment of the body of the same name in 1933. However, since this essay explores the foundation of the Radium Beam Therapy Research Board, beam therapy is a convenient shorthand for this technique, despite its anachronistic use in the period leading up to 1933. Radium beam therapy, when first developed, was described as teletherapy, massive radiation and distance radium therapy.It involved the incorporation of radium into a 'bomb' and could expose the patient to a uniform dose of radiation through a beam. The technique involved no surgery whatsoever unlike the needling techniques and this was hailed as one of its greatest advantages. H. S. Souttar, "The Distribution of Radium", *British Medical Journal*, vol. i [April 27, 1929], pp. 787-788; Replies included R. H. Jocelyn Swan, "The Distribution of Radium", *British Medical Journal*, vol. i [May 4, 1929], p. 831; S. Forsdyke, "The Distribution of Radium", *British Medical Journal*, vol. i [May 18, 1929], p. 927; F. Hernamen-Johnson, "The Distribution of Radium", *British Medical Journal,* vol. ii [May 25, 1929], pp. 972-973; "The Effective Use of Radium", *The Lancet*, vol. 216 [April 27, 1929], p. 881.

3 The earliest use of the term "bomb" in radium experiments can be traced back to J. E. Petavel's use of a complete steel sphere, of half a foot diameter, where radium salts could be exposed to high temperatures and pressures during controlled explosions. It is uncertain whether this "bomb" was influential upon the "bombs" used in beam therapy or if these experiments just imported the word and its meanings into the world of radium research. Professor E. Rutherford F.R.S. and J. E. Petavel F.R.S., "The Effect of High Temperature on the Activity of the Products of Radium", *Report of the British Association for the Advancement of Science 1907*, London: John Murray, 1908, pp. 456-457.

4 A previous experiment involving a two and a half gramme unit had been carried out at the Middlesex Hospital in 1920 under the authority of the MRC. It is described as a mass radium unit ("bomb") but was quickly broken up and distributed amongst several research centres. F. G. Spear and K. Griffiths, *op cit.*, p. 133.

5 Sir Ernest Graham-Little, "Radium Therapy: Scientific Application", *The Times*, April 5, 1932. He described the "reputation" of the foreign centres of Stockholm, Paris and New York as "far higher, unhappily, than is the reputation of this country at the present time."

uneconomic use of rare radium resources.[6] However, having announced the closure of the 'bomb' unit months before the actual event, the Commission had to shelter from the lightning strikes of its critics.

The first intimation of this criticism came in Stanford Cade's letter to *The Times* when he argued that Westminster Hospital wished to discontinue the 'bomb' for financial reasons and that this dissolution would burden beam therapy with unfortunate connotations of danger or failure.[7] Cade's wish to protect the reputation of beam therapy was soon superseded by the campaign of Sir Ernest Graham-Little to establish a Committee of Inquiry that would reorganise the existing system of distributing and supplying radium. Both Cade and Graham-Little supported the continuation of beam therapy in some form and cited the success of continental centres as evidence that the research was valid. Graham-Little, Independent M.P. for London University and knighted in 1931, was a "sturdy individualist...a strong supporter of the Society of Individualists." and a physician who shared Dawson's belief that medicine was an art and spoke out on medical matters in the House of Commons.[8] He often asked Ministers of Health, whether Labour, Conservative, or National, about the organisation of radium and his criticism

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6 "'Radium Problem'. A Survey by the Commission. Encouraging Results in Cancer Cases", *The Times*, November 15, 1929. "A new weapon, and a powerful one, has been placed in the hands of the medical profession , though how effective it may be it is impossible, as yet, to say."; "Another Year of Radium", *The Lancet*, vol. 221 [October 17, 1931], p. 862. "The continued use of the bomb in its present form is regarded as unwarranted.";H. S. Souttar, "Radium in the Service of Surgery", *British Medical Journal*, vol.i [January 3, 1931]:, pp. 1-5, 5.

7 Stanford Cade, "Radium for Cancer: Experiments with Apparatus", *The Times*, August 10, 1931.

8 Henry Morris-Jones, "Sir Ernest Gordon Graham Graham-Little", *Dictionary of National Biography*, pp. 315-317, 316. Like Alexander Watson-Watt, Graham-Little was born Little but assumed a double-barrelled name when he acquired social status. In his particular case, it was a knighthood.

of the Radium Commission was detrimental to the influence of the Royal Colleges.[9] He called the termination of the 'bomb' unit a "retrograde step" and argued that since the Radium Commission was not an expert body, it did have the qualified individuals to judge whether beam therapy was successful or not and a parliamentary expert committee, independent of the body, should assess the situation.[10] His provocative letter was followed by supportive missives from J. H. Douglas Webster, Malcolm Donaldson and F. Cavendish-Bentinck, the Vice-Chairman of the Middlesex Hospital. Both Webster and Donaldson argued the line that continental centres were superior to British hospitals and that radium therapy required greater support and more funds.[11]

This flurry of letters was followed by a leader article in *The Times* on whether Graham-Little's proposal for a Committee of Inquiry was plausible. The leader noted that while the Commission was closing this 'bomb' because of poor results, it had also stated that results in other countries had been better and research with foreign 'bombs' was continuing on that basis. It argued that the Commission's role was concerned with the supply and distribution of radium, whilst the 'bomb' should be considered separately by a committee of expert radiologists appointed by Parliament. This echoed and supported Graham-Little's call for a parliamentary committee that would include expert

9 "Radium", *British Medical Journal*, vol i, [February 27, 1932], p. 408; "National Radium Trust", *British Medical Journal*, vol i, [May 7, 1932], p. 869; "Report of Radium Committee", *British Medical Journal*, vol. ii, [December 3, 1932], p. 1038.

10 Sir Ernest Graham-Little, "Radium Therapy: Scientific Applications", 6.

11 J. H. Douglas Webster, "Radium Therapy", *The Times*, January 18, 1932; F. Cavendish-Bentinck, "Radium Therapy", *The Times*, January 19, 1932; Malcolm Donaldson, "Radium Treatment", *The Times*, January 27, 1932.

radiologists and a "preponderent lay element".[12] This leader was not the thunderous voice of *The Times* alighting upon another issue of public concern but a deliberate accompaniment to the chorus of oppositional physicians. In the same paper, a letter protesting against the closure of the 'bomb' unit and mustering the standard arguments of foreign results, British backwardness and the necessity of a committee of inquiry was published. It was signed by six medical men: Stanford Cade, N. S. Finzi, E. Graham-Little, Douglas Harmer, Walter G. Spencer and J. H. Douglas-Webster. The moving hand of Graham-Little could be discerned in the description of the closure as "a retrograde step", a phrase lifted from his earlier letter.[13] Graham-Little's coterie was aware of the role of *The Times* in establishing the Radium Commission and used a similar strategy of leader articles to publicise and strengthen their own demands. The success of this strategy can be measured by the response.

Lords Dawson and Moynihan responded to the bait with concessions to Graham-Little's position.[14] Their letter proposing an inquiry under the auspices of the Royal Colleges was designed to prevent parliamentary encroachment upon the territory of the medical profession. Policing their boundaries, Dawson and Moynihan argued that a parliamentary role was "neither a necessary nor a desirable means to reach this end". They argued that as Fellows of the Royal Colleges, the signatories of the letter of protest

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12 E. Graham-Little, *op cit.*, 8.

13 Stanford Cade, N. S. Finzi, E. Graham-Little, Douglas Harmer, Walter G. Spencer and J. H. Douglas-Webster, "The Radium Bomb", *The Times*, February 17, 1932; "An Inquiry into Radium?", *The Times*, February 17, 1932.

14 Lord Dawson of Penn succeeded Sir John Rose Bradford as President of the Royal College of Physicians in 1930.

could use the machinery of the Royal Colleges which would promote a rational and scientific outcome.[15] Their conciliatory tone emphasised that "differences of opinion" were a corollary of progress but "public interest" demanded agreement and resolution on the questions raised by Graham-Little. Given their efforts in assuring the preponderance of the medical profession on the Radium Commission, neither Dawson nor Moynihan were willing to allow the existence of this young body to be questioned. Their concession was to establish an inquiry into the closure of the 'bomb' under their own supervision in order to head off Graham-Little's accusations of waste in the supply and distribution of radium. Graham-Little and his co-signatories accepted that their original demands had been hijacked by the Royal Colleges and welcomed the new conference while calling for a suspension of the decision to close the 'bomb' unit.[16] With the problem now subsumed under a professional conference whose deliberations were private, the Commission proceeded to close the 'bomb' unit in July 1932.[17]

The Radium Conference was the foundation for the negotiations that would take place in the Athenaeum from February 1933, moving some of these protagonists to centre-stage. The conference met on March 4th, 1932 at the College of Physicians and put forward its recommendations towards a

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15 Lord Dawson of Penn and Lord Moynihan, "The Radium Bomb: Inquiry into Methods of Treatment: A Matter for the Medical Profession", *The Times*, February 19, 1932. "In this way, the facts can be ascertained, experience pooled, conflicting views weighed and we hope, reconciled, and the best line of future action determined." The conference would come to a scientific conclusion.

16 Stanford Cade, N. S. Finzi, E. Graham-Little, Douglas Harmer, Walter G. Spencer and J. H. Douglas-Webster, "The Radium Bomb", *The Times*, February 27, 1932; E. Graham-Little and Walter G. Spencer, "The Radium Bomb", *The Times*, April 18, 1932; Stanford Cade, N. S. Finzi, Douglas Harmer and J. H. Douglas-Webster, "The Radium Bomb: Awaiting the Report", *The Times*, April 19, 1932.

17 "The Re-Allocation of Radium", *The Lancet*, vol. 222 [June 18, 1932], p. 1319.

resolution of the problem.[18] The conference was directed by the Royal Colleges. Dawson was chairman and fellow members included Moynihan and three representatives of the Radium Commission, who could be counted upon to construct a resolution favourable to the Royal Colleges and Commission. Graham-Little and his clique had no representation at the conference. The conference absolved the Commission of incompetence, by agreeing that the closure of the 'bomb' unit was "a sound conclusion".[19] However, its second recommendation was for a radium institute, complete with trained staff, to investigate "the more difficult and speculative problems connected with radium and ray therapy". The question of financing such an expensive research centre was not included in the report of the conference. Finally, it decided that "an expert committee" should be formed to consider the scientific advantages of beam therapy and compare the technique with the dominant paradigm of needles and seeds.[20] Although Mr H. S. Souttar, representative of the British Medical Association at the conference, was Chairman, the members of the expert committee included the Presidents of the Royal Colleges. Other members included prestigious physicians in surgery, gynaecology and radiotherapy but Graham-Little's group again did not have representation. Physics was represented by Lord Rayleigh, (the former President of the radium subcommittee which had established the Radium Commission) and Professor John McLennan, an eminent professor of physics from Toronto. Aware of the public pressure wielded by Graham-Little through *The Times* and his position in the House of Commons, the remit

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18 H. S. Souttar, "A Conference on Radium", *The Lancet*, vol. 222 [May 28, 1932], p. 1174.
19 "A Conference on Radium", *The Lancet*, vol. 222 [May 21, 1932], p. 1110.
20 *Ibid.*

of the committee emphasised privacy: "This committee to obtain any evidence and seek any information which it may think necessary; *its proceedings to be private and its report to be made to the Conference.*"[21]

Despite habitual references to the touchstones of radium therapy, expertise and technique, the expert committee was successfully veiled from any public pressure. The dissident voice belonged to Graham-Little who urged the publication of the report of the expert committee through a parliamentary question on November 28, 1932 and a letter to *The Times*.[22] The report of the expert committee had been handed to the conference in the early autumn of 1932 and remained unpublished until December 19, 1932. There is no evidence to link Graham-Little's lobby and the report's publication.

The report supported the construction of a new research centre devoted to beam therapy and containing a 'bomb' of at least five grammes. It took evidence from Stanford Cade, one of Graham-Little's enthusiasts, Professor Sydney Russ, a physicist associated with radium therapy since before the Great War and E. Rock Carling, the expert on the Westminster 'bomb'. McLennan and Souttar also visited Stockholm and Paris to inquire at first hand about the techniques and successes of radium therapy. This focus upon foreign centres was completed by the submission of Mr. Comyns Berkeley who had explored the world of radium therapy for the League of Nations. Given Souttar's original scepticism about beam therapy and praise for the improvement of needling techniques, this report did embody a

21 *Ibid.* (italics in original).

22 Sir E. Graham-Little, "Radium Treatment", *The Times*, December 14, 1932.

conversion to beam therapy of one of the most influential investigative surgeons in radium therapy. With such a scattering of expertise, the report was perceived to have taken an even-handed and honest approach to the problem. Graham-Little's call for the report to be published was in itself a recognition that the report contained the most practical solution to the divisions that had split the medical profession.[23]

Despite the promise of this report, it faced one almost insurmountable hurdle. Radium was a very expensive element that could only be bought from a monopoly supplier. The Government had already contributed one hundred thousand pounds to a fund raising drive in 1928 before the Great Depression shrunk public finances. In 1932, a year and a half after the crisis over government spending that had preceded the formation of the National Government, the probability that an administration wedded to balanced budgets and financial orthodoxy would finance such a research centre was slim indeed.[24] Such expenditure was not politically feasible and there is no record of the conference considering the financial arrangements to support their recommendations.[25] Whether unofficial soundings took place remains unknown, but another strategy required exploring the possibility of a loan from the Union Miniere du Haut Katanga.

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[23] "The Value of Massive Radiation", *The Lancet*, vol. 224 [January 7, 1933], pp. 44-47.

[24] In July 1930, the price of radium was £14,500 a gram which represented a reduction from the wartime price of £25,000. At such prices, the cost of a five gram radium 'bomb' was £72,500, almost three-quarters of the £100,000 given by the government in 1928. "The Price of Radium", *British Medical Journal*, vol.ii [July 5, 1930], pp. 28-29.

[25] John Stevenson and Chris Cook, *Britain in the Depression: Society and Politics 1929-1939*, London: Longman Group UK Ltd., 1994 [1977]; Andrew Thorpe, *Britain in the 1930s*, Oxford: Blackwell, 1992.

The Belgian monopoly had come into existence following the First World War and was firmly established by the mid-twenties. Their ores were far richer than the Austrian pitchblende from which the Curies had extracted the original element. Since the price had almost halved between 1919 and 1930, the American mines that had been their main competitors were slowly but surely strangled. The costs of extraction were so expensive that even the Belgians were unsure how large (or small) their profit was. This monopoly was not looked kindly upon by other powers. In the exchanges preceeding the establishment of the radium sub-committee in 1928, the existence of the monopoly had vexed Fletcher and his correspondents. "The greedy Belgian monopoly is holding everyone to ransom at present, only concerted action against them is likely to have any effect."[26] Professor Russ described its destruction as "a very worthy aim".[27] Radium soon acquired 'imperial' overtones. With its military and medical applications, the substance was deemed too important to remain under the purview of a fragile ally when a war could necessitate the confiscation of medical supplies by the military authorities.[28] Priority was to be given to "the possibilities of developing some new sources of radium supply within our own Empire", since the ore was derived from the Belgian Congo, a territory surrounded by British possessions.[29] This exchange reflected the postwar assumptions of imperial self-sufficiency in a hostile world and the hostility felt towards the Belgians. As Russ noted, "Cannot the Belgians be reminded that their gifts to one ally

[26] Sir Walter Fletcher to Sir George Newman. November 1, 1928. PRO FD1/4454.
[27] Professor Sidney Russ to Sir Walter Fletcher. March 21, 1929. PRO FD1/4454.
[28] W. A. Robinson to Sir Walter Fletcher. May 2, 1928. PRO FD1/4454.
[29] Sir Walter Fletcher to W. A. Robinson. May 15, 1929. PRO FD1/4454.

(France) suggest that [the] same preferential treatment be given to us?"[30] Alongside the parliamentary questions tabled, such statements reflected the uphill journey the Belgian monopoly had to take in order to allay the opposition of the civil service and the relevent professional interests to a foreign monopoly.[31]

The loans that the Belgian monopoly made for radium beam therapy were first given to the Parisian 'bomb' unit in Paris. Several reasons can be discerned for these loans. Major powers were reconciled to the monopoly by demonstrations that the Belgians took humanitarian considerations into account when dispensing radium. Secondly, by supporting beam therapy in other countries, the monopoly was stimulating demand for radium by advancing a new technique that would use larger quantities than the more economic techniques of radium needles and radon seeds.[32] Thirdly, by publicising its support for the medical application of radium, the monopoly represented itself as a beacon of progress and as a friend of the cancer patient. Finally, the monopoly looked askance at developments in Canada. Excellent ores which contained no impurities had been discovered on the shore of Great Bear Lake in the North Western Territories and the mining companies expected radium of a higher quality than the Katanga ores that could be extracted more cheaply. The production of radium was expected to start in February 1933 and provided the government with the imperial source

30 Professor Sidney Russ to Sir Walter Fletcher. March 21, 1929. PRO FD1/4454.

31 "Supply of Radium", *The Lancet*, vol. 216 [February 2, 1929], p. 260; "Supply of Radium", *The Lancet*, vol. 218 [March 15, 1930], p. 600; "Radium Supplies", *The Lancet*, vol. 219 [December 20, 1930], p. 1375.

32 "Belgian Radium Loan". February 22, 1933. PRO FD1/3364. "...and he [Mr. G. L. Lechien, the representative of Radium Belge] admitted that if this free loan now made should lead to better use of big masses in this country, it would ultimately benefit the commercial suppliers."

that it was so keen to find in 1928.[33] At about the same time it is noteworthy that Radium Belge, the subsidiary of the Belgian monopoly, was available for negotiations over a loan of radium and wished to involve government agencies as guarantors. The monopoly had loaned radium for a 'bomb' at Westminster Hospital in 1928 and the conference in 1932 was grappling in private with the necessity of finding sources of funding. Their alternatives after the closure of government funding were raising the funds privately or charting the possibility of a loan from the Union Miniere du Haut Katanga. Both sides found that they had mutual interests.

6.2 The Initial Negotiations on Beam Therapy at the Athenaeum

Souttar and Fletcher had an undated conversation sometime between the report of the conference was published in Christmas 1932 and February 7, 1933. On the basis of this conversation, Souttar drew up a memorandum to outline the most favourable proposal for guaranteeing a loan from the Belgians.[34] It was decided to approach Radium Belge, the Belgian company that sold the radium mined by the Union Miniere du Haut Katanga and ask for a loan of ten grammes in order to establish the Radium Beam Therapy Research Board.[35] The Board was projected as building upon the achievements of the conference and the technical committee. The technical committee would act as an "advisory body" to the Board whilst the DSIR and

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33 "Radium from Canada", *British Medical Journal*, vol. ii [December 3, 1932], pp. 1024-1025. This discovery formed the subject of a lecture delivered by Major Bernhard Day at the Institution of Mining and Metallurgy.

34 Sir Walter Fletcher, "Massive Radium Units", February 8, 1933. PRO FD 1/3364.

35 Radium Beam Therapy Research Constitution. February 7, 1933. PRO FD1/3364. The Radium Beam Therapy Research Board was not named until May 1933.

the MRC would act as trustees for the loan of the radium.[36] The supervisors were McLennan and Souttar. They were responsible for the organisation and equipment that would be required to replicate the research undertaken at Stockholm. The ten grammes of radium would be divided into a five gram clinical unit based at London Hospital, where Souttar was a surgeon and another five gram unit at the Radium Institute under McLennan's eye that would be focused on "experimental work, both physical, biological and clinical".[37] Both McLennan and Souttar were the negotiators for the conference who approached Radium Belge and learned the conditions for the loan. Later statements identified McLennan as the conduit between the company and the conference and one can surmise that these contacts were built up on their European travels. It was also eased by Souttar's role as surgeon at the Antwerp field hospital at the start of the Great War for which he was awarded the Order of the Crown of Belgium. Such an honour held a formal status in Brussels, similar to the honours system of the United Kingdom.[38]

The scientific bureaucracy was required because the Radium Belge were unwilling to consider a private venture for their loan. The company would examine the loan favourably once it knew "that the investigation should be obtained under the most authoritative auspices obtainable".[39] The conference that had hitherto been dominated by the Royal Colleges was now forced to

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36 *Ibid.*
37 *Ibid.*
38 R. A. Cromarty, "Sir Henry Sessions Souttar", *Dictionary of National Biography*, pp. 969-971.
39 *Ibid.*

forced to include the MRC and the DSIR in its deliberations. These bodies would provide government sponsorship and finance. They would pay for the insurance of the radium, the cost of equipping a small physical laboratory with the necessary, specialist apparatus and the salaries of the laboratory technicians. This structure was not detailed in the original report of the conference which called for a "large radium unit" that would incorporate "coordinated clinical, experimental, and physical research".[40] The structure that catered for both clinical and experimental science can only be traced to the requirements of the loan since the Royal Colleges were unwilling to retreat from institutions where they gained dominance or act in a way that expanded the remit of the MRC at the cost of their own control. This division of beam therapy between clinical and experimental science reflected a retreat by the Royal Colleges from their hope of directing the new body towards the clinicians and represented an effective compromise between the medical profession and the scientific bureaucracy. The technical committee, now acting in an advisory role, contained the Presidents of the Royal Colleges and a representative of the MRC, allowing both sides to maintain an interest in the proceedings of beam therapy research.[41]

The disagreements between Dawson and Fletcher in these informal

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40 "The Value of Massive Radiation", *The Lancet*, p. 46.

41 E. Rock Carling, "The Value of Massive Radiation", *The Lancet*, vol. 224 [January 14, 1933]: p. 114. In this letter, Carling anticipated some of the points of the memorandum by indicating the dangers of placing the new 'bomb' in one hospital where it could become inaccessible to the research community. Carling called for research into the clinical, biological and physical sciences. The unit should be directed by a clinician but the physics community should be included. "It is highly desirable that every hospital should cooperate, and that all the brains of the profession - *including those of the physicians* - should be laid under contribution." (my emphasis). Carling only included such a phrase because he expected physics to be poorly served by the new unit.

negotiations involved the structure of the proposed Board that would research beam therapy. Dawson prolonged the negotiations in his attempt to guarantee the dominance of the Royal Colleges and minimise the role of government. Secondary to the issue of structure was the pressure of time that grew as the wrangles amongst the domestic camp developed and prevented a comprehensive answer to the Belgian's proposal. With the public disagreements between members of the medical profession that had preceded the establishment of the conference and the public domain within which issues concerning radium unfolded, privacy became an important concern for all of those involved. The informal meetings that decided the course of events needed a space that completely excluded any of the general public and, especially, the media and Graham-Little. The Athenaeum, with its strict rules of membership and reputation for exclusivity, provided a suitable environment in which these negotiations could be conducted.

Lord Rutherford was the ringmaster at these discussions because of his eminence and influence within the scientific establishment. These negotiations bore the stamp of his particular approach to dealing with the civil service: a belief in the small private group who, over lunch or dinner, in a college or club, set the agenda and made the decisions that even the "small sub-committee" inevitably followed.[42] Rutherford had already shown his interest in radium when he worked with Henry Tizard, W. H. Bragg, Fletcher and Russ to persuade the MRC to reallocate some of the radium held by its

[42] David Wilson, *Rutherford: Simple Genius*, London: Hodder and Stoughton, 1983, pp. 453-454.

research units to the physicists.[43] By chairing these meetings, he was able to maintain his guiding role over the use of radium in physics while the group had obtained the support of one of the most prestigious men of science, preeminent at home and abroad.

The first "informal discussion" took place at the Athenaeum on February 8th, 1933 between McLennan, Souttar, Sir Frank Smith, Secretary of the DSIR and Rutherford.[44] Information about this meeting stems from Fletcher's aide-memoire and Souttar's letter to him on the following day. The discussion achieved a remarkable degree of agreement on the initial memorandum. Constructive criticism was provided by Rutherford who argued that a period of two years was the minimum required for research of this kind. He "approved in particular of the exercise of a general control" by the DSIR and MRC.[45] Rutherford was keen to ensure that beam therapy remained outside of the control of particular interests like the Royal Colleges and under the supervision of a body balanced between medical and scientific interests represented through their respective research bodies in the civil service. The memorandum incorporated this view and it is testimony to the instincts of Fletcher and the drafting skill of Souttar that they were able to construct a document on which a consensus amongst all the participants was immediately achieved.[46] However, neither Smith nor Rutherford were willing to make the opening move in this "plan" and indicated that Fletcher should

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43 *Ibid.*, p. 480.

44 Sir Walter Fletcher, "Massive Radium Units", February 8, 1933. PRO FD1/3364.

45 *Ibid.*

46 *Ibid.* "The basis of the discussion was a memorandum drawn up by Mr. Souttar after a conversation with Sir Walter Fletcher."

act "representing the medical aspect".[47] Souttar and McLennan had purposefully met with Smith and Rutherford as important and eminent representatives of the scientific community. Smith and Rutherford were "in favour of our [Fletcher and Souttar's] plan...[and] fully recognise, however, the importance of the physical side and will back you all the way".[48] The men of science were aware of the differences between the goals of the scientific community and the medical profession. By advising that Fletcher make the first move, they hoped to prevent the misrepresentation of their involvement by physicians as an invasion on to medical turf.

At the first meeting, McLennan expected to arrange luncheon with the representatives of Radium Belge at the Athenaeum on February 16, 1933. However, this meeting was eventually rearranged for Wednesday, February 22.[49] Unlike the earlier "informal discussion", this luncheon was organised with McLennan as the host and those individuals who were not club members were present as his guests.[50] Present, apart from the original four, were Fletcher, Dawson, Mr. Geoffrey Pearce and Monsieur G. L. Lechien. Pearce was a manager of the Chemical Services Company Ltd., the company that had organised the supplies of radium ordered by the King Edward's Hospital Fund for London and the National Radium Trust.[51] Lechien was a highly decorated director of the Union Miniere du Haut Katanga and his presence demonstrated the importance with which the monopoly regarded these

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47 H. S. Souttar to Sir Walter Fletcher, February 9, 1933. PRO FD1/3364.
48 *Ibid.*
49 Professor J. McLennan to Sir Walter Fletcher. (Date illegible). PRO FD1/3364.
50 Sir Walter Fletcher, "Belgian Radium Loan". February 22, 1933. PRO FD1/3364.
51 *Ibid.* Pearce was a Fellow of the Royal Physical Society, a member of the British Institute of Radiology and a managing director of Watson and Sons (Electro-Medical) Limited.

negotiations.[52] This semi-official luncheon was designed to place the negotiations in a salubrious environment. The participation of Dawson, Rutherford, Fletcher and Smith demonstrated to Lechien that Radium Belge's willingness to consider a loan was of sufficient importance to demand the personal presence of the leaders of the scientific and medical communities. The gaze of Radium Belge was raised from the little indians to the big chiefs. The choice of the Athenaeum was a reflection of that club's prestigious reputation. Its exclusivity and sumptuous interior were symbols of gravitas that reflected its historical focus upon learning and proved a powerful attraction for academics whose salaries no longer afforded such a lifestyle. Here, rather than the suburban house or the public restaurant did the surrounds render all the participants equal by recreating for them the experience of the upper middle class Victorian gentleman.

The luncheon started with Lechien proposing the conditions under which Radium Belge was willing to loan the radium. The initial conditions, which demanded the involvement of government agencies, had already been

[52] Lechien was born in 1878 and his educational qualifications included a Candidat Docteur en Sciences Physiques et Mathematiques and Professor Honoraire de l'Universite de Montreal. His decorations included Chevalier del'Ordre de Leopold, Chevalier de l'Ordre de la Couronne, Etoile de Service a une raie, Medaille Commemorative du Congo, Officier de la Legion D'Honneur and Commander de l'Ordre de la Couronne de Romanie. His commercial positions included a former managerial position as Manager of the Ether Section at H.M. Fautory in Gretna, Directeur de l'Union Miniere du Haut Katanga, Administrateur-Delegue de la Societe Generale Industrielle et Chimique du Katanga, Administrateur-Delegue de Etudes et Traitements Chimiques, Administrateur de Societe D'Epurations et D'Enterprises, Administrateur de Pharmacie Centrale de Belgique, Administrateur des Pharmacies du Congo, Administrateur de African Metals Corporation, Administrateur de Belgo-American Trading Corporation, Administrateur de Radium Chemical Company, Vice-President de Radium Luminous Corporation, Vice-President de Radon Company and Commissaire de l'Union Chimique Belge. Lechien, as his positions demonstrate, was a member of the Belgian imperial elite whose eminence derived from his interests in the network of companies that comprised the radium monopoly and whose decorations recognised and enhanced his commercial status.

conceded. Now, the company would loan ten grammes free of charge for one or two years if the use of beam therapy took into account the experience of foreign countries. Lechien noted that the failure of the Westminster 'bomb' had "greatly discouraged the sale of radium on that [four grammes] scale" in Britain.[53] The response to this offer was polite and enthusiastic. Rutherford wished that the loan was guaranteed "for at least two years" so that the research could be conducted under a reasonable timescale.[54] All agreed, though, that the loan would be used solely for research and not for routine treatment. The acceptance of the radium and its use purely for research was a source of consensus amongst all of the participants. When discussion moved on to institutional arrangements however, this consensus vanished. Fletcher had already seen Souttar's memorandum and unrolled this proposal at the meeting. He and Smith agreed that neither the MRC nor the DSIR would meet any real difficulty in acting as trustees for the radium. However this meeting could be described as a charade. Souttar, McLennan, Fletcher, Smith and Rutherford had decided to construct a united front on the organisational apparatus in advance and exclude Dawson in order to prevent him from taking unilateral action. Fletcher, especially, was wary of Dawson after the debacle over the Commission. Their expectations that he would disagree were fulfilled. The involvement of government agencies undermined his professional role as he stressed. He stated his need for the medical profession to be consulted and worried about the reaction of the Radium

53 "Belgian Radium Loan", February 22, 1933. PRO FD1/3364. The absence of an interpreter indicates that Lechien was a good, if not fluent, English speaker. The quote also shows that Radium Belge viewed beam therapy as the medical technique most likely to lead to increased sales of radium.

54 *Ibid.*

Commission. He thought they "might be offended".[55] Fletcher and Smith answered this first objection and the document pays testimony to their exasperation with Dawson and the bias of this subsequent aide-memoire. Dawson's professional concern is reduced to predictable utterances about the medical profession. "Dawson said it was most important to consider the medical profession etc. etc., and all the other interests concerned etc., etc.,and the Radium Commission might be offended, and so on, and so on."[56] Additionally, Fletcher felt that Dawson's concentration on the institutional equipment was rude, noting that the discussion was "not interesting to Lechien and Pearce".[57] A mannered escape was achieved by Rutherford's overture that the issue should be discussed by a committee composed of Fletcher, McLennan, Souttar and Smith with Dawson in the Chair, thereby absolving the Lord of Nelson from any responsibility and assuring his neutrality. In a conversation with Fletcher "on leaving the club", Dawson was still "uncertain" and thought that the Souttar Committee was too unwieldy for the role assigned to it.[58]

The tactics of this group depended upon the gentlemanly code of manners that governed such meetings. The others hoped that the pressure brought to bear by the presence of Lechien and Pearce would constrain Dawson from uttering divisive comments in his role as spokesman of the medical profession. Such comments, providing evidence of splits in the domestic camp, could damage their credibility to negotiate a loan. Dawson's silence

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55 *Ibid.*
56 *Ibid.*
57 *Ibid.*
58 *Ibid.*

could then be interpreted as agreement to the offer. Unfortunately, this pre-emptive line depended upon Dawson's tacit perception that arguing the toss in front of the opposition would be 'bad form'. Dawson did not share their view of the meeting and tenaciously advanced his interest into the open. Etiquette here provided a political resource for censoring a 'difficult' member of the domestic group, but due to the elastic and unspoken nature of mannered behaviour, the strategy failed to contain a determined individual intent upon defending his corner.

6.3 Professional Conflict and the Organisation of Beam Research

The structure of the new Board was contested by Dawson and the scientific network as he tried to establish the dominance of the Royal Colleges and the scientists tried to guarantee the loan. Dawson, as the chairman of the committee proposed by Rutherford, arranged for a luncheon at the Athenaeum on March 6th.[59] Fletcher's report of this meeting in his aide-memoire was unfavourable, concluding that "No real progress [was] made".[60] Dawson wished to negotiate the proposal with Radium Belge by himself since he believed "that this opportunity must be used for welding the rival medical bodies firmly together etc. etc.".[61] He therefore proposed that the conditions of the Belgian loan should be discussed by the radium conference who could then "refer the question back to the bodies they represented".[62] Fletcher, suspicious of Dawson's reasons, saw parallels with 1929. "He [Dawson]

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59 Secretary of the Royal College of Physicians to Sir Walter Fletcher. March 2, 1933. PRO FD1/3364.
60 Sir Walter Fletcher, [Untitled]. March 6, 1933. PRO FD1/3364.
61 *Ibid.*
62 *Ibid.*

plainly did not know what to propose, and only wanted somehow to delay, presumably so as to bring himself or, the two Royal Colleges somehow into control."[63] However, he toned down his active resistance to Dawson's prevarications because he did not wish to jeopardise his "good working terms" with the physician on the MRC.[64] The personal suspicions of Fletcher and Dawson, representative of their differing conceptions of medicine and their institutional aims, again coloured the development of radium policy. Dawson used a similar strategy to his previous altercation. As a leader of the medical profession, Dawson perceived a need to consult all of the interests involved and form a consensus before any action could be agreed. Such a consensus required time and consultation that the others, including Souttar, did not see a need for. Fletcher, especially, was a man whose time was running out. Living under the increasing constraints of ill-health, he depended upon the private meetings to provide a speedy resolution to the negotiations.

Although Fletcher was quick to ascribe a Machiavellian role to Dawson's prevarications, the situation could be interpreted as a further clash of roles. Dawson's position as President of the Royal College allowed him both to act and consult as he wished. It is very hard to interpret his motivation as a belief that consultation was required before such a momentous step in radium policy could be taken or whether he was using his position as a smokescreen to delay any action until he could marshall the professional forces required to ensure that the Radium Beam Therapy Research Board was controlled by the Royal Colleges. Indeed, the two motives are not incompatible. The

63 *Ibid.*

64 Sir Walter Fletcher, [Untitled]. March 7, 1933. PRO FD 1/3364.

incompatibility lay between the methods of Dawson and Fletcher. Dawson saw part of his role as meeting all areas of the medical profession and agreeing a line before negotiating with other public bodies. This accorded with the establishment of the radium conference as a method of defusing public dissent within the profession and an ideology of clinical science that could hold together the increasing number of specialisms that had been institutionalised in medicine during the first years of the twentieth century. Fletcher, on the other hand, was a civil servant whose years in government and broad networks had crystallised his strategy into one similar to Rutherford's: private meetings behind closed doors to resolve difficulties fast and present a united front to other interests to gain maximum advantage. Given Rutherford's and Fletcher's positions within the scientific community, one could argue that this strategy of private negotiation and public unanimity was representative of elite scientists within the civil service, the Royal Society and the universities.

Dawson's objections to the predominant role of the MRC and DSIR as custodians of the radium remained the main obstacles to any resolution at this meeting on March 6th. Both Souttar and McLennan were "indignant" at his failure to cooperate.[65] Rutherford had proposed this small committee as a way of finding common ground between Dawson and the other participants. However, Dawson's wish for referral back to his constituency only widened the gap between his aims and those of his companions. It was very easy for

65 *Ibid.* "Smith said he had hardly met D. [Dawson] before, and he seemed amazed that anyone could act so obstructively without being able to give any clear reason for anything he proposed. He said, 'Even when we tried to crystallise his ideas, he only poured more water on to keep them in solution'."

Fletcher to perceive this delay with *deja vu* and transmit his suspicions to Souttar, Smith and McLennan. Certainly, his own view was that Dawson was up to his old tricks, preferring the supervision of the Royal Colleges to the scientific custody of a government department. However, Dawson did face the conditions of Radium Belge which no amount of professional meandering would be able to outmanoevre.[66]

At this meeting it was agreed that the ten grammes of radium offered by Radium Belge should be handled at the Radium Institute with "supplementary activities" provided by Mount Vernon Hospital.[67] Disagreement remained over responsibility for the radium and the constitution of the consultative committee to the Radium Beam Therapy Research Board. Fletcher set the scene quite clearly in his memorandum to all members of the informal committee. His emphasis lay on the speed required to capitalise on these negotiations; an emphasis directed at Dawson's delaying tactics. Fletcher also spiced his argument with manners stating that "it will be discourteous to keep the Radium Belge much longer in doubt". A fortnight had already passed since the initial meeting with Lechien and Pearce. Fletcher's tactic was to sideline the issue of the consultative committee and offer the services of the MRC and DSIR as custodians of the radium. Both bodies had cooperated for more than a decade in handling radium. There were no other facilities comparable to theirs' and their involvement was welcomed by Radium Belge. McLennan and Souttar were also writing to the Radium

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[66] *Ibid.* Even Fletcher was astounded by Dawson's refusal to agree that the MRC should have custody of the radium. Fletcher described it as "(not a very pleasant thing from a member of *my* Council to say about the Council's work to these *outsiders*!)". (my italics)

[67] Sir Walter Fletcher, "Belgian Radium Loan". March 7, 1933. PRO FD1/3364.

Institute with details of the new centre. While the radium was being transported and measured, Dawson and the committee could negotiate over the constitution of the consultative committee that would supervise the research into beam therapy. Fletcher drew attention to the model of the Marie Curie Hospital where a small advisory committee functioned harmoniously with a research centre. He endorsed the same structure for the new Research Board and indicated that it "corresponds with the small Committee of six or seven which Lord Dawson proposed".[68] The document was a compromise, offering Dawson concessions on the consultative committee so long as he agreed to the MRC's custody of the radium. Fletcher wished to open official negotiations as quickly as possible in order to prevent Radium Belge from withdrawing their offer.

Fletcher's acquiescence at the meeting with Dawson on March 6th was a stimulus for his circulation of the confidential memorandum detailed above, which could serve as a base for negotiations. Returning to the Athenaeum for lunch on the following day, he ran into McLennan, Souttar and Smith "by chance".[69] These three had already agreed to meet and may have read Fletcher's passivity as a detachment from their 'interest'. Their anger with Dawson was considerable and McLennan was threatening to act alone and open negotiations. Smith's and Fletcher's admission that they were going to see Stanley Baldwin the next day for official permission to ratify the loan defused this potential rupture. Fletcher's familiarity with Dawson's actions was again highlighted by his reflection that Dawson's methods had been a

[68] *Ibid.*

[69] Sir Walter Fletcher, [Untitled]. March 7, 1933. PRO FD1/3364.

"revelation" to both Souttar and McLennan.[70]

The idea of seeing Baldwin was first mooted by Smith in a conversation with Fletcher, followed up with a supportive letter to Rutherford.[71] Baldwin was Lord President of the Council, a role that included ministerial responsibility for the MRC and DSIR. Informing Baldwin of the negotiations would ensure political support for the loan and could strengthen the hand of Fletcher and Smith in their discussions with Dawson. The meeting with Baldwin took place at the House of Commons on March 8th, 1933. The delegation of Rutherford, Smith and Fletcher indicated the importance of the loan to them but its marginal impact upon politics can be seen in the fact that Baldwin was only willing to give them ten minutes of his precious time.[72] After a short description of the background leading up to the loan, Fletcher was clear that it involved no financial burden and it was only brought to his attention because of the "international character" of the loan.[73] The position of the men of science as supplicants is made clear by Fletcher's description of Baldwin's reaction as "interested, and [he] directed us to carry on".[74] Baldwin was their political master and had the power to halt their actions. Through this meeting, the MRC and DSIR gained political legitimacy for their proposal which was designed to strengthen their demands vis-a-vis Dawson's. This meeting demonstrates the freedom of action that the secretaries of the MRC and DSIR were privileged to hold and shows the limits to their sphere of freedom.

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70 *Ibid.*
71 Sir Frank Smith to Lord Rutherford of Nelson. March 6, 1933. PRO FD1/3364.
72 *Ibid.*
73 Sir Walter Fletcher, [Untitled]. March 8, 1933. PRO FD1/3364.
74 *Ibid.*

Able to initiate and follow through policy within their financial limits, the departments had to seek political support when their actions had the potential to antagonise external interests. Fletcher and Smith were using Baldwin as a political resource but at the same time keeping him informed to avoid the danger that he could become embroiled in a controversy through an approach from other quarters. The avoidance of political interference depended upon the research bodies keeping concerned politicians onside.

In order to solve the structural question, Rutherford formulated a proposal, enhanced by his neutral position between Dawson and the others, concerning the constitution of the consultative committee. Rutherford proposed that the consultative committee should include the Presidents of the Royal Colleges and the Royal Society plus the Secretaries of the MRC and the DSIR. This effectively left the unaligned President of the Royal Society with the casting vote whilst the structure of the committee recognised that the interests of the government and the Royal Colleges were evenly represented. Rutherford's bid to break Dawson's deadlock over the future of beam therapy depended upon his manipulation of the meetings to present a mask of impartiality to Dawson. However, by broaching the suggestion with Fletcher and Smith first of all, Rutherford was testing its acceptability and secondly, relying upon the support of his professional colleagues and personal acquaintances. This informal dependence was compounded by the drafting of Rutherford's proposal to Dawson by Fletcher. Through professional and personal links, Rutherford was favourably inclined towards

and McLennan.[75]

Rutherford's letter to Dawson symbolised the entrance of an establishment heavyweight into the ring. After declaring his continued interest and involvement in the matter, the proposal was unfolded. Rutherford's concern that "the work is done under auspices that will command general assent and confidence" was his motivation for preventing any delay to the negotiations with Radium Belge.[76] His proposal included the assumption, challenged by Dawson, that the DSIR and the MRC would be responsible for the custody of the radium.[77] Rutherford's suggestion could have been perceived by Dawson as an unwelcome intrusion. It was therefore reinforced by Baldwin's personal seal of approval. Rutherford used this political encounter as a sanction but it was couched in terms of a personal favour on his behalf towards Dawson and the others: "...and Mr. Baldwin has privately assured me that he will approve this, in view of the international nature of the loan and of the importance of the work proposed."[78] This letter was supported by all three as a realistic resolution of the dispute.

Dawson chose to ignore Rutherford's compromise since he had already drafted an alternative plan for the development of radium beam therapy which came to light at the meeting of the Radium Institute in early March. He

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[75] *Ibid.*

[76] Lord Rutherford to Lord Dawson. March 8, 1933. PRO FD1/3364. The final sentence included the same sentiment. "Would not such a Committee as this have the immediate confidence of all the interesrs concerned?"

[77] This inclusion can probably be traced to Fletcher who used this opportunity as an attempt to remove this issue from the dispute.

[78] *Ibid.*

slip in the first meeting at the Athenaeum that he wished to consider the centre for postgraduate medical education in Hammersmith as a site for beam therapy.[79] Fletcher's reaction to this at the time was puzzlement. However, Sir Cuthbert Wallace, director of Mount Vernon Hospital which specialised in cancer and a member of the governing committee of the Radium Institute, warned Fletcher that Dawson had opposed acceptance of McLennan's scheme.[80] Dawson wished to create institutional links between the Radium Institute and Hammersmith, replacing the postgraduate course in radium therapy that was taught in cooperation with Mount Vernon Hospital.[81] This linkage would enhance the influence of the Royal Colleges in radium therapy. No doubt Fletcher must have perceived this move as an opportunistic affront that placed the interests of the Royal Colleges above those of the country and endangered the negotiations.

The bureaucratic wheels began to turn. Fletcher detailed the negotiations in a memorandum for the MRC.[82] The process was discussed by the Radium Conference.[83] Whereas Fletcher only asked for permission at a later stage to assume custody of the radium, Dawson attempted to steer the Conference towards his goal by using his influence as Chairman. The Hammersmith Hospital was discussed as a possible site for beam therapy and the constitution of the Governing Committee was decided. The Conference plumped for the Radium Institute as the most suitable location because

79 Sir Walter Fletcher, "Belgian Radium Loan". February 22, 1933. PRO FD1/3364.
80 Sir Walter Fletcher, [Untitled]. March 9, 1933. PRO FD1/3364.
81 "The Teaching of Radium Therapy", *The Lancet*, vol. 218 [April 5, 1930], p. 783.
82 Sir Walter Fletcher, MRC Memorandum: "Radium Therapy". March 14, 1933. PRO FD1/3364.
83 Minutes of Radium Conference. March 10, 1933. PRO FD1/3364.

Dawson was unable to persuade the representatives of the Radium Commission that Hammersmith was a feasible site.[84] However, when Rutherford's proposal was discussed, it was mutilated by Dawson to ensure a majority of clinicians.[85] The elegant simplicity of its political balance was consigned to the dustbin of history. The DSIR was removed and replaced by the Radium Institute and the Radium Commission. With a medical profession constituting a majority, the influence of the Royal Colleges would be easier to wield. A scientific advisory committee "including a clinician or clinicians...selected because of their scientific knowledge and experience" would act as a check upon the researchers. "Subject to the assistance of this Advisory Committee, those appointed to engage in the researches [sic] will be free and unfettered in their work."[86] Dawson wished to ensure that clinicians would govern, direct, supervise and assist in all aspects of beam therapy. This structure was passed by the Conference

However, the formal offer of the loan was now sent by Pearce after his talks with McLennan. Radium Belge wanted to ensure that their loan was guaranteed to benefit beam therapy research. Their demands included the right to approve the Physical Director. They wished the 'bomb' to be modelled on the Stockholm centre where the Medical Director would require two months training. The responsibility for the custody and return of the radium

84 *Ibid.* "It was pointed out that at the present time the Radium Institute has a working arrangement with Mount Vernon Hospital and the co-operation of these two bodies has for some time past received the support of the Radium Commission." The Radium Commission had three representatives at the Conference.

85 Although no record exists that Dawson had received Rutherford's letter by March 10, there are noted similarities between Rutherford's proposal and the Conference's Governing Body. Most notable is the inclusion of the Royal Society which had not been mentioned in the Conference before.

86 *Ibid.*

had to reside in a "properly constituted legal body" and that Pearce would sit on the Governing Committee. Such a "legal body" would require government support and effectively ruled out a voluntary organisation which would have been preferred by the Royal Colleges. These conditions were strict but Radium Belge wanted a public success that showed the benefits of beam therapy. Publicly, Radium Belge were indulging a "humanitarian view" stating "that they, as custodians of supplies of Radium feel a moral obligation rests on them to provide the means of demonstrating the value of Mass Radium Treatment of Malignant Disease".[87] Their agenda was revealed by Clause 12 of the letter seeking assurance "that the scheme meets with the full approval and cooperation of the National Radium Trust".[88] The Trust was the main purchaser of radium in the United Kingdom and Radium Belge wanted to maintain a good working relationship in private with its British purchaser as well as gaining public support from "the English Nation".[89]

As the offer was tendered, Fletcher accepted the Conference's motion concerning the constitution of the Radium Beam Therapy Research Board. He did not try to defend Rutherford's bid at mediation when the motion was presented to the MRC.[90] Time for the dispute to solve itself was closed off by the arrival of the offer. One could also interpret Fletcher's acquiescence as a *quid pro quo*. Since Dawson had dropped his support for Hammersmith Hospital and accepted the MRC as the custodian of the radium, Fletcher

87 Geoffrey Pearce to Professor J. C. McLennan. March 16, 1933. PRO FD1/3364.
88 *Ibid.*
89 *Ibid.*
90 MRC Memorandum: 'Radium Therapy'. March 17, 1933. PRO FD1/3364; Minutes of Medical Research Council, Minute 34. March 17, 1933. PRO FD1/3364.

could afford to support this constitution so that the offer could be accepted as quickly as possible.

The dispute rumbled on due to the time taken by the Radium Institute to ascertain whether it could house the new centre. Dawson was also unwilling to antagonise Rutherford and remained in contact with him and Fletcher concerning "the formation of a representative supervisory body, bringing together the chief scientific and professional interests".[91] McLennan lunched with Dawson the following day and the new structure was agreed. Dawson agreed that the Governing Body should be reconstituted as a Board, with an Executive Committee administering research and the scientific advisory committee existing as previously proposed. He recommended that a representative of the Radium Institute should be added to the Board, mooting Lord Moyne with whom he had worked.[92] These were far-reaching concessions from his previous position. His intentions are unclear but perhaps he thought that these concessions would allow him to act without further interference. He agreed to a representative of the DSIR which he seemed to regard as a personal role for Rutherford, having taken a dislike to Smith.[93] He conceded to restructuring the proposed body as a Board, effectively abandoning the motions proposed by the Radium Conference. After consulting the medical profession, he was unwilling to allow their institutional decisions to encroach upon his flexibility. For all his rhetoric,

[91] Sir Walter Fletcher to Professor J. McLennan. March 31, 1933. PRO FD1/3364.

[92] Professor J. McLennan to Sir Walter Fletcher. April 1, 1933. PRO FD1/3364. The Board would consist of Sir Frederick Gowland Hopkins (P.R.S.), Lord Dawson (P.R.C.P.), Mr. Wilfred Trotter (M.R.C.), Lord Rutherford (D.S.I.R.) and a representative from the Royal College of Surgeons.

[93] Sir Walter Fletcher, [Untitled]. April 7, 1933. PRO FD1/3364. "I gather D. funks Smith and thinks Rutherford more amenable!"

Dawson remained a senior officer, always willing to pull rank.

Rutherford's acquiescence in Dawson's self-appointed role as organiser of the new Board had been a tactical error, designed to halt an argument in front of the representatives of Radium Belge back in February, but effectively giving a licence to Dawson to act in his own time and using his own resources. The result was "general dissatisfaction" amongst the others at their "casual talk" in the Athenaeum in early April.[94] Their shared anxiety focused upon the completion of all the arrangements concerning the Board in a "reasonable time".[95] Fletcher was also determined to point out that the MRC could act independently of the Lord President and had the machinery to establish the Board within two to three days. All the participants blamed the delay on Dawson and his shenanigans.

Dawson was preparing the membership of the Board in his own time. He had already invited the Royal College of Surgeons to appoint a representative and asked Sir Frederick Gowland Hopkins, President of the Royal Society, to lunch to discuss the position of the Royal Society. He himself would be appointed by the Royal College of Physicians to the Board at their meeting on April 10th. He had also lunched with Rutherford to keep him up to date. Rutherford had tried to persuade Dawson to accept a Board appointed by Baldwin, resolving the situation in a simple and rapid manner. Dawson refused and his possessive references to "his Body" demonstrate how far he had come to view the putative success of this venture as a matter of personal

94 *Ibid.* Present at this meeting were Fletcher, Smith, Rutherford and McLennan.
95 *Ibid.*

and professional honour.[96] This personal and professional commitment would not brook interference by a government department.

Fletcher had automatically received a letter from Hopkins asking what this invitation from Dawson was actually about since he was regarded by the scientific elite to be the administrator for medical research and called on Dawson at home, uninvited, to offer his help in the urgent completion of the situation.[97] Under this renewed pressure, Dawson drew back from his earlier acceptance of the structure of the Board as passed by the motions of the Radium Conference. He tried to represent his lunch with Rutherford to Fletcher as a symbol of his power. His acceptance of the DSIR on the Governing Body was a personal gesture to Rutherford and, in return, Rutherford had accepted the motions of the Conference that the research should be based at the Radium Institute and governed by a Body appointed by the concerned professional and research interests. Dawson's judgments about the role of the other participants indicate his ignorance of the personal relationships that tied the men of science together. He did not anticipate Rutherford communicating with Fletcher about this lunch.

Fletcher's main point in this conversation was that the MRC could have established this organisation without any delay:

> I [Fletcher] explained again the difference between the M.R.C. and the S. & I.R.D. and urged that he had never understood

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[96] *Ibid.*

[97] Sir Frederick Gowland Hopkins to Sir Walter Fletcher. April 6, 1933. PRO FD1/3364.

> that properly till this moment (which he admitted), and it was galling to me, when I had won complete executive freedom for the M.R.C. [in] the interests of the medical profession, that he instead of using this freedom to get what he actually wanted, was turning rather to the S. & I.R.D., which meant turning to an Advisory Council and therefore to their Minister, that is [to] what he called the 'Government' for executive action.[98]

He argued that he had stepped back and allowed Dawson to act without any restraint. In Fletcher's account, time was passing, and Dawson was writing letters, holding lunches, without any resolution to the crisis. Indeed, Dawson had failed to write a letter to the Royal Society and, to cover up this omission, invited the President of the Royal Society, Sir Frederick Gowland Hopkins down from Cambridge for lunch to discuss the new body. Hopkins had asked Fletcher "what it all meant".[99] Fletcher was perceived as the overseer of medical research by the scientific elite and Dawson's antics were an embarrassment to the MRC. Dawson was a member of the MRC but did not use its facilities. Through his independent actions, he was risking the reputation of the MRC for efficiency and bringing it into disrepute with the scientific community. Fletcher reinforced this argument by stating that what took Dawson four months took the MRC three days.

By airing his grievances in a frank manner, Fletcher hoped to remove misunderstanding as an excuse for Dawson to continue his obfuscation and

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98 *Ibid.*
99 *Ibid.*

delay. In the first meeting at the Athenaeum, Fletcher stated he had not supported "McLennan & Co.", in order to "keep the peace".[100] His description of the cause of their anger was telling:

> I [Fletcher] said that my own temper was not at all short, but that McLennan, Souttar and Smith were certainly cross at being told by him that they must run away and play, and do nothing at all until he had made some wonderful arrangements with the higher medical powers of which he could not condescend to explain the details.[101]

Fletcher's reticence can be traced to the need to maintain a good working relationship with a fellow member of the MRC. He was also familiar with Dawson's waywardness and fierce defence of his interests. His strategy was to show that Dawson's fears were misplaced. If Dawson had been less suspicious of the MRC and had depended upon Fletcher, this whole crisis would not have occurred. The MRC embodied the professional interest. Fletcher also pointed out that delay was inevitable until May since Henry Dale, Secretary of the Royal Society was away in America and the next session did not take place until that month. Again, his own personal knowledge of Dale and Hopkins would have been sufficient to swing the invitation without any need for lunches or letters.

Fletcher wrote to Hopkins detailing the proposal that Dawson was

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100 *Ibid.*
101 *Ibid.*

preparing.[102] Although not documented, Hopkins took up Dawson's offer of the chair on the Governing Body, as expected.[103] Dawson's formal proposal was not drafted until May. Agreement from all interests and representatives concerned with the Board was announced at a special dinner party hosted by Dawson on June 16.[104] The body itself came into existence from July. The MRC and DSIR both agreed to the custody of the radium.[105] Because of its nongovernmental base, Smith opined that the opportunity for extending and enlarging the loan had been lost since Radium Belge had expressed its preference for government supervision.[106] The Radium Beam Therapy Research Board was publicised in the medical journals that same month.[107] The Governing Body was chaired by Hopkins and included the Royal Colleges, the DSIR, the MRC, the Radium Commission and the Radium Institute. An Executive Research Committee was chaired by McLennan. Dawson had succeeded in fending off government support for this body but he was unable to extend the control of the Colleges. This structure embodied an uneasy compromise between the medical and the scientific interests. Fletcher himself had to retire due to ill-health and the absence of his experience added to the confusion and delay. This was not a victory for one side or another but a conflict between two different communities.

102 Sir Walter Fletcher to Sir Frederick Gowland Hopkins. April 9, 1933. PRO FD1/3364.

103 Sir Frederick Gowland Hopkins to A. Landsborough Thomson. July 12, 1933. PRO FD1/3364.

104 Viscount Dawson to Lord Rutherford. May 13, 1933; Viscount Dawson to Lord Rutherford. June 14, 1933. Rutherford Papers, Add. MS. 7653. Cambridge University Library.

105 Minutes of the Medical Research Council, Minute 27. July 14, 1933. PRO FD1/3364.

106 F.E. Smith to Sir Walter Fletcher. May 9, 1933. PRO FD1/3364.

107 "Radium Research: New Facilities for Beam Therapy", *The Times*. July 14, 1933; "Radium Beam Therapy", *The Lancet*, vol. 224 [July 15, 1933], p. 135; "Radium 'Beam Therapy' Research'" *British Medical Journal*, vol ii [July 15, 1933], p. 121-122.

One of the most revealing features of this episode for the historian was the perception by Fletcher that it was exceptional. In various letters, Fletcher and his immediate successor as Secretary, A. Landsborough Thomson, continually emphasized the departure from the normal methods of the MRC to others as they became involved. "This proposal for new work on bomb therapy became entangled at the start in a curious way with medical politics, and the M.R.C. have had to make what they could of a procedure which was not of their choosing or like their own usual practice."[108] Fletcher was keen to absolve himself from the delay by claiming that he could have established the body within two days using the machinery of the MRC "and had done again and again in similar cases for many past years".[109] Although this claim came to the fore as the delay lengthened, it does cast light on the differences in working practices between Dawson and Fletcher.

6.4 Conclusion

The educational and institutional backgrounds of Fletcher and Dawson supported the gentlemanly world of the professions. Fletcher's father was a nonconformist Liberal civil servant who became Chief Inspector of Alkali Works in London. His son attended the University College School, a nonconformist competitor to the public school system and was a graduate of Sir Michael Foster's physiological laboratory at Cambridge where he had collaborated with Gowland Hopkins on research.[110] Dawson was the fifth son of an architect who attended a Clarendon public day school, St. Paul's, and

108 A. Landsborough Thomson to Professor Sidney Russ. June 28, 1933. PRO FD1/3364.
109 Sir Walter Fletcher, [Untitled]. April 7, 1933. PRO FD1/3364.
110 T. R. Elliott, "Sir Walter Morley Fletcher", *The Dictionary of National Biography*. London: Oxford University Press, 1949, pp. 284-285.

undertook his medical training in London. While Fletcher was following his research career as a Fellow of Trinity College, complemented by medical training at Bart's Hospital, Dawson had to pursue his own research part-time while working as a private consultant.[111] Fletcher the nonconformist was inducted into the scientific elite and became Secretary of the MRC whilst Dawson, the 'old boy' of St. Paul's, struggled to compete in the competitive medical world of London hospitals. Fletcher settled into this powerful position, but Dawson entered the gentlemanly firmament when he became physician-extraordinary to King Edward VII in 1906, the first step to his viscountcy. Fletcher grasped the academic and administrative opportunities opening up for the career scientist in this period and Dawson combined scientific and gentlemanly reputations within his own elevation up the the ladder of the medical profession. Fletcher was a scientific administrator whose education and research career at Cambridge provided invaluable ties with other members of the scientific elite while Dawson's links with the medical and social elites embodied the marriage within his profession between expertise and its service to gentlemanly clients.

Fletcher had the organisational facilities of the MRC to aid any course of action that he undertook, whereas Dawson had to write his own letters and arrange his own meetings.[112] This most telling distinction was the difference between the professional administrator and the lobbying professional. However, it is not a sufficient explanation for their actions. Fletcher was an

111 Sybil D. Eccles, "Bertrand Edward Dawson", *The Dictionary of National Biography, 1941-1950*, London: Oxford University Press, 1971, pp. 201-204.
112 *Ibid.*

effective manager who could communicate to interested parties with ease using the letter and the telephone. He could utilise the reputation and machinery of the MRC to support his role and provide an institutional framework for such projects. The most important advantage was his membership of the small community that incorporated the scientific leadership. He belonged to the Royal Society and the Athenaeum. The benefit of such membership was demonstrated by Hopkins's natural turn to him to explain Dawson's invitation.[113] Similar to Rutherford's operations, Fletcher would contact all concerned and work for a consensus on a particular scheme or body before allowing the matter to come before a committee or a politician. He represented himself as a spokesman of the medical profession amongst men of science and they turned to him as a conduit with physicians and surgeons.

On the other hand, Dawson's methods were an amalgam of "casual talks and luncheons and spasmodic letters".[114] Dawson had served on committees and held a number of professional positions, but without institutional backing of the MRC's calibre, his strategies resembled those of the political operator. He did not know many men of science and his actions show that he was unaware of Rutherford's acquaintance with Fletcher or Smith. This ignorance of the networks that bound the scientific leadership together was probably his greatest disadvantage. Knowledgeable of the speed with which the MRC resolved administrative problems, Dawson's first response was procrastination, followed by an attempt to shore up his position by

113 Sir Frederick Gowland Hopkins to Sir Walter Fletcher. April 6, 1933. PRO FD1/3364.
114 Sir Walter Fletcher to Sir Frederick Gowland Hopkins. April 8, 1933. PRO FD1/3364.

professional allies behind a united front. This depended upon personal contacts rather than institutional loyalty mirroring the fractured nature of the medical profession and the design of its leaders to promote unity through an ideology of clinical science.

The actions of Fletcher and Dawson reflected their corporate identities and their positions within a world of state funded research councils and professional bodies.The most surprising theme within this political opera is that Dawson's unilateral acts broke down the smooth course of events which the scientists were used to and provided the key for us to witness the private conclaves that took place behind closed doors.

Chapter Seven

"TOOLING UP FOR APPEASEMENT": THE POLITICAL ROOTS OF THE TIZARD COMMITTEE

7.1 Introduction

As hopes for a peaceful resolution to the diplomatic questions governing the postwar settlement in Europe began to fade under the domestic political pressures of economic catastrophe, the pacifistic mood that gripped the United Kingdom was reinforced by lurid descriptions of the horrors awaiting any nation that dared to use the bombers. The aeroplane was one of the most important symbols of technological progress in the interwar period, combining romantic associations of freedom with an anticipated potential for wreaking more damage than any previous weapon of war.[1] This cultural symbol played a powerful role in the politics and diplomacy of the period. All concerned with the analysis of air warfare drew attention to the peculiar vulnerabilities of the British Isles. The obstacles that rendered invasion across the Channel so costly appeared to be useless for containing the threat of the bomber. Indeed it was argued that traditional immunities were now advantageous to the continental enemy. Long stretches of coastline and the large conurbations sprawling across the island prevented standing patrols of aircraft operating as an effective defence and magnified the damaging potential of an enemy bomber fleet. This fear was often accompanied by the token quote of Stanley Baldwin that politically legitimated these warnings: "The bomber

1 Olaf Stapledon, *Last and First Men/ Last Men in London*, Harmondsworth, Middlesex: Penguin Books Ltd., 1972 [1930], pp. 26-27.

will always get through."[2]

Narratives on radar have been derived from the stories that participants or their biographers published after the need for secrecy ended. These texts were shaped by and contributed to destinate histories of Britain. The history of radar is therefore a political history. It requires an interpretation quite distinct from the traditional nationalist Whiggism that has served as its context. The Second World War distorts the thirties and fosters associations between that decade and the war itself. Thus radar is usually located on the road to 1939 and characterised as the invention that saved the United Kingdom by the skin of its teeth from invasion. Those who supported radar become gifted with foresight and those who opposed or hindered its development are guilty men. Moreover, national myths of plucky British ingenuity, a special destiny of the elect and the immunity of the island race from invasion were all sustained by picking the radar rabbit out of the historical hat. One of the historiographical problems with this interpretation was the association of those who supported radar with appeasement whilst wartime heroes like Churchill hindered its development. This complication also rendered radar problematic for the accounts of appeasement which followed Cato's 'guilty men' thesis and condemned the ministers of the National Government for lacking the foresight to avoid the strategic disaster of 1936 to 1941 when the Empire faced three enemies, (Germany, Italy and Japan), on at least two fronts. Such historical texts are better off consigned to the level of the primary source, dropping out of the historiographical stratum and telling us more

2 David E. Fisher, *A Race on the Edge of Time: Radar - The Decisive Weapon of World War II,* New York: McGraw-Hill Book Company, 1988, p. 11. On 10th November 1932, Stanley Baldwin said, "I think it is as well for the man in the street to realize that no power on earth can protect him from getting bombed. Whatever people may tell him, the bomber will always get through".

about its period as a text than as a contribution to debate.[3]

The study of the origins and development of radar cannot be divorced from its political context. The ministers and civil servants who sanctioned and financed this infant and the officers and scientists who assured its operational effectiveness all lived and breathed in an atmosphere of mounting political pressure and increasing urgency as the pace was forced by timetables of diplomacy and rearmament. These two chapters aim to explore the origins of radar in its institutional setting - the establishment of the Committee for the Scientific Survey of Air Defence (C.S.S.A.D.), also known as the Tizard Committee after its chairman, Henry Tizard.[4] This Committee was an area of conflict for two factions: the professional scientists allied to the Air Ministry and the appeasers versus Winston Churchill and his scientific advisor, Frederick Lindemann. In turn, their battles were shaped by the ease with which scientists became insiders at the Air Ministry and the alienation that Lindemann felt for this world of gentlemanly professionalism.

7.2 Gentlemanly Professionalism and the Aristocratic Lindemann

The Air Ministry was not part of the mainstream structure of Whitehall. Like the other Service Ministries, the War Office and the Admiralty, it was staffed by a mixture of serving officers and administrators. It did not

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3 "Cato" [Frank Owen, Michael Foot and Peter Howard], *Guilty Men by "Cato"*, London: Victor Gollancz, 1940.

4 Radar has excellent potential for analysis as a case-study using Thomas Hughes's systems approach. Such a methodology would have to tackle the importance of operational effectiveness versus technological 'advance' since the radar stations built by Britain, 1936-1939, can be viewed as a national 'success' but as a technological 'failure' in comparison to the Germans. Tony Devereux, *Messenger Gods of Battle: Radio, Radar, Sonar: The Story of Electronics in War*, London: Brasseys (UK) Ltd., 1991, p. 104. Germany's 'Freya' system was developed by Dr. Rudolph Kuhnhold between 1933 and 1936 "for coastal surveillance of surface vessels".

therefore conform to the typical structure of a Ministry, presided over by generalist civil servants and confining specialists to a subordinate position. However, the Air Ministry and the Royal Air Force (RAF) were not the bureaucratic excretion of a machine responding to new technological opportunities but owed their existence to the political recognition of air power in Great Britain.[5] The RAF was formed on the 1st April 1918 in a revolutionary Act of Parliament that established an air force independent of both the Army and the Navy.[6] Once the Armistice was declared, the RAF had to overcome the interservice rivalry that worked for its dissolution and justify its usefulness to the Treasury by acting as a cheap "Imperial police force" beginning with the Iraqi insurgency of 1921-1923.[7] As Edgerton summarises:

> Here was the shape of things to come. An air force separate from the two traditional services, with an increasing emphasis on the bombing of civilians, a continuing association of aviation with right-wing politics and the right-wing popular press, and a deep concern on the part of the state with the economics of warfare.[8]

By 1934 the RAF had been in existence for sixteen years and was perceived to be a permanent addition to the military structure by Whitehall despite the arguments of the Army and the Navy. However, continued institutional insecurity directed the RAF towards the adoption of tactical

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5 David Edgerton, *England and the Aeroplane: An Essay on a Militant and Technological Nation*, London: The MacMillan Press, 1991, p. 13.

6 Malcolm Smith, *British Air Strategy between the Wars*, Oxford: Clarendon Press, 1984, pp. 14-18.

7 *Ibid.*, p. 14.

8 Edgerton, *op cit.*, p. 17.

and strategic doctrines on the imperial and continental stages whilst ignoring the possibilities of air defence on the Home Front.

The Secretary of State for Air managed his Ministry with the cooperation of the military. This was achieved through the Air Council on which the Minister, senior RAF officers and the permanent secretary sat. This was the principal body through which the Secretary of State supervised the RAF and coped with its primary source of power, the links between the Chief of the Air Staff and the Deputy Director Plans. The other two positions of some importance on the Air Council were the Member for Personnel and the Member for Research and Development. Since the number of Service staff in the Ministry numbered only 370 in 1934, "the Ministry and the Service formed a closely-knit and relatively informal group, in which quite junior officers could make their voices heard".[9] This informal structure was helped by the small size of the Ministry and the lack of time necessary for institutions to ossify into rigid hierarchies. As a consequence, the RAF was more flexible in its recruitment than its older siblings and able to accommodate a loose cannon like the Tizard Committee. Sir Hugh Dowding, the Air Member for Research and Development from 1931 to 1936 in charge of Tizard's toy, raised the importance of his department but was passed over when Sir Edward Ellington, Chief of the Air Staff, 1933-1937, retired. Dowding's disgruntlement was caused by his reputation as a taciturn loner and by his emphasis on the fighter in strategic thinking which placed him out of step with the Air Staff who supported the strategy of the bomber as a priority of

[9] Smith, *op cit.*, p. 42. The number of Service staff was to treble by 1939 in response to the rearmament campaign.

forward planning.[10] His association with the Tizard Committee and the diversion of vital funds from rearming bomber squadrons to air defence also counted against him.

This informal structure should not blind us to the common class origins of the majority of professionals associated with the air force and the air industry. Due to its technological underpinnings, the RAF required educated pilots, engineers, mechanics and researchers. All involved with the enterprise would have gone to some form of secondary school and/or served an apprenticeship. This service was far more professional and middle-class in its orientation than either the Army or the Navy. Both the Army and the Navy relied on the working-classes to provide their soldiers and sailors but the RAF looked to the public schools for their pilots and the 'respectable' working-class or the lower-middle-class for their mechanics and other ranks. Its earliest history provides evidence for this. The Royal Flying Corps (RFC) recruited many of its pilots from the ranks of cavalry officers who also provided its first commander, yet it originated as a Royal Engineering unit.[11] More than just "a corps of flying civilian or military engineers", its pilots transferred their equestrian glamour to the aeroplane.[12] The RFC was romanticised as a chivalric order, the 'knights of the air' and it continued to legitimate these values on the Home Front and in the military world long after disillusionment permeated the trenches. The gentlemanly ideal that the RFC reproduced was one derived from the ideology of the public schools but, given the novelty of the aeroplane, the qualities of seeking adventure and courage were accentuated. As Sir

10 *Ibid.*, pp. 37-39.
11 David Edgerton, *op cit.*, p. 51.
12 *Ibid.*

Walter Raleigh's official history of aviation in the Great War recounted:

> We were late in the beginning, but once we had begun we were not slow. We were rich in engineering skill and in the material for the struggle. Best of all, we had a body of youth fitted by temperament for the work of the air, and educated, as if by design, to take risks with a light heart - the boys of the Public Schools of England.[13]

> An immense service was rendered in those early days by gentlemen adventurers, engineers and pilots, who all for love and nothing for reward, built machines and flew them.[14]

When Edgerton reproduced these quotes from Raleigh, he noted that gentlemanly status covered the engineers and the pilots as well as the adventurers. The professional status of these occupations, acquired during the Great War, utilising the order that all pilots had to be officers and directing recruitment drives towards the professional classes, resulted in a lack of distance between the pilots, the engineers and the scientists.[15]

To understand Lindemann's actions against this context of gentlemanly professionalism in the Air Ministry, his background and friendship with

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13 Sir Walter Raleigh (1861-1922) was a critic, essayist and Merton Professof of English Literature at Oxford from 1914. His patriotic writings during the First World War paved the way for an invitation to write the official history of the RAF in July 1918, just four months after the service was established. His obituarist noted that "the fervour of his admiration on the heroism of the air is everywhere apparent". D. Nichol Smith, "Sir Walter Alexander Raleigh" in *The Dictionary of National Biography, 1922-1930*, ed. J. R. H. Weaver, London: Oxford University Press, 1937, pp. 701-704; Sir Walter Raleigh, *The War in the Air*, Vol. 1, London: Oxford University Press, 1922, p. 111.

14 *Ibid.*, p. 121.

15 Ronald Clark, *Tizard*, London: Methuen & Co. Ltd., 1965, pp. 23-24; Sir Henry Tizard, *Autobiography*, Tizard Papers, HTT 713, pp. 73-80.

Churchill must be studied, since it was this path that led him away from professional assimilation with English science. His upbringing did not conform to the educational path of public school and university that characterised the professional classes. Born of an Alsatian father and English mother, he was raised in Sidholme near Sidmouth and educated by private tutors before spending three years at Blair Lodge in Scotland. However. although he did not advertise the fact, he was actually born at Baden-Baden in Germany. This upper-middle-class existence left Lindemann proficient in three languages (English, German and French), expert in tennis and classical music and confident in science . His father pursued his amateur interest in science within his private laboratory and Lindemann's early researches were exercises in dilettante experimentation.[16] Used to wealth and a secure income, Lindemann's professional pursuit of science naturally turned to the centre of international science in the Edwardian period, Germany. With no language barrier and the manners of a gentleman, he undertook scientific training at Darmstadt before gaining his Phd at the Physikalisches Chemisches Institut under Nernst.[17] Private income and professional success allowed the maintenance of a leisured lifestyle. Lindemann was one of champions of tennis in a sport dominated by amateurs and it was noted that "his normal chivalry to women [was]...notably absent on the courts".[18] With financial security and exposure to the paternalistic hierarchy of German science, Lindemann had not been socialized in the world of professional English science.

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16 The Earl of Birkenhead, *The Prof in Two Worlds: The Official Life of F. A. Lindemann*, pp. 22-29.

17 Lindemann's Phd was awarded for a programme of measuring the specific heat of substances at very low temperatures in order to acquire proofs of Planck's Quantum Theory. *Ibid.*, pp. 30-37.

18 *Ibid.*, p. 48.

Lindemann's entrance to this world was hurried if unforced. Wartime service was spent at the Royal Aircraft Factory in Farnborough where he befriended Robert Watson Watt, the progenitor of radar, and was able to overcome his disabling foreign background when mixing with professional scientists or conforming to their norms.[19] Despite his wartime contacts, he did not know many influential British physicists apart from Tizard and Rutherford. It was Tizard who provided the testimonial and leverage for his new position as Clarendon Professor of Physics, which included the management of the Clarendon Laboratory. This base was far less prestigious than its rival, the Cavendish, because the previous incumbent did not pursue research and the university authorities had starved the institution of funds necessary to establish a laboratory equipped to professional standards. Lindemann overcame these obstacles by raising funds from collegiate and commercial sources and his professorial career left the Clarendon as a thriving laboratory and a scientific asset for Oxford.[20] Lindemann's competitive nature set the attainment of the Cavendish's scientific reputation as the goal for his own institution but this gold standard remained out of reach after 1932. Lindemann's elevation to the Clarendon was rewarded by a fellowship of the Royal Society but there was no further scientific recognition for his research and academic achievements.

This was because Lindemann joined the social round of country-house parties and enjoyed the lifestyle of a leisured aristocrat. With his private

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19 Sir Robert Watson Watt, *Three Steps to Victory: A Personal Account by Radar's Greatest Pioneer*, London: Odhams Press Ltd., 1957, p. 42.
20 The Earl of Birkenhead, *op cit.*, pp. 81-114.

source of income, he could afford a personal servant in his quarters at Oxford who also doubled as a chauffeur. Lindemann was especially proud of the vehicular status symbol, being driven around in a succession of cars including a Mercedes, a Daimler and a (second-hand) Rolls Royce.[21] This lifestyle corresponded with his political views.[22] Lindemann's reactionary attitudes are best illustrated by the observations of Thomas Jones, who stayed with him and Churchill at Chartwell during the miners' strike of 1926. "Lindemann, I quickly discovered, regarded all miners, if not all the working classes, as a species of sub-humans. This drove me to the Extreme Left with Winston at the Right Centre [during the argument]." Jones warned Churchill of the Professor's influence on his eldest son, Randolph, and stated that "it was desirable he should not be unduly Lindemannised" given the continuous democratisation of British politics over the next twenty years.[23] These eugenic overtones in Lindemann's contempt for the lower classes were repugnant even to moderate Tories.

Lindemann first met Churchill in 1921 and they soon became firm friends. Churchill, like other politicians, cultivated contacts in as many professions as possible for use in his political career and journalism. Lindemann, nicknamed the 'Prof', was a member of the same social set and as a scientist, proving a convenient acquaintance for an author whose eclectic interests straddled history, science and politics. A source of knowledge turned to friendship as Churchill had lost his seat in the House of Commons and had more time to renew and explore associations outside

21 *Ibid.*, pp. 121-123.

22 *Ibid.*, pp.146-156.

23 Martin Gilbert, *Winston Churchill, Volume V: 1922-1939*, London: William Heinemann Ltd., 1976, pp. 181-182. Thomas Jones was the secretary of the Coal Committee negotiating with the owners and the strikers for a state sponsored settlement. Churchill was chancellor of the Exchequer. His prescience was accurate given the electoral victory of welfare socialism in 1945.

of the hothouse of Parliamentary politics. Lindemann was still new to post-war English 'Society' and required friendships with eminent men, preferably of old and distinguished families, to anchor his entry and secure acceptance to these exclusive circles. He was already on friendly relations with the Earl of Birkenhead, but he became a companion of Churchill.[24]

Lindemann began to holiday with the Churchills from the mid-twenties, often staying at Chartwell or accompanying them on their summer trips to the South of France and North Italy.[25] Churchill was appreciative of "the Prof's agreeable and instructive company" and "swore by" him as an impeccable oracle of knowledge on subjects of which Churchill was himself ignorant.[26] Their lobby was more successful because of the dovetailing of their interests. Lindemann provided the scientific ballast for Churchill's claims while the politician provided the channel where the scientist could deploy his knowledge and skills in the political arena for the good of his country. The major consequence of Lindemann's neglect of the scientific world was his ignorance of the protocols and gentlemanly codes that governed relationships amongst the professional classes. This was noted by his biographer, "He [Lindemann] was as remote from the proletariat as an aristocrat of the French ancien regime, and he knew little of the retired clergyman type...or of the professional classes who were working and issuing publications at the same time as himself."[27]

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24 The third Earl of Birkenhead was the father of Lindemann's biographer.
25 Martin Gilbert, *op cit.*, pp.132, 141, 245, 277, 299, 437.
26 *Ibid.*, pp. 245, 442.
27 The Earl of Birkenhead, *op cit.*, p. 125.

7.3 The Political Pressures of Air Defence, 1934-1935

The political forces that shaped radar derived from the failure of the Disarmament Conference in 1933. Britain's strategic vulnerability was initially addressed through diplomatic initiatives at this conference that aimed to outlaw the principal weapon of air attack, the bomber. However Hitler's accession to power led to the dissolution of the Disarmament Conference and the need to find new approaches that would solve Britain's weakness and allow Hitler to revise the Versailles Treaty through negotiation and stabilise Germany's position in the international system. The drawing-board was the Defence Requirements Committee and this decided that air rearmament was an economic method of deterring potential German aggression while demonstrating to the domestic electorate that the Government was responding to their anxieties about air attack. The change of policy was announced in July 1934 by Stanley Baldwin, who had sat on the sub-committee of the Defence Requirements Committee with Sir Philip Cunliffe-Lister and assessed different schemes of air rearmament. Ministers were addressing Britain's weaknesses in air defence through policies of diplomacy and deterrance, the precursors of appeasement, but a concrete scientific solution would reduce the probability of a successful air attack on the British Isles.[28]

The Air Exercises of 1934 had brought home to the Government the deficiencies of air defence. Under the rules of these nocturnal wargames the Air Ministry and the Houses of Parliament were successfully destroyed without difficulty. Sir Winston Churchill chillingly described London as "'the

[28] Malcolm Smith, *op cit.*, pp. 109-139; David E. Fisher, *op cit.*, p. 23; John Ferris, "The Theory of a "French Air Menace": Anglo-French Relations and the British Home Defence Air Force Programmes of 1921-25", *Journal of Strategic Studies*, vol. 10 (1987), pp. 62-83; Sir Robert Watson-Watt, *op cit.*, pp. 78-80.

greatest target in the world...a valuable fat cow tied up to attract the beasts of prey'", like Rome, prostrate before the barbarians.[29] Lindemann took the first step independently by writing to *The Times* on the need for research into a system of air defence. The letter was peppered with references to "gangster Governments", "gases", "bacteria" and other lurid phrases that conjured up the nightmare of aerial attack. Within this rhetorical flourish could be divined Lindemann's unstated goal: a strong and concerted effort to develop a system of air defence independent of the Air Ministry and the Civil Service. "The problem is far too important and too urgent to be left to the casual endeavours of individuals or departments."[30] Lindemann's aims had been fleshed out years earlier. Amongst his positions in the world of aeronautical research, he had been a member of the Anti-Aircraft Sub-Committee of the Committee of Imperial Defence which was chaired by Lord Haldane until its dissolution on his death in 1928.[31] Sir Maurice Hankey, Secretary to the Cabinet and the Committee of Imperial Defence, asked Lindemann for his views on air defence. Lindemann replied after the dissolution of the committee:

> Though the results attained by this particular Sub-Committee may not have been as gratifying as could be wished, I am convinced that there is not only room but a very decided need for some such Sub-Committee provided a suitable Chairman and personnel can be found. As I have often told you, it seems to me that general scientific information and

29 Sir Winston Churchill, quoted in Keith Middlemas and John Barnes, *Baldwin: A Biography*, London: Weidenfeld and Nicolson, 1969, p. 1085.

30 F. A. Lindemann, "Science and Air Bombing", *The Times*, 8th August 1934.

31 Lindemann was appointed to the Meteorology Sub-Committee of the Aeronautical Research Committee, 1921-1924. In 1925, he was appointed Chairman of the Kite Balloon Sub-Committee of the Aeronautical Research Committee. In 1926, he was appointed to the latter committee, on which he served until 1932.

> advice are essential for any proper consideration of defence problems, and a Sub-Committee to suggest and discuss new problems and methods would seem to me an important adjunct of the C.I.D. [Committee of Imperial Defence].[32]

A month after the letter to *The Times*, Lindemann had escaped to the South of France with Churchill and his son Randolph. Whilst there, they called upon Stanley Baldwin, Lord President of the Council and leader of the Conservative Party, during his holiday at Aix. Baldwin was the power behind the throne in the National Government and wielded more influence over parliament and party than the Prime Minister, James Ramsay Macdonald. Baldwin's position outside the main Departments of State left him able to catch fish that could slip through other ministerial nets. The two highlighted Britain's vulnerabilities and called for a research campaign into new methods including Lindemann's pet, aerial mines. The backbencher and his adviser therefore raised the matter of air defence with the man who had the power, inclination and time to fulfil their demands. Air defence and radar were indissolubly linked with the policies of the National Government and the internal machinations of the Conservative Party.[33]

Rowe, a scientific civil servant at the Air Ministry, was motivated by the cultural fear of the aircraft and the perceived vulnerability of the British Isles to collect the fifty-three relevant files on air defence.[34] His misgivings

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32 The Earl of Birkenhead, *op cit.*, pp. 174-5.

33 *Ibid.*, p. 175; Keith Middlemas and John Barnes, *op cit.*, p. 781; Martin Gilbert, *op cit*,. p. 560.

34 A. P. Rowe to Henry Tizard, 22nd February 1936. Tizard Papers HTT 79; A. P. Rowe, *Our Story of Radar*, Cambridge: Cambridge University Press, 1948, p. 1. Rowe was "employed wholly on armament problems and the legality of even this was open to doubt".

were confirmed by the miniscule attention the subject had received at the Air Ministry and he compiled a memorandum surveying the state of air defence for the attention of his superior, Harry Egerton Wimperis, the Director of Scientific Research, on the 4th June 1934, concluding "that unless science evolved some new method of aiding air defence, we were likely to lose the next war if it started within ten years".[35] Rowe recommended bringing the memorandum to the attention of the Secretary of State for Air, Lord Londonderry.

Wimperis read Rowe's memorandum and lunched with his old friend Professor A. V. Hill at the Athenaeum, discussing the possibilities of a 'death ray' in combination with the importance of air defence.[36] Hill argued that the 'death ray' was a sterile approach but that air defence problems should be scientifically investigated.[37] Hill was an idiosyncratic conservative who opposed any intrusion of the state on the professional world of science especially in the guise of 'planning' or Marxism and shared the public concern with air defence.

Wimperis wrote a memorandum which was sent to Dowding, Ellington and Londonderry suggesting a committee "of outsiders" to study the problems of air defence on the 12th November.[38] The paucity of research resources and personnel at the Air Ministry demanded the recruitment of external professionals if the state of air defence was to be evaluated successfully.

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35 *Ibid.*, p. 5.

36 Archibald Vivian Hill was the Royal Society's Fowlerton Research Professor in physiology at University College, London from1926 to 1951. He was awarded the Nobel Prize in 1922.

37 David E. Fisher, *op cit.*, p. 27.

38 *Ibid.*; R. W. Clark, *op cit.*, pp. 109-111. The suggestion for an expert committee of academic scientists and the prospective members came from Wimperis. H. E. Wimperis, "Radiant energy methods of A.A. Defence. Note of a discussion with Professor A. V. Hill, FRS", Tizard Papers HTT700.

The inclusion of scientific specialists and academic personnel on aeronautical research was already a long-standing practice. For example, Tizard was Rector of Imperial College in London and also doubled as the Chairman of the Aeronautical Research Council. Both Dowding and Londonderry endorsed the proposal. However Londonderry was a confidante of Ramsay MacDonald, the Prime Minister, and enjoyed few links with the powerful spine of the National Government, the Conservative Party. He was appointed because of his enthusiasm for all things aeronautical and his tenure as Secretary of State for Air left the Air Ministry in a political backwater. He saw the proposed Committee for the Scientific Survey of Air Defence (CSSAD) as not just a response to the misgivings of individual officers and administrators but also an opportune answer to parliamentary and cabinet pressure. When the Disarmament Conference and the British diplomatic campaign to outlaw the bomber foundered in 1933, the political factions supporting disarmament and rearmament utilised the images and fear of aerial bombardment to support their arguments. Questions about bombing and air policy were raised in parliament between November 1933 and July 1934 before culminating in the 'air panic' that crystallised public anxiety during the winter and spring of 1935.[39] This Committee strengthened Londonderry's hand in responding to Conservative critics like Baldwin who distrusted the Air Ministry and tended to marginalise its Minister on the increasingly important policies that linked aviation, diplomacy and strategy.[40]

Baldwin had already become involved in the problem of air defence

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39 Uri Bialer, *The Shadow of the Bomber: The Fear of Air Attack and British Politics, 1932-1939*, London: Royal Historical Society, 1980, pp. 1-47, 68.

40 J. A. Cross, *Lord Swinton*, Oxford: Clarendon Press, 1982, p.135.

through the overtures of Churchill and Lindemann. He had suggested that Lindemann contact him upon his return to London but did not see him until after the end of the Conservative Party Conference in early October. Lindemann's sense of urgency was apparent when he telephoned for an appointment with Baldwin on 29th September followed up by a letter to his Private Secretary, Sir Geoffrey Fry, on 9th October. When they eventually met, Baldwin suggested that Lindemann should summarise his proposals before the new Sub-Committee of the Committee of Imperial Defence dealing with air defence, under the chairmanship of Air Chief Marshall Sir Robert Brooke-Popham. To this end, Baldwin checked that Lindemann had not approached the Air Ministry through the offices of the Assistant Secretary of the Committee of Imperial Defence, Wing-Commander E. J. Hodsall. Having avoided stepping on ministerial toes, Baldwin arranged through Hodsall for Lindemann to be invited to appear before the Brooke-Popham Committee.

Lindemann's qualms about the organisation of air defence reflected his earlier ideas that were expressed in the letter to Hankey in 1928. He wrote to Baldwin on 3rd November questioning the effectiveness of the Brooke-Popham Committee. Lindemann foresaw a committee of scientists and service representatives under the chairmanship of an eminent and dynamic individual like Lord Weir - a member of 'the great and the good' but independent of the Civil Service.[41] Lindemann believed that the need to develop rapidly a system of air defence required a committee unburdened by the normal constraints of the civil service or the narrow remit of a single department, under the aegis of the Committee of Imperial

[41] The Earl of Birkenhead, *op cit.*, p. 175; Keith Middlemas and John Barnes, *op cit.*, pp.1086-1087.

Defence. Independently from Tizard, Lindemann also concluded that only cooperation with the armed forces would successfully bring such a system to operational effectiveness. Lindemann met Tizard at the Royal Society on the 15th November to sound out his response to the proposals. According to his notes, "Mr. Tizard undertook to support them if possible" and he thought he had secured a certain degree of professional support for his plan through Tizard and his contacts.[42]

As Chairman of the Aeronautical Research Committee from 1934 and a former Secretary of the Department of Scientific and Industrial Research, Tizard was perceived to be the natural Chairman of the new committee. His experience in wartime research for the RFC and his wide links with the scientific communities in the administrative and academic spheres were considered to be supremely useful assets. Tizard was a Fellow of the Royal Aeronautical Society, a Fellow of the Royal Society and a member of the Athenaeum Club. As Chairman he was an expert in aeronautical science with a track record in research and was thus deemed to have the capability of teasing out new possibilities in the field of air defence. His scientific contacts also gave him the influence to call expert witnesses and to direct research to those most capable of producing results. He had already met Sir Philip Joubert de la Ferte, Commandant of the RAF Staff College, Wimperis and other concerned parties at a meeting of Air Defence Great Britain, that part of the RAF dealing with the defence of the metropolis, in October 1934. They discussed means of detecting incoming aircraft and Tizard advised that acoustical methods were useless whilst

42 R. W. Clark, *op cit.*, p. 112; Keith Middlemas and John Barnes, *op cit.*, p. 1087.

mooting electrical processes as a possible alternative.[43] Wimperis's proposition for a new Committee was approved by the Air Council on 12th November 1934 and letters were sent out soon after inviting Tizard, Hill and P.M.S. Blackett, Professor of Physics at Birkbeck College in the University of London, to become members.[44]

Meanwhile Lindemann wrote to Churchill on 25th November outlining the continuing inadequacies in British air defence.[45] Churchill was aware of Lindemann's attempts to engage with the government machinery, as it formed one part of their two-pronged assault on the Government. Lindemann's final attempt came with his evidence to the Brooke-Popham Committee on 27th November which stopped his campaign with a bureaucratic finality, lost in the yawning depths of a report. Churchill's turn came a day later with the parliamentary debate on air policy and rearmament. Churchill set down an amendment criticising the Government's rearmament policy and warned of the dangers of German rearmament, especially its bombing capability.[46]

Baldwin's reply to this speech included the claim that there was no defence against the bomber. The leader of the Tories would not give ammunition to the critics of the Government unnecessarily especially after he became aware that the Tizard Committee was on the drawing board. Lindemann however took this statement at face value as the symptom of a "defeatist attitude" and wrote off Baldwin as an advantageous conduit for

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43 H. Montgomery Hyde, *British Air Policy between the Wars, 1918-1939*, London: William Heinemann Ltd., 1976, pp. 323-324.
44 *Ibid.*, p. 324.
45 Martin Gilbert, *op cit.*, p. 570.
46 *Ibid.*, p. 573.

changing the policies concerning air defence.[47]

Lindemann had actually gained Baldwin's attention, as shown by the aid given in October. Baldwin now turned to Hodsall, one of his main advisers on military concerns, to keep him informed of developments on air defence.[48] Hodsall had been acting as Secretary of the Committee of Imperial Defence during Hankey's sojourn in Australia. He had suggested "a joint military and scientific committee" to assess the number of inventions that were coming to the attention of the Service Departments.[49] Hodsall soon became aware of Rowe's endeavours and informed Baldwin of events in the Air Ministry.[50] Hodsall's interest in these matters was confirmed and reciprocated by Wimperis who met him on 29th November to discuss the new Committee and secure its position within the Service Ministries. The alternatives were a departmental committee or as a sub-committee under the Committee of Imperial Defence. Wimperis's plan for a departmental committee was agreed to by Hodsall. Agreement was inevitably provisional given the intensely political nature of the subject and the interest shown in this matter by their political masters. Hodsall then related his conversation with Wimperis to Baldwin on the following day.[51]

Lindemann was irked by the failure of his approach to Baldwin but continued to sting the Air Ministry. However, his approaches would never lead to administrative action because of his friendship with Churchill. As Hodsall observed, "Whitehall shied off Lindemann like the plague, the

47 *Ibid.*, p. 578.
48 Keith Middlemas and John Barnes, *op cit.*, p. 753.
49 *Ibid.*, p. 1086.
50 *Ibid.*, p. 782.
51 *Ibid.*, p. 1088.

Government scientists hated the sight of him, and because Churchill had Lindemann as his stooge...Ministers avoided him also, as being highly dangerous."[52] Lindemann's last throw of the dice before the end of 1934 was a letter to Lord Londonderry, the Air Minister, outlining and modifying his proposals in the light of Baldwin's disappointing parliamentary response. Lindemann now called for the same committee that he had proposed earlier to be established under the power of the Prime Minister. Its remit was also narrowed to the discovery or invention of methods of air defence which the relevant Service Ministries would then implement. Londonderry, already supporting the CSSAD as a departmental initiative, wrote back to inform Lindemann of this and suggest that he should contact Tizard.[53] This correspondence anticipated the approach of Churchill and Lindemann to the Prime Minister in 1935.

The CSSAD was an unusual committee because of the wide range of political views represented and because of the exclusion of aeronautical experts from the aircraft industry or the academic world. Hill was a physiologist with an international reputation as a Nobel Laureate and experience in military research as director of the Anti-Aircraft Experimental Section during the Great War. The section was known as 'Hill's Brigands' and worked on the improvement of anti-aircraft gunnery and the behaviour of shells. Hill ended the War as a Brevet-Major, having joined up as a Captain in the Cambridge Regiment.[54] He was third Wrangler in the

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[52] *Ibid.*; Stephen Roskill, *Hankey: Man of Secrets, Volume III 1931-1963,* London: William Collins Sons & Co. Ltd., 1974, p. 144. "Lord Butler describes Lindemann as 'that sharp-witted sharp-tongued, pertinacious and more than slightly conspiratorial character who has long been Churchill's closest friend and confidant'."

[53] The Earl of Birkenhead, *op cit.*, pp. 176-178.

[54] Meg Weston Smith, "E. A. Milne and the creation of air defence: Some letters from an unprincipled Brigand, 1916-1919", *Notes and Records of the Royal Society of London*, vol. 44 (1990), pp. 241-255.

mathematical tripos of 1907 at Cambridge and subsequently took the natural sciences tripos before taking up physiology as a Fellow at Trinity College, Cambridge. His elite education was combined with his position in one of the most important professional positions in English science - the Biological Secretary of the Royal Society. Hill's interest in defending his chosen profession of scientist and his individual brand of conservatism led him to become an Independent Member of Parliament for Cambridge from 1940.[55] He was also a member of the Athenaeum Club from 1923.[56] Blackett, on the other hand, was the son of a stockbroker who had embarked on the naval career chosen for him, attending Osborne Naval College and Dartmouth Naval College. After active service during the First World War he had availed himself of the opportunity given to ex-naval officers to attend Cambridge University and took the natural sciences tripos. Under Rutherford's eye, he undertook research in the Cavendish Laboratory for the following twelve years culminating in his discovery of the positron in 1932. It was through this connection that he was probably brought into contact with Tizard. Combined with his membership of the scientific elite, Blackett's politics were to the left of either Tizard's or Hill's and he is remembered as one of the "outstanding 'progressive' scientists" of this period.[57] Unlike Gary Werskey's 'Visible College', Blackett was a left-liberal, who shared the post-Depression enthusiasm for planning but not for scientific socialism in its Soviet mode. With Wimperis representing the Air Ministry, these three formed the core of the committee under

55 William McGucken, *Scientists, Society and State: The Social Relations of Science Movement in Britain, 1931-1947*, Columbus, Ohio: Ohio University Press, 1984, pp.166-168, 185-193. 225-225. This outlines Hill's attempts, following his membership of the Tizard Committee, to reorganise state research and free scientific resources for the war effort.

56 *Royal Society Yearbook 1923*, London: The Royal Society, 1923.

57 Gary Werskey, *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*, London: Free Association Books, 1988 [1978], p. 10.

Tizard. Their careers and their positions reflected the comfortable world of metropolitan science that governed these connections. An Oxbridge education, a prestigious university post and membership of the Athenaeum were all suitable credentials for the membership of the Tizard Committee.

7.4 The CSSAD and the Promotion of Air Defence

After the CSSAD was appointed, the actions of the committee and its political opponents were inextricably intertwined. Tizard and the other members needed a viable air defence technology to justify their existence before Churchill and Lindemann persuaded their political masters to abolish the CSSAD and replace it with a new committee beyond the Air Ministry's control that would support aerial mines. Tizard received the invitation to become Chairman of the CSSAD in mid-December, 1934.[58] Ronald Clark argues that "Tizard did not leap at the idea; he warmed to the work over the weeks rather than jumped at it immediately..."[59] This hesitation should be linked to Tizard's awareness of Lindemann's hopes for a new committee, his gradual appreciation of the latter's failure, and the effect of such a position upon his rectorship of Imperial College. The terms of reference were "to consider how far recent advances in scientific and technical knowledge can be used to strengthen the present methods of defence against hostile aircraft". The committee also had the power to "consult" any expert.[60] The terms were necessarily imprecise because of the lack of research on the subject since the last war. More surprising to the historical onlooker is the free hand given to committee members to

58 J. M. Wright to Henry Tizard, 12th December, 1934. Tizard Papers, HTT 111.
59 R. W. Clark, *op cit.*, 112.
60 *Ibid.*

explore and follow avenues without any formal supervision or control on the part of the Air Ministry beyond the contributions of Wimperis. Wimperis's judgment and the professional credentials of the scientists were considered sufficient for the level of trust required to sit on an Air Ministry Committee. Their military records were an advantage and their services were given for free despite Hill's quibbles about a fee.

In his proposal for the establishment of a scientific committee on air defence, Wimperis dismissed claims that a 'death ray' could disable aircraft engines, kill humans or trigger bombs. Alongside this closure of the 'death ray' concept, he wrote about the increasing difficulties in air defence posed by the improvement in aircraft technology and argued that only a scientific survey of progressive technologies would bridge the defensive deficit.[61] The CSSAD was not established to exploit a specific technological development. The belief of ministers, military officers and civil servants in the general promise of the ideology of progress, as articulated by the scientists, led to expectations that a scientific survey would provide a solution to the weaknesses of air defence. Wimperis contacted Robert Watson Watt, the Superintendant of the Radio Department at the National Physical Laboratory, to consider further the possibilities of a 'death ray'. Wimperis represented the Air Ministry on the Radio Research Board of the Department of Scientific and Industrial Research and had met Watt in this capacity. Watt met Wimperis unofficially at the Air Ministry on the 18th January 1935 and promised to calculate the power required to kill a pilot or disable his aircraft using a 'death ray'.[62] It is unclear if Wimperis was trying to verify the impossibility

61 H. E. Wimperis, "Radiant energy methods of A.A. Defence".
62 Sir Robert Watson-Watt, *op cit.*, p. 81.

of a 'death ray' with independent scientific advice and head off useless discussion with Hodsall or whether he thought farming out the proposal might raise some fresh angle previously unconsidered. It could have been a mixture of the two but it does demonstrate the unpromising material with which the CSSAD had to work.

Watt wrote two memoranda: one debunking the 'death ray' and one elaborating on the possibilities of radiolocation as a form of air defence. Watt's account of the work leading up to these drafts was contested by his deputy, Arnold Wilkins. Watt claimed that he set a problem on the 'death ray' for Wilkins and that their subsequent discussions rubbished the claims of the 'death ray'. Watt only posed the question of radio detection and location whilst drafting his first memorandum to Wimperis in order to leaven its uncompromisingly bleak conclusions.[63] However Wilkins claimed that Watt was displeased with the failure of the 'death ray' problem and asked him if there were other possibilities that might help the Air Ministry. Wilkins recalled reading the results of engineers at the General Post Office who had reported aircraft leaving echoes on their radio equipment. Watt and Wilkins calculated the power needed to detect an aircraft and found that it was theoretically feasible.[64] Watt regarded Wimperis as an influential figure and was unwilling to report back that the 'death ray' was a total failure lest his own standing suffer. Radiolocation was initially a desperate attempt to secure Wimperis's approval and improve Watt's reputation for willingness and originality amongst the community of government scientists. The beginnings of radar were not the work of a brilliant mind discovering the military application of a pure

63 *Ibid.*, pp. 81-82.
64 David E. Fisher, *op cit.*, pp. 28-29.

science.

Watt's second memorandum, "Detection and Location of Aircraft by Radio Methods" drew directly on the work of the Radio Research Board. First of all, Watt wrote that obvious methods of detection such as sound, light and infra-red were too unreliable. This process of elimination left radio-waves as the only practical alternative. Detection technologies were either improbable or non-existent and Watt's rhetorical enhancement of the potential of radio accorded with Tizard's assertion that only electrical methods were practical. However Watt not only asserted the means but also the method. His research since the war had been the exploration and refinement of radio techniques in atmospherics. He therefore outlined, succinctly and clearly, with accompanying calculations, the two methods of radiolocation available: "illumination" (also known as "floodlighting") and pulse. The latter was to be preferred:

> If now the sender emits its energy in very brief pulses, equally spaced in time, as in the present technique of echo-sounding of the ionosphere, the distance between craft and sender may be measured directly by observation on a cathode-ray oscillograph directly calibrated with a linear distance scale, the whole technique already being worked out for ionospheric work at Radio Research Station.[65]

His pulse technique would approximately measure height, speed and course. Watt implied his own suitability for conducting the necessary

[65] Robert Watson Watt, "Detection and Location of Aircraft by Radio Methods" in Robert Watson Watt, *op cit.*, pp. 470-474, 471.

experiment by marketing radiolocation as an extension of the practices employed at Slough under his tutelage. "I am, however, convinced that the work can only be brought to a successful issue by the utilization of the wide range of cathode-ray technique in which Radio Research Station, Slough has specialized for many years, and in which its experience is unique."[66] He also disarmed potential critics by arguing that ionospheric disturbances could be filtered out and that secrecy would cover up the detection of radiolocation devices by other countries. Watt's whole proposal was a carefully constructed attempt to reorient the work of the Radio Research Station to an area of national importance. Watt was aware of the crucial nature of air defence for British politicians and their public. He wanted to capitalise on an opportunity that gave him the chance to supervise the development of a system of air defence; a surer road to professional recognition and social honours than his position as a middle-ranking official in an obscure cog of government.

Watt's proposal was scheduled to be discussed by the CSSAD at their first meeting on 28th January 1935. Whilst Londonderry's initiative appeared to be uncovering some promising material, Churchill and Lindemann were unwilling to let go of the rope. Within the first week of the New Year Lindemann returned to the attack, writing to Londonderry on the 7th January and stating "that he and his 'friends' would feel obliged 'to continue to press for more vigorous action'".[67] That same day he sent a draft note calling for a Committee of Imperial Defence inquiry into air defence to Churchill and Austen Chamberlain, which, signed by all three, would be forwarded to the Prime Minister. Churchill and Lindemann hoped

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[66] *Ibid.*, pp. 473-474.

[67] Martin Gilbert, *op cit.*, p. 623.

to circumvent the leadership of the Conservatives by appealing to the Prime Minister directly with the support of Austen Chamberlain, "the elder statesman of the Party".[68] Macdonald agreed to their proposals in his reply on January 10th.[69] However MacDonald was unaware of the existence of the Tizard Committee but was soon persuaded of its advantages by his close friend, Londonderry. MacDonald wrote to Chamberlain again on the 15th, in a letter drafted by Wimperis, outlining the proposed work of the Tizard Committee and, as a sop to these critics, calling on Lindemann to give evidence.[70]

In Cabinet it was agreed that the best way of neutralising these dissenters was to invite Lindemann to join the Tizard Committee and establish a sub-Committee of the Committee of Imperial Defence studying the same subject. Hankey had taken up Hodsall's ideas and presented them to Baldwin and MacDonald who now forged a consensus on the subject in the National Government.[71] Churchill and Lindemann had not received any sign to persuade them that the Tizard Committee was anything more than a tool of the Air Ministry. When the letter of invitation was sent out by the Air Ministry on 30th January, Lindemann's "reply was cautious in the extreme".[72] In letters to Churchill, Lindemann branded the Tizard Committee as "totally inadequate" and "a mere waste of time". He thought that under departmental control, such a Committee suffered from a

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68 *Ibid.*, p. 587.

69 *Ibid.*, p. 624; The Earl of Birkenhead, *op cit.*, pp. 178-179; Keith Middlemas and John Barnes, *op cit.*, pp.1087-1088.

70 Keith Middlemas and John Barnes, *op cit.*, p. 1088; The Earl of Birkenhead, *op cit.*, pp.179-180; Martin Gilbert, *op cit.*, p. 624; H. E. Wimperis, Diary entry, 15th January 1935. Tizard Papers HTT700.

71 Keith Middlemas and John Barnes, *op cit.*, p. 1089; H. E. Wimperis, Diary entry, 23rd January 1935. Tizard Papers HTT700. "From 3 to 3.30 with Londonderry on the work and organization of our new Committee. The Government would like us to add Lindemann."; Stephen Roskill, *op cit.*, pp.143-147.

72 Stephen Roskill, *op cit.*, p. 145.

"complete lack of status and power" leaving it unable to "proceed with experiments".[73] The two considered the Air Ministry to be sensitive to dissent within the Conservative Party and unwilling to act in any way that would compromise its standing.

The first meeting of the CSSAD discussed the "Possibility of detecting short wave electromagnetic reaction reflected from the metal surfaces, using a ground source..." and the height of balloon barrages. Wimperis stated that Watson-Watt's memorandum would be circulated as soon as it was received.[74] The memorandum was received on 12th February and the importance of its impact can be gauged by the meeting that took place in the Athenaeum two days later.[75] Tizard, Wimperis and Sir Christopher Bullock lunched with Watt and discussed his proposals. Within the convivial familiarity of a clubland lunch, Watt was questioned over his memorandum and had to make his sales pitch before the Chairman of the CSSAD, the Permanent Secretary of the Air Ministry and its Director of Scientific Research. Bullock was probably invited to keep Londonderry informed of developments and ensure departmental support for the development of Watt's ideas. Clark describes these "next moves" as "made on a purely personal basis" and does not ascribe any motives to this meeting.[76] Given Lindemann's campaign to dissolve the CSSAD, it required good reasons to justify its continued existence. Hence there was the need for this urgent meeting a week before the CSSAD was due to meet again on the 21st February.

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73 Martin Gilbert, *op cit.*, p. 624.

74 Extracts from Minutes of CSSAD. 1st Meeting, 28th January 1935. Tizard Papers HTT705; R. W. Clark, *op cit.*, p. 117.

75 Notes on Sir Robert Watson-Watt's book, "Three Steps to Victory". Tizard Papers HTT699.

76 R. W. Clark, *op cit.*, p. 117.

The site was picked because at least two of the participants, Tizard and Wimperis (and probably Bullock as well) were members. Watt would be assured of privacy behind the doors of the club and interested members of the Conservative Party were unlikely to witness this meeting. For the members, there was also the advantage that the 'guest', playing away from home, would be discomforted by eating in the heartland of the Establishment, uncertain of custom or etiquette. However the impression upon Watson Watt remains unknown because he never mentions this early foray into clubland in his autobiography. The meeting was judged successful as Wimperis noted in his diary, "It seems that it will be worth while doing some experimental work at once at Orfordness with N.P.L. [National Physical Laboratory] radio staff on Radio detection."[77] Watt had been able to persuade these powers to support his proposal whilst they in return gained something concrete to give to their political masters.

On the same day as the Athenaeum meeting, Churchill, Lindemann and Chamberlain had again arranged to see MacDonald to push for air defence to come under the responsibility of the Committee of Imperial Defence. Lindemann had already seen Londonderry on the 12th February to press for the dissolution of the Tizard Committee. According to Lindemann, MacDonald "'agreed that they had made out the case and promised to get the Tizard Committee to present a report at an early date and then to wind it up and form the sort of Committee under the CID which had been demanded'"[78] Following this up, Lindemann appealed to the

[77] H. E. Wimperis, Diary entry, 14th February 1935. Tizard papers HTT700. It should also be noted that Orfordness, the first site for R.D.F. experimentation was mooted from the beginning.

[78] Keith Middlemas and John Barnes, *op cit.*, p. 1089.

1922 Committee to support the dissenters in their campaign to reform air defence. On the 15th February, Wimperis asked Dowding for an initial £10000, to finance a first batch of experiments at Orfordness. Dowding was sceptical, despite the confidence of Tizard and Wimperis, and he suggested a demonstration of the theory. Wimperis, unable to disagree with the pursestrings, suggested that Watt should demonstrate detection at the Radio unit in Slough.[79] By mid-February air defence had spawned one actual committee and a hypothetical organisational alternative. The departmental committee was fighting for its existence, protected by its ministerial patron, Lord Londonderry but MacDonald, Baldwin, Hankey and the Tory dissenters all agreed that the Committee of Imperial Defence should add air defence to its empire.

Apart from the quotidian agenda that dogged the CSSAD, a demonstration of 'practical proof' confirming the existence of the radiodetection of aircraft promised to be the only card that the Air Ministry could play for the retention of the committee. Empirical confirmation would strengthen the hand of Dowding in asking for finance and Londonderry in defending the Tizard Committee against criticisms of powerlessness and departmental inertia. With Churchill and Lindemann urging that the new sub-committee should be established before the Air Estimates were debated on the 19th March, it was critical that a 'successful' demonstration was conducted as soon as possible. Watt met Dowding at the Royal Aircraft Establishment in Farnborough to explain the layout of the demonstration and veto any thoughts of failure:

[79] R. W. Clark, *op cit.*, p. 118; H.E. Wimperis, Diary entry, 15th February 1935. Tizard Papers HTT700. "Have asked for £10,000 to start the Orfordness experiment."

> We will drive this mobile set to a field ten or twenty miles from Daventry, and if you will make one of your aircraft fly up and down the Daventry beam at a height of eight thousand feet or so, we will show you large indications on the visual display. But (I added in effect) this is a game which I cannot and will not play unless I am allowed to write my own rules. They are quite simple. If I score, I have won. If I don't score, 'it don't mean a thing'! If we don't get the indications we expect, it will not be because we are wrong in our theory or seriously wrong in our rough figuring. It will be because we will have 'lashed up' a rough equipment meant for other purposes, set up a miserable strand of wire as an aerial, picked an unsuitable site, mis-estimated the strength of the Daventry beam, misinstructed the pilot, who can't be allowed to know why he is patrolling a dull and vacant beat, or have done one of a hundred things that should be avoided in a crucial demonstration, but can't all be avoided in a hurried demonstration.[80]

Watt, unaware of these political pressures, wished to safeguard the future of radiodetection by preventing the use of one demonstration as the sole guarantor of future development. He also arranged for the Heyford bomber to trail "a long communications aerial" in order to increase the chances of success.[81] If the demonstration did not succeed, Dowding

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[80] Sir Robert Watson-Watt, *op cit.*, p. 109. I follow Watt in referring to this event as a demonstration though it conforms to the definition of an experiment in that it was an attempt to verify empirically a theoretical proposition and application.

[81] Robert Buderi, *The Invention that changed the World: The Story of Radar from War to Peace*, London: Little, Brown and Company, 1996, p. 58.

was to accept that it was due to the lack of sensitive equipment or human error rether than a theoretical failing on the part of Watt. However, this financial veto was evidence that the Air Ministry was prepared to recognise the Tizard Committee as a failure if radiodetection proved a false god.

The demonstration took place at Daventry on 26th February 1935. Watt, with Rowe as the witness for 'success' or 'failure', drove out to a grassy field in sight of the BBC Daventry radio masts in the early morning where an antenna had been set up the day before with a cathode-ray oscillograph screen. It was hoped that the Daventry masts, the nearest sited to the Radio Unit at Slough would provide the radio signals needed for the demonstration. Rowe was shown the visual effect of the Daventry signal on the oscillograph screen as a baseline of 'normality' from which he could measure the effects of radiodetection. This was a dot about an eighth of an inch in length. A Heyford bomber from Farnborough flew four runs over Daventry, turning the dot into a line that wavered between half an inch and an inch and a quarter in length; growing and dwindling as the plane approached and receded the site.[82] This 'string and sealing wax' approach was considered adequate evidence for the existence of a radiodetection application. The flaws of the demonstration were covered up by the gentlemanly rules that governed such events. A large proportion of Watt's claims were 'taken on trust' since he effectively controlled the demonstration. Apart from Rowe as a witness, Tizard and his committee had accepted Watt at face value. This was the hallmark of their gentlemanly professionalism - the courtesy and acceptance of character

[82] *Ibid.*, p. 111.

that professionals extended to each other. If there had been real doubts, the Tizard Committee could have demanded proper scientific verification before themselves or outside experts that would have rigorously criticised the demonstration.

However the pressure for results demanded that Tizard and Wimperis gamble. They had to rely upon their own professional judgment of Watt's character and one trusted witness as the criterion for success. As Wimperis wrote to Dowding, "You enquired this morning whether preliminary tests to check the calculations could be made with existing apparatus at Ditton Park. Mr. Tizard and I have sufficient confidence in Mr. Watson Watt's work not to regard this as a necessary preliminary..."[83] In a mirror image of the Tizard Committee's reliance upon Watt, was the trust that Londonderry and the Air Ministry placed in Tizard. This trading in the reputations of experts was vindicated by the Daventry demonstration. Rowe reported that radiodetection was "demonstrated beyond doubt".[84] Wimperis received the news in a letter from Rowe the next day and asked for the finances that Dowding had promised on the 28th February.[85] Moreover Baldwin instructed Tizard to keep him informed of developments upon his Committee. This provided additional political support on a personal basis from the main power in the National Government and gave Tizard a valuable conduit outside of the Air Ministry.[86]

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83 *Ibid.*, p. 109.

84 *Ibid.*, p. 112.

85 "Glad indeed to have a letter from Rowe (I was at Folkestone) saying that yesterday's radio tests had been successful. Good Watson Watt!" "Dowding delighted with the success of experiment. I can now have 'all the money I want within reason!'" H. E. Wimperis, Diary entries, 27th February and 28th February 1935. Tizard Papers HTT700.

86 Keith Middlemas and John Barnes, *op cit.*, p. 782. Baldwin chose a number of advisers during his first term as Prime Minister including Tizard and Sir Basil Blackett. *Ibid.*, p. 496.

The success of the Daventry experiment temporarily thwarted Lindemann's plans and removed the offer of a place for him on the Tizard Committee.[87] At the third meeting of the committee on the 4th March, it was agreed that further radiodetection experiments should take place at Orfordness on the Suffolk coast.[88] Meanwhile Baldwin was taking steps to establish the new sub-committee of the Committee of Imperial Defence without jeopardising the existence of the Tizard Committee. Macdonald and Hankey were both supporting this innovation but Baldwin was the prime mover in providing political impetus to air defence whilst outflanking Tory critics at the same time. Baldwin's choice of Sir Philip Cunliffe-Lister as the new Chairman was based on a longstanding friendship stretching back to the break-up of the Lloyd George administration in 1922. This friendship was strengthened by their cooperation on air rearmament in committees of the Committee of Imperial Defence and Cunliffe-Lister was perceived by Baldwin "as his main co-adjutor in this field".[89] The appointment of Cunliffe-Lister marked Baldwin's exertion of control over the area of air defence and the final marginalisation of Londonderry.

Puzzlingly, Clark represents this new sub-committee as the "first success of the Churchill-Lindemann lobby" without examining their underlying political failure.[90] Neither Churchill nor Lindemann were able to do much more than watch as their original proposal was adopted and modified without increasing their political influence one iota. The sub-committee

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87 Sir Hugh Dowding to Henry Tizard, 21st March 1935. Tizard Papers HTT111.

88 Extracts from Meetings of CSSAD. Third Meeting, 4th March 1935. Tizard Papers HTT705. The Daventry experiment formed the thirteenth minute of the meeting which was primarily concerned with the effectiveness of gunnery in destroying incoming enemy aircraft. Since this was Hill's area of expertise, see also A. V. Hill to Henry Tizard, 21st March 1935 and A. V. Hill to Tizard, 25th March 1935. Tizard Papers HTT57.

89 J. A. Cross, *op cit.*, p. 135.

90 R. W. Clark, *op cit.*, p. 122.

was to study "the political and more general problems of air defence" while the Tizard Committee was retained as the technical committee.[91] Londonderry had written to Baldwin on 14th March over the uncertain future of the Tizard Committee as this structure developed, stressing its early successes as "a small and active Committee working in close harmony with a sympathetic department."[92] However the incorporation of the Tizard Committee within the new Sub-Committee was not considered useful by Baldwin after the Daventry demonstration. Wimperis certainly did not see the new structure as a threat, commenting that air defence had been "legitimised".[93] Tizard had already seen Hankey face-to-face and been assured that the Tizard Committee would continue to exist but that he, Wimperis and Hill would also sit on the new sub-committee.[94] A letter of invitation for Tizard eventually arrived on April 1st stating that members of his committee could attend if Tizard "thought it advisable".[95] Scientific representation on the sub-committee was now diluted and Tizard was thankful that he had not broken Hankey's confidence. "I note that I am to be the only member of my Committee to serve. Perhaps it is just as well that I said nothing to my colleagues about my conversation with you!"[96] This structure reflected the political status of air defence. The duality of the Tizard Committee's function as a technical committee and as a departmental committee reflected the importance politicians placed upon this subject. Not only did Tizard have to report to his Minister but to a wider audience since the work of the Committee of Imperial Defence was

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91 *Ibid.*

92 Keith Middlemas and John Barnes, *op cit.*, p. 1089.

93 H. E. Wimperis, Diary entry, 18th March 1935. Tizard Papers HTT700.

94 H. E. Wimperis, Diary entry, 19th March 1935. Tizard Papers HTT700. Hankey must have proposed to bring all the members of the Tizard Committee onto the new sub-committee. Blackett's absence is curious.

95 Sir M. Hankey to H. Tizard, 1st April 1935. Tizard Papers HTT99.

96 H. Tizard to Sir M. Hankey, 3rd April 1935. Tizard Papers HTT99.

reviewed by the Cabinet. This ended the supervision of the Air Ministry over air defence but guaranteed political support. As Hankey wrote:

> You need not be under the least apprehension as to interference with your Committee. The Prime Minister, Sir Philip Cunliffe-Lister, the Chairman of the Committee and the War Office have all told me that the last thing they want is any interference with your initiative. The Treasury are going to give the Air Ministry a letter saying that the appointment of the new Committee will in no way alter their own attitude towards your Committee. I think you can make your mind quite easy on this point.[97]

The Air Defence Research Sub-Committee of the Committee of Imperial Defence first met on the 11th April 1935.

7.5 Conclusion

The beginnings of radar show clearly the rules and institutions that governed the relationships between scientists, politicians and civil servants. Political and scientific success were interdependent, linked to the interests of the National Government in responding to and marginalising the lobbying efforts of its critics. Yet it also depended upon Tizard's intrinsic skill in conforming to the rules of Whitehall and turning them to his advantage. Tizard had learned the ropes as Secretary of the Department of Scientific and Industrial Research. Civil servants and politicians respected his reputation as an administrator and advisor. Two

97 Sir M. Hankey to H. Tizard, 4th April 1935. Tizard papers HTT99

events from the unfolding story have stood out as examples of this skill. One is Tizard's use of the Athenaeum as a resource for hastening the development of radiodetection. When aware of the vulnerabilities of one's position, one draws on one's available defences. If the lunch was merely social, Tizard could have used one of a number of hotels or tea-rooms that would have provided more pleasant surroundings and better servings than the stodgy fare of the Coffee-room.

The Athenaeum was chosen because it guaranteed privacy in the minds of its members. Radiodetection's secret status had to be kept hidden from the eyes of the public (and the enemy) as well as from any political opponent until its success was assured. From the inception of the Air Defence Research Sub-Committee, all of Tizard's letters and memoranda on the subject of air defence were marked SECRET. The Athenaeum was perceived to be a proper place to discuss government secrets: protected by its strict rules of membership and the etiquette that guaranteed that no member would eavesdrop or utilise information that he came across while within the club. The perception of clubs and gentlemanly status by civil servants as adequate guarantors for the maintenance of secrecy reflected the extraordinary trust and value placed in these institutions.

The other example is the role of 'confidence', referred to in an earlier chapter. Tizard's conversation with Hankey in March on the structure of the new sub-committee was not as important as the Athenaeum meeting and indicates that friendly meetings were an important conduit of information. Although there is no documentary confirmation, it is probable that this meeting took place at the Athenaeum since both men were

members and would have met at a convenient location. The importance of the meeting lies in Tizard's confirmation that he could have spoken to his colleagues on the committee but was stopped by an unspoken wish not to break the confidence of Hankey. In fact the only person he did confide in was Wimperis, a civil servant whom he felt he could trust not to divulge the content of the meeting with Hankey. This confirms that friendly relationships amongst civil servants depended upon the protection of the source of one's information, facilitating the free-flow of knowledge amongst Whitehall networks and demonstrating its dependence upon conventions like 'confidence' that prevented embarrassing situations or dangerous conflicts.

This story also revealed the vulnerability of the Tizard Committee to changing political equilibriums in the constellation of power that held the National Government together. As its work developed, it warmed to the curious stability that marked the Spring of 1935. The lobby of Churchill and Lindemann had been muzzled by snatching their clothes and leaving them shivering outside the door. The Air Defence Research Sub-Committee first met on 11th April and then only once in May. Experiments at Orfordness began to expand the potential of radiodetection. However, this respite from the political battle was to prove short-lived. Churchill soon became dissatisfied with the results of the Sub-Committee and criticised the Government for its lack of urgency in tackling the problems of air defence. The new Sub-Committee was a "slow-motion picture" while a proper scientific committee would have had twenty experiments on the go.[98] Churchill's misinterpretation of the development of air defence can

[98] Martin Gilbert, *op cit.*, p. 653.

be seen through his description of the Cunliffe-Lister Committee as a 'scientific' committee and his lack of knowledge concerning the work of the Tizard Committee. Baldwin and Cunliffe-Lister realised that their new committee would not silence Churchill. Yet their position was strengthened by the resignation of Macdonald and the resumption of Baldwin as Prime Minister for a third time. Londonderry was instantly dropped because of his political marginalisation and tactical errors. He had compromised the position of the Government in April by defending the air force and challenging Hitler's claim to air parity as Baldwin prepared to call a general election and face a pensive electorate opposing rearmament yet fearful of air attack. Given the strength of pacifism in public opinion, Londonderry was identified by the public and the Opposition as the Minister most supportive of rearmament. This political liability was replaced by Cunliffe-Lister and the Air Ministry was brought firmly under the control of Baldwin.[99] Any chance of confusion between the Air Ministry and the Cunliffe-Lister Committee was also removed. Confident of their ability to control the direction of air defence, Baldwin and Cunliffe-Lister were now willing to concede a position on their committee to one of their critics. Austen Chamberlain was the first Tory approached but declined and Churchill, less representative of the Right or backbencher opinion, was offered the position instead. Churchill was only willing to become a member if he retained the right to criticise official policy if he deemed it necessary and only if Lindemann became a member of the Tizard Committee as a scientific aide. Baldwin found these conditions acceptable on the grounds that keeping a bulldog on a leash renders it less dangerous than one running loose in the parliamentary playing fields.

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[99] Keith Middlemas and John Barnes, *op cit.*, pp. 805-807.

The Tizard Committee had an unwelcome member foisted upon its meetings. Lindemann's entry was the accommodation of an interest. Swinton realised this and immediately conferred with Tizard before meeting with Lindemann.[100] After the meeting Swinton wrote to Tizard setting out Lindemann's response to Churchill's condition and circumspection in approaching Tizard. Lindemann had asked Swinton to approach Tizard on his behalf and confirmed that an invitation to join the Tizard Committee would be answered in the affirmative. Swinton and Tizard collaborated closely from the Minister's earliest days at the Air Ministry - an alliance that married the work of the Tizard Committee to Baldwin's project of air rearmament. Lindemann "was a little inclined to go into past history" at his interview with Swinton;[101] an indication that his lobbying for the dissolution of the Tizard Committee had strained his friendship with Tizard and he was very uncertain if the actions of the previous six months would prejudice his position.[102] The scene was now set for "the dramatic conflicts immortalised in the rather lurid pages of Lord Snow".[103]

100 Sir Philip Cunliffe-Lister was raised to the peerage as Lord Swinton when he was appointed Air Minister in order to act as an 'executive' for air rearmament.

101 Sir Philip Cunliffe-Lister to Tizard, 26th June 1935. Tizard Papers HTT67.

102 R. W. Clark, *op cit.*, p. 124.

103 Keith Middlemas and John Barnes, *op cit.*, p. 1091.

Chapter Eight

"ONLY CONNECT": THE BREAKDOWN OF THE COMMITTEE FOR THE SCIENTIFIC SURVEY OF AIR DEFENCE

8.1 Introduction

In the previous chapter, the Tizard Committee provided the crucial focus for examining the relationship between professional scientists and government. This chapter is a sequel and studies the consequences of Lindemann's appointment to the committee in May 1935 including its dissolution and reconstitution in the summer of 1936. The historical lens magnifies the roles of Tizard and Lindemann because most sources have portrayed these events as a personal and bitter feud between these two protagonists. One can utilise the controversy surrounding the antipathy between Tizard and Lindemann to examine further the professional world of the scientist and its proximity to the gentlemanly worlds of the air force, both military and administrative. The shared values and assumptions that underpinned the two globes are linked to the socialisation processes of the public schools.

Snow and Clark have narrated the story of the Tizard Committee as a battle between Tizard and Lindemann, following up their portrayal of radar as the wizard weapon that saved Britain in 1940 with representations of Tizard as a prescient administrator and Lindemann as a misguided saboteur. These accounts inspired the alternate and oppositional viewpoint of Lindemann's biographer, the Earl of Birkenhead. Both sides of this school focus on one particular aspect of the "personal tragedy": the technical and political

differences between Lindemann and the remainder of the Tizard Committee that led to personal animosity.[1] It also follows Snow in considering the Committee as a case of 'closed politics' that functioned independently from the political context of the National Government. Yet it is Snow's poetic licence that provides the key to the historical interpretation of the events leading up to Lindemann's expulsion from the Tizard Committee. Snow's Godkin Lectures demanded the representation of the protagonists as fictionalised individuals through a combination of psychological traits, personal histories and mannerisms. Thus Lindemann was drawn as "a Central European business man - pallid, heavy featured, correctly dressed..."[2]; his character defined through rhetorical observation: "He enjoyed none of the sensual pleasures. He never drank. He was an extremely cranky vegetarian, who lived largely on the whites of eggs, Port Salut cheese, and olive oil."[3] Snow's prejudicial and rather batty account contrasted the natural Englishness of Tizard with the foreign (reading of non Anglo-Saxon extraction) eccentricity of Lindemann, but his assumption that the personal histories of the characters provided a deep well of explanation for their behaviour proves more accurate. The metaphor of the duel was applied to these events because Tizard's earlier friendship with Lindemann would always add a personal dimension to the story of a chairman dealing with a recalcitrant member. However, the conflict was a corporate, not a personal affair. Therefore Tizard should be studied, despite his peculiarities, as a representative of the professional scientists on the Committee and not

1 R. W. Clark, *Tizard*, London: Methuen and Co., 1965, p. 125.
2 C. P. Snow, *Science and Government*, London: Oxford University Press, 1961, p. 11.
3 *Ibid.*, pp. 12-13. This puritanical description of Lindemann is inaccurate.

merely for his own personal role.

8.2 Lindemann's Membership of the Tizard Committee

As referred to above, Tizard and Lindemann had known each other from their earnest beginnings as research students in Berlin. Although their recollections of friendship were marred by later conflicts, the ties were strong enough for Tizard to name Lindemann as the godfather of his son. By 1934, this friendship was muted by distance and Tizard's mistrust of Lindemann's judgment and performance on scientific committees. Lindemann had become a member of the Council of the Department of Scientific and Industrial Research in 1926 under Tizard's sponsorship "but his critical attitude made him unpopular with the other members".[4] This episode estranged the two but, more importantly, demonstrates that Lindemann did not have the required skills for working upon expert committees with other scientists and was unable to identify himself with other men of science. This legacy would have profound effects upon his attempt to cooperate with the other members of the Tizard Committee.

Lindemann's marriage to the Tizard Committee was marred by the small dowry of faith that he held in its activities. He wrote to Austen Chamberlain in June 1935 that he was "unsatisfied" with his new position and the thwarting of his concept of an expert sub-committee:

> I can scarcely believe that the somewhat unimportant Tizard

[4] Professor R. V. Jones, "Air Defence Clash in the Thirties" *The Times*, 6th April 1961.

> Committee can have the authority or power that is required, more especially if it is a question of getting work done by the War Office or some other Department. The Prime Minister [Ramsay Macdonald], of course, at our meeting promised to replace the Committee by a more powerful C.I.D. [Committee of Imperial Defence] Committee. Now they seem to want to whittle away the functions of the C.I.D. Committee and allow it merely to co-ordinate researches done by the various small departmental Committees.[5]

This passage shows that Lindemann fundamentally misunderstood the networks of power within Whitehall and lacked the skills of compromise and negotiation that marked a successful committee member. Lindemann did not perceive the tapestry of networks that interlaced the institutional boundaries and allowed individuals or committees to achieve their goals through brokerage and diplomacy. Lindemann only saw the institutional power of bodies like the Prime Minister or the Committee of Imperial Defence. To achieve an operational system of air defence that would not become waylaid by the Service highwaymen, he looked to the coordinating role of the Committee of Imperial Defence and a tough Chairman to ride roughshod over the sensibilities of particular Departments.

Lindemann's sojourn on the Tizard Committee lasted a year, from his political appointment at the tenth meeting on 25th July 1935 to his angry departure at

5 The Earl of Birkenhead, *op cit.*, p. 182.

the twentieth meeting on the 15th July 1936.[6] During these eleven meetings, the back of the Tizard Committee was broken and the original scientists invited to become members all resigned. The troubles of this technical sub-committee are hinted at in the extracts from the minutes. The first portents appeared at the eleventh meeting on 25th September 1935 with "(Much too much talk about trailing bombs)" and "(Lindemann arguing for infrared)", followed some weeks later on the 10th October by "Lindemann trying to crab radio location because of possibility of jambing".[7] These meetings became increasingly rancorous and the first one held with Lindemann's replacement, Edward Appleton, in October 1936 was noted for its "much better discussion".[8] This division and eventual breakdown should not be examined through Snow's school of blame but studied as a valuable opening on to the interwar world of science. As Lindemann's biography shows he was ill-fitted to join any expert committee with other professional scientists. This handicap was revealed and then exacerbated by the professional, political and technical issues that divided Lindemann from his colleagues on the Tizard Committee.

When Lindemann met Sir Philip Cunliffe-Lister concerning his invitation to join the Tizard Committee he had sent a memorandum outlining the justifications for his actions of the previous year and his judgment on the feasibility of various means of air defence. His sole motivation was defence of the country; to be achieved with as much speed and resources as the

6 Extracts from Minutes of C.S.S.A.D., Tizard Papers HTT705.
7 *Ibid.*
8 *Ibid.* This was the twenty-first meeting on 8th October 1936

allow. Like Tizard, he recognised the importance of contacting and cooperating with serving officers in supporting and shaping experiments that would be useful to the military users of an air defence system. As Cunliffe-Lister had emphasized the secrecy of the entire project, Lindemann had written this text to outline his own ideas, publish his right to priority in the confines of the Committee and confirm that he was not the source of a 'leak'. "I desire to place this on record so that it should be plain in case *any of my suggestions* have already, or in case they should percolate through other channels, that I have not divulged anything in request of which the Committee should be entitled to demand secrecy from me."[9] Lindemann's exaggerated sense of scientific property owned two concepts: the aerial mine and infra-red detection of aircraft. He was critical of traditional methods of detection and defence, arguing that acoustic methods were poor and anti-aircraft fire was limited because it required the saturation of the entire sky. The tactical objectives of air defence which framed the development of radar, namely detecting, locating and damaging or destroying enemy aircraft formed a consensus amongst all parties. However Lindemann's answers to these tactical problems was detecting aircraft by means of their infra-red emissions and destroying them by seeding their projected flight-paths with aerial mines on wire parachutes. Both concepts required arduous and detailed programmes of experimentation before they could be assessed or brought to fruition.[10]

This memorandum was analysed by Rowe who discarded most of

9 Memorandum of Professor F. A. Lindemann, FRS. Tizard Papers HTT67. (My italics)
10 *Ibid.*

Lindemann's suggestions by referring back to the work of the Tizard Committee over the previous few months. Lindemann had suggested anti-engine devices and Rowe commented that, "The possibility of putting an engine out of action is well known and has been considered at length. The Committee has not favoured the idea because of the prodigious quantities needed unless interception has been achieved when other methods have been employed."[11] Rowe, as Secretary, became an expert on the technical researches that air defence engendered and the particular work undertaken by the Tizard Committee. Unlike the permanent members who held other positions and met only monthly, Rowe recorded and implemented their technical conclusions. With this full-time position, he became a specialist in the field of air defence and his comments show how far the Committee had come in evaluating various technological possibilities and constructing a programme of research in air defence, focused primarily upon radiodetection. Lindemann was therefore forced to accept a consensual programme of research that he had no part in and discard his own methods of air defence to which he was greatly attached. Rowe had concluded that: "Perhaps the only useful point in the memorandum is the stress laid on the wire-parachute possibility". He recommended that Colonel Wrisberg of the Ordnance Committee and a representative of the Royal Aircraft Establishment should be invited to the next meeting "to help the Committee to get down to an *immediate* programme of experiments".[12] Rowe's objective was to bridge the gap between Lindemann and the Committee. He had read the memorandum, discarding those suggestions that were incompatible with the Committee's

11 *Ibid.*

12 *Ibid.* (My italics)

agenda and attempting to find one possibility that might yield experimental results. To appease their new arrival, the Committee concentrated its first meeting with him to exploring the "wire-parachute possibility".[13] From the first, Lindemann's presence distorted the comfortable consensus that had been shaped by the other members.

Snow pictured the scene at these meetings for the benefit of his audience, embellishing the recollections of others with authorial licence. His passage is worth quoting for the distortions and misrepresentations that Snow added to the historical record:

> Blackett and Hill would be dressed casually, like academics. Tizard and Lindemann, who were both conventional in such things, would be wearing black coats and striped trousers, and both would come to the meetings in bowler hats. At the table, Blackett and Hill, neither of them specially patient men nor overfond of listening to nonsense, sat with incredulity through diatribes by Lindemann, scornful, contemptuous, barely audible, directed against any decision that Tizard had made, was making, or ever would make.[14]

In Snow's lecture the committee meeting was transformed into a boxing ring with Tizard and Lindemann as pugilists, the other members as astonished

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[13] Tenth Meeting, 25th July 1935. Extracts from Meetings of C.S.S.A.D. Tizard Papers HTT705.

[14] C. P. Snow, *op cit.*, p. 32.

witnesses. Blackett recalled that the main consequence of Lindemann's arrival was the meetings becoming "long and controversial" as he disputed "the priorities for research and development".[15] Lindemann was unwilling to compromise with the decisions that the Committee had already taken and continually advanced the case for the aerial mine and infra-red detection at every meeting. This undermined Tizard's position as Chairman since the agenda and shape of every meeting was outlined in advance by himself and Rowe, only for Lindemann to disrupt the planned minutes with justifications for his concepts. This reflected badly upon Tizard since the role of the Chairman was to maintain a corporate consensus and bring the members to a united conclusion. Lindemann's arguments also cast doubt on the professional judgment of his fellow scientists since he had to criticise and undermine their research programme in order to change the priorities in air defence. Lindemann was convinced that his arguments were impervious to criticism from other scientists and considered them more important than mere committee etiquette. The Tizard Committee became a Sophoclean stage where he declaimed his implacable belief that he was correct before a Chorus of 'Nos'.

The main differences between Lindemann and the other members of the Committee lay in the prioritisation of various areas of research. Defenders of Lindemann have always maintained that he did not try to impede or criticise

15 P. M. S. Blackett, "Tizard and the Science of War" in P. M. S. Blackett, *Studies of War: Nuclear and Conventional*, London: Oliver and Boyd Ltd., 1962, pp. 101-119, 105.

the development of radiolocation.[16] Since decisions were taken in the committee room, it seems foolish to discard the evidence that in the autumn of 1935, Lindemann was still sceptical about the advantages of radiolocation and that this scepticism combined with his natural skills of criticism.[17] Since the other scientists had invested their professional reputations in the hands of Watt and radiolocation, Lindemann's criticisms struck at their professional judgment and at the main reason for the continued existence of the technical sub-committee. Given his earlier actions to dissolve the Tizard Committee, political suspicions and professional criticism were soon fused with personal animosity.

The other issue that divided Lindemann from the Committee was his sense of urgency. Both Lindemann and Churchill had voiced their anxiety about Britain's vulnerability to air attack and emphasized the necessity of speed in rearmament and air defence development at the expense of other concerns like strategic direction or the quality of research. After Lindemann had joined the Committee, he was given the finances to conduct the infrared experiments for which he had lobbied. The initial infrared experiments took place at the Clarendon Laboratory in the autumn of 1935 and the "scaled-down" research programme on aerial mines was authorised on 4th December 1935.[18] Churchill's presence on the Swinton Committee (the Air

16 Professor R. V. Jones, *op cit.* "It has been said that Lindemann objected to the high priority given to radar: but, whatever the verbal exchanges may have been at the committee table, Lindemann's papers show that the relevant objection in his written minority report was the reverse of this..."

17 Twelfth meeting, 10th October, 1935. Extracts from Minutes of C.S.S.A.D. Tizard Papers HTT705: "Lindemann trying to crab radio location because of jambing".

18 R. W. Clark, *op cit.*, p. 131; Sir Hugh Dowding to H. Tizard, 29th June 1935. Tizard Papers HTT111.

Research Sub-Committee of the Committee of Imperial Defence) had given his air defence agenda increased weight.[19] When the infrared experiments proved unpromising during the autumn of 1935, Rowe wrote to Tizard, asking if he had any objection to the report being sent to the Swinton Committee. "Personally I think it is well that it should, since it will show one particular member of that Committee [Winston Churchill] that infra red has not been forgotten and has limitations."[20] Despite these comments, the Tizard Committee continued to finance R. V. Jones, a physicist at the Clarendon Laboratory, to probe the possibilities of infra-red detection on a full-time basis.[21] Lindemann and Churchill remained dissatisfied with the institutional arrangements coordinating air defence research. They utilised their hard-won positions on these commttees to implement their research programme against scientific and departmental opposition.

Even more important for the Tizard Committee was the role of Rowe in averting conflict between the Swinton Committee and its technical sub-committee. He was secretary of the Tizard Committee and co-secretary with Hodsall of the Swinton Committee. His letters to Tizard show the cooperation necessary to fix an agenda that would reconcile all members of the Tizard Committee. When he wrote memoranda on air defence it was from a

19 A. P. Rowe to H. Tizard, 3rd October 1935. Tizard Papers HTT79. "Professor Lindemann 'phoned me yesterday and wanted me to go to Oxford before the next meeting on order to discuss the infra red data I sent him, but I certainly cannot go this week, but will try to do so before this meeting. He particularly wished the further consideration of infra red detection to appear on the Agenda for the next meeting, and since the Cunliffe-Lister Committee have asked to report on this question in due course, I have taken a chance that you will agree to the addition of this item."

20 A. P. Rowe to H. Tizard, 28th November 1935. Tizard Papers HTT79.

21 R. W. Clark, *op cit.*, p. 134. "Despite this negative result, the Tizard Committee - rather surprisingly in the strained circumstances - asked me [R. V. Jones] to continue the work on a full-time basis, with the object of developing an airborne infra-red detector."

conscious stance, such as the "Headquarters view" of January 1936, designed to give an overview for "the three members of the Committee who, after all, are not intimately in touch with Air Defence problems - Blackett, Hill and Lindemann".[22] Tizard found that his position was shifting from an advisory to a managerial role that involved coordinating the diverse enterprises overseen by his Committee. As the months passed, he was increasingly seen as an ad hoc civil servant rather than as an independent expert. This perception was fostered by the cordial relationships that he maintained with Swinton and Dowding. At a day-to-day level, a strong rapport was forged between Tizard and Rowe, while Lindemann was unable to muster the administrative resources to strengthen the concessions given during 1935. This rapport allowed Rowe to voice his frustration at the departmental obstacles that seemed to dog the work of the Committee.[23]

This frustration grew out of the inherently political nature of the Tizard Committee's work. The programmes, the experiments and the results were all reviewed by the Swinton Committee and subject to the various interests represented upon it. This political accountability resulted in the recommendations of the Tizard Committee being delayed by the objections of the Air Ministry or the RAF. This is demonstrated by the difficulties that the Tizard Committee encountered when it pushed for interception experiments in order to analyse relevant scientific problems as they arose. It also undermines the claims of radar apologists that its success was due to

22 A. P. Rowe to H. Tizard, 1st January 1936. Tizard Papers HTT79.

23 A. P. Rowe to H. Tizard, 18th January 1936. Tizard Papers HTT79. "The months are going on and we get little further on this vital business."

continuous cooperation between the concerned scientific and military interests. The Tizard Committee recommended that "frequent exercises" should take place so that a scientific staff could study interception problems. Tizard thought that these experiments would contribute to an operational system of air defence as he wrote on the 27th March 1936:

> On the other hand I am not at all happy about the other side of the work...These are tactical problems. Scientific problems are involved, in which the help of a scientific committee is useful, and perhaps essential; but they are far from being purely scientific problems. Practical experience of flying, organisation and command is essential if this side of our work is to be fruitful and not wasteful. I feel that we want much more constructive criticism from experienced officers of the R.A.F.[24]

Tizard was aware of the importance of service feedback for the success of air defence and Rowe therefore included his proposal in the conclusions of the Swinton Committee. When Swinton examined the draft conclusions he ordered this recommendation removed.[25] Whatever the reason, this recommendation was placed in limbo and continued to fester. By the end of June, Rowe was tentatively proposing that Swinton's veto should be bypassed by utilising Churchill to publicise the failure of the Government to test the operational effectiveness of the country's air defence system:

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[24] R. W. Clark, *op cit.*, pp. 135-136.

[25] A. P. Rowe to H. Tizard, 16th March 1936. Tizard Papers HTT79.

> I would like to give you a reason (or excuse) for quoting the recommendation of your Committee on exercises. If Winston wants a real scandal he could have it on this question. There has never been a full-scale trial of the A.D.G.B. [Air Defence Great Britain] system - Observer Corps, searchlights, D/F [Direction/Finding] etc. Many of us believe that the existing scheme will be useless, and that its existence gives a false sense of security. Yet, this year, only two days will be given to something called Sector training and might be called a small-scale exercise. In my opinion the only thing that will make people see the danger is a full-scale trial, yet the only result of your Committee's recommendation is that less will be done this year than ever before.[26]

The obstacles placed in the way of the Tizard Committee's recommendations during the first half of 1936 seemed, in Rowe's eyes, to demand a political solution. If the mountain to be scaled was forcing a civil servant like Rowe to confront unspoken conventions like neutrality in politics, then the temptation to intervene must have been akin to treading in the footsteps of Tantalus for a political beast like Lindemann.

8.3 Watson Watt and the Rift within the Tizard Committee

This 'politicisation' of the Tizard Committee was accelerated by another issue that engaged its members at the same time. The Tizard Committee

[26] A. P. Rowe to H. Tizard, 29th June 1936. Tizard Papers HTT79.

recommended that Watt should be transferred from the Department of Scientific and Industrial Research to the Air Ministry on 13th March 1936 as Superintendant of Bawdsey, the experimental centre for radiolocation research.[27] In addition, Watt would also be responsible for all research into the location and detection of aircraft, advising the Air Staff as required.[28] Effectively, Watt would be taking a position that combined administrative duties at the Ministry with supervision in the field. Despite this recommendation, the Air Ministry did not respond to the urgings of the Tizard Committee and finally offered Watt a position as "an out-station man" with far less flexibility and independence than the scientists wanted.[29] Tizard was continually aware of these limited moves on the part of the Air Ministry since Watt kept "in touch" with him. To rectify this situation, Tizard met Wilfred Freeman, Dowding's successor as Air Member for Research and Development, in early May, "and explained at some length the absolute importance we [the Tizard Committee] all attached to the job and my [Tizard's] views as to the organisation and as to the proper personal position of Watson Watt."[30] Tizard's arguments were not accepted and he was frozen between telling Watt to reject the Air Ministry's offer whilst acknowledging that Watt had to accept because of the "extreme national importance" of the work.[31] Therefore, Tizard wrote to Watt's superior and his own successor, Sir Frank Smith, the Secretary of the Department of Scientific and Industrial Research and a member of the Swinton Committee. Tizard wanted to ensure

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[27] Sir Robert Watson-Watt, *Three Steps to Victory: A Personal Account by Radar's Greatest Pioneer*, London: Odhams Press Ltd., 1957, p. 145.
[28] *Ibid.*, p. 146.
[29] *Ibid.*, p. 147.
[30] H. Tizard to F. E. Smith, 21st May 1936. Tizard Papers HTT90.
[31] *Ibid.*

that Smith was supporting his actions before he approached Swinton to cut through the bureaucratic tape with political scissors.

Tizard's 'political' solution to this problem undermines Snow's assertion that he was an apolitical administrator and also shows that he retained confidence in his influence with his political patrons rather than looking for influential contacts with the Opposition, the right-wing press or the Tory critics of air rearmament. Smith agreed with Tizard and only opposed Watt's specific proposals for restructuring scientific research at the Air Ministry to accommodate himself.[32] Smith wrote to Sir Christopher Bullock, Permanent Secretary at the Air Ministry to support Watt's suitability for the post of Deputy Director of Scientific Research at the Air Ministry and Superintendant at Bawdsey, endorsing the Tizard Committtee.[33] Tizard thought that his marshalling of administrative and political resources would overcome the bureaucratic delays and propel Watt into his new job.

Tizard's own strategy was undermined by Lindemann's determination to capitalise on any opportunity that would reveal the Air Ministry's 'sabotage' of air defence. Lindemann's earlier scepticism of radiolocation had been replaced by respect for Watt's administrative and scientific capabilities. The striking successes of the radiolocation programme led Lindemann to write to Churchill that, "The reason for this seems to me to be that it has been put in the hands of a man who suggested the method and believed in it and that he

[32] F. E. Smith to H. Tizard, 22nd May 1936. Tizard Papers HTT90.
[33] F. E. Smith to Sir Christopher Bullock, 26th May 1936. Tizard Papers HTT90.

could and did push whatever experiments he thought necessary".[34] Lindemann's praise for Watt was linked to his wider critique of the Tizard Committee. Radiolocation was "the only work which has made satisfactory (or indeed any) progress".[35] Lindemann blamed institutional inertia rather than the limitations of his own scientific judgment for the lack of success in aerial mines and infra-red detection. He confided to Churchill that he believed the Tizard Committee had "not materially itself initiated or even seriously helped any new developments".[36] Even after serving on the Tizard Committee, Lindemann was unable to recognise its role as a body for facilitating, coordinating and applying scientific research to the needs of air defence. Lindemann saw administration as a parasitical burden on the free-flow of pure scientific research, and his perception of the Tizard Committee conformed to this view. It merely added an extra layer of bureaucracy to the Swinton Committee:

> It is probably true to say that experimental work cannot be carried out by a Committee, since each experiment must be based upon the previous one and usually fifty or even a hundred experiments will be required before success is attained. If each new experiment must await a new meeting of the Committee, progress can only take place at a snail's pace. The only method is to hand over research to people who are enthusiastic believers in the possibility of finding a solution and

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[34] The Earl of Birkenhead, *The Prof in Two Worlds: The Official Life of F. A. Lindemann, Lord Cherwell*, London: Collins, 1961, p. 185.
[35] *Ibid.*
[36] *Ibid.*

utilising the Committee, if at all, as an occasional advisory body to which those in charge can appeal if desired.[37]

Lindemann was an early subscriber to the view that scientists should be on tap but not on top, as his own relationship with Churchill indicated. Convinced that the body on which he was serving was a hindrance to the long-term project of establishing a viable system of air defence, Lindemann felt no corporate loyalty and dutifully reported all scientific failures to Churchill to be aired in the Swinton Committee.[38]

Baldwin and Swinton's plan to appease Churchill by appointing him to the Swinton Committee had backfired since it soon became a shooting gallery with the Tizard Committee as the target. Churchill coordinated his increasing litany of criticisms with Austen Chamberlain, Lindemann and Archibald Sinclair, the leader of the Liberal parliamentary party. He wrote to Austen Chamberlain on 10th May, complaining about the "slow progress of all the experiments" and to Sir Thomas Inskip, the Minister for the Coordination of Defence, on 25th May, accusing the Tizard Committee of "dilettante futility".[39] From 2nd June, Churchill strengthened his hand by circulating a paper in the Swinton Committee, based on Lindemann's knowledge and criticising the Tizard Committee for failing to divert sufficient funds or time to the development of the aerial mine. Tizard was already alarmed at Lindemann's indiscretions. Thomas Merton, Professor of Spectroscopy at

[37] *Ibid.*, p. 186.
[38] *Ibid.*
[39] Martin Gilbert, *Winston Churchill Volume V, 1922-1939*, London: William Heinemann Ltd., 1975, pp. 737, 743.

written to Tizard in April that Lindemann had used some "unfortunately suggestive phrases" in an newspaper article about air defence, specifically "talk of surrounding England with rays!!"[40] Now Tizard did marry science and politics by matching Lindemann's political patronage with his own. He complained to Swinton that Lindemann was enlisting the support of an individual outside of the Committee to influence internal scientific debate within the Committee in a letter on 12th June and circulated his own memorandum setting out the history of authorised aerial mine research.[41] As Lindemann and Churchill increased the intensity of their attack, Tizard ensured political support for his own position which superseded any criticisms he might have held against the Air Ministry. Wimperis noted in his diary that "'Winston's latest will, I think, take L. [Lindemann] off the C.A.D. [Committee of Air Defence] - H.T. [Henry Tizard] says so, anyway'"[42]

Lindemann invited Watt to tea with himself and Churchill at the latter's Westminster home on 12th June 1936.[43] Watt was unsure if this approach was officially correct but Lindemann assured him that Churchill, as a member of the Swinton Committee, had a right to be informed about the experiments on radiolocation.[44] Watt saw this as an opportunity to publicise the Air Ministry's lack of enthusiasm for appointing himself to the post of Deputy Director and roundly condemned the department for failing to institute "emergency machinery" and consequently delaying the advance of

40 Thomas Merton to H. Tizard, 20th April 1936. Tizard Papers HTT67.
41 Martin Gilbert, *op cit.*, p. 750 ; A. P. Rowe to Lord Swinton, 10th June 1936. PRO Cab21/426.
42 H. E. Wimperis, quoted in R.W. Clark, *op cit.*, p. 138.
43 Sir R. Watson-Watt, *op cit.*, p. 147; Martin Gilbert, *op cit.*, pp. 750-751.
44 Sir R. Watson Watt, *op cit.*, p. 147.

radiolocation. He also linked this issue to the need for interception exercises and wartime simulations of the radiolocation devices, clouding Tizard's own lobbying with the criticisms of Churchill and Lindemann. Watt was also aware that his own actions could be "interpreted in Air Ministry as manoevres to magnify the importance of my prospective post".[45] Watt had criticised his prospective employers, the Air Ministry, before Churchill, one of the major critics of the National Government. In order to prevent any accounts of the meeting that could be interpreted as support for these critics, Watt detailed the interview in a letter that he sent to all concerned: Churchill, Lindemann, Sir Frank Smith and Freeman.

Churchill's memorandum, criticising the Tizard Committee for failing to support the aerial mine, was circulated on the 2nd June and discussed by the Swinton Committee on the 15th June at what Wimperis's diary recorded as a "'vehement meeting'".[46] The Committee was divided over Churchill's charges with Swinton and Tizard defending their policies vigorously. Wimperis also conversed with Freeman who was "'incensed'" at Churchill's intervention. There had been a natural constituency for Churchill's accusations since many of those concerned with air defence had observed with increasing disquiet the inertia of the Air Ministry. However, his alliance with Lindemann effectively blocked the support of the scientific community. Tizard thought that Churchill's intervention was a breach of gentlemanly conduct. "Had Mr. Churchill been a gentleman, he would have come to me first."[47] This episode

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[45] *Ibid.*, p. 148.
[46] H. E. Wimperis, quoted in R. W. Clark, *op cit.*, p. 138.
[47] The Earl of Birkenhead, *op cit.*, p. 190.

undermined Churchill's position on the Swinton Committee since he was unwilling to divorce his role as government critic from his role as advisor on air defence. It also doomed Lindemann's position on the Tizard Committee. Tizard was now determined to remove him. The rest of Wimperis's diary for that day recorded that Tizard was meeting Hill and Blackett urgently in order to discuss the future of the Committee.[48]

Hill's letter to Tizard on the following day encapsulates the uncertainty and issues that resulted from the tumultuous meeting. Hill proffered his support and stated that he would resign if Lindemann was made Chairman. The scientists on the Committee were still unsure of their long-term position and Hill's possible futures included victory for Lindemann and the reconstitution of the Committee under another Chairman. Yet he also took this opportunity to return to the failure of the Committee to have its recommendations for trials carried out. If Hill resigned, he was prepared to state "publicly" the reasons for leaving the Tizard Committee to the Labour Party or the *Daily Mail*. Hill's personal frustration was linked to the downgrading of his own experimental agenda in air defence - "that of making hostile aircraft visible against illuminated cloud" - in favour of "foolish experiments with bombs tied to parachutes".[49] The unwillingness to stage any form of trial, combined with the reported growth of the German airforce, was pushing even professional scientists like Hill to contemplate political action in order to force the Government's hand.

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[48] *Ibid.*

[49] A. V. Hill to H. Tizard, 16th June 1936. Tizard Papers HTT67.

Tizard had seen Swinton and made clear his view that Lindemann's position was untenable following Churchill's "written attack". He also wrote to Lindemann personally in his capacity as Chairman and set out his arguments for opposing Lindemann's actions. First of all, Churchill had not approached Tizard as Chairman to confirm his criticisms, effectively undermining his leadership role. Secondly, Lindemann had not demonstrated any loyalty to the Committee or any willingness to observe its rules. "I should really enjoy working with you if you were ready to work as a member of a team, but if you are playing another game I don't think it is possible for us to go on collaborating without continual friction."[50] Thirdly, "the only effect of your [Lindemann's] actions is to retard progress".[51] Tizard's use of the sporting metaphor in his description of the Committee shows how this small body functioned through fostering corporate loyalty from its membership, aided by the common professional values to which the scientists subscribed. These unwritten ties of loyalty to the team derived ultimately from the public schools and were inculcated there or propagated through other channels like magazines, the cinema, wartime experience, or university. Lindemann had shown that he was unwilling to recognise the concept of the "team" or the professional values that Tizard embodied. The letter finished with Tizard's declaration that he was "writing a general statement about the policy underlining the priority attached to different items of our [the Committee's] work", a text that would effectively open up the contested differences between Lindemann and the rest of the Committee.[52] On the 17th June,

[50] H. Tizard to Professor F. Lindemann, 17th June 1936. Tizard Papers HTT67; R. W. Clarke, *op cit.*, p. 139.
[51] *Ibid.*
[52] H. Tizard to Professor F. Lindemann, 17th June 1936. Tizard Papers HTT67.

Tizard had also discussed the recruitment of Professor Edward Appleton, Professor of Physics at King's College, London and an eminent radio researcher, with Wimperis.[53] There is no direct documentary evidence for the assertion that Appleton was lined up as Lindemann's replacement but his anticipated membership of the Tizard Committee was a response to Lindemann's actions. As Tizard explained to Swinton:

> I think I have told you before that none of the present members of the Research Committee have made any special study of radio problems. That has not mattered much up to now, but recent events have made it highly desirable that we should enlist the help of someone of standing who is capable of advising on the details as well as on the general nature of radio research work.[54]

Tizard wanted to remove Lindemann from his Committee and replace him with an academic, supportive of radiolocation, who would be able to explain its workings to the Swinton Committee and head off any criticism from its members. The Committee's Report was used to accentuate the differences between Lindemann and the rest of the Committee by focussing upon those issues which caused the most conflict.

Swinton had an interview with Watt on 17th June to discuss his grievances and ascertain his role in this affair. After Watt assured Swinton that Churchill

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[53] H. Tizard to H. E. Wimperis, 19th June 1936. Tizard Papers HTT111.
[54] H.Tizard to Lord Swinton, 19th June 1936. Tizard Papers HTT111.

would not use the meeting of the 12th June for parliamentary fodder, the MInister invited him to come to the Air Ministry as Superintendant at Bawdsey and guaranteed his own support. Watt later became Director of Communications Development in 1938 at Freeman's behest and learned that the delay of fifteen weeks betwen Tizard's recommendation and his final acceptance of the Air Ministry's offer was caused by negotiations with the Treasury. As research at the Air Ministry was divided between the Directorate of Scientific Research and the Directorate of Development. Watt's own projected post would have trespassed upon the demarcated subjects of each Directorate and the Treasury was unwilling to fund a new position that brought the administrative structure of the Air Ministry into question.[55] Swinton's own intercession and Watson Watt's acceptance defused the immediate crisis as the leading pawn was now securely attached to the Air Ministry and the work in radiolocation could continue without fuss.

8.4 The Breakdown of the Tizard Committee

Churchill and Lindemann had lost their ace with Watson Watt's acceptance of the status quo. Churchill wrote to Swinton on June 22nd complaining about the "slowness" of experimental investigations, the lack of research into aerial mines and his inability to raise specific issues in public. "I am however quite sure that if instead of serving on your Committee Lindemann and I had pressed our points by all the various methods and channels open to us, these ideas would have had better treatment than they have received."[56]

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55 Sir R. Watson-Watt, *op cit.*, pp. 149-151.

56 Martin Gilbert, *op cit.*, p. 752; Winston Churchill to Lord Swinton, 22nd June 1936. PRO Cab 21/426; The letter is reproduced in The Earl of Birkenhead, *op cit.*, pp. 188-189.

Implicit in this sentence was the threat that Churchill and Lindemann could cause more trouble for the Government through public and parliamentary criticism outside the Swinton Committee than their arguments within the official circles of air defence. Swinton replied on 25th June vigorously denying Churchill's claims and wrote to Hankey on the 26th condemning Churchill's estimates of air strength - another point of dispute - as "fallacious".[57] Churchill had rendered all of his criticisms nugatory by his uncritical support of Lindemann.

Lindemann himself wrote a fierce letter to Tizard defending the use of any method to accelerate progress given the "immense importance of the question".[58] His inability to recognise the collegiate features of committee work was enshrined in the sarcastic finish to his letter, personally addressed to Tizard. "I am sorry if this offends you, but the matter is too vital to justify one in refraining from action in order to salve anyone's *amour propre*."[59] Lindemann was unable to differentiate between Tizard the individual and Tizard the Chairman. Events in the committee room had often propelled the two into personal conflict as Lindemann endeavoured to reiterate his arguments and Tizard tried to focus the meeting on the agreed agenda. Lindemann's maladaptation to committee politics led him to elevate and personify this dispute. Tizard replied by shifting their contest back to the workings of the Committee and Lindemann's inability to conform to what was expected of the members:

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57 Lord Swinton to Sir Maurice Hankey, 26th June 1936. PRO Cab21/426.
58 Professor F. Lindemann to H. Tizard, 25th June 1936. Tizard Papers HTT67.
59 *Ibid*; R. W. Clark, *op cit.*, p. 140.

> You need not worry about salving my amour propre. I haven't got any. My quarrel with you is not that my dignity has been affronted, but that your way of getting on with the job is the wrong one, and that far from 'accelerating progress' you are retarding it. Of course I know you want to get on with the job, but do try to realise that other people are just as anxious about this as you are, and are really putting in just as much work.[60]

This self-effacement and personal reminder of teamwork was accompanied by a call for Lindemann to put his "scheme on paper *in detail*" in order to provide polished scientific arguments that might convince his scientific colleagues, instead of denigrating their personal contributions by calling them "slackers".[61] Tizard had invited Lindemann to resolve their conflict by setting out his arguments for aerial mines and infra-red detection in the form of a scientific paper. He also ended his letter realistically by looking forward to further "co-operation" but stating that the continuation of Lindemann's antagonism would end in the Committee's dissolution.

Armed with this promise, Lindemann was appalled to receive a copy of the draft report on July 10th from Rowe that removed any opportunity for him to put forward the scientific case for aerial mines of infrared detection. Tizard's offer of 'co-operation' was now perceived by Lindemann to be conscription to the committee line without any reciprocal chance to voice his own arguments over the priorities for research in air defence. After angrily expressing his

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60 H. Tizard to Professor F. Lindemann, 5th July 1936, quoted in *ibid.*, p. 141.
61 *Ibid.*

views on how a draft report should be studied by a committee and finding the timescale of three days for comment "intolerable", Lindemann threatened to write his own "brief report" and circulate it with the official report. Tizard had already written to Swinton enclosing a copy of his letter to Lindemann of the 5th July, stating that, "If he [Lindemann] does not respond to it I feel that I must press you to remove him"[62], to which the minister replied, praising Tizard's final gesture to Lindemann for cooperation.[63]

A meeting of the Tizard Committee had been scheduled for 15th July to approve the draft report which would be discussed at the Swinton Committee on the 24th July. Lindemann was now determined to write his own report and concluded that his membership of the Tizard Committee had ceased to be of any use. He wrote to Rowe on the 11th July stating that he would submit his own draft "'as a basis for discussion'".[64] On the same day he wrote to the electors at Oxford University informing them of his decision to stand as an independent candidate, supporting the National Government but critical of its policies on air rearmament and air defence.[65] Swinton and Tizard considered any overt political moves by one of their experts as incompatible with their advisory role within the Air Ministry. Expert judgment would be tainted by political interests. In the eyes of the other members of the Tizard Committee, Lindemann was transgressing the boundaries of professional science. Tizard

62 H. Tizard to Lord Swinton, 5th July 1936. Tizard Papers HTT67.

63 Lord Swinton to H. Tizard, 6th July 1936. Tizard Papers HTT67.

64 R. W. Clark, *op cit.*, p. 142.

65 The Earl of Birkenhead, *op cit.*, pp. 149-155. Lindemann had already tried to stand as a candidate during the 1935 General Election when he was already a member of the Tizard Committee. This renewed attempt was far more controversial because Lindemann's candidacy could be perceived as an abuse of position; contributing to policy on air defence as a member of the Tizard Committee yet politically criticising it in general terms at the same time

had met Wimperis on the 14th July to coordinate a united front to Lindemann's demands and the acrimonious meeting took place. According to Blackett, the arguments became "so fierce...that the secretaries had to be sent out of the committee room so as to keep the squabble as private as possible".[66] Lindemann and Tizard did not attempt to cooperate or compromise. Tizard saw Lindemann as a Churchillian tumour that would continue to disrupt the Committee's work and whose value as a concession to the Tory critics was at an end. Lindemann believed that the Tizard Committee constrained his attempts to wield political influence. Having worked within a research structure that he continually criticised, he saw a parliamentary seat as an alternative from which he could campaign for administrative reform and the prioritisation of his own research agenda.

The Committee's consensus had broken down. Lindemann was permitted by Tizard to submit his Minority Note. Hill and Blackett both informed their Chairman that they were no longer prepared to serve with Lindemann and wished to resign. Tizard did not attempt to dissuade them but advised that they write to Swinton personally "so that their letters need not be regarded as 'official' and final".[67] Tizard wrote an account of the meeting for Swinton from the Athenaeum on the same day and at the same location as Hill was writing his resignation letter. It is reasonable to assume that he read and approved Hill's letter. Both Hill and Blackett followed Tizard's advice and submitted their resignation notes on a personal basis. Both letters had two constants. One was support for Tizard's "able chairmanship" and the other was placing

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66 P. M. S. Blackett, *op cit.*, pp. 105-106.

67 H. Tizard to Lord Swinton, 15th June 1936. PRO Cab21/426.

the cause of the Committee's breakdown upon differences with Lindemann.[68] Blackett wrote his letter at Birkbeck College and succinctly explained his actions. Hill's letter, under Tizard's tutelage, set out detailed reasons for his own resignation since the missive would probably be read by all interested in the Committee's breakdown, including the Prime Minister, Baldwin. Tizard maintained his neutrality as Chairman but was able to express his own opinions through professional collegiality. Lindemann's inability to respect the Committee's confidence was cited as the main reason for this breakdown with his Oxford candidacy given as supporting evidence:

> You know the whole story but my view of it is as follows. [A sentence that demonstrates Hill was aware that Tizard was in contact with Swinton] Instead of being frank and open with his colleagues on the Committee, he [Lindemann] went behind their backs and adopted methods of pushing his own opinions which - apart from anything else - would make further co-operation with him very difficult. It is clear, moreover, from paragraphs in his morning's press in reference to Prof. Lindemann's candidature for Oxford University that he intends to use any available method of advertising the unique value of his opinions, and, no doubt, to use his membership of the Committee, while criticising it behind its back, as a means to his own ends.[69]

The letter was crafted through sarcasm to stress Lindemann's individualism

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68 Professor P. M. S. Blackett to Lord Swinton, 15th July 1936. PRO Cab21/426

69 A. V. Hill to Lord Swinton, 15th July 1936. PRO Cab21/426.

in contrast with the collective unity and achievements of the Committee. If Lindemann's political and scientific misanthropy and indiscretions were not sufficient to guarantee his expulsion, then the letter played the 'secrecy' card. "The other Members of the Committee are only anxious to work as quietly as possible and to avoid publicity of any kind which can only be harmful in such work as we are undertaking. The very undesirable publicity of 1935 was due to Lindemann and his friends."[70] According to Hill, Lindemann was no longer just a political liability but also a security risk because of his machinations and provided an additional and more serious argument for his removal.

Although Lindemann's Minority Note was phrased in far more conciliatory terms than the notes he circulated to the Tizard Committee, it was impossible for him to retain his position. Swinton was determined to interview Blackett and Hill to ensure that they would continue to serve on the technical sub-committee.[71] Tizard also wrote to Hill, observing that "we are in a strong position, for we want to do a useful job of work. We don't want notoriety, we don't advertise, and we don't mind if the Government decide they would do without us."[72] Tizard echoed Hill's resignation thoughts before adding an assurance that the majority on the Committee would win this round. Whatever Tizard's private thoughts on Lindemann's conduct, he was now projecting their dispute in oppositional terms and employing military metaphors to emphasize the division. Swinton saw Blackett and Hill on 22nd July to confirm their unofficial resignations whilst Tizard retired to the Lake

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70 *Ibid.*

71 Lord Swinton to A. V. Hill, 16th July 1936. Tizard Papers HTT58.

72 H. Tizard to A.V. HIll, 16th July 1936. Tizard Papers HTT58.

District for a quick fishing holiday before an anticipated conflict with Churchill at the next meeting of the Swinton Committee on 24th July. However, the showdown did not materialise as Churchill backed down after Tizard outlined the events leading to the breakdown of his Committee. Blackett's and Hill's letters were read out demonstrating the gravity of the crisis. Churchill was unwilling to take responsibility for the inevitable hiatus in scientific research that would follow the dissolution of the Tizard Committee. He also knew that Tizard and his professional colleagues enjoyed the political support of Swinton and, through him, Baldwin. Better to retain his voice in Jerusalem than return to solipsistic shouting in the wilderness. Therefore the Swinton Committee decided to reconstitute the Committee with "'members who could work effectively together'".[73] Over the summer recess, Tizard, Hill and Blackett officially resigned forcing the dissolution of the technical sub-committee and it was reconstituted less Lindemann plus Appleton.[74]

8.5 Conclusion

The story of the Tizard Committee allows the historian to stand at the threshold and observe the world of the professional scientist during the nineteen-thirties. The first drawback to earlier narratives like Snow's or Clark's is the narrow conception of politics employed and the withdrawal of technics behind an apolitical guise. This artificial division is then utilised in descriptions of Lindemann and Tizard, projecting the former as the political taint and the latter as the prescient man of science. For example, Clark

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73 H. E. Wimperis, quoted in R. W. Clark, *op cit.*, p. 145.

74 Lord Swinton to A. V. Hill, 3rd September 1936. A. V. Hill to Lord Swinton, 3rd September 1936. Lord Swinton to A. V. Hill, 9th September 1936. Tizard Papers HTT58.

divides their perceptions of the Tizard Committee into Lindemann's executive body and Tizard's advisory role, linking these goals to their differing reaction to politics. While this interpretation gives some indication of the divisions between the two scientists, it distorts the motivations and ideals that shaped their utterances and actions. Clark subscribes to the professional ideology of science so prevalent during the interwar period and purifies Tizard of all non-scientific associations. Tizard and his colleagues conflated their patriotism with their faith in science and then advised politicians and airmen to support radar, simplifying its intricacies to enable elected representatives to make the right decision. Lindemann's belief that political control of air defence is necessary to hasten its implementation becomes a betrayal of scientific faith and a questioning criticism of his patriotism. Yet how can one divorce politics from the administrative structure that politicians use to implement their policies? We have seen how radar was spawned in the political and cultural brew of 1934 that triggered Rowe's search through old air defence files and the important decision to finance air rearmament. Tizard's own close links with the Conservatives in the National Government have been examined and placed in the context of his Committee. One must conclude that the historical analysis of Tizard's and Lindemann's actions requires an understanding of the political context within which they operated.

Tizard's own position demonstrates that networks permeated the political, administrative, military and scientific elites which were collectively called the Establishment by postwar critics. As shown, the Service Departments functioned at arm's length from Whitehall but remained within its circle

through the appointment of generalists as permanent secretaries and the pivotal position of Hankey who combined the Secretaryships of the Cabinet and the Committee of Imperial Defence. More important than this for the history of science was the proximity of scientists to the centres of political power. Radar provided Tizard and his committee with an awareness of their influence and importance in the context of appeasement and rearmament. Yet, if the Tizard Committee was examined in institutional terms, its advisory remit and provisional existence would cloak the executive role that it effectively undertook. Despite the marginalisation of specialists in the occupational structure of the civil service, scientists and other experts were able to gain powerful positions and wield influence under opportune circumstances. Historians have to investigate the 'old-boy' networks which brought scientists to the notice of potential political and administrative patrons if they wish to understand the role of the scientific specialist in the interwar civil service.

Unlike the earlier case-study on the Radium Beam Therapy Research Board, the Athenaeum club played far more of a peripheral role in the story of radar. Its utilisation as a site to discuss Watt's memorandum on radiolocation reinforces the concluding arguments of previous chapters. Wimperis, Tizard and (probably) Bullock were members and confirmed the professional and elite composition of the membership. Like Fletcher's lunches, Tizard's meeting was also arranged with the certain knowledge that the club guaranteed security. The second comparison between Fletcher and Tizard lay in their use of the club's surroundings to persuade a stranger, the 'guest',

to accede to the host's demands. Fletcher hoped that consensus around the dinner table amongst Lord Dawson, Henry Souttar, Rutherford and himself would convince or browbeat Lechien of Radium Belge to loan his radium on the least onerous terms. Tizard indicated the importance of radar to Watt through his invitation to lunch at the Athenaeum. This flattering inducement of a meal at the pre-eminent gentleman's club was also an attempt by Tizard to interrogate Watt on his document and, with the additional weight of Bullock and Wimperis, coerce him into accepting the air defence agenda of the CSSAD. The privacy and convenience of these lunches could have been replicated at any other club but the Athenaeum had a prestigious reputation which could be utilised as a political and cultural resource by Fletcher and Tizard to manipulate their guests into accepting their interests and agendas.

However, the central focus of this chapter was the misunderstanding and division between Lindemann and the other members of the Tizard Committee. The comparison with the antagonistic relationship between Lord Dawson and Walter Fletcher confirms an earlier argument that controversy provides the best doorway for examining gentlemanly values in the professional world. 'Trust' and 'confidence' were key values in the professions and the civil service especially for the integrity of committees. This lack of 'trust' was one of the fundamental causes for the breakdown of the Tizard Committee. All other members, including Tizard, subscribed to the basic values that underpinned the life of a committee. All agreed that committee decisions had to be unanimous and, under the exceptional need for secrecy, that their discussions should not be disclosed except through

official documents and Tizard's position on the Swinton Committee. The confidential nature of the Tizard Committee and the authority of Tizard's chairmanship reinforced each other. Lindemann broke the confidential consensus of the Tizard Committee by confiding in Churchill about decisions taken behind closed doors. When Churchilll raised these matters on the Swinton Committee, Tizard's authority was undermined since it was demonstrated amongst his peers that he could not control his own committee or forge an expert consensus by decisively refuting Lindemann's arguments. Lindemann placed a greater priority on the need to change air defence policy than on the pressure to conform to the gentlemanly values of his profession emphasizing his patriotism at the expense of convention. As Clark noted, "Lindemann felt that the position was too serious for scientists to abide by the normal rules of conduct".[75] This overtly political nullification of gentlemanly behaviour led to the breakdown of the Tizard Committee.

It is fitting to record that the Athenaeum Club was the location for one last attempt to renew this old friendship. Brigadier Charles Lindemann, brother of the Professor and a friend of Tizard's, tried to engineer a rapprochement for the duration of the Second World War. A symbolic handshake did nothing to repair the shattered friendship and indicated the gradual hollowing out of old forms and rituals.[76]

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[75] R. W. Clark, *op cit.*, p. 147.

[76] Professor R. V. Jones, "Scientist At War: Lindemann v. Tizard II", *The Times*, April 7, 1961.

CONCLUSION

These two case-studies have demonstrated that scientists, in both unofficial and official capacities, exercised a decisive influence over areas of policy during the interwar period. In the case of radium, a scientific and medical problem required a political solution due to public interest caused by a rising fear of malignant disease. In the case of radar, a solution to the political and strategic problem of Britain's vulnerability to air attack was sought, under close political supervision, through technological research. Neither substantiates the general arguments of Corelli Barnett and Martin J. Wiener that Britain's political elites were ignorant of and hostile to the potentialities of scientific knowledge. This thesis, including its study of the elite education of scientists in the public school and the university, has aimed to undermine an interpretation of British history that depends upon the inverted Whiggism of premodern survivals and antimodern attitudes - a British Empire ruled by an aristocratic elite that glorified the countryside and actively worked to limit or reverse the processes of industrialisation. This aim has been achieved through the examination of two historical phenomena: the socialization of a large proportion of the scientific elite through public schools and Oxbridge and the position of scientists within the civil service as administrators and advisors. Both of these show that science was incorporated into the processes of education and career structure that shaped the professional and political elites.

I have argued that science should be analysed as a marginal activity in British culture and society. Its range of activities for the public were too broad and its entanglements with politics and the civil service were too specialised for this area of knowledge to be reduced to a simple set of

principles or activities. One could argue that the only unifying feature for science was the role of the scientist himself as an authoritative expert. Chapter Three demonstrated that scientists were aware of their position as outsiders and wished to gain greater power and influence through domination of the educational curriculum, especially in the public schools. This marginalisation was not caused by an anti-industrial spirit. Science was handicapped in comparison to other professions because it was unable to offer security of employment or high salaries and, as a consequence, competed badly with other professional elites in the quest for status and power. This had two political consequences. One was the "Haldane principle" whereby scientists in the research councils supervised the apportionment of grants to their colleagues within the general outlines on which their departments were established under the benign neglect of the Lord President. They were too politically unimportant to require direct ministerial supervision. The other was the establishment of expert bodies like the Committee of Civil Research, answerable to the Prime Minister, the Cabinet or individual ministers, which could examine issues of technological controversy and provide expertise on which to base policies. In the British government system, scientists were left to administer their own affairs or were used as technical sources to establish and legitimate certain policies like radar and radium. Due to its subordinate position through these institutions in the strategies of government, science was a political and politicised activity.

Insider scientists were those who adapted to the political and professional requirements of Whitehall. Philip Gummett has argued that the careers of scientific advisors were too varied to draw a general picture of the criteria

needed to attain these positions, citing the differences between Tizard, Lindemann, Blackett and Solly Zuckermann. Yet the case-studies of this thesis show that an understanding of the customs and values which governed the routines of Whitehall were of the utmost importance for the success or failure of a scientific advisor. These customs and values, partially captured in Chapters Seven and Eight through the concept of 'confidence', were derived from the gentlemanly codes of conduct inculcated by the public or grammar schools and modified to the local circumstances of different professions and institutions. A knowledge of these codes and their place within the professional worlds of science and Whitehall were distinctive advantages as Lindemann and Dawson found out to their cost. Education at the right school and university where these codes became second nature was a distinct advantage and conferred a patina of gentlemanly status compared to the products of grammar schools and provincial universities. Scientists were therefore more likely to be accepted by politicians and civil servants if their gentlemanly professionalism was not called into question by their background and education.

Despite the need for a far greater number of experts during the Second World War, the recruitment of scientific advisors from a public school and Oxbridge background predominated during the postwar period. Studies of the Advisory Council on Scientific Policy, Council for Scientific Policy and Advisory Board for the Research Councils by S. S. Blume and Gummett from 1947 showed "a remarkably cohesive elite, constantly renewed in

[its] own image".[1] Biographical details of the members of these institutions demonstrated that between a quarter and a third attended public schools whilst Oxbridge (predominantly Cambridge) accounted for almost half of this group. These figures were corroborated by W. L. Guttsman who examined the research councils between 1950 and 1955, confirming that a third of their members had been to public school and that 27% had degrees from Cambridge.[2]

The structural pattern of the British scientific elite that I examined during the interwar period in Chapter Four retained its distinctive qualities after the Second World War. This thesis does not study the roots of this elite pattern but notes that it already existed before the Great War and crystallized in the late Victorian period alongside the generational entrance of public school alumni into the older professions. This process was accompanied by the development of a cohesive generalist elite at Whitehall that excluded specialists from career positions. The British scientific elite of the twentieth century was reshaped by the gentlemanly education of the public schools which provided a passport to influence and patronage amongst the professional elites whilst simultaneously contributing to the marginalisation of the scientific profession in the British system of government.

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[1] Philip Gummett, *Scientists in Whitehall*, Manchester, Manchester University Press, 1980, p. 93; S. S. Blume, *Toward a Political Sociology of Science*, London: the Free Press, 1974, pp. 199-201.

[2] W. L. Guttsman, *The British Political Elite*, London: MacGibbon and Kee, 1965. This text was cited in Philip Gummett, *op cit.*, p. 93.

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