The contribution of the Women's Factory Inspectorate (1893-1921) to improvements in women's occupational health and safety

A Spurgeon

A thesis submitted in partial fulfilment of the University's requirements for the degree of

Master of Philosophy

2012

University of Worcester

Abstract

The first women factory inspectors were appointed in 1893. Until 1921 they operated as a separate section of the Factory Inspectorate with special responsibility for inspecting the working conditions of women. This thesis has examined the work of the women inspectors between 1893 and 1921 and has sought to evaluate how far they were able to effect improvements in women's working conditions. The inspectors' work has been explored through a series of four illustrative case studies selected to cover occupational health and safety issues which were of particular importance to women workers during the period. These were lead poisoning in white lead works, accidents and injuries in laundries, ventilation in small workshops and industrial health and safety during the First World War. The period of study was marked by important changes in the functioning of the Factory Department, occurring in response to increasing state intervention in the conduct of industry and a growing awareness of medical, scientific and technical developments which began to inform policy and practice. The work of the women inspectors has been examined within this context showing how the approaches they adopted were highly reflective of these new developments. Contrary to existing historiography, which considers that the women inspectors were operationally ineffective and that their appointment was largely symbolic, it is argued that they achieved some notable successes in terms of reducing the risks to women workers. Despite their small numbers, they were able to harness new knowledge to investigate problems and identify solutions and, in the process, were able to contribute to policy development and legislative change. Their work before the First World War was indicative of a growing professionalism and expertise. During the war, however, their development was interrupted when their resources were diverted away from health and safety and towards the administration of a large industrial welfare system. This system was established by the government in response to public fears that the recruitment of large numbers of young women into factory work might have a morally destabilising effect on the nation. The professional progress of the women inspectors was thus largely curtailed during this period. Their special remit to investigate the health and safety problems of women workers was resumed only briefly after the war and their section was amalgamated with the men's inspectorate in 1921.

This thesis is dedicated to

the memory of

Dr. Ronnie Kowalski

and

Dr. Tim Shakesheff

Acknowledgements

Much of the material which has informed this study was found in various archives and libraries. I would, therefore, particularly like to thank the staff of the following, for all the help they have provided throughout.

University of Worcester Library.

University of Birmingham Library.

Modern Records Centre, University of Warwick.

The National Archives, Kew.

The British Library, London.

The Women's Library, London Metropolitan University.

The Health and Safety Executive, Bootle, Liverpool.

Wolverhampton Archives and Local Studies Department.

The Kensington and Chelsea Local Studies Department.

I am most grateful for the support of a number of individuals, particularly my partner Tim, and also my tutors Frank Crompton and Maggie Andrews both of whom had to step into the role unexpectedly, and at a relatively late stage, as a result of the serious illnesses of my two earlier tutors. They have been unfailingly conscientious and supportive in helping me to continue with the project. Finally I would like to pay tribute to those earlier tutors, who were there at the start of this work but who sadly did not see its completion. The thesis is dedicated to their memory.

Index

Tables

Figures

Chapter 1

Study Rationale and Objectives

The British Factory Inspectorate was initially established in 1833 with the appointment of four men to inspect working conditions in textile factories and to ensure compliance with the terms of the new Factory Act introduced that year. [1] During the following 50 years the inspectorate underwent considerable growth and development both in terms of the size of its staff and the scope of its work but, despite the presence of large numbers of women in the industrial workforce, it remained an exclusively male organisation. In 1893, however, the first women factory inspectors were appointed, establishing a separate section of the inspectorate with a specific remit to inspect and regulate the employment conditions of women. The separation of male and female sections was maintained until 1921 when the two were amalgamated to form an integrated organisation in which the duties of male and female inspectors were merged. The work carried out by the separate women's section between 1893 and 1921 forms the subject of the current thesis. The objective is to examine the nature and the effectiveness of the work carried out by the women inspectors during this period in order to assess the importance of their contribution to improvements in women's occupational health and safety.

The impetus for the present study was provided by the current dearth of literature examining the work of women factory inspectors and, more particularly, by the absence of texts which consider this work within the context of contemporary developments in industrial health and safety. A small body of historiography has emerged in recent years, which alludes to the inspectors' work within the context of women's history of the late Victorian and Edwardian periods and which offers a largely feminist perspective on the role of the women inspectors. Mary Drake McFeeley's popular history, *Lady Inspectors*, published in 1988, [2] and Susan Yeandle's *Women of Courage*, commissioned in 1993 to mark one hundred years of women factory inspectors, [3] each present a relatively uncomplicated

[1] Factory Act, 1833 (3 & 4 Will. IV, c.103).

[2] McFeely, M.D. (1991), *Lady Inspectors: The Campaign for a Better Workplace, 1893-1921*, University of Georgia Press, Athens and London.

[3] Yeandle, S. (1993), *Women of Courage: 100 Years of Women Factory Inspectors*, HMSO, London.

picture of courageous pioneers establishing a female presence in a previously male world. Other historiography has focussed on the issue of protective legislation for women and the role of the women inspectors in enforcing this. Here the development and enforcement of health and safety regulations during the period has been considered as an aspect of gender-based power relationships which contributed to the subjugation of women, particularly of working-class women. By selectively regulating women's employment conditions, but not those of male workers, it is argued, legislation ostensibly designed to protect women from the most onerous or dangerous work, (for example by limiting their hours of work or the particular jobs they could do) was part of a wider state agenda to undermine women's right to participate in the labour market. [4] Early manifestations of this agenda have been traced to some of the earliest factory legislation which, in 1842, had prohibited the employment in mines of all females and raised the age at which boys could be employed underground to ten. [5] This particular piece of legislation appears to have been prompted by a mixture of concerns about the health, welfare and also the moral consequences of scantily clad males and females working in close proximity underground. [6] The response of the government meant that, for the first time, women were excluded from a specific occupation and were also grouped with children in terms of the legislation. Historian Alan Heesom has suggested that these regulations also contained elements of social control, in the sense that the return of women to their child rearing duties within the domestic environment, as well as the proposed Christian education of young boys excluded from the mines, was intended to reduce the risk of civil unrest amongst the working classes. [7] At a time when women were entering the labour force in increasing numbers and male employment was coming under threat, historian Robert Gray has further argued that early factory legislation was an important vehicle for the expression of social norms which assumed the primacy of the male breadwinner, [8] Thus two years after the Mines Act of 1842, a further piece of legislation again classified women with juvenile workers in terms of selectively restricting their working

[4] Rose, S.O. (1991), 'From behind the women's petticoats: The movement for a legislated nine hour day and state protection of working women in Britain, 1870-1878', *Journal of Historical Sociology,* Vol. iv, pp. 32-51.
[5] Mines Act, 1842 (5 & 6 Vict. c.99).
[6] Bryan, Sir A. (1975), *The Evolution of Health and Safety in Mines*, Ashire Publishing Ltd, Lechworth, p. 34.
[7] Heesom, A. (1981), 'The Coal Mines Act of 1842, Social Reform and Social Control', *The Historical Journal* , Vol. 24, Part 1, pp. 69-88.
[8] Gray, R. (1996), *The Factory Question and Industrial England*, *1830-1860*, Cambridge University Press, Cambridge, p. 35.

hours, creating a precedent for working time differentials which persisted up to and beyond the appointment of the women factory inspectors. [9] Feminist historians have suggested, therefore, that female inspectors, appointed half a century later to enforce regulations selectively aimed at women workers, were complicit in the maintenance of a well-established discriminatory agenda.

The strongest condemnation of protective legislation has come from historian Carolyn Malone who has explored the influence of contemporary discourses of maternity and domesticity on women's exclusion from a specific industry, the white lead trade. [10] Malone argues that gender-based arguments, which emphasised both women's supposed physical vulnerability and the importance to the nation of their maternal role, provided the justification for interventionist legislation which restricted women's working hours and excluded them from certain jobs. Such protective legislation, she maintains, was politically expedient because it accorded with currently popular sentiments about the need to safeguard the health of the nation by ensuring that women successfully carried out their functions of child-bearing and child rearing. She notes the increasing concern about these issues which arose at the end of the 19th century in response to revelations about the poor health of large sections of the male population during recruitment for the Boer War. [11] Within Malone's analysis the women inspectors appear only briefly and are evaluated specifically in terms of their attitude towards protective legislation as an indicator of their ideological position on the employment rights of women. This approach leads her to be somewhat dismissive of their work which, she considers, reflected the fact that they were 'steeped in the dominant social ideal of protecting women'. [12] Historian Helen Jones appears to concur with this view arguing that the inspectors 'saw a need for...improving working class women's occupational health, but within the norms laid down by society'. [13]

---

[9] Factory Act, 1844 (7& 8 Vict. c.15).

[10] Malone, C. (1996), 'The Gendering of Dangerous Trades: Government Regulation of Women's Work in the White Lead Trade in England, 1892-1898', *Journal of Women's History,* Vol. 8, Part 1, pp. 15-29.

[11] Davin, A. (1978), 'Imperialism and Motherhood', *History Workshop*, No. 5, Spring pp. 9-65.

[12] Malone, C. (1996), 'The Gendering of Dangerous Trades: Government Regulation of Women's Work in the White Lead Trade in England, 1892-1898', *Journal of Women's History,* Vol. 8, Part 1, pp.15-29.

[13] Jones, H. (1988), 'Women Health Workers: the Case of the First Women Factory Inspectors in Britain', *Social History of Medicine*, Vol. 1, Part 2, pp. 165-181.

Historian Barbara Harrison, in her comprehensive discussion of women's working conditions during the late Victorian and Edwardian periods, devotes a chapter to the women inspectors, [14] and offers a more pragmatic interpretation of their approach. She concludes that they were almost certainly uncomfortably aware of the contradictions inherent in their position, with many of their actions reflecting the inevitable compromises and political accommodations which characterise the work of public servants. Thus, she argues, the inspectors often appeared ambivalent or at least uneasy about legislation which threatened women's right to work. She notes, for example, that they frequently countered suggestions that employment itself was undesirable for women, or that factory work was necessarily damaging to maternity. Rather they pointed to the benefits of employment, such as the extra income it provided for very poor families, as well as the necessity of work for those women who were unmarried or widowed. [15] Harrison suggests, in addition, that it was not protective intervention *per se* which threatened women's employment rights but the nature of that intervention. She notes that members of the women's factory inspectorate, alongside male and female union activists, repeatedly urged, not the prohibition of women workers, but the prohibition or control of dangerous substances from the workplace. [16] Harrison's conclusions are supported by the work of historian Clare Holdsworth who notes a highly influential report by two women inspectors in 1897, which recommended the development of leadless glazes to reduce problems of lead poisoning in the pottery industry. [17] This was a practical alternative to medical suggestions that women, who were considered to be particularly vulnerable to lead poisoning, should be banned from the industry altogether. [18]

Other historiography in this field has focused on the intersection between class and gender and the extent to which class differences effectively negated the inspectors' efforts to improve the employment conditions of working-class women. As historian Anne Phillips

[14] Harrison, B. (1996), *Not only the Dangerous Trades: Women's Work and Health in Britain, 1880-1914,* Taylor and Francis, Abingdon, Oxon, pp. 181-199.

[15] Harrison, B. & Nolan, M. (2004), 'Reflections in Colonial Glass? Women Factory Inspectors in Britain and New Zealand, 1893-1921', *Women's History Review,* Vol. 13, Part 2, pp. 263-287.

[16] *Ibid.*

[17] Holdsworth, C. (1997), 'Women's work and family health: evidence from the Staffordshire Potteries, 1890-1920', *Continuity and Change,* Vol.12, Part 1, pp.103-128.

[18] See further discussion of policies relating to lead exposure in Chapter 4.

succinctly notes 'we live in a gender order that is also structured by class, which means that women experience their womanhood in different ways, and that their unity as women is continually disrupted by conflicts of class'. [19] During the period in question the 'lady inspectors', as they were often termed, continued to be drawn from the ranks of the well-educated middle-classes who had no direct experience of employment in factories and workshops. Some historians have concluded that, as a result, it was attachment to class rather than loyalty to gender which determined the policies and practices of the inspectors, an attachment which led them to pursue a state-sponsored paternalistic agenda towards working-class women which alienated female factory workers whilst enhancing their own professional opportunities. Historian Ruth Livesey argues that class divisions and antagonisms effectively undermined most of the inspectors' efforts to improve working conditions. She suggests that the appointment of middle-class women evoked a form of social maternalism in which the lady inspectors acted as protectors of their vulnerable working-class sisters. Thus the initial establishment of women inspectors was an extension of the philanthropic tradition, whereby middle-class woman gained access to power through social work and the exercise of 'reformatory authority' over the working classes. [20] All the early inspectors, she maintains, relied heavily for their appointment on the patronage of aristocratic or political contacts and, once in post, embarked on a path of increasing professionalization, seeking to create an elite organisation by progressive demarcation of their area of expertise and the introduction of increasingly stringent entry qualifications. Undeniably these factors created considerable barriers to the entry of working-class women into the factory inspectorate. However, the reasons for their prolonged exclusion are perhaps more complex than Livesey suggests. Patronage undoubtedly played a major role in the appointment of May Abraham, [21] the first women inspector, who was previously secretary to Lady Dilke, [22] a significant campaigner for the appointment of women inspectors and wife of the Liberal MP Sir Charles Dilke, [23] and neither Abraham nor Paterson, the

[19] Phillips, A. (1987), *Divided Loyalties. Dilemmas of Sex and Class,* Virago, London, p. 12.

[20] Livesey, R. (2004), 'The Politics of Work: Feminism, Professionalisation and Women Inspectors of Factories and Workshops', *Women's History Review,* Vol.13, Part 2, pp. 233-255.

[21] May Abraham (1869-1946), See Appendix 1 which contains short biographical notes of individuals appearing in the text.

[22] Lady Emilia Dilke (1840-1904), See Appendix 1.

[23] Sir Charles Dilke (1843-1911), See Appendix 1.

second appointee, were subjected to the usual Civil Service entry requirements. However, by the time two further women inspectors, Lucy Deane [24] and Adelaide Anderson [25] were appointed in 1894, this situation had changed. Both Deane, who had previously worked as one of the first women sanitary inspectors for the Borough of Kensington [26] and Anderson, a university educated 'Girton girl' [27] were required, over two days, to sit examinations in dictation, copying, English composition and arithmetic, followed by an oral examination of their knowledge of the principle provisions of the Factory and Workshop Acts. [28] These examination subjects were, in fact, largely the same as those which confronted aspiring male inspectors who from an early stage had been required to have a relatively high standard of education. Suggestions by some authors that, unlike the women, male inspectors were drawn from the ranks of working men are not supported by the evidence. Most of those appointed in the 19th century were of middle-class origin and many had military backgrounds. [29] The possession of professional expertise and high status, it was argued, helped them to maintain an important distance between themselves and those who were subject to the regulations they enforced, as well as enabling them to hold their own in a court of law. They were required to be of good health and moral character, to be free from debt and, from 1855, to have passed a civil service examination which in its early years included Latin and modern languages. They were, in addition, relatively well-paid, since high wages were considered to reduce their susceptibility to corruption. [30] This was particularly

[24] Lucy Deane (1865-1950), See Appendix 1.

[25] Adelaide Anderson (1863-1936), See Appendix 1.

[26] In 1893 Kensington Vestry was the first local authority to appoint women sanitary inspectors to visit homes and advise on living conditions in an attempt to tackle the problem of high infant mortality in the area. These women inspectors were also instructed to visit factories where the women worked and thus Deane would have had some experience of this prior to her appointment. Mooney, G. (1997), 'Professionalization in public health and the measurement of sanitary progress in nineteenth-century England and Wales', *Social History of Medicine*, Vol. 10, pp. 53-78.

[27] A graduate of Girton College, the first women's college at the University of Cambridge, established in 1869.

[28] Deane, Lucy (30 March 1894), Personal Diary, Modern Records Centre, University of Warwick, MSS.69/1/1-24.

[29] *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1894,* C. 7745, (1895), HMSO, London, p. 226.

[30] The original four inspectors, appointed in 1833, were paid £1000 per year, (although required to pay all their own travel and hotel expenses), while eight additional superintendents were appointed a few years later on a salary of £250 per year. Health and Safety Executive, (1983), *Her Majesty's Inspectors of Factories, 1883-1983. Essays to commemorate 150 years of Health and Safety Inspection,* HMSO, London, p. 69.

important since previous enforcement of factory law had been undermined by the use of 'factory visitors' who were often friends or relatives of employers and as such were neither well-trained nor impartial. At a more prosaic level, inspectors were required to produce detailed, well written reports, something which required rather more than a basic standard of literacy and numeracy. In many ways, therefore, entry and training requirements for the women simply mirrored those of the men. Indeed to waive them for women inspectors would have signalled a reduction in their professional status within the Factory Department. Not only would this have undermined their authority when confronted with potentially hostile factory managers or patronising magistrates but, importantly, it would have diminished them in the eyes of their male colleagues, many of whom already doubted their competence and suitability for the role. Interestingly, the creation of the grade of 'inspector's assistant', which occurred simultaneously with the appointment of the first female inspectors, represented a concession on the part of the Home Secretary to trade union demands for the appointment of working men. However, the duties and responsibilities, as well as the promotional opportunities, of the fifteen 'working men' assistant inspectors appointed in 1893 were relatively limited. They did not have powers of inspection, enforcement or prosecution, but simply carried out information gathering duties such as the recording of newly established factories and workshops. [31] By contrast, the women inspectors were awarded full powers with immediate effect.

Barbara Harrison and her co-author Melanie Nolan, in their comparison of the work and attitudes of women factory inspectors in Britain and New Zealand, appear to have reached a different conclusion about the loyalties of the women inspectors. [32] Although first appointed just a year later than their British counterparts, female inspectors in New Zealand were predominantly working women with backgrounds in trade unionism. Their initial appointment originated in an apparently impromptu decision by the Minister of Labour to appoint a woman (and specifically a working woman) to oversee the implementation of recent legislation limiting women's working hours. This contrast provided Harrison and

[31] *Report of the Chief Inspector of Factories of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1893*, C. 7368 (1894), HMSO, London, p.18.

[32] Harrison, B. & Nolan, M. (2004), 'Reflections in Colonial Glass? Women Factory Inspectors in Britain and New Zealand, 1893-1921', *Women's History Review,* Vol. 13, Part 2, pp. 263-287.

Nolan with a unique opportunity to explore the relative importance of class and gender as determinants of the way the inspectors carried out their work. They noted that, in New Zealand, the inspectors' working experience seems to have enhanced their credibility with the women whose complaints they investigated. However, it also counted against them in official circles where they were accused of being partisan and where they struggled to gain respect. Despite differences in class, however, Harrison and Nolan considered that inspectors in both countries appeared united in a sense of sisterhood, motivated largely by compassion for women workers and sharing a belief that their most important role was to provide women with access to other women who would hear and understand their grievances and act on their complaints. There was evidence that women did indeed complain, in both countries, in increasing numbers, either directly or through women's organisations. In many cases, therefore, it seems to have been this concept of sisterhood which prevailed over class origins.

Notwithstanding Harrison and Nolan's more sympathetic treatment of the women factory inspectors, the picture which emerges from much of the existing historiography is one of an elite, well-educated group of middle-class women who operated as agents of the state to enforce legislation which often ran counter to working-class women's employment rights. Moreover, the focus on the inspectors' support for protective legislation and their social class has led many historians to conclude that the inspectors were unlikely to have made any significant contribution to improvements in working conditions. These factors, it has been suggested, would have effectively separated them from any understanding of the needs and problems of working-class women. Historian Helen Jones has expressed a further and essentially practical reservation about the ability of the inspectors to effect improvements. They were, she maintains, far too few in number to have had any significant impact on more than a handful of workplaces. [33]

The prominence of a feminist theoretical framework in this historiography supports the suggestion by historian Catherine Mills that ideological and/or economic interpretations have tended to dominate the recent study of health and safety legislation and the state's

[33] Jones, H. (1988), 'Women Health Workers: the Case of the First Women Factory Inspectors in Britain', *Social History of Medicine*, Vol. 1, Part 2, pp. 165-181.

involvement in its development during the 19th and early 20th centuries. [34] Other theoretical models, however, have offered a different perspective on the way state intervention has evolved within this field and it is argued here that these provide a more appropriate context for the work of the women inspectors. Mills, for example, has discussed how far the development of statutory hygiene regulation within the mining industry might be understood by reference to the early descriptive model proposed by Oliver MacDonagh. [35] Within MacDonagh's framework the introduction of state intervention is considered to be a largely reflexive process, driven not by ideological or philosophical concerns, but rather occurring when the nature of any abuse suffered by one section of society is regarded as sufficiently intolerable to compel action. Initially, the response of powerful, threatened interests tends to result in the dilution of any proposed action, such that this is invariably insufficient to fully address the problem. The reduction of the permitted age of employment in mines of young boys, which occurred as the 1842 Mines Bill progressed through Parliament, provides a good example of this. The initial proposal for a minimum age of thirteen was eventually reduced to ten as a result of pressure from the House of Lords with its strong representation of mine-owning interests.[36] Nevertheless, MacDonagh argues, initial intervention tends to stimulate the need for further measures, provoking a process which gathers momentum as successive regulations are introduced to close loopholes and address the limitations of earlier legislation. As a result, state intervention proceeds in a cumulative but piecemeal manner. The appointment of officials or inspectors, who both oversee the implementation of regulations and identify the need for further action, constitutes an essential part of this process. MacDonagh's model chimes well with the views of reformer Sydney Webb who, in the early part of the 20th century, described factory legislation as 'a typical example of English practical empiricism' which began with 'no abstract theory of social justice or the rights of man'. [37] Webb, himself, despaired of an

[34] Mills, C. (2008), 'The Emergence of Statutory Hygiene Precautions in the British Mining Industries, 1890-1914', *The Historical Journal*, Vol. 51, Part 1, pp. 145-168.
[35] MacDonagh, O. (1958), 'The Nineteenth Century Revolution in Government: A Re-appraisal', *Historical Journal*, Vol.1, pp. 52-67.
[36] Bryan, Sir A. (1975), *The Evolution of Health and Safety in Mines.* Ashire Publishing Ltd, Lechworth, pp. 33-34.
[37] Hutchins, B. L. & Harrison, A. (1903), *A History of Factory Legislation*, P.S.King & Son, Orchard House, Westminster, p. vii.

approach whereby 'each successive statute aimed at remedying a single ascertained evil' [38] but appeared resigned to the idea that in Britain, at least, this was the way in which state intervention proceeded. More recently, historian Peter Bartrip has also noted that, in terms of the development and enforcement of British health and safety regulations, MacDonagh's model has considerable explanatory value. [39] Mills has pointed out, however, that the direction and pace of state intervention is a complex process and its detailed analysis requires the consideration of a wide range of influences. These may, for example, be economic, social, scientific or technological. In many situations, therefore, MacDonagh's model seems insufficiently flexible to account for this complexity. Notwithstanding these limitations, however, one of its central tenets, that state regulation develops reflexively, in response to situations as they arise, would appear to provide an appropriate context for the assessment of the work of the Factory Department during the period under consideration here. As individuals, the women factory inspectors embraced a variety of strands of contemporary feminism and varying shades of political allegiance. [40] However, their approach to their work was largely a pragmatic one, in the sense that they operated on the basis of what was immediately achievable, rather than ideologically desirable. They used their knowledge of existing regulations and the data they collected to identify and highlight new problems, and drew on new scientific and technological developments to formulate solutions. Historian Kitson Clark has argued that the appointment of factory inspectors in 1833 constituted a turning point in factory reform since inspectors not only put into effect factory legislation, but also reported on how it worked. Thus their reports, which were indicative of their increasing specialised knowledge, provided the information on which future legislation was necessarily based. [41] This would seem to aptly describe the way in which the women inspectors, appointed 50 years later, carried out their work.

[38] *Ibid.*
[39] Bartrip, P.W.J. (2002), *The Home Office and the Dangerous Trades: Regulating Occupational Disease in Victorian and Edwardian Britain,* Rodopi, Amsterdam, p. 286.
[40] See Appendix 1
[41] Kitson Clark, G. (1962), '*The Making of Victorian England',* Methuen, London, p. 94.

The current thesis

The current thesis has considered the work of the women inspectors within the framework described above and has used contemporary data to consider the extent to which their work resulted in actual improvements in the occupational health and safety of women workers. It is argued that the negative evaluation of the inspectors' work which emerges from the existing historiography rests largely on the adoption of a perspective whereby issues of class and gender are placed at the centre of the analysis. Thus the inspectors' support for certain forms of protective legislation is equated with state interference in women's employment rights, while class differences are considered to preclude any understanding of the needs of women workers, and to undermine any attempts to gain their trust. These factors, together with small numbers and inadequate resources are judged to have nullified the inspectors' efforts to improve working conditions. The current thesis proposes a different perspective whereby the inspectors' work will be examined, not in terms of their ideological position on protective legislation or their social class, but within the context of the developments taking place within occupational health and safety at that time. During the period, growing interventionism on the part of central government led to a plethora of new regulations and to different approaches to health and safety management, while the emergence of new scientific and medical information made unprecedented demands on the professional expertise of the Factory Inspectorate as a whole. A close examination of the women inspectors' work in some specific areas of contemporary concern will be used to demonstrate the multifaceted nature of their activities and the way in which these reflected both developments within the field of health and safety and their own growing expertise. Jones' concern about small numbers, for example, rests on the assumption that routine and regular inspection, accompanied by automatic prosecution when contraventions of the law were discovered, represented the only means whereby factory inspectors were able to influence working practice. But then, as now, the inspectorate as a whole operated with limited resources and increasingly employed an informed sampling procedure in terms of the workplaces visited, often using guidance and persuasion rather than punitive sanctions, and choosing prosecutions carefully in order to achieve the maximum deterrent effect. Further, Jones and others appear to have neglected other aspects of the inspectors' work

such as their investigative role, their representation on special committees of enquiry and their contributions to policy development. It is thus argued that an examination of these aspects offers a different perspective on the contribution of the women inspectors to women's occupational health and safety. The objectives of the thesis are contained within the following research questions.

1. Did the health and safety of women workers improve during the period?
2. To what extent, and in what ways, did the women inspectors contribute to any such improvements?
3. How far did the work of the women inspectors reflect contemporary developments in industrial health and safety practice?

These questions have been addressed by means of four case studies selected to reflect different aspects of the work of the women inspectors between their initial appointment in 1893 and their amalgamation with the men's inspectorate in 1921. The thesis will focus on two important aspects of the inspectors' work, namely the prevention and control of occupational disease and of industrial accidents. During the period in question the remit of the factory inspectorate also encompassed a wide range of employment conditions such as working hours, the legally permitted age of workers [42] and the prevention of abuses such as the system of 'truck'. [43] The regulation of industrial disease and accidents has been selected

[42] In the UK, conditions of employment such as hours of work and wages ceased to be part of health and safety legislation and became part of employment legislation following the Health and Safety at Work Act of 1974. In some other European countries employment conditions have remained as part of the same body of law. This difference underpinned the dispute between the UK and the European Commission in the early 1990s when EU regulations required all member states to enforce a maximum 48 hour week on health and safety grounds. The UK government argued (unsuccessfully) that working time was not a health and safety issue.

[43] 'Truck' was the system whereby workers were paid in goods and not in coin of the realm. This was illegal after the Truck Act of 1831, which was reinforced by the Truck Act of 1897. It also refers to the system of making deductions from workers' wages for equipment used, or for heating and lighting costs, or for reputedly spoiled work, late arrival at work or other infringements of works rules. The system was often abused by employers and, in extreme cases, could result in workers owing 'wages' at the end of the week.

for study, however, because of the availability of statistics which were regularly produced by the Factory Department at this time.

The definition of the terms 'disease' and 'accident' has been the subject of considerable historical interest. [44] A major driver of the debates surrounding this issue has been the development of insurance and compensation systems and discussion of the subject has largely taken place within this context. Thus an early lack of equalisation between payments for an accident and a disease focussed attention on the need to define the distinction and to establish criteria for occupational causation. [45] Should, for example, a 'disease' such as acute poisoning, occurring at a specific point in time as a result of a well-defined exposure, be categorised as an 'accident', distinguishable from a 'chronic' condition developing over time and hence more difficult to attribute unequivocally to occupational causes? [46] The extent to which these debates subsequently influenced the classification systems adopted within the operational arm of the Factory Department is currently uncertain. However, during the period covered by the present thesis, it is clear that the definitions used by the factory inspectors in compiling their statistics were different to those employed under the terms of existing compensation systems, [47] a difference which derives from their different objectives. Thus compensation definitions were intended to determine eligibility for payment, whilst those adopted by the Factory Department were intended to inform and monitor measures for prevention and control. In the present thesis use has been made of statistics recorded in the reports of the Chief Factory Inspector in order to consider changes in the incidence rates

[44] Milles, D. (1997), 'What are occupational diseases? Risk and risk management in industrial medicine in Germany, c. 1880-1920', in Cooter, R. and Luckin, B. (eds.), *Accidents in History: Injuries, Fatalities and Social Relations*, Rodopi, Amsterdam, pp. 179-195; Bronstein, J.L. (2008), *Caught in the machinery. Workplace Accidents and Injured Workers in Nineteenth- Century Britain*, Stanford University Press, Stanford, California, pp. 125-168; Figlio, K. (1985), 'What is an accident?' in Weindling, P. (ed.), *The Social History of Occupational Health*, Croom Helm, London, pp. 180-206.

[45] These issues were discussed at the Second International Congress for Occupational Diseases held in Brussels in 1910. Leading industrial hygienist, Ludvig Teleky, argued successfully for the equalisation of payments for specific diseases and industrial accidents. Subsequently a list of qualifying industrial diseases was drawn up. However, implementation of the international agreement on this issue was interrupted by the advent of World War 1 and not achieved until 1925.

[46] The criteria currently employed by the present Industrial Injuries Advisory Council, which advises on the list of 'prescribed industrial diseases' (eligible for Industrial Injuries Disablement Benefit), are based on those originally developed by the Samuel Committee in 1906.

[47] For example, under the terms of the British Workmen's Compensation Act of 1906 the definition of an 'accident' required 'incapacitation from work for a period of at least one week'. Within the reports of the Chief Inspector of Factories the period was three days.

of accidents and certain diseases. The definitions employed, therefore, will be those adopted by the Factory Inspectorate in their contemporary annual reports.

The work of the women inspectors spanned a very large number of industries and it has been necessary to be selective in terms of those studied here. In making this selection, a number of criteria have been employed. First, industries have been selected which were of particular importance to women, either because large numbers of women were employed in the industry concerned, or because women suffered disproportionately as a result of the particular jobs they did. Other criteria relate to the way in which the women inspectors engaged with the health and safety problems in particular industries and how this reflected developments within the factory department as a whole. On the basis of an examination of the annual reports of the Factory Inspectorate, cases have been selected which are considered to illustrate the women inspectors' use of new knowledge, both medical and technological, and of new methodology such as the collection and collation of statistics to inform prevention and control. Clearly a selective approach precludes the conclusion that all the work of the women inspectors contributed significantly to improvements in the occupational health and safety of women workers. However, the objective of this approach is to highlight areas where their work might be considered to have made such a contribution and hence to challenge some of the conclusions of the existing historiography.

It should be noted that two industries employing large numbers of women during the period, the textile industries and the earthenware and china industry, have not been included. In the case of the textile industry this omission is based on evidence from the factory inspectors' reports that the women inspectors had little involvement in the introduction of health and safety measures in this field. As one of the original industries of the industrial revolution in the 18th century, the textile trade was an old industry by the 1890s. In the mid 19th century it was the focus of most of the early factory legislation and absorbed much of the attention of the first (male) factory inspectors. A major focus was the prevention of accidents by means of machinery guarding, a function traditionally carried out by male inspectors who were considered to possess the necessary knowledge of engineering. Until their involvement in the problem of accidents in steam-powered

laundries, (discussed in chapter 5), women factory inspectors referred all such issues to male inspectors. For this reason their involvement in the textile industries was very limited.

The earthenware and ceramics industry, by contrast, represented an important focus for the work of the women inspectors. By 1901 it employed approximately 23,000 women and was a major source of lead poisoning. [48] The inspectors were involved in attempts to reduce this from the early 1890s. For example, a dedicated woman inspector was located in the potteries for the purpose of overseeing and monitoring the implementation of industrial hygiene measures. A major reduction in poisoning was achieved by 1921, an achievement to which the women inspectors could be considered to have made an important contribution. This industry, however, has already been the subject of several detailed analyses, [49] including examinations of the development of health and safety measures. It was considered, therefore, that an examination of other less well-researched industries would, potentially, offer a more useful contribution in terms of exploring new material.

Case studies selected

Lead poisoning in the white lead industry

The majority of workers in the white lead industry were women. Although aspects of the regulation of this industry have been the subject of previous analyses, [50] these have focussed primarily on the exclusion of women from parts of the trade and the examination of the relationship between this measure and a purported, ideologically-based government agenda. Little attention has been given to other aspects of factory regulation or to the work of the women inspectors. In the present thesis the different measures adopted by the

[48] Whipp, R. (1990), *Patterns of Labour. Work and Social Change in the Pottery Industry,* Routledge, London, p. 18.

[49] Bartrip, P. (1996), 'Petticoat pestering: the Women's Trade Union League and Lead Poisoning in the Staffordshire Potteries, 1890-1914', *Historical Studies in Industrial Relations*, Vol. 2, pp. 3-25; Malone, C. (2003), *Women's Bodies and Dangerous Trades in England, 1880-1914*, Boydell Press, Woodbridge, Suffolk, pp. 52-73; Harrison, B. (1989), '" Some of them gets lead poisoned": Occupational lead exposure in women, 1880-1914', *Social History of Medicine*, Vol. 2, pp. 171-193; Holdsworth, C. (1997), 'Women's work and family health: evidence from the Staffordshire Potteries, 1890-1920', *Continuity and Change*, Vol.12, Part 1, pp.103-128.

[50] Malone, C. (1996), 'The Gendering of Dangerous Trades: Government Regulation of Women's Work in the White Lead Trade in England, 1892-1898', *Journal of Women's History,* Vol. 8, Part 1, pp. 15-29.

factory inspectorate are considered to provide an example of emerging approaches to prevention and control. These included an initial focus on prohibition, but also a subsequent and rapid movement towards an emphasis on industrial hygiene. The need to control exposure to lead dust was relatively uncontroversial during this period since the relationship between the exposure and the disease was well established. This is in contrast, for example, to the delay in the introduction of control measures in relation to silica dust, both in Britain [51] and the United States, [52] where the distinction between tuberculosis and silicosis remained a subject of debate. However, the nature of control measures in the lead works was affected by other debates. First, there remained uncertainty about the relative importance of inhalation or ingestion as the primary means of uptake. Thus it was unclear whether prevention should focus on reducing the lead dust in the air, or on the risk of lead getting on to the hands, and from there on to the workers' food. Second, the question of whether women were differentially susceptible to the effects of lead exposure remained unresolved.

Accidents and injuries in laundries

During the early 20th century laundry work increasingly moved out of the home into premises employing steam powered equipment. The development of small workshops where groups of women worked under a single employer brought the laundry industry under the umbrella of factory regulation, while the introduction of new technology had important effects on health and safety. Thus the inexperienced use of new machinery resulted in a high incidence of accidents and injuries amongst a predominantly female workforce. The laundry industry is a somewhat neglected topic in the field of occupational health and tends to be grouped with the so-called 'sweated trades', where women worked long-hours for low pay, often in their own homes. [53] In addition, those writers who have

[51] Bryder, L. 'Tuberculosis, silicosis, and the slate industry in North Wales, 1927-1939', in Weindling, P. (ed.), *The Social History of Occupational Health*, Croom Helm, London, pp. 108-126.
[52] Rosner, D. & Markowitz, G. (1991), *Deadly Dust. Silicosis and the Politics of Occupational Disease in Twentieth Century America*, Princeton University Press, Princeton, pp.19-31.
[53] Holloway, G. (2005), *Women and Work in Britain since 1840,* Routledge, London. pp. 22-24.

discussed the laundry industry [54] and who have also considered health and safety regulations [55] have focussed almost exclusively on the subject of working hours. The examination of industrial injuries and the work of the women inspectors in this setting, however, illustrate both the increasing use of statistics in the factory department during this period and the involvement of women inspectors in engineering control, a subject previously confined to male inspectors.

Ventilation in small workshops

Small workshops provided employment for thousands of women during the early 20th century. Discussion of these workshops, however, has similarly tended to be subsumed under that relating to the more general title of the 'sweated trades'. The term 'sweating' encompassed a range of factors, including not only long hours and low wages but also insanitary conditions. As historian Sheila Blackburn has noted, however, both within government and contemporary reform groups, the term became largely synonymous with only one of these factors, that of poor pay. [56] As a result the political solution concentrated on the concept of a minimum wage and the establishment of the Trade Boards. During this period small workshops became a major focus for the work of the women factory inspectors who attempted to address a different aspect of the problem, notably the insanitary conditions. Their work has received little historical attention and has tended to be dismissed on the grounds of the assumption that their numbers were too small to have made any appreciable difference to working conditions. [57] Moreover, in common with the discussion of laundries, there is a tendency in the literature to focus on homeworking and to neglect the increasing tendency during the early part of the 20th century for women to be concentrated

[54] Mohun, A.P. (1999), *Steam Laundries. Gender, Technology and Work in the United States and Great Britain, 1880-1940.* John Hopkins University Press, Baltimore.
[55] Kessler- Harris, A. (2003), *Out to Work. A History of Wage- Earning women in the United States,* Oxford University Press, Oxford, p. 112.
[56] Blackburn, S. (1991), 'Ideology and Social Policy: The Origins of the Trade Boards Act', *The Historical Journal*, Vol. 34, Part 1, pp. 43-64.
[57] Pennington, S. & Westover, B. (1989), *A Hidden Workforce. Homeworkers in England, 1850-1985*, MacMillan Education Ltd, Basingstoke, Hampshire, p. 108. The authors' consistent reference to the factory inspector as 'he' and 'him' suggest that they were unaware of the existence of women inspectors during the early 20th century.

in small groups outside the home, working for a single employer. The focus in this thesis, therefore, is on the activities of the women inspectors in relation to such workshops, specifically in relation to one aspect of the problem, that of ventilation. This is considered to provide an illustration of the extent of their engagement with technological developments and new concepts of disease.

Health, Safety and Welfare in World War 1

The final case study has examined the work of the women inspectors during the First World War and is included because the period was a particularly important one in terms of changes in women's employment patterns and in the nature of the inspectors' role. It offers a contrast to the previous three case studies in that it discusses a period when, as a result of wartime government policy, there was a discontinuity in the inspectors' normal work. Although developments in industrial health and safety arrangements continued, these were increasingly contained within a larger programme of industrial welfare, reflecting an increasing preoccupation with Taylorist management techniques [58] and emerging notions of overall worker well-being as a means of improving performance. In addition, there were concerns about the potential effects on the moral state of the nation as a result of mass female employment. These concerns resulted in the diversion of the women inspectors into aspects of welfare which contained elements of social control and which seem to have placed the women inspectors in a position of moral authority over working women. It is argued, therefore, that there was a discontinuity in their work as health and safety professionals during this period and that their contribution to improvements in health and safety was correspondingly reduced.

In advance of the discussion of the four case studies, chapters 2 and 3 provide the context for the examination of the work of the women inspectors in terms of the factors leading to their initial appointment in 1893. Thus chapter 2 discusses the development of the existing Factory Inspectorate during the course of the 19th century, and the nature of its form and

[58] Sundstrom, E. (1986), *Work Places. The Psychology of the Physical Environment in Offices and Factories,* Cambridge University Press, Cambridge, p. 19.

function in the early 1890s, while chapter 3 considers how the appointment of women inspectors reflected the aspirations of some parts of the 19th century women's movement and considers the attitudes and expectations which accompanied their appointment as a result. These chapters form the backdrop to the case studies contained in chapters 4 to 7. The concluding chapter 8 returns to the central questions of the thesis and considers how the activities of the women inspectors, as depicted in the case studies, demonstrated both an important contribution to women's occupational health and safety and a growing expertise which was in tune with the developmental direction of the Factory Department as a whole.

Chapter 2

The Development of the Factory Inspectorate before 1893

> The very streets which receive the droppings of an 'Anti-Slavery Society' are every morning wet with the tears of innocent victims of the accursed shrine of avarice, who are compelled (not by the cart whip of the Negro slave-driver) but by the dread of the equally appalling thong or strap of the overlooker, to hasten half-dressed, but not half-fed, to those magazines of infantile slavery – the worsted mills in the town and neighbourhood of Bradford. [1]
>
> *Richard Oastler 1830*

Richard Oastler, who penned these words in 1830, was a propagandist for the Factory Reform Movement [2] which pressed for improvements in the working conditions of children employed in British textile mills. Nearly thirty years earlier, the Health and Morals of Apprentices Act [3] of 1802 had sought to provide a measure of protection for the moral and physical welfare of the pauper apprentices [4] who by the late 18th century formed approximately one third of the workforce in British textile factories. [5] While moral considerations were prominent, [6] some physical concerns were also addressed. Under the Act, children's hours of work were to be reduced to twelve per day, night work was to be

[1] Oastler, R. (October 16, 1830). 'Yorkshire Slavery', *Leeds Mercury.* Richard Oastler, (1789-1861), was steward for absentee landlord, Thomas Thornhill, at the Thornhill estate in Yorkshire. Oastler strongly supported the preservation of the traditional estate system whereby property owners maintained control over their workers, whilst exercising a duty of protective care. He also campaigned for the abolition of slavery in the West Indies.

[2] The Factory Reform Movement during this period consisted of an alliance of ideological opponents which included radical socialists committed to the reform of the structure of society, some more enlightened factory owners and Tory philanthropists, many of whom were also motivated by a desire to curb the power of the new factory owning elite.

[3] Health and Morals of Apprentices Act, 1802 (42 Geo.III, c.73).

[4] Owners of large textile mills purchased large numbers of children from workhouses who were bound by a contract of employment ('apprenticed') for several years. They came to be known as 'pauper apprentices'. This reduced labour costs since children were much cheaper to employ than adults.

[5] Honeyman, K. (2007), *Child Workers in England. 1780-1820. Parish Apprentices and the Making of the Early Industrial Labour Force,* Ashgate, Aldershot, p. 105.

[6] For example, under the Act separate bedrooms were to be provided for the two sexes and children should sleep no more than two to a bed. For the first four years of apprenticeship they should receive at least one hour of Christian teaching each Sunday.

abolished and factories were to be lime washed and properly ventilated. These proposals reflected two overriding concerns of the time, namely the poor health of many child labourers and the need to control outbreaks of typhus in places where large groups of people were gathered together. Thus, despite an increasing toll of industrial accidents and some initial understanding of the hazardous effects of dust and fumes, physical welfare during this period was rather narrowly defined, focussing on the high risk of fever and on the generally retarded growth and debilitated constitution of the typical child labourer. Since the former represented a risk, not only to the labourers but also to other sections of society, and since both problems represented a threat to production, such concerns presumably arose from somewhat mixed motives. The Act was, however, notable in the sense that it marked a first attempt on behalf of the state to regulate the conditions of labour. [7] Unfortunately it was equally notable for its lack of observance, not least because its implementation was monitored by voluntary 'factory visitors', many of whom were themselves factory owners or members of the owners' families.

In contrast to the 1802 Act, the subsequent Factory Act to Regulate the Labour of Children and Young Persons in Mills and Factories, [8] passed in 1833, introduced the idea that the state had a role, not only in factory regulation, but also in its subsequent enforcement. In 1832 Lord Grey's Reform Act [9] had substantially increased the franchise and granted new seats in the House of Commons to industrial towns and cities, replacing those which had previously represented small communities with tiny populations (the so called 'rotten boroughs'). The newly formed House of Commons, with an overwhelming Whig majority, introduced a series of measures designed to address some of the humanitarian concerns of the day. [10] This included the institution of a Royal Commission to enquire into the conditions of employment of children in British factories. [11] Evidence collected from sub-

[7] The only previous state intervention in employment conditions had been the 'Statute of Artificers' (1558-63) a group of laws which regulated the supply and conduct of labour in relation to apprenticeships and the professions, essentially taking over the functions of the feudal craft guilds.

[8] Factory Act, 1833 (3 & 4 Will. IV, c.103).

[9] The Representation of the People Act, 1832 (2 & 3 Will. IV, c.45).

[10] Significantly, in view of Oastler's comments, these included the Slavery Abolition Act, 1833 (3 &4 Will. IV, c 73).

[11] First Report of the Central Board of His Majesty's Commissioners for Inquiry into the Employment of Children in Factories; with Minutes of Evidence and Reports by Medical Commissioners, (1833), PP 1833 XX & XXI.

commissioners, appointed around the country, highlighted the excessive working hours, the dirty and dangerous conditions and the cruelty and violence experienced by many child labourers at that time. Some historians have suggested that the compelling verbal accounts of children contained in these reports were an important contributor to the changing perception of childhood around this period. Thus children were for the first time seen in a more sentimental light, with less emphasis on their utility as an economic unit. [12] Among the recommendations of the report, which formed the basis of the 1833 Factory Act, was the replacement of the largely ineffective visitors by officially appointed government inspectors. In August 1833, therefore, four men were duly appointed and the Factory Inspectorate was born.

The original appointees were not greeted with unalloyed enthusiasm by members of the Factory Reform movement who noted their lack of experience of factory conditions, their small numbers and the role of patronage in their appointments. Described by a contemporary as, 'a briefless lawyer, a broken down merchant, a poor aristocrat and an intimate friend of Lieutenant Drummond', [13] it was assumed that they would conspire with factory owners to render the new Act ineffective. Moreover, social reformer Charles Wing [14] wrote in 1837 that 'the few inspectors and superintendents that are appointed would need the eyes of Argus, the hands of Briareus, the seven-league boots of Jack the Giant-killer, with his coat of invisibility, to discharge their duties effectually.' Despite these difficult beginnings, however, at least some of the inspectors appear to have gained a measure of respect as the years progressed. The 'intimate friend of Lieutenant Drummond', Leonard Horner, had a long and distinguished career and ultimately received this tribute from Karl Marx, who maintained a close interest in the inspectors' reports:

[12] Steedman, C. (1990), *Childhood, Culture and Class in Britain. Margaret MacMillan, 1860-1931*, Virago, London, pp. 63-65.

[13] Comment made during Short Time Committee at Birstall, West Yorkshire, (1833), quoted in, Health and Safety Executive, (1983), *Her Majesty's Inspectors of Factories, 1883-1983. Essays to commemorate 150 years of Health and Safety Inspection,* HMSO, London, p. 68. The four factory inspectors were respectively Thomas Howell, Robert Rickards, Robert Saunders and Leonard Horner.

[14] Wing, C. (1837), *Evils of the Factory System Demonstrated by Parliamentary Evidence.* Part 1, Dissertation on the Evils of the Factory System, Saunders & Otley, London, p. vi. Charles Wing was a surgeon at the Royal Metropolitan Hospital for Children.

> ...he rendered invaluable service to the English working class, carrying on a lifelong contest, not only against embittered factory owners, but also against the ministers of State, to whom the number of votes given by the factory owners in the Lower House, was of more importance than was the number of hours worked by the hands in the mills. [15]

As Marx's comment implied, a primary focus of the early Factory Inspectorate was the regulation of working hours. Initially this reflected contemporary public concerns about the long hours worked by children, a factor highlighted by the findings of the Children's Employment Commission of 1833 and reinforced by those of the subsequent Commission of 1842. Thus, the Factory Act of 1844 stipulated that children under the age of nine, as certified by specially appointed factory surgeons, [16] could not be employed in textile mills (other factories being exempt from the Act), while those under the age of thirteen were prohibited from working for more than nine hours per day and were required to have at least two hours schooling daily. [17] An unintended consequence of the restrictions on child labour, however, was an increase in the recruitment of young women into the textile trade, a development which tapped into growing public anxiety about the potential moral consequences of female labour. This had earlier been awakened by sensational reports about the employment of semi-naked women and children in coal mines. In 1842 the Mines Act [18] had for the first time grouped women and children together in prohibiting their employment in underground mining. In 1844 a new Factory Act [19] adopted a similar principle in respect of textile factories, restricting the working hours of women and of 'young persons', (defined as those between the ages of thirteen and eighteen), to twelve per day. Subsequently the Act of 1847 (the 'Ten Hours Act') [20] reduced this to ten. In the absence of any of the moral concerns attendant on the employment of women, men were excluded from all of this legislation. Moreover, there was a prevailing assumption that interference in

[15] Marx, K. (1906), *Capital: A critique of political economy*. Vol 1. Modern Library, New York, p. 249, note. 1.
[16] Factory Act, 1844 (7 & 8 Vict. c.15).
[17] Before the establishment of local School Boards, required by the Elementary Education Act of 1870, (33 & 34 Vict. c.75), it was also the inspectors' responsibility to ensure that facilities existed for the provision of this education.
[18] Mines Act, 1842 (5 & 6 Vict. c.99).
[19] Factory Act, 1844 (7 & 8 Vict. c.15).
[20] Factory Act, 1847 (10 & 11 Vict c. 29).

the contract of employment between a man and his employer was both unacceptable and unnecessary. This was well-illustrated nearly fifty years later when pottery worker Edward Dunn wrote to a factory inspector expressing concerns about the exposure of kiln men to high levels of lead. The inspector replied 'I beg to inform you that enamel kiln men are adult males (inspector's underlining) and therefore well able to take care of themselves'. [21] With the gradual extension of the Factory Acts to a wider range of industries, restrictions on the working hours of women and children were correspondingly extended to a larger number of occupations and the enforcement of working hours regulations thus became a major part of the work of the factory inspectorate.

A second major focus for the early inspectors was the prevention of industrial accidents. Almost from their inception they had begun to collect and record some rudimentary accident statistics and their regular reports contained numerous accounts of serious incidents involving unguarded factory machinery. An entry from 1842 provides a graphic picture of both conditions and workers in a typical textile factory.

> A man named Campbell, the overlooker of the room in which it happened, was mending a belt which was held for him by a little girl. Another girl named Burns, 14 or 15 years old, incautiously running between them and an upright revolving shaft, got her clothes entangled with the shaft, and whilst Campbell was trying to extricate her, the girl who had been holding the belt for him, being frightened threw it down and ran away. The belt getting entangled with the teeth of the shaft, caught Campbell also and both he and little Burns were drawn up and before the machinery could be stopped, almost crushed to pieces. [22]

The inspector went on to report eleven further accidents, (four fatal), of whom ten were to children under the age of sixteen, which had occurred during the previous quarter. Information such as this subsequently informed the development of a series of Acts, beginning with the Factory Act of 1844, [23] which required the occupiers [24] of textile factories to fence the moving parts of machinery and to institute various other safety precautions.

---

[21] Dawkins-Cramp, William, Superintendant Inspector for the Midlands, (9 February 1893), Letter to Edward Dunn. National Archives HO45/9851/B12393E.

[22] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1932 (Including a Review of the Years 1833-1932),* Cmd. 4377 (1933), HMSO, London, p. 26.

[23] Factory Act, 1844 (7 & 8 Vict. c.15).

[24] A term for those who owned or leased the premises, usually synonymous with 'employer'.

Moreover, as the century progressed and increasing numbers of workers were employed in various forms of manufacturing, [25] early narrow definitions of what constituted a 'factory' (often negotiated by factory owners seeking exemption from regulations) were gradually abandoned. By 1878 the new Factory and Workshop Act [26] interpreted this term in a much wider sense. [27] Andrew Ure, writing shortly after the inspectors first took up their duties, reported that there were just over 3,154 textile factories in Britain, which would have come under their jurisdiction. [28] By the end of the century this had grown to 233,312 workplaces. [29]

From their initial appointment, factory inspectors possessed considerable powers, notably the power to prosecute under the criminal law. They also had the legal right to demand entry into a factory at any time of the day or night for the purpose of enforcing legislation. The obstruction of an inspector in the execution of his duty constituted a criminal offence. Historian Peter Bartrip has noted that the confrontational and reforming culture of the 19th century Factory Inspectorate was markedly different from that of its parent department, the Home Office, which in other areas favoured a more conservative and consensual approach. [30] The work of the factory inspectors frequently brought them into direct conflict with influential industrialists and with magistrates who failed to impose adequate penalties. Thus their views and allegiances were often in opposition to those of their bureaucratic masters. Partly for these reasons and partly because of its small staff and large workload [31] the Home Office appears to have allowed the Factory Inspectorate to operate almost completely autonomously, exercising minimal control over its activities. Historian Jill Pellow,

---

[25] Hobsbawn E. J. (1968), *Industry and Empire. The Pelican Economic History of Britain.* Volume 3. List of Diagrams. No. 7. Some British occupations, 1841-1951, Penguin Books, Harmondsworth.

[26] Factory Act, 1878 (41 Vict. c.16).

[27] A factory or workshop was defined as an establishment where at least 50 people were employed and/or some form of power (water or steam) was used in the work process.

[28] Ure, A. (1835), *Philosophy of Manufactures*. Statistical Table of the Textile factories of the United Kingdom, reproduced in Crookes E. (2005), *The Factory Inspectors. A Legacy of the Industrial Revolution.* Tempus Books, Stroud, Gloucestershire, p. 39. Andrew Ure, (1778-1857), was a physician, chemist and writer who conducted a number of industrial tours of England during the mid 19th century.

[29] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1901*, Cd. 1112 (1902), HMSO, London, p. A2.

[30] Bartrip, P.W.J. (2002), *The Home Office and the Dangerous Trades: Regulating Occupational Disease in Victorian and Edwardian Britain,* Rodopi, Amsterdam, pp. 40-42.

[31] Troup, C.E. (1925), *The Home Office,* Putnam & Sons Ltd, London, p. 24.

in her discussion of ten Home Office inspectorates created between 1832 and 1876, similarly notes a distance between the activities of the central officials of the Home Office and the staff of its dependent agencies. [32] She argues that the increasing expertise of inspectors during this period discouraged interference from Home Office officials, whose knowledge of workplaces was limited and whose social and educational status was relatively low.

The growing expertise of the Factory Inspectorate assumed a more formal professional dimension following the appointment, in 1879, of Alexander Redgrave as Chief Inspector of Factories. [33] During his period of office higher educational requirements and improved training for inspectors were introduced, recruitment was increased and the Factory Department was organised into five separate districts, each presided over by a superintendent inspector. By the 1880s inspectors routinely advised on machinery safety, negotiated the implementation of improvements with employers, provided guidance on the interpretation of legislation, as well prosecuting under the law. Annual reports were prepared detailing accident numbers and types in various sectors of industry as well as lists of prosecutions undertaken. By the early 1890s there were over 60 factory inspectors operating throughout the United Kingdom and in 1892, a typical year, they secured 2,376 convictions against employers for various contraventions of the Factory Acts. [34] For most of this period, however, there was little reference to the risk of industrial disease other than occasional general statements about foul and dusty air and the need for ventilation, reflecting the prevailing public health model of disease causation and prevention which emphasised pervasive environmental influences, identified by the presence of dirt and offensive smells, rather than single causes associated with specific agents. [35] By the middle of the 19th century a small number of physicians had published various concerns about the health hazards associated with particular occupations [36] and industrial medicine pioneer,

[32] Pellow J. (1982), *The Home Office, 1848-1914. From Clerks to Bureaucrats*, Heinmann Educational Books, London, pp. 122-3.

[33] Sir Alexander Redgrave (1818-1894), See Appendix 1.

[34] *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1892*, C. 6978 (1893), HMSO, London, p.309.

[35] Porter, D. (1999), *Health, Civilisation and the State. A History of Public Health from Ancient to Modern Times.* Routledge, London, pp. 141-2.

[36] For example, Percival Potts had described scrotal cancer in chimney sweeps, George Calvert Holland and James Johnstone wrote about respiratory problems in cutlery grinders in Sheffield and needlepointers in

Charles Turner Thackrah, had produced a first text on the subject, covering 100 trades in his native Leeds. [37] However, it was not until the final years of the 19th century that matters of occupational health and disease, as opposed to occupational safety, began to receive the attention of politicians and policymakers. Bartrip suggests a number of reasons for this. [38] In earlier years widespread problems of cholera, typhoid fever and phthisis (tuberculosis) tended to dwarf any residual concerns about other sources of ill-health. Moreover, in many cases, lack of medical knowledge hindered attempts to determine the link between a disease and exposure to particular agents in the workplace. These difficulties, he suggests, were exacerbated by the slow progress of many industrial diseases. Hence there was rarely a 'body on the floor' to motivate investigation and prevention. Rather, the victims of occupational disease tended to retreat from the workplace, rendering themselves largely invisible.

During the last years of the 19th century new legislation, which increasingly acknowledged the link between industrial conditions and ill health, and thus focussed on the control of dangerous substances and processes, began to shift the emphasis in terms of the inspectors' activities on the ground. In 1882, prompted by an article in the *Daily News*, [39] newly elected Liberal MP Thomas Burt drew the attention of the Home Secretary, Sir William Vernon Harcourt, to allegations of lead poisoning in the white lead factories of East London and Tyneside and, in particular, to the recent death from lead poisoning of one Hannah McCarthy in Shoreditch Infirmary. [40] At Hannah's inquest Mr Forbes, the Medical Officer of Shoreditch Workhouse, had commented that such deaths were a common occurrence and

---

Redditch, Thomas Percival wrote about lead poisoning in miners and smelter workers, William Allison wrote about respiratory problems in Edinburgh stonemasons and Charles Hastings wrote about diseases among porcelain and leather workers in Worcestershire.

[37] Thackrah C.T. (1832), *The Effects of Arts, Trades and Professions and of Civic States and Habits of Living, on Health and Longevity: with Suggestions for the Removal of Many of the Agents which Produce Disease and Shorten the Duration of Life,* Longman, London. Charles Turner Thackrah, (1795-1833), was a physician and supporter of Factory Reform who was particularly concerned about the employment of children in textile mills.

[38] Bartrip, P.W.J. (2002), *The Home Office and the Dangerous Trades: Regulating Occupational Disease in Victorian and Edwardian Britain,* Rodopi, Amsterdam, p. 10.

[39] Report of inquest (3 April 1882), *Daily News.* This newspaper was founded in 1846 by Charles Dickens who was (briefly) its first editor. It was a mouthpiece for liberal social reformist views and campaigned on issues relating to social and factory reform.

[40] Hansard's Parliamentary Debates (4 April 1882), Vol. 268, pp. 666-7.

that little was done to protect the workers. Burt had also received letters from the Chairman of the Gateshead Board of Guardians and from the Rector of Gateshead expressing the same view. [41] The Home Secretary requested a report on the matter from Alexander Redgrave, who personally visited white lead works in London and Newcastle upon Tyne. Largely as a consequence of his findings the first major piece of industrial health legislation was passed the following year, [42] requiring Home Office certification of all white lead works and compliance with certain 'special rules' [43] which covered hygiene, ventilation and sanitation. A few years later, in 1892, Charles Booth published the first of his influential reports on the living and working conditions of the poor in London, [44] while, in the same year, physician, Thomas Arlidge, produced the first comprehensive text on industrial medicine to appear in Britain. [45] These developments, alongside increasing industrial unrest and trade union activity, [46] fuelled by economic depression and growing unemployment, [47] provided the stimulus for the establishment of the Royal Commission on Labour. [48] The Commission which, over two years, conducted enquiries into working conditions in a wide range of

[41] J.O.Caris (undated) letter to Thomas Burt; W. Moore Eden, (5 April 1882), letter to Thomas Burt, National Archives HO/45/A15330.

[42] Factory and Workshop Act, 1883 (46 & 47 Vict. c. 53).

[43] These were preventative measures enforced by the Factory Inspectorate. In white lead works manufacturers were required to provide working clothes for workers, bathing and changing facilities and a separate dining area to reduce inhalation and ingestion of lead from dust. All workers were required to be medically examined weekly and the working area was to be regularly watered down to reduce dust. Report from the Departmental Committee on the Various Lead Industries, (1895), London, HMSO. C.7239.

[44] Booth, C. (1892), *Life and Labour of the People in London, 1892-1897*, MacMillan, London. This represented the results of a fifteen year investigation into the conditions of the poor in London carried out by social investigator Charles Booth.

[45] Thomas Arlidge (1822-1899) was physician to the North Staffordshire Infirmary, a position which brought him into contact with industrial disease, particularly amongst potters. In 1869 he was invited by the Royal College of Physicians to give a series of lectures on 'Occupations and trades in relation to public health', which were subsequently published in book form. Arlidge, J.T. (1892), *Hygiene, Disease and Mortality of Occupations*, Percival, London.

[46] Between 1890 and 1891 trade union membership doubled and there was increasing awareness of socialist ideas. A number of notable strikes occurred, for example the London Dockworkers Strike of 1889, the Manningham Mills strike of 1891 and the first women workers' strike of matchmakers in 1888. Shiach, M. (2004), *Modernism*, *Labour and Selfhood in British Literature and Culture. 1890-1930.*Cambridge University Press, Cambridge, pp. 200-201.

[47] Musson, A.E. (1959), 'The Great Depression in Britain, 1873-1896: A Reappraisal', *The Journal of Economic History* , Vol. 19, Part 2, pp. 199–228.

[48] Royal Commission on Labour. Conditions of Work in Various Industries in England, Wales, Scotland and Ireland, (1892-4). National Archives HO45/98421/B11168.

industries across the United Kingdom, ultimately recommended the establishment of the 'Dangerous Trades Committees' [49] to identify risks to health and safety in particular industries and to recommend special rules. However, although such rules were legally enforceable, in practice they were rarely implemented, largely because they were open to appeal by employers, who then had a legal right to enter into an arbitration process with the Home Office. [50] This was a time consuming process frequently viewed by civil servants, as well as by inspectors and workers, as a tactic adopted by employers to delay the implementation of the rules, or occasionally to achieve their dilution or complete circumvention. This situation continued until 1901, when the Factory Act of that year [51] removed the right of employers to insist on arbitration.

This brief chronology of 19th century factory legislation reflects a gradual extension of the inspector's remit to include matters of health and disease as well as safety together with a more general strengthening of government control over the way in which factories operated. This in turn reflected a more general political trend away from earlier *laissez-faire* approaches to economic activity and towards state interventionism and bureaucracy. [52] Increasingly government policy was underpinned less by the opinions of influential individuals and more by scientific and technological information and numerical data. Thus the growing national enthusiasm for the collection and collation of statistics which had earlier taken hold in the field of public health had, by the 1890s, pervaded the newly emerging field of occupational medicine. [53] Within the Factory Department, this took the form of a requirement for detailed records of the numbers and types of different factories, instances of accidents and disease as well as prosecutions undertaken and fines imposed. Changes in the occupants of controlling positions in the Home Office and in the Factory

[49] Departmental Committee Appointed to Inquire into and Report upon Certain Miscellaneous Dangerous Trades (1895-1899). National Archives. HO45/9856/B123930.

[50] Two arbitrators (usually lawyers) were proposed, one by the Home Office and one by the employer. Each had to be accepted by both parties before the process of arbitration could begin.

[51] Factory and Workshop Act, 1901 (1Edw.7 c.22).

[52] Midwinter, E.C. (1968), *Victorian Social Reform,* Longman, London, pp. 44-59; Fraser, D. (1973), *The Evolution of the British Welfare State: A History of Social Policy since the Industrial Revolution,* Palgrave MacMillan, Basingstoke, pp.121-134, p.152.

[53] Bartrip, P.W.J. (2002), *The Home Office and the Dangerous Trades: Regulating Occuaptional Disease in Victorian and Edwardian Britain,* Rodopi, Amsterdam, New York, pp. 159-60.

Department brought further shifts in culture and approach. Alexander Redgrave, Chief Inspector since 1879, retired in 1891 and the following year saw the election of a Liberal government and the appointment of a new Home Secretary, Herbert Asquith. [54] At this juncture the relationship between the Home Office and the Factory Inspectorate appears to have undergone a radical change. Asquith was keenly interested in industrial health reform and determined to bring the work of the inspectorate into the mainstream of Home Office activity. Moreover, he began to institute a change of culture in the Home Office itself, creating a more innovative and proactive department. [55] The introduction of competitive entry requirements resulted in the recruitment of better educated civil servants. The inspectorate thus entered a new phase of development as an accountable part of an increasingly interventionist government.

Redgrave's successor, [56] R. E. Sprague Oram, [57] had first entered the inspectorate in 1861 and had worked his way through the ranks of the Factory Department during Redgrave's reign as Chief Inspector. Oram's tenure in the post was, in fact, relatively short-lived, lasting only four years. He retired in 1896 to be succeeded, not by an existing superintendent inspector, but by a physician, Arthur Whitelegge, [58] whose appointment appeared to signal a recognition of the growing importance of medicine in the practice of health and safety. [59] Despite his short term of office, however, Oram presided over a significant transition in the development the Factory Department and, in particular, was largely responsible for driving through one particular reform, the introduction of women inspectors. Redgrave's trenchant opposition had for many years constituted a considerable obstacle to this development. However, his retirement in 1891, as well as the appointment of a new Home Secretary in 1892, provided a window of opportunity for those women's organisations, notably the

[54] H.H. Asquith (1852-1928), Home Secretary, 1892-1895; Chancellor of the Exchequer, 1905-1908; Prime Minister, 1908-1916.

[55] Bartrip, P.W.J. (2002), *The Home Office and the Dangerous Trades: Regulating Occupational Disease in Victorian and Edwardian Britain,* Rodopi, Amsterdam, pp 41-42.

[56] Mr. Frederick Whymper was very briefly Redgrave's successor. He was appointed in October 1891 but retired due to ill health in January 1892.

[57]Richard E. Sprague Oram (1830-1909), See Appendix 1.

[58] Dr (Sir) Arthur Whitelegge (1852-1933), See Appendix 1.

[59] The first operational Medical Inspector of Factories, Thomas Legge, was appointed two years later in 1898. Dr (Sir)Thomas Legge (1863-1932), See Appendix 1.

Women's Trade Union League (WTUL) [60] which for several years had been committed to the establishment of a women's section. Oram, a strong supporter of the idea, immediately showed himself both willing and able to prevail against the considerable opposition which emanated from senior factory inspectors. [61] Asquith, meanwhile, was also enthusiastic, not least because of his close personal connections with a network of reformers dedicated to the cause. This included Liberal MP Charles Dilke and his wife Emilia, president of the WTUL, as well as Jack Tennant, [62] Asquith's private secretary, who chaired the Dangerous Trades Committee and who, with Dilke, was a prominent parliamentary advocate for occupational health regulation. In 1896 Tennant married Emilia Dilke's secretary, May Abraham, who in 1893 had became the first woman Factory Inspector, while in the same year Tennant's sister had became Asquith's wife. In recalling his support for the appointment of women inspectors Asquith said later that he considered they would be particularly well-suited to investigate problems associated with occupational health. [63] It was a view perhaps reinforced by the fact that the first major industrial health issue on his agenda concerned the employment of women in the white lead trade. Women inspectors promised to be useful allies in his efforts to negotiate a course through this highly charged and controversial issue. [64] It was against this background therefore that, in May 1893, May Abraham, the daughter of an Irish barrister and Mary Muirhead Paterson, the daughter of a prosperous Glasgow bootmaker [65] were appointed as the first female factory inspectors.

[60] The WTUL was an umbrella organisation formed by predominantly middle class women to promote the formation of women's trade unions. Further discussion of the WTUL is contained in Chapter 3.

[61] McFeely, M.D. (1991)*, Lady Inspectors. The Campaign for a Better Workplace, 1893-1921*, University of Georgia Press, Athens and London, p. 16.

[62] Harold John (Jack) Tennant (1865-1935), MP for Berwickshire. He served in a number of posts under Asquith: (i) Assistant Private secretary to Asquith 1892-5 (ii) Parliamentary Secretary to the Board of Trade 1909-1911 (iii) Financial Secretary to the War Office 1910-12 (iv) Under Secretary of State for War 1912-16. He did not serve under Lloyd George (who became Prime Minister in 1916) and lost his parliamentary seat in 1918.

[63] Earl of Oxford and Asquith (1926), *Fifty Years of Parliament*, Cassell, London, pp. 213-4, 230-1.

[64] See Chapter 4 for discussion of this subject.

[65] Mary Muirhead Paterson (1864-1941), See Appendix 1.

Chapter 3

The Formation of the Women's Factory Inspectorate

> ... it has been argued that where women are employed some enquiries could be more appropriately made by women…but it is seldom necessary to put a single question to a female. Possibly some details, here and there, might be superintended by a female inspector... but I fail to see advantages likely to arise from her ministrations in the factory...so opposite to her sphere of good work in the hospital, the school or the home. ...the general and multifarious duties of an inspector of factories would really be incompatible with the gentle and home-loving character of a woman...Factory inspecting requires activity and acumen and the stern authority of a man to enforce obedience to his interrogatories. [1]
>
> *Alexander Redgrave 1879*

In 1893 the appointment of women to relatively high positions within the civil service was almost unprecedented. While local public health departments had occasionally appointed women sanitary inspectors, only in the field of children's education and welfare had women previously been appointed at this level in central government. [2] Unsurprisingly Asquith faced considerable opposition from a number of Home Office officials and serving male inspectors, many of whom doubted the competence of women and considered them inherently unsuited to the role. He wrote later that 'Of all the innovations, the institution of female inspectors of factories and workshops was perhaps regarded in the office with most misgivings'. [3] In addition, there were administrative concerns about the organisation of the women's work. Instead of appointing the women to particular districts under the supervision of a superintendent inspector, as would have been the case with a male appointee, Oram elected to designate them as peripatetic, reporting directly to him. Moreover he drew up a list of duties largely based on those of a superintendent inspector, albeit at the rate of pay of a junior inspector (£200 per year) and omitting any responsibility for machinery safety. The latter was presumably regarded as outside the competence of women, given the nature of

[1] *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Office for the Year ending 32st October, 1879.* C. 2489 (1880), HMSO, London, p. 100.

[2] As inspectors of needlework in 1883, of boarded out children in 1885, and of domestic subjects in 1890. Martindale, H. (1938), W*omen Servants of the State, 1870-1938*, Allen & Unwin, London, pp. 36-38.

[3] Asquith, H.H. (1928), *Memories and Reflections, 1852-1927,* Little Brown, Boston, Vol.1, p. 229.

their educational backgrounds. They were to focus their inspections on the conditions of women and girls but, significantly, they were to inform the Chief Inspector of any problems they encountered amongst male workers, in order that these might be referred to the superintendent inspector of the district concerned. [4] Their position was therefore highly unusual and somewhat ambiguous. It is clear that many superintendents perceived them as an annoyance and even as spies for the Chief Inspector, while junior inspectors feared territorial conflicts and duplications of work which might generate confusion among workers and employers and potentially undermine their authority.

Certainly the early women inspectors appeared to have had a close and supportive relationship with Oram, which many superintendents must have found disconcerting and threatening. Inspector Lucy Deane noted in her diary in 1894 that Oram had warned her that Mr Dawkins-Cramp, Superintendent in the Midlands, disliked women inspectors and that she was to be careful in her dealings with him. [5] On other occasions she reported on the hostility and obstruction emanating from male inspectors. Some were 'disagreeable and when a woman is sent to help them they will send her to those places visited shortly before them... thus virtually wasting her time and rendering her position...ridiculous'. [6] Others were more subtle in their approach. Mr Arnold, District Inspector for Worcester was, she noted, 'very careless about Forms and Abstracts'. [7] He was also '*very* nice, but evidently wants to hoodwink me and keep me "harmless"'. [8] By contrast, Captain Bevan, the District Inspector for Nottingham met her for dinner one evening and 'at once burst into a furious tirade'. He accused her of 'going into places and finding fault where he had never done so'. He also professed himself to be 'very hurt about Miss Abraham's prosecutions'. [9] Deane recorded that she informed him that she was not his assistant, nor had she exceeded her instructions and at a later stage she reported the encounter to Oram, who confirmed that she had

[4] Instructions by the Secretary of State for her Majesty's Inspectors of Factories and Workshops as to the duties of Female Inspectors in the Inspection of Factories and Workshops, (1893), National Archives HO45/9772B1137AF.
[5] Deane, Lucy (5 May 1894), Personal diary, Modern Records Centre, University of Warwick, MSS.69/1/1-24.
[6] *Ibid.,* (6 April 1894).
[7] These were the posters summarising the provisions of the Factory Acts which were required to be prominently displayed in each workplace.
[8] *Ibid.,* (4 May 1894).
[9] *Ibid.,* 16 May 1894.

'behaved correctly'. [10] Male fears that the women sometimes operated as informants were perhaps not entirely unfounded. May Abraham seems to have relished the privileged position of the women, which rested in large measure on the support of Oram. Commenting on the hostility of some male inspectors she remarked to Deane that 'the men have been lax in their work...they are angry at what virtually amounts to an Inspection of their inspecting work'. [11] These examples serve to illustrate some of the attitudes which the early inspectors brought to their work as well as the difficulties they faced. Thus their appointment presented a considerable challenge to a factory inspectorate already undergoing radical change.

Viewed from the perspective of the Home Office, therefore, the appointment of the first two women inspectors was one of a series of significant and sometimes uncomfortable changes which took place during the 1890s. For Abraham, Paterson and their supporters, however, the perspective was somewhat different. Essentially these appointments represented the achievement of two objectives of which the first was the promotion of employment opportunities for middle-class women. Redgrave's comments of 1879, noted at the head of this section, encapsulated the attitudes which they sought to demolish. Secondly, however, the campaign for women factory inspectors was driven by wider concerns about industrial reform, and it is here that it came into conflict with certain aspects of contemporary feminism which, during the final years of the 19th century encompassed a broad spectrum of ideological positions. These ranged, for example, from the uncompromising ambition for total equality between the genders to the more moderate pursuit of parity, later termed 'social feminism', where the needs, qualities and aspirations of women were regarded as different but nevertheless of equal significance to those of men. [12] The tension between different ideological stances impinged on a number of feminist issues of the period and determined the degree to which they attracted the support of various individuals and organisations.

[10] *Ibid.,* (15 Jan 1895).
[11] *Ibid.,* (20 April 1894).
[12] Malone, C. (2003), *Women's Bodies and Dangerous Trades in England, 1880-1914*, Boydell Press, Woodbridge, Suffolk, pp. 31-32.

It is clear that the campaign for women inspectors was, from an early stage, based on notions of parity rather than total equality. By the early 1890s the driving force behind the campaign was the Women's Trade Union League (WTUL), an umbrella organisation which promoted and co-ordinated the activities of women's trade unions of the period. This organisation had, however, grown out of an earlier one, the Women's Protective and Provident League (WPPL), which adhered to the view that protective legislation was degrading to women and that banding together in trade unions was the primary means by which women could protect themselves and win equal employment rights. [13] In 1878, when the WPPL was transformed into the WTUL, its founding President, Emma Paterson, [14] although apparently maintaining support for total equality on various other matters, unexpectedly moved the WTUL behind the campaign for women inspectors. Historian Gerry Holloway has suggested that Paterson's uncharacteristic change of stance can largely be explained by simple pragmatism. [15] By the 1890s, she notes, it was becoming increasingly clear that the organisation of women into trade unions in order to address concerns about their employment conditions was an uphill struggle. As late as 1896, after years of campaigning by the WTUL, only approximately 142,000 of the two million women working in industry were trade union members and more than half of these came from the traditionally well-organised areas of the Lancashire textile industry. [16] Given these realities, various forms of state intervention, negotiated by women for women, appeared to be the most productive route to improvements in women's working conditions. Pragmatism aside, Paterson's actions may also have represented an acceptance that the tide of ideological opinion within the women's movement was turning more generally towards a position of social feminism. From 1878 Paterson and others pressed the case for women inspectors at successive meetings of the Trade Union Congress (TUC) and succeeded in pushing through a series of

[13] Holloway, G. (2005), *Women and Work in Britain since 1840,* Routledge, London, pp. 58-60.

[14] Emma Paterson (1848-1886), See Appendix 1.

[15] Holloway, G. (2005), *Women and Work in Britain since 1840,* Routledge, London, pp. 59-61.

[16] McFeely, M.D. (1991)*, Lady Inspectors: The Campaign for a Better Workplace, 1893-1921*, University of Georgia Press, Athens and London, p. 10; Drake, B. (1920, republished 1984), *Women in Trade Unions,* Virago, London. Table I, quotes 117.888 female union members in 1896 but notes that this did not include teachers, professional workers or those in semi-organised trades or enrolled in general labour unions. Drake records 106,540 female members of the textile unions, which is a higher percentage of total membership than that recorded by McFeely. Despite the variation in figures, both sources indicate that female union membership was predominantly a feature of the textile trades.

resolutions supporting the motion. Historian Helen Jones has noted, however, that official trade union endorsement was never translated into any form of action, most of which came from members of the WTUL with some sporadic support from some of the weaker men's unions. [17] The larger, more powerful, male-dominated trade unions continued to express reservations about the suitability of women for the inspectorate, especially if they were called upon to inspect workshops where men were employed. Moreover, pressure for the appointment of women inspectors threatened to divert attention from a current union campaign to persuade the Home Office to recruit more working-class men as factory inspectors.

The luke-warm attitude of the TUC reflected the uneasy relationship which had often existed between male trade unionists and feminist activists. Writing in 1920 on behalf of the Fabian Women's Group, [18] Barbara Drake described the various interchanges between the two during the 1880s, noting that many working men were simply dismissive of women's issues, which they regarded as trivial in the context of the wider labour struggles of the time. [19] For others, gender equality represented a threat to male employment prospects and wages, leading many women activists to suspect the motives of those male unionists who supported protective legislation for women. At the same time, historian Lee Holcombe has noted that many union men saw middle-class women as ill-informed 'do-gooders', ignorant of industrial life and of the very real need for protection of both men and women from ruthless employers. [20] As historian Ray Strachey observed 'The men's very genuine fears were put aside by the feminists as plain sex selfishness, while the ideals of the women were derided as middle-class ignorance by the men'. [21] Class-associated divisions were brought into sharp focus when arguments developed over the type of women who should be recruited to the inspectorate. Working women with direct experience of industrial conditions were favoured by male trade unionists and by Emma Paterson and other members of the WTUL. Officials at

[17] Jones, H. (1988), 'Women Health Workers: The case of the first women factory inspectors in Britain', *Social History of Medicine,* Vol. 1, part 2, pp. 165-182.

[18] The Fabian Society was established in the 19th century as a society of intellectuals dedicated to the promotion of socialism via gradual reform rather than revolutionary action.

[19] Drake, B. (1920, republished 1984), *Women in Trade Unions,* Virago, London, pp. 16-20.

[20] Holcombe, L. (1973), *Victorian Ladies at Work: Middle Class Working Women in England and Wales, 1850-1914,* David & Charles, Newton Abbott, p.170.

[21] Strachey, R. (1928, republished 1978), *The Cause*, Virago, London, p. 238.

the Home Office, however, were unequivocally of the view that only middle-class women were sufficiently well-educated and authoritative to command the necessary respect. This was a view shared by many feminist activists who, Jones argues, conceived of the job as part of their campaign to increase the employment opportunities of middle-class women, thus further alienating male trade unionists. [22]

Paterson's early death from diabetes in 1886 resulted in her replacement by Emilia Dilke as President of the WTUL. Dilke was primarily a social reformer whose strong support for protective legislation for women reflected the growing ascendancy of social feminism within the WTUL. The ensuing movement away from demands for total equality appeared to be broadly helpful to the League in that it encouraged the support of the male-dominated trade unions. Thus in 1890 the WTUL was able to organise, jointly with the TUC, a large promotional meeting at the Assembly Hall in London's Mile End Road. The gathering attracted considerable public and press interest and Emily Faithful, founder of the women's Victoria Press, [23] published a strongly worded article in *The Times* which underlined the premise that the interests of women workers could only be understood and protected by women. [24] In the same year, Emilia Dilke successfully argued that women needed special representation on the newly inaugurated Royal Commission on Labour since their limited unionisation might result in aspects of their working conditions being overlooked. The government agreed to appoint four Lady Assistant Commissioners, specifically to investigate the working conditions of women. The group was chaired by Eliza Orme, [25] a radical reformist lawyer. The others were Clara Collet [26] who had worked with Charles Booth to collect information for his report into working conditions in East London, [27] Margaret

[22] Jones, H. (1988), 'Women Health Workers: The case of the first women factory inspectors in Britain', *Social History of Medicine,* Vol. 1, part 2, pp. 165-182.

[23] The Victoria Press was started in 1860 by Emily Faithful who learned typesetting and went on to hire and train other women as compositors to work with her. She was opposed by male compositors and the Printers' Union, who traditionally excluded women from this trade. Prominent Victoria Press publications were the feminist *The English Women's Journal* and *The Victoria Magazine* both of which promoted employment opportunities for women.

[24] Faithful, Emily (19 February 1891), letter to the editor of *The Times*,

[25] Eliza Orme (1816-1892), See Appendix 1.

[26] Clara Collet (1860-1948), See Appendix 1.

[27] Booth's fifteen year investigation, eventually published in 1902, into the conditions of the poor in London was informed largely by questionnaire and interview and he recruited a number of people to assist with the survey.

Irwin, [28] a labour activist who was currently the Secretary of the Scottish Council for Women's Trades and May Abraham. How these women were selected is unrecorded, but their reformist backgrounds strongly suggest the influence of the Dilkes and their associates. Unsurprisingly, their detailed reports repeatedly underlined the need for women inspectors to address the myriad concerns of women workers which they identified. [29]

Early in 1893 a deputation of several women's organisations led by Emilia Dilke met with Asquith who finally agreed to the appointment of two women inspectors. Requests from women trade unionists that experienced factory workers should be appointed were overruled and it was agreed that the posts should be offered only to well-educated, middle-class women. Dilke, herself, had earlier expressed the view that the backgrounds of working women 'had not prepared them to take the initiative or to organise or to grapple on their own responsibility with work'. [30] As Holloway notes, Dilke was unlikely to press for the appointment of working women. As a liberal reformer rather than a feminist or socialist she was motivated by a desire to ameliorate poor conditions rather than to reform relationships dictated by capitalist power. [31] Jones has suggested that the appointment of middle-class ladies also offered some form of compromise to those who saw the advent of women inspectors as an unwelcome example of governmental concessions to the demands of labour activists. [32] Moreover, she argues, women inspectors could be used to defuse potential conflict situations in places where women were employed by addressing grievances in advance of any political action such as a strike. Certainly the matchmakers strike of 1888, widely considered to be the first example of organised action by women workers, had raised new issues in relation to the handling of female unionism. Historian Louise Raw has noted that both the police and the Home Office, fettered by social constraints on the physical or verbal treatment of women, were somewhat at a loss to know how to deal with female

[28] Margaret Irwin (1858-1940), See Appendix 1.

[29] Report of the Assistant Lady Commissioners. Royal Commission on Labour. The Employment of Women. PP XXXVI.

[30] Deane, Lucy (3 January 1894), Personal diary, Modern Records Centre, University of Warwick, MSS.69/1/1-24.

[31] Holloway, G. (2005), *Women and Work in Britain since 1840,* Routledge, London, pp. 93-4.

[32] Jones, H. (1988), 'Women Health Workers: The case of the first women factory inspectors in Britain', *Social History of Medicine,* Vol. 1, part 2, pp. 165-182.

militancy. [33] Women factory inspectors may thus have been regarded as a potentially useful governmental negotiating tool at a time of increasing industrial unrest.

Once appointed, the inspectors, as public servants, were required to maintain, at least overtly, a strictly neutral stance on political matters. In 1892 Eliza Orme warned Lucy Deane that if she joined the Factory Department she would need to 'keep clear of public speaking or sympathy with anything political or trade union etc' [34] because the government could not employ someone who conspicuously supported a particular cause. Deane apparently did not always heed this advice. She continued to contribute financially to the WTUL and three years later, when investigating working conditions in the Irish lace industry, recorded her close contacts with the Belfast Textile Workers Union. [35] May Abraham also had connections which rendered her vulnerable to accusations of partiality, particularly when a change of government in 1895 removed the protection of Asquith. Abraham was a close friend of Vaughan Nash, labour correspondent of the radical newspaper the *Daily Chronicle* which specialised in exposing scandalous working conditions. [36] Both Nash and his wife, radical journalist and suffragist Rosalind Shore-Smith, were members of the WTUL committee. [37] By contrast, Adelaide Anderson, for most of the period Principal Lady Inspector and thus the directing mind of the women's section, was socially (although not politically) conservative in her outlook and tended to stress the need for conformity with government requirements, a position which sometimes brought her into conflict with the more radically-minded Deane. During an inspection visit to Ireland in 1897, for example, Deane was intent on prosecuting the wealthy owners of handkerchief-making factories in Belfast whom she considered

[33] Raw, L. (2009), *Striking a Light: The Bryant and May Matchwomen and their Place in History,* Continuum International Publishing, London, p. 144.

[34] Deane, Lucy (27 October, 1892), Personal diary, Modern Records Centre, University of Warwick, MSS.69/1/1-24.

[35] McFeely, M.D. (1991)*, Lady Inspectors: The Campaign for a Better Workplace, 1893-1921*, University of Georgia Press, Athens and London, p.76.

[36] The *Daily Chronicle* (formerly the *Clerkenwell News*) was founded in 1876. Politically it supported the Liberal Party and published a number of articles in the 1890s highlighting poor factory conditions and the exploitation of workers.

[37] Vaughan Nash (1861-1932), became labour correspondent of the *Daily Chronicle* and also worked for the *Manchester Guardian* and the *Daily News*. In 1905, he was appointed Assistant Private Secretary to the new Liberal Prime Minister, Henry Campbell-Bannerman, and promoted to Principal Private Secretary by Asquith in 1908. Nash was married to a cousin of Florence Nightingale, Rosalind Shore-Smith, who was also a journalist, specialising in labour and suffrage questions and who was a member of the WTUL committee.

colluded with a system of truck, by knowingly allowing sprigging [38] to be placed with women outworkers by agents who paid in goods rather than money. Within this exploitative system, women outworkers were trapped in considerable poverty and perpetual debt. Deane considered that the real beneficiaries were the factory owners who usually claimed ignorance of the system and thus escaped legal sanction, while the less powerful and often relatively poor agents became the target of prosecution. Her relentless pursuit of factory owners, however, created considerable antagonism amongst influential industrialists at a time of delicate Anglo-Irish relations. [39] Her endeavours had to be abandoned when she received a telegram from Anderson who, having spoken to Chief Inspector Whitelegge, instructed her to curtail her activities. An outraged Deane wrote in her diary 'This *smells* of the Home Office'. [40]

These examples serve to illustrate the diverse attitudes which different inspectors brought to their work as well as the differing expectations of those involved in their initial appointment. Over time, as more women inspectors were appointed, this diversity inevitably increased. It is difficult and, it is argued here, ultimately unproductive to categorise these women in terms of any political ideological position or to assess their work within this type of framework. What is clear, however, is that the need to protect women from onerous and dangerous working conditions was implicit in their approach and that the special problems of women within the workplace were not only their primary focus but also the original justification for their existence. In their attempts to achieve this protection they employed a number of different approaches, which appear to have been determined by practical circumstances and by current developments in their professional field, rather than underpinned by ideology. Examples of these are discussed in the following chapters which consider four illustrative case studies.

[38] A form of simple lace work which formed a decorative border around a handkerchief.

[39] At this time of increasing Irish nationalism, Belfast industrialists were overwhelmingly Unionist and politically allied to the Conservative British government.

[40] Deane, Lucy (9 November 1897), Personal diary, Modern Records Centre, University of Warwick, MSS.69/1/1-24.

Chapter 4

Lead Poisoning in the White Lead Industry

> She was employed in shovelling white lead soaked with water, and would not in the performance of this work be brought into contact with any dust. The manager stated that she had always been looked upon as a healthy girl. All the doctor's entries referring to Annie Case except two are testimonies of good health. On one occasion she is marked 'very pale had better stop away' From the date of that entry an interval of two months elapsed before she recommenced work, when the entry is 'pale but well'. [1]
>
> *May Abraham, 1893*

In September 1893, four months after her appointment as a factory inspector, May Abraham was asked to submit a report to the coroner on the death of 19 year old Annie Case, a worker employed at the Millwall White Lead Company in East London. [2] Annie had died on the 9th August 1893, having been sent home from work by the foreman on the 18th July, because she appeared unwell. The doctor who attended following her death reported that she had died from 'the cerebral form of lead poisoning attended by colic...the blue line was present', [3] a reference to the blue line which appears on the gums following high exposure to lead. [4] Annie Case's death occurred at a time of heightened public and governmental concern about the hazards of employment in the white lead industry. During this period white lead was manufactured by the so-called 'Dutch method', [5] a process by which metallic lead was converted to lead carbonate, otherwise known as white lead. Some parts of this process which involved high exposure to lead-laden dust were carried out primarily by women. In 1883 special rules had been instituted which required the watering down of lead during such processes, thus accounting for Abraham's perhaps somewhat optimistic assessment that Annie Case would not have been exposed to dust during her work. Despite

[1] Abraham, M.A. Report of an enquiry into the death of Annie Case a white lead worker in the employment of the Millwall White Lead Company, (1893), National Archives HO45/9848/B12393A

[2] Inquest, (Aug 12, 1893), *Stratford Express.*

[3] *Ibid*.

[4] Hunter, D. (1975), *The Diseases of Occupations.* 5th edition, The English Universities Press, London, p. 260. A blue line visible on the gums consists of a precipitate of lead sulphide caused by the action of hydrogen sulphide on lead salts in the circulation. It is a marker of exposure rather than an indicator of poisoning.

[5] For details of this process see Appendix 2.

the supposed implementation of these special rules, public concern, fuelled by press agitation, remained high. Late in 1892 the *Daily Chronicle* had published a series of sensational articles about the unhealthy conditions in the industry. Under the various titles of 'Death in the workshop', 'White cemeteries: Massacre of the innocents', and 'Paralysis convulsions and death', the newspaper described how lead was unavoidably 'gasped into the lungs, swallowed in the saliva and absorbed through the skin' and how the symptoms of poisoning progressed through anaemia, headaches, vision problems, convulsions and death. Women without any alternative means of support, it was claimed, were forced to accept such employment and those fortunate enough to survive often suffered with chronic colic and paralysis. [6]

These articles heralded a chain of events in which the newly appointed women inspectors were to become central figures and which, in 1898, culminated in the enforcement of new special rules governing the production of white lead. [7] These rules contained a range of measures designed to prevent the inhalation or ingestion of dust. Significantly, however, they also required the exclusion of women from employment in those parts of the process where dust exposure was particularly high. This selective exclusion of women was an unprecedented and highly controversial approach to disease control. Although women, along with children, had previously been subject to a number of restrictions on their working hours [8] only in relation to mining and nightwork had the more extreme measure of total exclusion been employed, and in both these cases the measure appeared largely a product of moral rather than health and safety concerns. [9] Opposition to the exclusion of women from parts of the white lead trade came from a number of sources, notably from employers concerned about the economic impact on their industry and from the workers themselves who feared for their livelihoods. As noted in Chapter 1, some historians have argued that this legislation had no basis in contemporary scientific understanding, but rather reflected a

[6] 'Death in the workshop', (15 December 1892), *Daily Chronicle;* 'White cemeteries: Massacre of the Innocents', (21 December 1892), *Daily Chronicle;* 'Paralysis, convulsions and death', (28 December 1892), *Daily Chronicle.*
[7] Amended Special Rules. White Lead Works, (1898). National Archives. HO45/9853 B12393E.
[8] Factory and Workshops Extension Act, 1867(30 &31 Vict.c.46). Factory and Workshop Act, 1878. (41 Vict. c.16).
[9] Mines Act, 1842 (5 & 6 Vict. c.99); Factory Act, 1878 (41 Vict. c.16); Bartrip, P. (2002), *The Home Office and the Dangerous Trades: Regulating Occupational Disease in Victorian and Edwardian Britain*, Rodopi, Amsterdam, p. 61.

belief system that women were the weaker sex in need of protection. The white lead regulations, they have maintained, were instituted by a government heavily influenced by medical opinion which held that women were constitutionally unsuited to the workplace and should be confined to the domestic sphere. [10] This particular interpretation, however, which focuses rather narrowly on ideological issues, fails to consider the prevailing political and scientific climate of the period which was characterised by increasing state control over factory conditions, and by the growing application of medical knowledge to address health and safety concerns. Moreover, the exclusive emphasis on employment rights neglects the fundamental question of whether the regulations were, in fact, successful in reducing the risk of death and disease from lead poisoning. This chapter will consider the events leading up to the exclusion of women from parts of the white lead trade and examine the role the women inspectors played in the process. It will be argued that the inspectors' support for the measure reflected their agreement with contemporary medical opinion that women were more susceptible to lead poisoning than were men, and that female exclusion from parts of the trade was, in fact, successful in reducing lead poisoning in women. However, this success was tempered by an increase in cases in the men who took over the women's work. Ultimately the approach proved untenable as a long-term solution to the problem and attention soon moved to the use of preventative measures within the workplace. Thus, while the women inspectors played a central role in the formation and enforcement of regulations excluding women from parts of the trade, they were subsequently involved in efforts to reduce lead exposure in those parts of the industry where women were still employed. In this way their activities reflected the direction in which regulatory policy was moving at that time.

The Dangerous Trade committees of the early 1890s had identified four specific sources of industrial poisoning, namely arsenic, mercury, phosphorus and lead. Because of its extensive use in many parts of industry, lead represented by far the most serious problem in terms of the incidence of disease and the number of fatalities. In 1899, the first year in which deaths

[10] Malone, C. (2003), *Women's Bodies and Dangerous Trades in England, 1880-1914*, Boydell Press, Woodbridge, Suffolk, pp 139-42; Long, J. (1998), 'The Colour of Disorder: Women's employment and 'protective' intervention in the lead industry in Victorian England', *Women's History Review,* Vol. 7, Part 4, pp. 521-545; Lewis, J. & Davies, C. (1991), 'Protective legislation in Britain, 1870-1990: Equality, Difference and their Implications for Women', *Policy and Politics*, Vol. 19, Part 1, pp. 13-25.

were recorded separately, there were 1,258 cases of lead poisoning with 31 deaths. In the same year there were 8 cases of phosphorus poisoning and 1 death, no cases of arsenic poisoning, and 10 cases (no deaths) of mercury poisoning. [11] Even allowing for inaccuracies in the figures, the preponderance of lead poisoning cases was marked. Furthermore, as a result of the aforementioned campaign by the *Daily Chronicle,* the source of lead exposure which attracted most public concern during the 1890s was the manufacture of white lead and the workers considered most at risk were women. In 1895 lead poisoning became one of the initial six notifiable industrial diseases [12] and for the first time there was access to some form of statistical data which could be used to determine the size of a particular problem and measure the effectiveness of any intervention. An initial perusal of the returns from this reporting system (Figure 4.1, below) indicates that total cases of lead poisoning (all industries) as well as cases occurring specifically in the white lead industry, decreased substantially between 1896 and 1921. Cases in women fell dramatically after 1898 following their exclusion from the those parts of the process where dust exposure was particularly high, even though they continued to be employed in other parts of the industry. Cases in men showed an initial increase following the exclusion of women and then a steady fall, almost certainly reflecting the introduction of dust control measures. Data on male and female cases separately within the white lead trade were unavailable for the years of the First World War (1914-1918 inclusive). However, during the war female prohibition was relaxed to some extent in that women over the age of 35 were permitted to work in parts of the industry from which they had previously been excluded. [13] It seems likely, therefore, that many of the 52 cases which were reported during those four years were in women. By 1920 official figures suggested that lead poisoning in women had virtually disappeared. None of the 17 cases reported that year were in female workers.

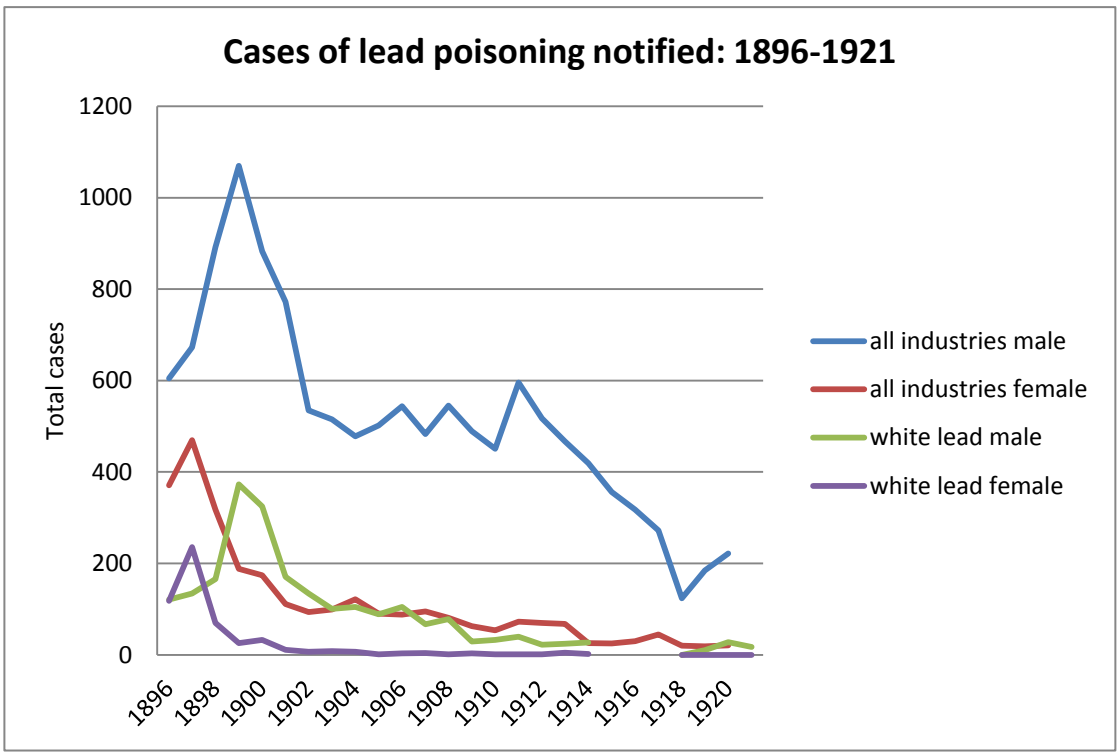
---

[11] Legge, T. M. (1934), *Industrial Maladies,* Oxford University Press, Oxford, p. 9.

[12] Under the Factory & Workshop Act of 1895 (58 & 59 Vict. c37) any employer or medical practitioner was required to notify any occurrence of six specific diseases to the Chief Inspector of Factories. The six diseases were anthrax, ankylostomiasis (hookworm), poisoning by lead, mercury, arsenic or phosphorus.

[13] Although this seems a curious decision, given that women of this age were more likely to be married, to have husbands at home rather than at the front, and thus to be involved in childbearing, it reflects a concurrent belief that younger people were more susceptible to poisoning. See Legge, T. M. & Goadby, K. W. (1912), *Lead Poisoning and Lead Absorption. The symptoms, pathology and prevention, with special reference to their industrial origin and an account of the principal processes Involving risk*, Arnold, London, p. 35.

Figure 4.1 [14]



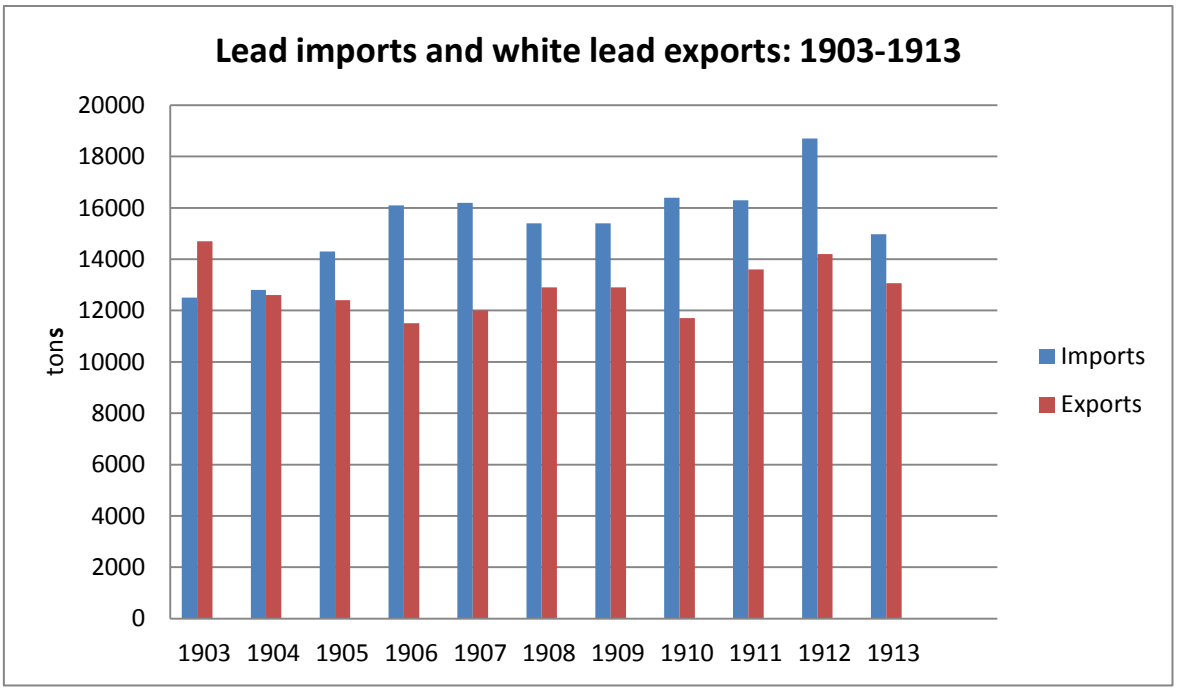
In 1934 Dr Thomas Legge, the first specialist Medical Inspector of Factories, published a comprehensive review of industrial lead poisoning covering the years since his appointment in 1898. [15] He described his cautious optimism at the reduction in poisonings during this period, but also some justifiable reservations in his interpretation of the data, pointing to a number of limitations and potential sources of bias. [16] Most obviously, the figures lacked a denominator in the form of the numbers of people employed in the industry during different years. Not only did this make it difficult to compare annual rates, but it precluded any meaningful comparison between males and females. Whilst the numbers of those employed were available for the pottery industry, which represented the main source of lead poisoning, for the white lead industry they were virtually impossible to obtain. In 1895, May Abraham observed that most white lead manufacturers employed both men and women on a casual basis, with workers moving in and out of employment at several points during the

[14] Derived from the annual notifications reported in the Annual Reports of the Chief Inspector of Factories and Workshops, (1896-1921), HMSO, London.
[15] Legge, T. M. (1934), *Industrial Maladies,* Oxford University Press, Oxford, pp. 47-69.
[16] *Ibid.,* pp. 57-8.

year in response to varying degrees of personal economic hardship. [17] Recognising these limitations, Legge estimated that approximately 1,201 persons (both men and women) were employed in white lead production in 1913 and that 1,119 were employed in 1914. This translated into 24 and 26 cases per thousand workers for 1913 and 1914 respectively. [18] If one assumes that similar numbers were employed immediately after the war the rate per thousand had fallen to 17 by 1920 and to 13 by 1921, an encouraging reduction on pre-war figures.

In the absence of precise figures there are reasonable grounds to assume that overall numbers employed in white lead manufacture did remain fairly stable throughout the period 1890-1920, excluding the war years. Some support for this view is provided by import and export figures (Figure 4.2, below).

Figure 4.2[19]



[17] Report of May Abraham on the results of her enquiry into the employment of women in the white lead trade in Newcastle, (1895), National Archives HO 45/9848/B12393A.

[18] Legge, T. M. (1934), *Industrial Maladies,* Oxford University Press, Oxford, p. 58.

[19] Derived from figures published in Rowe, D.J. 1983 *Lead Manufacturing in Great Britain,* Croom Helm, Beckenham.

Between 1896 and 1914 imports of pig [20] and sheet lead, from which white lead was manufactured, increased from 167,799 metric tons in 1896 to 224,916 metric tons in 1914. [21] The figures for UK exports of white lead between 1903 and 1913 showed some fluctuations but remained around 12,000 tons, with exports peaking at just over 14,000 tons in 1912. Overall, therefore, the figures suggest an expansion rather than a contraction in the industry and thus it seems reasonable to conclude that the fall in numbers of cases was not a reflection of a reduction in the numbers employed. Legge noted that the industry maintained regular production up to 1914, at which point it contracted to approximately 50% of previous output. White lead was predominantly used as a basic ingredient of paint, demand for which was considerably reduced during the war. In 1917 the industry was shut down completely for six months, but production resumed to about 60% of its former level in 1918 and increased thereafter. [22]

Legge also drew attention to the difficulties associated with the diagnosis of lead poisoning. In his 1934 publication *Industrial Maladies* he prefaced his section on diagnostic criteria with the following caution:

> One difficulty the medical man is faced with is that the cases of poisoning he is expected to notify do not present the same unequivocal signs that acute infectious diseases like smallpox and scarlet fever do. No absolute definition of what constitutes industrial poisoning is possible, and each practitioner in reporting what he 'believes' to be a case of industrial poisoning must form his own standard. [23]

In the early years in particular, therefore, reporting was likely to have been erratic and diagnosis uncertain. However, there are indications that for most of the period this may have lead to over-reporting rather than under-reporting, resulting in an overestimate of the size of the problem. More general experience with occupational disease reporting systems [24]

[20] Crude lead formed into lead ingots known as 'pigs' following smelting.

[21] Rowe, D.J. (1983), *Lead Manufacturing in Great Britain,* Croom Helm, Beckenham, p. 169.

[22] Legge, T.M. (1919), Industrial Poisoning, in *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918,* Cmd. 340, (1919), HMSO, London, p. 66.

[23] Legge, T. M. (1934), *Industrial Maladies,* Oxford University Press, Oxford, p. 5.

[24] Systems requiring notification to a central source of each occurrence of a disease. For a more recent example see Hussey, L. Turner, S. Thorley, K. *et al* (2010), **'**Surveillance of work-related ill-health; a comparison of occupational physicians' and general practitioners' reporting'**.** *Occupational Medicine,* Vol. 60, Part 4, pp. 294-300.

suggests that the apparent surge in cases up to 1897, in both sexes, was likely to reflect an increasing awareness of the disease notification system introduced in 1895 and compliance with its requirements, as well as the reporting of a back-log of pre-existing cases. It may also have owed something to an over enthusiastic application of the diagnostic criteria [25] by medical practitioners who were paid 2/6d for each reported case and could be fined up to £2 for failure to report a case. [26] The equally dramatic reduction in cases after 1900 may have reflected stricter adherence to these criteria. Legge noted that in the initial years of reporting, on average 6.8% of reports were found to be errors of diagnosis when routinely followed up by Home Office Certifying Surgeons. [27] Moreover, many reports were found to fall outside the remit of the reporting system, as a result of which, in 1900, the Home Office found it necessary to issue a special memorandum to all employers and medical practitioners which stated that, 'The opinion to be notified is not merely that the patient is suffering from lead poisoning, but that he is the subject of lead poisoning which the practitioner believes to have been contracted in a factory or workshop'. [28] Employers may have been more reluctant than medical practitioners to report cases, since each report prompted a visit from the Factory Inspectorate to ascertain compliance with special rules, often resulting in costly modifications to the workplace. However, they were required by law to employ a medical practitioner to examine workers on a regular basis and were thus largely unable to escape their obligations in this respect. It seems likely, therefore, that most errors associated with reporting practices were more likely to overestimate rather than underestimate the number of cases.

[25] Standard set of signs and symptoms which define the presence of a particular disease.

[26] Factory and Workshop Act, 1895 (58 & 59, Vict. c 37 s29).

[27] Cases notified by medical practitioners were followed up by 'certifying surgeons' employed by the Home Office. These were senior physicians who certified whether the case was genuinely one of lead poisoning and that it was caused by lead exposure in the workplace. Legge, T. M. & Goadby, K. W. (1912), *Lead Poisoning and Lead Absorption. The symptoms, pathology and prevention, with special reference to their industrial origin and an account of the principal processes Involving risk*, Arnold, London, p. 45.

[28] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, p. 127.

Significantly the Workmen's Compensation Act of 1906 [29] appeared to have no noticeably effect on the number of cases reported after this date. The Act extended compensation payable for industrial accidents to certain industrial diseases, including lead poisoning. Historian Peter Bartrip has suggested that any effect of the Act would be to increase notifications, not only because of the new incentive for current workers to report ill-health, but also because pre-existing and hitherto unreported cases of lead poisoning might now come to light. [30] However, certain features of the scheme, as it worked in practice, made this unlikely as far as white lead workers, and particularly women, were concerned. The requirement for the workers themselves to negotiate the claims process, the fact that it was the employers from whom the compensation was claimed and the scheme's non-application to cases of precautionary suspension, [31] all acted to discourage claims from poor, uneducated workers who were unsupported by organised bodies such as trade unions. Two cases described by Adelaide Anderson in 1908 underline the difficulties they experienced.

> The case of L.D. a lead worker is an illustration of the rudeness and indignity which workers often have to suffer when applying for compensation. L.D., aged 20, was attacked with lead poisoning. Her mother not knowing the proper method of applying for compensation, and being able neither to read nor write got a friend to write to the manager of the works, at which her daughter was employed and ask for "a little assistance". In due time came the following reply:-"I am in receipt of your letter of the –inst., and regret very much your daughter's illness. I should have been pleased to place your letter before my directors, but as you may suppose after the hundreds of pounds spent in taking the precautions that have been taken, and eliminating all risks they naturally will resent the sentence (i.e. her illness) just as does, Yours very truly, A.B." [32]

[29] Workmen's Compensation Act, 1906 (6 Edw.7 c.58). The previous Workmen's Compensation Act of 1897 had given workers the right to compensation if they were injured as a result of an accident at work. The 1906 Act extended this right to those who contracted one of the six notifiable diseases as a result of their work. Despite the title both Acts applied to women as well as men.

[30] Bartrip, P.W.J. (2002), *The Home Office and the Dangerous Trades: Regulating Occuaptional Disease in Victorian and Edwardian Britain,* Rodopi, Amsterdam, p. 123.

[31] Medical practitioners often advised suspension from work for a limited recovery period in those showing minor symptoms of lead poisoning.

[32] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1908*, Cd. 4664 (1909), HMSO, London, p.142.

> The position of lead workers suspended as a precaution, and who therefore obtain no compensation, is sometimes a bad one. X.Z., e.g. a girl of about 20, was suspended on account of anaemia for three months as a precaution, and as she could obtain no employment outside the lead process, it seemed doubtful whether illness from starvation would not be substituted for an attack of lead poisoning. [33]

Anderson also noted that many women assumed, wrongly, that compensation applied only to men. [34] Perhaps unsurprisingly, therefore, the advent of the scheme appears to have had no noticeable effect on notification figures which continued to show a steady downward trend after 1906.

Despite the obvious limitations of the available data it seems reasonable to conclude that there was a genuine and substantial decrease in cases of lead poisoning in the white lead industry between 1895 and 1921 and that the reduction in female cases commenced after women's exclusion from parts of the industry in 1898. The implementation of exclusion as a solution to the problem was ostensibly based on the assumption that women were biologically more susceptible than men to the disease. In the 1890s the adverse reproductive effects of lead exposure, in terms of the increased risk of miscarriage or foetal abnormality, were well-known, not only to physicians but also to large numbers of women who ingested lead in the form of diachylon [35] in order to abort unwanted children. Perhaps by extrapolation, many medical practitioners of the period also subscribed to the view that women were particularly susceptible to the other, haematological and neurological, effects of lead exposure. [36] Thomas Oliver, consultant physician at the Newcastle Infirmary [37] and widely regarded at the time as one of the foremost British experts on lead poisoning, was unequivocally of the opinion that women were more vulnerable than men to all

---

[33] *Ibid.*

[34] *Ibid*.

[35] Diachylon pills contained lead oxide and glycerine. Ransom, W.B. (1900), 'On lead encephalopathy and the use of diachylon as an abortifacient', *British Medical Journal* , 1900, pp. 1590-1.

[36] Most prominent effects are anaemia and a form of muscular atrophy most commonly evident in the characteristic 'wrist-drop' of workers subject to long-term exposure. Both effects were identified in the mid 19th century. Hunter, D. (1975), *The Diseases of Occupation,* 5th edition, The English Universities Press Ltd, London, pp. 256-60.

[37] Dr. (Sir) Thomas Oliver (1853-1942), See Appendix 1.

manifestations of lead poisoning. [38] He was, however, equally firm in his view that the workplace in general was an unsuitable environment for women, [39] and a number of historians have concluded that the two subjects were inextricably linked within a broader agenda to return women to the domestic sphere. [40] It has been suggested, for example, that the governmental decision to exclude women from parts of the lead industry was heavily influenced by Oliver's backing for the *Daily Chronicle* campaign. However, not all physicians shared Oliver's views. Thomas Legge, who exerted a major influence on industrial health policy from 1898 until his retirement in 1925, was keen to maintain a distance from what he termed the 'moral' aspects of the matter and to base his arguments on the scientific data alone. Writing as late as 1934 he noted:

> There is at all events no doubt as to the baleful influence of lead compounds on the uterine functions. I personally hold the view that the only restriction which should constitute a bar is employment directly interfering with the function of maternity, and employment in lead is the only one I know. I would prefer to leave it to women to say how far moral dangers should lead to restrictions. [41]

Legge also noted that those who were malnourished and otherwise in poor health were more vulnerable to the effects of all potential poisons, [42] a view endorsed by inspector Mary Paterson in 1908 when visiting women who had suffered from poisoning and thus been suspended from working in those parts of the lead works still open to women. Highlighting the difficult balance to be struck between ill-health and extreme poverty she observed that she was 'impressed from my visit to this woman, as well as others, with the importance of nourishing food for these workers. Poverty and consequent want of nourishment, were striking features in most cases'. [43]

---

[38] Oliver, T. (1902, reprinted 2004) *Dangerous Trades: History of Health and Safety at Work*, Continuum Press, Chippenham, p. 296.

[39] Oliver, T. (1916), *Diseases of Occupation from the Legislative, Social and Medical Points of View*, 3rd Edition. Methuen & Co Ltd, London, p. xviii.

[40] Malone, C. (1996), 'The Gendering of Dangerous Trades: Government Regulation of Women's Work in the White Lead Trade in England, 1892-1898', *Journal of Women's History,* Vol. 8, Part 1, pp.15-29; Harrison, B. (1991), 'Women's health or social control? The role of the medical profession in relation to factory legislation in late nineteenth century Britain', *Sociology of Health and Illness,* Vol. 13, No. 4, pp. 469-490.

[41] Legge, T. M. (1934), *Industrial Maladies,* Oxford University Press, Oxford, p. 64.

[42] *Ibid.,* p. 114.

[43] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904,* Cd. 2569 (1905), HMSO, London, p. 257.

In 1898 May Abraham wholeheartedly supported the decision to exclude women from the dusty parts of the white lead trade. Her report on the death of Annie Case found no evidence of blame attaching to the firm in respect of its adherence to existing special rules, instituted in 1883, nor did she find any evidence of non-compliance with the requirement for regular medical examinations and for periods of suspension. [44] Her report revealed a strict adherence to an official brief whereby records of medical examinations, attendance sheets and a factual description of the work processes were presented to her and duly reproduced. Her only concern seemed, in the circumstances, to have been a relatively trivial one. A scrutiny of Annie Case's employment record and her age, as revealed at the inquest, suggested that she had first been employed (illegally) under the age of 18 years. [45] It is possible that this report simply reflected Abraham's inexperience and her inability to detect the real situation at the works. However it is important to note that she was also constrained by the regulations and, in the event, detailed the only infringement for which she could find definite evidence. Others who were less constrained disagreed strongly with her findings. The Reverend Newland who, with his wife, ran the Canning Town Evening Home for Working Girls wrote to the coroner to say that both Annie and her sister were well known to them. Along with many other girls they had frequently talked of the bad conditions at the works and were often ill, but he added, 'they will not always talk in the absence of a lady', a remark which appeared to support one of the main arguments advanced for the initial appointment of women inspectors. [46] Annie's sister, he noted, had periods of sickness when she showed symptoms of lead poisoning, but had disappeared when asked to appear at the inquest to give evidence. [47]

Abraham was thus faced with a situation in which a woman had died and others were apparently ill in a factory where, to all outward appearances, regulations had been adhered to. This appeared to provide proof that existing regulations were insufficient to protect women from lead poisoning. Added to this, Abraham undoubtedly shared Oliver's conviction

[44] Abraham, M.A. Report of an enquiry into the death of Annie Case a white lead worker in the employment of the Millwall White lead Company, (1893), National Archives. HO45/9848/B12393A.
[45] Employment of young people in the white lead industry under the age of 18 years was prohibited under the Factory and Workshop Act 1878 (41 Vict. c. 16, s. 38).
[46] Reverend Newland (1893), letter to the East London coroner, National Archives, HO/45/9848/B12393A.
[47] *Ibid.*

that women and children were particularly susceptible to the lead's effects, something which she considered to have been confirmed by the results of her own investigations. In 1895 she had been asked by Sprague Oram to collect information on the health of women employed in the industry in the Newcastle area. With Mary Paterson she visited six factories and reported on cases of lead poisoning in men and women. Abraham considered that her statistics (summarised in Table 4.1, below) showed 'in a remarkable manner the greater susceptibility of women'. [48]

Table 4.1[49]

Total number of cases of lead poisoning in six white lead works, 1894, 1895.

	1894	1894	1895	1895
	Number employed	Number ill	Number employed	Number ill
Male	409	34	409	39
Female	385	234	385	268

Abraham added a number of comments to support her conclusions. First she noted that in two firms the numbers of cases far exceeded the numbers employed. Essentially, therefore, the figures for these firms represented multiple poisonings in some women. Precautionary suspensions due to poisoning, usually for between three and six months were, she argued, so common that women regarded employment in the white lead works as supplementary employment to be undertaken between periods of suspension. She also noted that statistics from one firm were omitted on the grounds that their comparison with those of other firms would be misleading. Messrs Cookson & Co, she said, had changed their processes in an attempt to reduce lead exposure, but following a further female death from lead poisoning at the works had decided to remove women from employment in this area altogether. According to Abraham's report the firm experienced no adverse economic consequences, having successfully employed eight men to do the work of eleven women. Moreover, she

[48]Report of May Abraham on the results of her enquiry into the employment of women in the white lead trade in Newcastle, (1895), National Archives, HO45/9848/B12393A.

[49] *Ibid*., Table reproduced from Report of May Abraham.

was informed that the women had been re-deployed on other work and reported improvements in their health as a result. Abraham also recounted the details of ten cases of married women who had suffered numerous miscarriages or given birth to children who subsequently died following convulsions.

It is difficult to argue with the conclusion that, in these lead works at least, more women were suffering from lead poisoning than were men. However, Abraham's contention that this provided proof that women were particularly susceptible to the disease, while understandable within the constraints of the available statistical methodology, is more difficult to sustain. There was an absence of exposure data to determine whether or not women were subject to higher exposures, no comparative data from workers unexposed to lead and no clear distinction between new and repeat cases. Consistent diagnostic criteria for lead poisoning were yet to be developed and the validity of reports from factory owners and women workers cannot be assumed to be reliable. Moreover, Abraham's information source in the cases of the ten married women was Dr. Oliver, a man apparently heavily influenced by his beliefs about the deleterious effects of female employment on the health and well-being of the family. Notwithstanding this potential source of interpretive bias, however, Oliver's data are questionable on other grounds. The use of case histories, derived from hospitalised patients, to demonstrate an association between an exposure and a disease is speculative at best, essentially constituting an exercise in hypothesis generating rather than hypothesis testing. In Oliver's patients, for example, congenital syphilis, known to be common during this period and to result in similar symptoms to foetal lead poisoning, would have provided an equally plausible explanation for the reproductive problems he described. [50]

In 1896, amid continuing reports of poisoning, the recommendations of a committee (the third of a series convened since the Dangerous Trades Committee of 1892) contained the proposal that women should be excluded from work in the 'whitebeds and stoves or any

[50] The similarity between the pattern of reproductive problems due to lead exposure and to syphilis was recognised at the time. Legge, T. M. & Goadby, K. W. (1912), *Lead Poisoning and Lead Absorption. The symptoms, pathology and prevention, with special reference to their industrial origin and an account of the principal processes Involving risk*, Arnold, London, p. 36.

place where white lead is packed'. [51] Significantly this committee (which included among its members Abraham's husband, Jack Tennant) noted that Abraham's recent report considerably strengthened the case for this course of action. Home Secretary Asquith, with his personal connections to Abraham and Tennant and, through them, to Vaughan Nash, editor of the campaigning *Daily Chronicle,* [52] was also a strong supporter of female exclusion. In 1895 the government passed enabling legislation which effectively allowed the prohibition of vulnerable groups from white lead production when and where this was considered necessary, without recourse to further legislation. [53] Pressure from conflicting interests, however, meant that the actual implementation of this prohibition did not take place until July 1898. The majority of employers objected strongly to most of the proposed special rules and even more strongly to the exclusion of women from the trade. Edward Troup, Permanent Under-Secretary of State at the Home Office, received numerous letters of protest from white lead manufacturers. L Tudor & Co of Hull expressed typical concerns:

> ...foreign manufacturers can obtain cheaper labour, are not hampered by legislation, and against the free import of his goods there is no opposing tariff, besides which the system of through rates from abroad will enable him to place his products in midlands and other centres at less or practically the same cost as the railway company will carry it for the English Maker. The abolition of female labour means such an immense addition to the cost of manufacture that competition with the foreigner will become nearly impossible, and the industry so far as England is concerned will almost become extinct in a few years.[54]

In 1896, Locke, Lancaster and Johnson & Sons Ltd, occupiers of the Millwall White Lead works, where Annie Case had been employed, wrote to ask for a year's grace in implementing special rules because of the cost involved, a delay which was subsequently agreed to by the government. [55] In the same year a petition was received from workers in the North East under the title:

---

[51] *Annual Report of the Chief Factory Inspector for the Year 1899*, Cd. 223, (1900), HMSO, London, p. 49. See Appendix 2 for an explanation of the terms 'whitebeds' and 'stoves'.

[52] Abraham and Tennant were close friends of Vaughan Nash, who was a frequent visitor at the house of Lady Dilke, President of the WTUL.

[53] This was an amendment to Section 8 of the Factory and Workshop Act of 1891 (54 & 55 Vict. c.75).

[54] L Tudor & Co of Hull, letter to the Home Secretary, (May 1896), National Archives, HO45/9856/B12393AC.

[55] Locke, Lancaster and WWR Johnson & Co, letter to the Home Secretary, (May 1896), National Archives HO45/9856/B12393AC.

> We the undersigned female workers employed in the various lead works on the Tyne nearby beg to draw your attention to the very serious consequences it will be to us if women's labour is entirely abolished in the lead works. Many of us are widows with large families to support- others have no means of getting a living except by this kind of work therefore should this act come into force the consequences will be very serious for us. [56]

The petition contained over 500 names, about a quarter of which were represented by an X. It is difficult to determine the nature and extent of the influence exerted by employers on the preparation of this petition. However, Troup noted that, in assuming exclusion applied to the whole industry rather than to some parts of the process only, the signatories appeared to be misinformed as to the nature of the proposed regulations. [57] As this correspondence accumulated, Troup embarked on a process of persuasion, informing employers that some firms had already re-organised successfully without significant economic cost. In April 1896 he informed Asquith that the government was now in a strong position as 'one of leading firms Messrs Cookson has accepted and will give evidence in favour', adding that some firms, particularly the smaller ones, were likely to back down anyway since this 'often happened once arbitrators were appointed'. [58] (It was at this point that employers were required to lodge details of their objections, with supporting evidence, within fourteen days). Negotiations eventually came to an end in 1898 when the government succeeded, without recourse to arbitration, in persuading the majority of white lead manufacturers to fall in behind the lead of Cooksons, and regulations specifically excluding women from work in the 'whitebeds' and 'stoves' were implemented.

The contribution of the women inspectors to the formation of these regulations, notably in terms of the information they provided, has attracted suggestions that they were either insensitive to or unconcerned with the employment rights of working-class women. [59] However, there is no evidence that their support for this particular policy reflected more

[56] Petition to Home Secretary from female lead workers of Newcastle on Tyne**,** (June 1896), National Archives HO45/9856/B12393AC.

[57] Edward Troup (12 June 1896), memo to the Chief Inspector of Factories, National Archives HO45/9856/B12393AC.

[58] Edward Troup (April 1896), memo to the Home Secretary. National Archives, HO45/9856/B12393AC.

[59] Malone, C. (1996), 'The Gendering of Dangerous Trades: Government Regulation of Women's Work in the White Lead Trade in England, 1892-1898', *Journal of Women's History,* Vol. 8, Part 1, pp.15-29.

general support for reductions in female employment. Rather they appear to have been motivated by pragmatism derived from their knowledge of the real situation on the ground. Their reports contained numerous accounts of the hardship experienced by working women, revealing a realistic appreciation of their difficulties as well as an overriding respect. In 1908, for example, Anderson described the fortitude of one woman, struggling to support a family while suffering from lead poisoning as 'nothing short of heroism'. [60] Given these realities the notion of preserving the rights of working women was perhaps interpreted first and foremost in terms of the right to health and ultimately to life. Abraham, the most senior of the five women inspectors in post at the time exclusion was agreed, genuinely believed that women were more vulnerable to the effects of lead than were men. In 1898, when the measure was implemented, opinion on the matter was divided and remained so for many years. Writing in 1929, Harvard Professor Alice Hamilton, an internationally acknowledged expert on occupational health and industrial toxicology, recorded her uncertainty on the subject after careful appraisal of the data on lead poisoning from around the world, including the British figures. She also recorded the results of an investigation of the pottery trade in parts of the USA, carried out in 1921. Observing that this study was 'far more thorough' than an earlier one carried out by herself in 1912 she noted that 'although men are far more exposed to lead in this trade than women, there is more plumbism [61] among the women than among the men'. [62] It is clear, therefore, that even by the 1920s well respected occupational physicians were undecided on the matter. [63]

It is undeniable that this legislation may have resulted in the destitution of some female workers who were unable to obtain alternative employment, although opinion is divided on this point and hard evidence is difficult to find. What is clear, however, is that a number of women in other industries who experienced lead poisoning did become destitute, not because they were excluded from work by legislation, but because they became too ill to

[60] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1908*, Cd. 4664, (1909), HMSO, London, p. 142.

[61] Contemporary term for lead poisoning.

[62] Hamilton A. (1929), *Industrial Poisons in the United States*, MacMillan, New York, pp. 8-9.

[63] The issue was only resolved with the advent of more sophisticated measurements of exposure involving blood testing in the 1930s and bone x-ray spectometry in the 1980s, alongside developing knowledge of the biological mechanisms involved in lead poisoning.

work. [64] Significantly the actions of the women inspectors were strongly supported by trade unionist Mary Macarthur, founding president of the National Federation of Women Workers. [65] Although opposed to the general principle of exclusion as a means of protection, Macarthur recalled and justified her position on the white lead industry at the Trades Union Congress of 1909. 'We have helped get women out of the mines, and out of the white lead works,' she stated. 'Where there is special danger to women, where there is proof of the injurious effects to children, we are prepared to advocate that women should not be allowed to work until such time as the trade can be made a healthy one'. [66] For Macarthur, the exclusion of women, a measure which effectively highlighted the serious risks to their health, was justified in certain circumstances in the interests of pursuing the longer term aim of improving conditions in the industry as a whole. Adelaide Anderson, later appointed as Principal Lady Factory Inspector, adopted a similar stance, underlining her own opposition to more general female exclusion from employment in 1894 when she provided a report to the Chief Factory Inspector on the differences between French and British factory regulations. Noting the long list of occupations from which, under French legislation, women were excluded she observed that 'while it is only possible to admire the decision which excludes all children and young growing persons from nearly every occupation which has dangerous or hurtful possibilities in it, it is impossible to restrain astonishment at the considerable list of occupations from which women are excluded, and which they might with *due care and regulation* (Anderson's italics) work with as much safety as men.' [67]

In the white lead industry the exclusion of women in 1898 was followed by a marked increase in male poisoning cases, something which Anderson was quick to highlight in order

[64] A*nnual Report of the Chief Inspector of Factories for the Year 1908,* Cd. 4664 (1909), HMSO, London, pp. 142-3.

[65] Mary Macarthur (1880-1921) was a member of the Council of the Independent Labour Party from 1909-1919 and by 1919 was a member of the Executive of the Labour party.The National Federation of Women Workers was a trade union formed from a number of smaller women's unions. By 1914 it had over 20,000 members. It merged with the National Union of General Workers in 1921.

[66] Mary Macarthur, (1909), Report of the Trade Union Congress. Reported in Drake, B. (1920, republished 1984), *Women in Trade Unions,* Virago Press, London, p. 67.

[67]*Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1894*, Cd. 7745 (1895), HMSO, London, p. 11.

to press home the point that the real solution lay in the improvement of preventative measures.

> 10 men are now paid 7/6 a day for doing work for which 13 women formerly received 2/6 a day – some had to employ as many men as women at double the wages and no better results. The immediately observable ill effects on men's health of the dangerous employment, to a degree for which no payment can compensate gives rise to the hope that the indirectly increased cost of labour will hasten the development of new methods in industrial technology to lessen or remove its dangers. [68]

Following female exclusion, the industry experienced considerable difficulty in attracting males to replace female workers, despite the increased wages offered to men. Work in the white lead industry, it seemed, was so poorly paid and so unpleasant that only those with little alternative would undertake it. In 1893, for example, a pamphlet published by the Humanitarian League on the subject of women's working conditions contained the observation that, 'it is mostly women of the very poorest and roughest class who offer themselves to work in the white lead factory. The widow who has a family to support, the wife of a drunken husband, the girl whose character will not bear scrutiny – these are the candidates for employment'. [69] Thus many men were reluctant to fill the jobs vacated by women and as a result large numbers of Italian immigrant workers, previously employed in lead smelting works where wages were even lower, were recruited into the trade. [70] This appears to have exacerbated the problem of male poisoning. In 1899 the factory inspector for East London reported that such workers were poorly fed and ill-clothed as well as entirely ignorant of the regulations now operating in the white lead works, factors which

---

[68] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1898,* Cd. 27 (1899), HMSO, London, p. 166.

[69] Mallett, C (1893), *Dangerous Trades for Women,* Humanitarian League, Pamphlet No. 9, William Reeves, London, p. 8. The Humanitarian League was formed in 1891 by Henry Salt, a writer and campaigner for social reform. The League aimed to apply rational principles to oppose all forms of cruelty in society. Its members used tracts, lectures and letters to newspapers to address a wide range of issues including hazardous industries and the sweated trades.

[70] The collapse of the rural economy in southern Italy during the late 19th century resulted in the mass emigration of Italian labourers. From the early 1880s many settled in Britain, particularly in London, where they experienced poor living conditions and low paid employment. The Italian population of London in 1901 was estimated at 11,000. Hatton,T.J. and Williamson, J. G. (1994). 'What Drove the Mass Migrations from Europe in the Late Nineteenth Century? *Population and Development Review*, Vol. 20, Part 3, pp. 533–559.

rendered them highly vulnerable to poisoning. [71] In that year the Certifying Surgeon reported 85 male cases at the Millwall works of which 58 were in Italian workers. [72] These observations offered some support for the view that it was the level of dust exposure rather than the sex of the worker which was the determining risk factor. This was the conclusion reached by Thomas Legge who did not consider that the exclusion of women constituted a real solution to the wider problem of lead poisoning. Rather he concluded that the steady reduction in cases up to 1921 and beyond, reflected a range of other measures designed to reduce exposure to dust. Thus he observed, 'I emphasise again after perusal of some 25,000 cases which have accumulated in the past that locally applied exhaust ventilation is the sheet anchor in the protection of workers from leady dust and fume and that these are alone the causative agents.' [73] In 1912 Legge and Certifying Surgeon Dr. Kenneth Goadby [74] had published a comprehensive text on the subject of industrial lead poisoning [75] which included a guide to prevention and control. [76] In this text they described current methods for the measurement of dust and fumes, provided recommendations for the installation of ventilation ducts, hoods and fans and for the provision of respirators. The importance of workplace cleanliness was emphasised, notably the separation of work and dining areas and the provision of overalls and washing facilities for the workers. It is clear, therefore, that a number of measures for the reduction of lead exposure, based on the assumption that the inhalation and ingestion of dust were the primary risk factors, were available by this date. Such measures were progressively included in the special rules of 1898, (amended in 1899 and again in 1911 [77]) which, having been accepted by employers in 1898, became legally

[71] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899,* Cd. 223 (1900), HMSO, London, p. 134.
[72] *Ibid.,* p. 308.
[73] *Annual Report of the Chief Inspector of Factories and Workshops for the Year* 1919, Cmd. 941 (1920), HMSO, London, p. 61.
[74] Among other appointments Kenneth Goadby was certifying surgeon to smelting and white lead factories in East London.
[75] Legge, T. M. & Goadby, K. W. (1912), *Lead Poisoning and Lead Absorption. The symptoms, pathology and prevention, with special reference to their industrial origin and an account of the principal processes Involving risk*, Arnold, London.
[76] *Ibid*., pp. 199-241.
[77] Amended Special Rules (1899) under the Factory and Workshop Act, 1891 (54 & 55 Vict. c.75); Amended special rules, Special order 79, (1911), under the Factory and Workshop Act, 1901 (1 Edw. 7 c.22).

enforceable from that date. [78] Moreover, under the provisions of the Factory and Workshop Act of 1901, the right of employers to insist on arbitration was removed. [79]

It is clear, therefore, that despite the initial decision to exclude women from parts of the white lead trade, the Factory Department was, by 1898, rapidly moving away from this type of approach as a solution to the problem of industrial disease. Instead it turned to the use of control measures within the workplace, an approach which involved the women inspectors in a central role. From the mid 1890s, their reports were indicative of a programme of regular visits to all white lead manufactories, the locations of which were detailed in the Annual Reports of the Chief Inspector. [80] Any notified case of lead poisoning required a follow-up visit from an appointed factory surgeon to confirm the diagnosis, as well as an advisory visit from the factory inspector to ascertain compliance with special rules. These visits sometimes resulted in prosecutions, usually of employers, but occasionally of workers who also had legal responsibilities under the terms of the special rules, for example to comply with regulations regarding washing and the use of overalls and face masks. In general, however, women inspectors seemed reluctant to prosecute in cases involving white lead exposure, preferring to act in an advisory capacity. Most appear to have followed the lead of Anderson who, in 1909, considered that the reports of the women inspectors showed that 'much good work can be done without resort to prosecution'. [81] In 1897 Mary Paterson had brought a case against a Scottish white lead company where a young girl had died of lead poisoning. However, under cross examination the factory doctor who originally notified the case became less certain of his diagnosis and the case was not proven. Paterson commented that the decision of the sheriff in this case 'did not encourage one to repeat the experiment'. [82] In general, prosecutions were rare and usually undertaken by male inspectors. Of twelve prosecutions for infringements of the white lead regulations recorded

[78] Enabling powers were contained in Section 28 of the Factory and Workshop Act of 1895 (58 & 59 Vict. c.37).
[79] Factory and Workshop Act, 1901. (1 Edw. 7 c.22).
[80] Numbers of firms operating under special rules were recorded annually in the Report of the Chief Factory Inspector. For example, in 1899 there were 28 white lead works in the UK. This number had fallen to 20 in 1910, and was 21 in 1914.
[81] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1909*. Cd. 5191 (1910), HMSO, London, p. 163.
[82] *Annual Report of the Chief Inspector of Factories for the Year 1897*, C. 8965 (1898), HMSO, London, p. 96.

between 1896 and 1900, [83] two related to employment of a young person [84] in a prohibited industry, but none to illegal employment of women. Cases of poisoning in women were substantially reduced after 1898 but those that did occur were routinely referred for follow-up to the women inspectors, providing a specific framework for their programme of work. In 1909 Adelaide Anderson reported that the diminishing number of cases of industrial poisoning in women 'prevented over-taxing of the resources of the inspectors' [85] indicating that in this field at least they felt equal to the demands made upon them in terms of inspection and advice.

As well as highlighting infringements of the regulations, visits by women inspectors often identified the particular difficulties experienced by women workers. In 1895, for example, Lucy Deane drew attention to the reluctance of women to wear respirators [86] since these had previously been worn by other workers and were left unwashed. She observed that 'most people would object to wearing a respirator which is worn in turn by other persons as well, or to wearing one which age, constant handling, use, constant washing etc. has reduced to a mere rag'. [87] As a result employers were subsequently required to provide women with personal respirators or to make arrangements for them to be washed after each day's work. Mary Paterson observed in 1895 that the requirement for women to change their boots before going home failed to take account of the fact that very few of the women employed in white lead manufacture possessed more than one pair of boots. [88] While this reflected her sensitivity to the needs of the workers and also her realism, there is no record of how the difficulty was resolved. More generally, however, the special clothing required by the regulations largely became the responsibility of employers. During the arbitration process of 1898, the women inspectors successfully argued that employers

[83] Lists of prosecutions were routinely recorded in the Annual Reports of the Chief Inspector. Until 1900 prosecutions relating to individual industries were recorded separately with details of the firm and the offence. From 1900 they were grouped according to broad industrial sector or by type of offence. It is not possible, therefore, to separate out offences relating specifically to white lead works after this date.

[84] Under the age of 18.

[85] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1909*. Cd. 5191 (1910), HMSO, London, p. 143.

[86] 'Respirators' at this period referred to face masks, not to air-fed helmets as today.

[87] *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1895*. C. 8067 (1896), HMSO, London, p. 113.

[88] *Ibid.,* p. 114.

should bear the cost of providing overalls and ensuring that these were regularly washed, something to which employers had been steadfastly opposed and which had for a time proved to be a major sticking point in the negotiations. [89]

The provision of washing and sanitary facilities which were suitable for women was something the women inspectors returned to repeatedly in their annual reports. This was particularly important in the white lead works because of the regulatory requirement for a weekly bath to reduce dust on the skin. [90] In 1898 Adelaide Anderson reported that 'In one works, where elaborate bathing and lavatory appliances had been introduced in compliance with the Special Rules, I was amazed to find more unsuitable and inadequate sanitary accommodation for the women than I have seen in any but the worst cases in the old Lancashire mills'. [91] By 1907 she was able to report that 'much has been achieved as a direct or indirect consequence of the order of 1903', [92] but that 'the slowest progress is in making arrangements that have due regard to suitability and protection of the modesty of the workers, a very serious matter.' [93] Rose Squire, noting the lack of partitions and doors, similarly commented on 'the unsuitability from the point of view of modesty and morality of otherwise excellent, newly erected sanitary conveniences', [94] while in Glasgow, Mary Paterson considered that the facilities were 'insulting to the respectable girls employed'. [95] It is possible to interpret this preoccupation with sanitary arrangements as an imposition of middle-class standards of modesty and morality on an unconcerned factory workforce. However, it is important to recognise that for much of the 19th century such arrangements

[89] Special Rules Arbitration, (28 Nov. 1898), National Archives HO45/9853 B12393E.

[90] The provision of facilities to enable workers to have a weekly bath was a requirement contained in the regulations of 1898 to prevent dust accumulating on the body. It derived from a belief that lead could be readily absorbed through the skin.

[91] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1898.* Cd. 27 (1899), HMSO, London, p. 166.

[92] The Sanitary Accommodation Order (1903), under Section 9 of the Factory and Workshop Act 1901, (1 Edw. 7 c.22) required separate and clean accommodation for males and females, sufficient accommodation for males and females and privacy, with doors and fastenings, and partitions between adjacent closets provided for females.

[93] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1907*. Cd. 4166 (1908), HMSO, London, p.160.

[94] *Ibid.*

[95] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, p. 363.

were largely absent from workplaces and those that existed had been constructed entirely for the use of men. When the 1903 regulations required the construction of improved facilities the inspectors found that on numerous occasions these had once more been constructed to serve the needs of an exclusively male workforce.

Inspectors also noted the failure of some employers to understand the practicalities of reducing dust exposure. In 1895 Mary Paterson visited a works in Newcastle where she observed the presence of a ventilator with a hood in the packing area of the factory but that 'unfortunately the actual packing was carried out some distance away from the ventilator, the space under the hood being occupied by already packed closed barrels' [96] In 1913 Inspector Emily Sadler visited a factory where two cases of poisoning had occurred in women employed in stacking and filling the 'blue beds', [97] a process considered to be relatively free of dust. She observed, however, that the dust- laden 'white beds' were stripped in close proximity to areas where the women were employed and that the gangways were covered in dust and never washed. Moreover the women carried lead on boards on their heads. They carried, she said, 'between thirty and 50 lbs of lead at a time up ladders ten to fifteen feet high'. [98] These boards had previously been used in the 'white beds' and thus were also impregnated with dust. Other women were employed removing these dust-laden boards from the white beds, a process which had been omitted from the special rules. Sadler obtained a voluntary agreement from the firm concerned to cease this practice, despite the absence of any formal regulations on the subject. [99] A similar agreement was obtained by Mary Paterson in 1898 on discovering women employed in sweeping passages alongside the stacks, an activity omitted from the terms of the formal regulations, but involving high exposure to lead laden dust. [100]

---

[96] *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1895*, C. 8067 (1896), HMSO, London, p. 114.

[97] See Appendix 2 for an explanation of this term.

[98] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1913,* Cd. 7491 (1914), HMSO, London, p. 87.

[99] *Ibid*.

[100] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1898*, Cd. 27 (1899), HMSO, London, p. 166.

Finally, the women inspectors were instrumental in the introduction of detailed record keeping, whether this related to the time of the required weekly bath, the findings of routine medical examinations or the date of any suspensions because of ill-health. [101] Use of these records enabled Mary Paterson to draw attention to any escalation in health problems occurring in a particular workplace or to the failure of employers to prevent the re-employment of those with a history of lead poisoning. On visiting some women at home, for example, she identified cases where women had been suspended with serious symptoms including convulsions, had worked in other jobs such as fish curing for a short period and then re-applied to the white lead works and obtained employment. Examples such as these illustrate that the role of the women inspectors in addressing the problem of lead poisoning went far beyond the initial decision to exclude women from the dustier parts of the trade. Moreover, the methods they employed were highly reflective of a developing approach to industrial disease which was more in keeping with that already adopted in the field of accident prevention and machinery guarding, namely the institution of control measures within the workplace. Ultimately, it was this approach which contributed most significantly to the reduction in cases of poisoning.

[101] *Ibid.,*p. 114.

Chapter 5

Accidents and Injuries in Laundries

> There are many considerations which ought to induce all to attend to the duties of cleanliness. It is *personal* duty, that is to say, a duty which we owe ourselves individually; it is a *social* duty, that is, a duty we owe to society; and it is a *religious* duty, that is, a duty which we owe to God. [1]
>
> Reverend G.B. Dickson 1852

The link between cleanliness and morality which formed the subject of the Reverend Dickson's sermon in 1852, was well-established by the end of the 19th century as was the association between attention to personal hygiene and social status. Thus *Routledge's Manual of Etiquette* in 1860 advised that 'in these days of public baths and universal progress, we trust that it will be unnecessary to do more than hint at the necessity of the most fastidious personal cleanliness...a soiled shirt, a dingy pocket handkerchief, or a waistcoat that has been worn once too often are things to be scrupulously avoided by any man who is ambitious of preserving the exterior of a gentleman.' [2] By the 1880's the burgeoning urban population in Britain included a substantial middle-class keen to embrace the social values which would distinguish them from the lower strata in society. The maintenance of clean clothes and household linen represented an important element of these aspirations. 'At the bottom of our social ladder is a dirty shirt', wrote author Stephen Reynolds in his early 20th century novel about family life in Devon, [3] while Robert Roberts, in his memoir of a Manchester slum during the same period, noted that clean clothes were an important marker of social status within all classes. 'Tradesmen', he observed, 'took pride in wearing stiff collars even in the workshop'. [4] Added to this, new knowledge about the role of bacteria in the development and spread of disease [5] further reinforced the popularity of

---

[1] Dickson, G.B. (1852), Sermon 'On Cleanliness', Edinburgh. Quoted in Mohun, A.P. (1999), *Steam Laundries. Gender, Technology and Work in the United States and Great Britain, 1880-1940.* John Hopkins University Press, Baltimore, p. 35.

[2] *Routledge's Manual of Etiquette* (1860), Routledge, London, p. 49.

[3] Reynolds, S. (1908, republished 1982), *A Poor Man's House*, Oxford University Press, Oxford, p. 57.

[4] Roberts, R. (1971), *The Classic Slum: Salford Life in the First Quarter of the Century*, University of Manchester Press, Manchester, p. 22.

[5] Wohl, A.S. (1984), *Endangered Lives. Public Health in Victorian Britain,* Methuen University Paperbacks, London, p. 69.

cleanliness, not only as a personal aspiration but also as a social duty. The large quantities of dirty washing generated by middle-class households during this period, however, frequently exceeded their capacity to maintain the desired standards of respectability. [6] Many houses lacked the space, the equipment, the staff or the water to provide a regular supply of clean linen. Drying was a particular problem since items hung outside in the smoke-laden air of large cities rapidly became covered in smuts. The growth of commercially operated laundries with established water supplies, employing groups of women who operated increasingly sophisticated equipment provided an answer to these difficulties. Thus the urbanisation of the 19th century which led to the growth of the so-called 'sweated trades' [7] also encouraged the rapid expansion of the laundry industry. Not only did laundries provide a service to middle and upper-class households but they also found a ready market amongst the thousands of clerks and business men living in single rooms, whose rising social status required high standards in terms of personal appearance. [8] By the end of the 19th century the proliferation of laundries to serve the needs of the wealthy inhabitants of Kensington and St John's Wood had earned for the neighbouring district of Kensal Town the title of 'Soapsuds Island'. [9]

The majority of laundries established at this time were small businesses situated in basement rooms or on the ground floors of multi-occupancy dwelling houses. Most employed no more than a dozen workers of whom the majority were women. Inevitably the atmosphere of laundry premises was damp and steamy with fetid odours arising from dirty clothes. Any windows were invariably sealed to prevent smuts alighting on newly washed linen. [10] Working hours usually exceeded sixty over six days, rarely with any provision for

---

[6] Mohun, A.P. (1999), *Steam Laundries. Gender, Technology and Work in the United States and Great Britain, 1880-1940.* John Hopkins University Press, Baltimore, pp. 39-40.

[7] Defined by the Select Committee of the House of Lords on the Sweating System, (1890) as 'wherever workers spent long hours in poor conditions for only low wages'. Bythell, D. (1978), *The Sweated Trades: Outwork in Nineteenth Century Britain,* Batsford Academic, London, p. 232.

[8] Mohun, A.P. (1999), *Steam Laundries. Gender, Technology and Work in the United States and Great Britain, 1880-1940.* John Hopkins University Press, Baltimore, p. 41.

[9] Harper-Smith, T. (1990), *Kensal New Town,* Local History Booklet, Kensington and Chelsea Local Studies Department, London.

[10] Malcolmson, P. (1986), *English Laundresses: A Social History, 1850-1930,* University of Illinois Press, Chicago, p.129; *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1908,* Cd. 4664 (1909), HMSO, London.

meal breaks and often including night work. [11] The work was both physically arduous and hazardous with women frequently suffering scalds from hot water and steam and burns from hot irons. In the 1890s new hazards were introduced in the form of steam-powered equipment and women began to suffer serious accidents resulting from the use of unguarded machinery, reminiscent of those experienced by workers in the early textile factories. On their appointment in 1893, laundries rapidly became a special area of concern for the women inspectors. Like the small workshops which will be discussed in chapter 6, such premises proliferated in the areas in which the inspectors lived and, as single women often living in rented rooms, they would no doubt have availed themselves of their services and been aware of the conditions under which they operated. Up to the 1890s, however, commercial laundries had been largely ignored by the Factory Department. Washing clothes and linen was traditionally viewed either as part of a woman's domestic duties or as a form of homeworking rather than as an industrial occupation. Moreover, prior to the use of machinery, the health problems of laundresses, lacking the focus of any specific industrial disease, would have been difficult to distinguish from the general problems of the poor. Male factory inspectors were predominantly concerned with the more obviously hazardous industries which contributed the larger share of accidents and fatalities, and which were predominantly the domain of male workers. [12] This chapter, therefore, will consider how the women inspectors responded to the safety problems they encountered in laundries, initially in terms of bringing the matter to the attention of the Home Office and pressing for legislative change and subsequently in focussing the attention of engineers on the challenge of designing practical guards for laundry machinery. In the process they employed new methodological approaches, involving the use of statistics to investigate the nature of safety problems, as well as developing their ability to evaluate the efficacy of safety equipment. The incidence of accidents in laundries showed a steady decline between the years 1895 and

[11] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1897,* C. 8965 (1898), HMSO, London, p. 107.

[12] In 1895, the first year in which reporting became a legal requirement, there were 8,662 reported accidents for males of which 431 were fatal. The comparable figures for women were 1804 reported of which 24 were fatal. *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1895,* C. 8067 (1896), HMSO, London, p. 263. These figures presumably reflect the smaller number of women employed overall and the preponderance of men employed in more hazardous industries, although it may also reflect lack of reporting in industries predominantly employing women.

1914 and it will be argued that much of this improvement can be attributed to the work of the women inspectors.

In the early 1890s laundries operated outside the reach of factory legislation. Their gradual transformation from a service carried out in women's own homes to small businesses employing several workers had passed largely unnoticed by the Home Office. Any regulation of their activities, therefore, was undertaken by the local Sanitary Authorities. In 1895, however, the amended Factory Act of 1895, [13] brought laundry workers under the protection of factory regulation for the first time. This legislative change represented the culmination of a long battle which, in earlier years, had been fought unsuccessfully by the laundry workers themselves. In the late 1880s government regulation of the employment conditions in laundries was the subject of a vigorous but short-lived campaign which sought an amendment to the 1891 Factory Act [14] whereby laundries would be covered by factory legislation. The laundress' primary objective in pursuing this, however, was not so much the enforcement of safer working conditions, but rather the achievement of a ten hour day, currently in force for factories and workshops included under the Act. In 1889, a group of London laundresses, with the encouragement of the WTUL, formed the Amalgamated Society of Laundresses. [15] Within a year the Society had approximately 3,000 members and, having sent delegates to the Trade Union Congress of 1890, gained unanimous endorsement of a motion proposing the amendment. Employment in laundries was essentially women's work and thus presented no threat to male unionists who were happy to lend their support. A subsequent rally to highlight the issue, held in Hyde Park in June 1891, reportedly attracted nearly 30,000 unionists as well as the support of a number of radical MPs. [16] Less than a week later Liberal MP David Randell introduced a House of Commons motion proposing the amendment. [17] In the event, however, it was defeated following a parliamentary debate in which the Conservative Home Secretary, Henry Mathew, argued that the laundry industry was too diverse in size to implement universal rules on working hours. Moreover, he stated that regulation would undermine those laundries run by

[13] Factory and Workshop Act 1895. (58 & 59 Vict. c37).
[14] Factory and Workshop Act, 1891. (54 & 55 Vict. c75).
[15] 'The Society of Laundresses' (15 October 1889), *Women's Union Journal,* No. 14, p. 86.
[16] *The Times,* (15 June 1891).
[17] Hansard's Parliamentary Debates (19 June 1891), Vol.354, pp. 928-47.

institutions and charitable organisations which often depended for their income on laundry work and operated under conditions which made it difficult for them to be compliant with working time legislation. This particular argument appeared to be a concession to the demands of Irish MPs on whom the current Government depended for its majority and who strongly opposed any regulation of the numerous laundries situated in Irish religious institutions at that time. [18]

With the apparent failure of the campaign the resolve of the laundry workers seemed to have evaporated as suddenly as it had arisen. By the end of 1893 less than sixty members of the Amalgamated Society out of the original 3,000 remained, and by the beginning of 1895 the short-lived union had disappeared altogether. [19] The effect of its activities lingered on however, not least in the minds of newly elected members of the Liberal government of 1892, as it struggled to contain the wave of industrial unrest which had begun in the late 1880s and continued into the early 1890s. The actions of the Amalgamated Society appear to have been part of a more general industrial agitation which for the first time had involved women workers. [20] Historian Louise Raw has suggested, for example, that the famous matchwomen's strike of 1888 was not, as has sometimes been suggested, a singular unprecedented event orchestrated by middle-class reformers, but rather a manifestation of the much wider 'New Unionism' of workers hitherto unrepresented by existing craft-based unions. In London, in particular, this movement encompassed both male and female workers. [21] The establishment of the Labour Commission to investigate conditions in unhealthy and hazardous industries was largely a response to this industrial unrest and the inclusion of a special investigation into the employment conditions of women presumably reflected their growing importance within labour activism. Moreover, as noted earlier, one of the commissioners appointed to conduct this inquiry was embryo factory inspector May

[18] In Ireland large numbers of young people who had been orphaned or had been abandoned by their families were placed in Roman Catholic religious institutions. The girls usually worked in the laundry which provided the institution with a regular income stream. Smith, J.M. (2007), *Ireland's Magdalen Laundries and the Nation's Architecture of Containment*. Notre Dame University Press, Notre Dame, Illinois, pp. 23-43.

[19] Drake, B. (1920, Reprinted 1984), *Women in Trade Unions*, Virago Press, London, p. 28.

[20] In 1899, Mrs Barber of the Union of Chelsea Seamstresses helped to organise the laundresses' union. 'The Society of Laundresses', (15 Oct 1889), *Women's Union Journal,* No.14, p. 86.

[21] Raw, L. (2009), *Striking a Light. The Bryant and May Matchwomen and their Place in History*, Continuum International Publishing, London, pp. 171-2.

Abraham, who in 1892 was secretary to Lady Dilke, President of the WTUL which had supported the formation of the laundresses union. [22] Unsurprisingly, therefore, the report, published in 1893, made a number of recommendations for improvements to conditions in laundries. [23] When the bill to amend the Act of 1891 was eventually passed in 1895 it introduced a new level of protection for laundry workers, albeit not necessarily in ways which would have satisfied the central demands of the laundry workers themselves. The amendment contained so many permitted exceptions to the normal ten hour day it was rendered virtually useless in terms of protecting laundresses from excessively long hours. However, it did contain a legal requirement to notify the occurrence of certain specified occupational diseases and, importantly, any industrial accidents which resulted in at least two days absence from work. In addition, employers were legally required to install guards on dangerous machinery. Both these elements were now applicable to power-driven laundries. [24] The terms of this Act which, it is reasonable to assume, were largely based on evidence collected by Abraham and her fellow commissioners, were important prerequisites for the subsequent work of the women inspectors.

As the 1895 bill made its way through parliament significant changes were taking place in the laundry industry. In pursuit of enhanced speed and capacity, laundry owners were increasingly abandoning traditional hand operations and installing power driven machinery. By the early 20th century a typical power-driven laundry contained a washing machine in which clothes were agitated in a metal drum, an extractor which rotated and extracted water via centrifugal force and a heated 'calender' or mangle which smoothed and dried items at the same time. This equipment was driven by belts and pulleys powered by a small steam engine. There was usually a heated drying closet for starched items or items otherwise unsuited to mangling which would be ironed by hand using gas-powered irons. [25]

[22] Women's Trade Union League (15 February 1889), 'Meeting of the Wandsworth Laundry Workers', *Women's Union Journal.* No. 14, p. 15; 15th Annual Report, p 6.

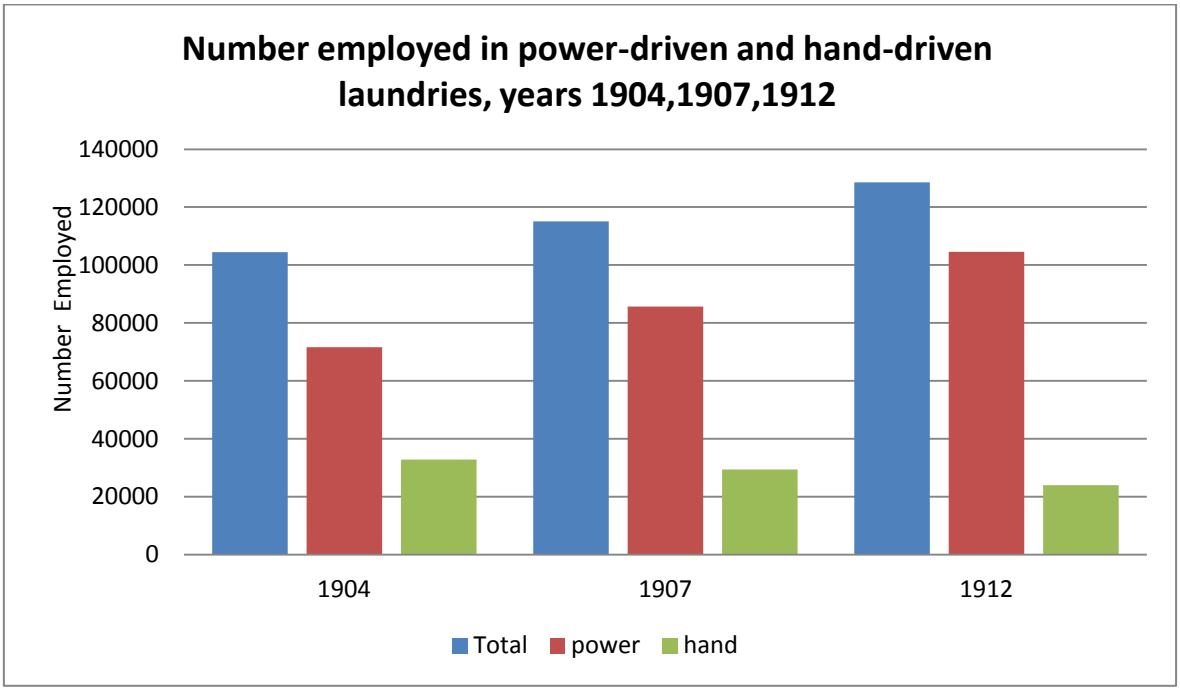
[23] Royal Commission on Labour (1893-4), Employment of Women. Report by Miss Clara E Collet (Lady Assistant Commissioner) on the Conditions of Work in London. PP 1893-4 XXXVII.

[24] As a concession to Irish MPs, during a period of Conservative/Unionist government, laundries situated in religious houses were initially exempt from the Act. This changed in 1909 when such exemption was removed by the Liberal government.

[25] See Appendix 3.

Figure 5.1, (below), illustrates the change in the numbers employed in hand laundries and power-driven laundries between the years 1904 and 1912, for which figures are available.

Figure 5.1 [26]



The speed with which these changes were adopted resulted in many employers purchasing steam engines without the necessary operational knowledge and a number of explosions ensued. Others purchased cheap second-hand and faulty laundry equipment which Principal Inspector, Adelaide Anderson, felt contributed to an already rising number of accidents amongst laundry workers. [27] It is clear that the introduction of technology into this industry significantly shifted the balance from health issues, associated with long hours, poor air quality and a hot damp environment, to safety issues where there was a real risk of serious injury. Steam power increased the speed at which processes were carried out and could not be turned off rapidly to stop a machine if the need arose. To the ever-present risk of burns and scalds was now added the possibility of crushed limbs as workers fed items into the rollers of the calenders and death or scalping as a result of hair or clothing being caught in

[26] Data derived from, *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1912*, Cd. 6852 (1913), HMSO, London, pp. 142-44.

[27] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900,* Cd. 668 (1901), HMSO, London, p. 379.

the belts and pulleys which drove the equipment. In 1896, the first year in which an analysis of accident figures was carried out, including those occurring in laundries, there were 84 reported laundry accidents, of which 81 recorded the cause as 'machinery'. [28]

In the three years which followed the passing of the 1895 Act the women inspectors made few comments on these hazards. Their reports were confined instead to observations about the hot damp atmosphere and foul air, an emphasis which recognised laundries as one part of the wider problem of insanitary basement workshops, and to concerns about working hours, the main focus of the complaints received from the laundry workers themselves. Rose Squire reported '...how far the long looked for Act has fallen short of their hopes. The "coming under the Act" has been found not to bring the expected relief but to give sanction to the late hours and long day's work'. [29] At this stage, however, the women inspectors were both few in number and relatively inexperienced, particularly in the field of machinery safety. Moreover machinery guarding had long been a central focus for the male inspectorate, a factor underlined by the requirement for male (but not female) candidates for the inspectorate to sit a paper in 'applied mechanics'. [30] With the exception of the textile trades, where male inspectors had traditionally taken charge of accident prevention, few women had worked in power-driven industries. There was, therefore, a tacit understanding that women inspectors would not be concerned with issues relating to machinery safety. In 1899, however, inspector Anna Tracey signalled a break with this tradition by drawing attention to the fact that machinery guarding in respect of women's employment in laundries appeared to have been ignored. She reported as follows:

> The adequate and compulsory fencing of laundry machinery is a matter which presses greatly on an inspector. So many accidents occur which might be prevented, if only proper guards were provided by the makers. So far some of these guards are not forthcoming, and, in spite of assertions that workable guards cannot be produced, one feels that it cannot be long before every worker at a wringer or ironing machine can feel that at any rate her fingers are safe if ever she should be so careless as to look up from her work for a moment.

[28] *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1896*, C. 8561 (1897), HMSO, London, p. 342. Two accidents were caused by 'an escape of steam', one was caused by 'hot liquid'.

[29] *Ibid.,* p. 67.

[30] Male Inspectors of Factories (20 July 1895), Subjects of Examination, National Archives, CSC 10/3015.

> It is difficult to realise that a moment's inattention (during the long washing day which extends often far into the night) may mean a maimed hand for life. Surely the manufacturers of England cannot be baffled by the production of an efficient guard for the machines if once they give the matter their earnest attention. [31]

In the same report inspector Mabel Vines drew attention to another failure in the system, the fact that accidents were frequently not reported. She provided the following illustration:

> Making an inspection of a steam laundry I noted that the wringing rollers of the washing machine were unguarded. The next day but one, returning, I noticed on entering that one of the young girls employed had her hand in splints, hanging in a sling. She had caught her hand in the unguarded ringing rollers on the day intervening between my two visits. The accident had not been reported. [32]

Arguably it was at this point that the women inspectors elected to extend their field of activity into areas previously considered to be the exclusive domain of their male counterparts, namely matters concerned with machinery safety. In doing so, and in embracing a further new development in the field of occupational health, the collection of statistical data, they appear to have achieved one of their most notable successes in improving the safety of women workers.

In Anderson's report for 1900 she underlined her opinion that machinery guarding was a legitimate area of concern for the women inspectors and that the rapid introduction of machinery into laundries, where the workforce was overwhelmingly female, provided adequate justification for this. Diplomatically she excused the earlier failures of male inspectors to address the issue by pointing to the lack of experience with laundry machinery which, she considered, prevailed across the inspectorate as a whole. Thus she declared that:

> ...the responsibility for registers, enforcement of notices, and for completeness and thoroughness of inspection in general rests entirely with myself and my staff, ...the effect of the regulation which provides for the consultation of an Inspector outside that staff has been to secure a more than redoubled attention to the special

[31] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899,* Cd. 223 (1900), HMSO, London, p. 266.
[32] *Ibid.*

> dangers of those factories which are mainly so far assigned, namely, factory laundries...The rapid recent development of machinery of a specialised kind in laundries produces a situation and a class of risks which... leaves most Inspectors of any experience almost at the same starting point; knowledge has, in fact, to be acquired by all alike, and it is only too easy to overlook hidden dangers until the inevitable accident occurs. [33]

Anderson's method of acquiring this necessary knowledge indicated an approach which was both progressive and entirely in tune with current developments in the field of occupational health and safety. In 1900 Lucy Deane had taken up an appointment as inspector responsible for the 'West London Special District', the only area in the country assigned specifically to the women inspectors. [34] In addition to hundreds of dressmakers and fancy goods manufacturers the area contained a large concentration of laundries. Anderson elected first to carry out an investigation in this district which she argued presented 'in a small compass all the characteristic features of the trade', [35] to determine the size of the problem and the specific nature of the accidents which occurred most often. Essentially she conducted a systematic survey on a representative sample to identify the primary focus for preventative action. Her approach was no doubt informed by the methodology developed by Thomas Legge, appointed as the first Medical Inspector of Factories in 1898. With his earlier training and experience in the field of Public Health Legge had introduced into the Factory Inspectorate the recording systems already common in the field of sanitary science. Prior to 1895 accident recording took place somewhat haphazardly at the discretion of individual inspectors who sometimes conducted their own investigations into particular problems which concerned them. The Factory Act of 1895, however, had introduced compulsory recording of industrial accidents, including details of the type, cause and consequences of each incident. As these statistics accumulated it became possible to collate national data in order to discern trends and thus inform preventative strategies. From the late 1890s, therefore, tables of figures and graphs began to appear in the factory inspectors' reports,

---

[33] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, pp. 377-8.

[34] In 1900, as part of a wider re-organisation of the Factory Department, Whitelegge decided that it would be useful for women inspectors to assume sole responsibility for one particular district, the West London district, which contained scores of small workshops employing women in dressmaking, millinery and also laundry work.

[35] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, p. 378.

replacing subjective opinion as the basis for decision making. Anderson's initial investigation of laundry accidents shows clear evidence of the influence of this approach.

The women inspectors' report for 1900 listed the source of each of the thirty-seven laundry accidents identified by Deane between February 1900 and January 1901. [36] On examining these data Anderson concluded that unguarded calenders and wringing machines were responsible for more than half the accidents. Moreover, since accidents of all types increased in July and December in accordance with the demands of the 'season' [37] and each day increased immediately before lunch breaks, safety problems appeared to be exacerbated by long hours and fatigue. Two fatal accidents were caused by falls through unguarded trapdoors. These stark facts were supplemented by narrative reports of near accidents such as the following:

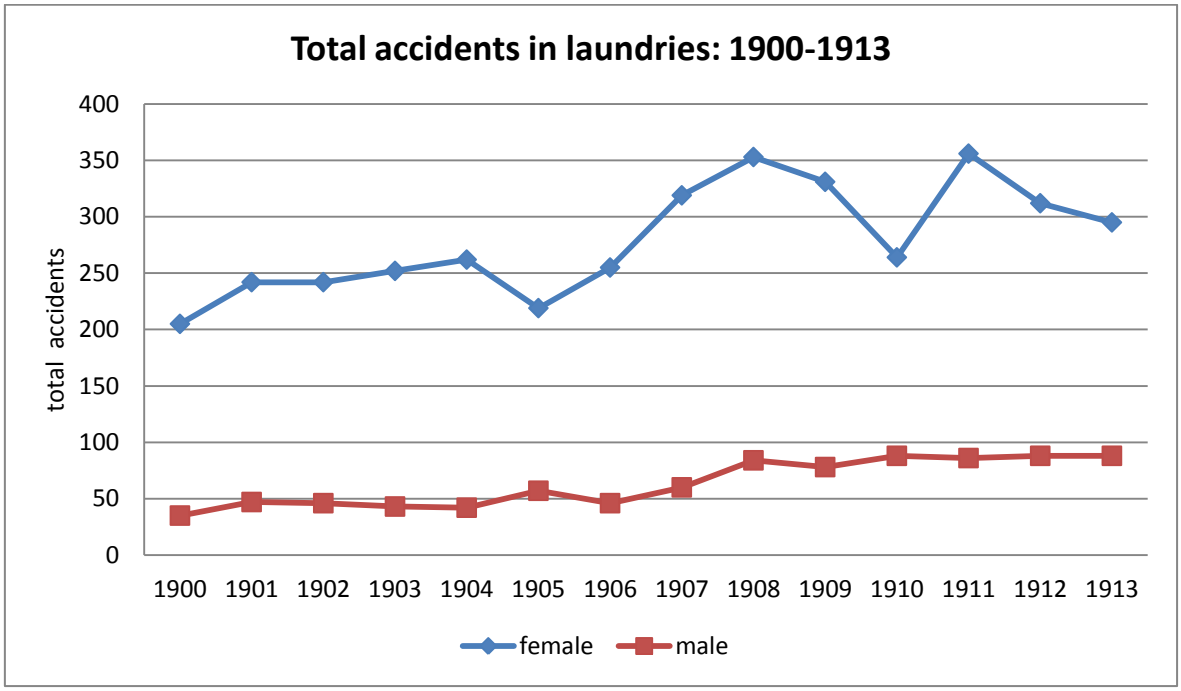
> A worker in a hot room naturally wears the neck of her bodice loose and perhaps finishes it with a lightly knotted ribbon or scarf. Going into such a room I found a girl with a face badly scorched (but not incapacitated for more than two days).The accident, unreported, was due to the long-worn but now discarded scarf caught by the unusualness nearness of the girl to the rollers. Nothing but complete control of the machinery and the presence of mind of the forewoman saved the girl from a sudden and terrible death. [38]

Concerns about the ill-informed use of second-hand steam engines were reinforced by a number of reports. One worker whose hand had been crushed commented that, 'Since the boss tied the old mangle up to the new engine she has taken to leaping back and forth that alarmin' and that sudden-like that its a wonder I've not been caught out sooner nor I have been.' [39] Deane visited the site of every reported accident to identify possible means of future prevention. Moreover, Anderson insisted that all other women inspectors visit these sites as a form of training in hazard awareness. [40] Deane's investigation into the West London district thus provided the blueprint for a longer term investigation into trends in laundry accidents throughout the country. Inspector Anna Tracey was assigned the task of collating data from the reports of Certifying Surgeons in order to discern trends and to

[36] *Ibid.*
[37] The London 'season' consisted of a series of annual events attended by the wealthy and fashionable.
[38] *Ibid.,* p. 379.
[39] *Ibid.*
[40] *Ibid.,* p. 378.

determine the effectiveness of various interventions. Her data for the period 1900 to 1913 is summarised in Figure 5.2 (below). Tracey often cautioned that reported accidents were likely to represent an underestimate of the total since all the inspectors frequently encountered incidents which had not been reported. [41] However, under-reporting is likely either to have remained constant, in which case it would not affect an examination of trends, or it may have reduced as a result of increased conformity with the system, creating a spurious impression that accidents had increased. Anderson certainly considered that under-reporting reduced year by year. In 1912 she noted that 'although unreported accidents still occur, and are not always discovered, prosecutions for failure to report are producing an effect, and there is certainly more nearly complete reporting than formerly'. [42]

Figure 5.2 [43]



The accident figures, in fact, show a reduction in 1908 following a previous steady rise which had begun around 1904. The downward trend in 1908 was arrested by a sharp rise in 1911

[41] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904,* Cd. 2569 (1905), HMSO, London, p. 285.

[42] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1912,* Cd. 6852 (1913), HMSO, London, p. 127.

[43] Data derived from, *Annual Reports of the Chief Inspector of Factories and Workshops for the Years 1900-1913.* Special reports of Inspector Anna Tracey.

which Anderson surmised was related to the increased pressure of work created by an excessively hot summer and the celebrations marking the Coronation of King George V.[44] During this period working hours increased substantially and large numbers of temporary and inexperienced workers were employed to cope with demand. Following 1911, however, the downward trend in laundry accidents resumed. Figures for the number employed in specific industries were not routinely recorded in the factory inspectors' reports and opportunities for the calculation of annual incidence rates are therefore limited. Total numbers employed in steam laundries were, however, included in the reports for the years 1903, 1904, 1907 and 1912, and, based on these figures, the annual incidence rates of accidents per thousand workers [45] can be seen to have gradually reduced after 1903 (Table 5.1, below).

Table 5.1 [46]

Accident incidence rates in steam laundries per 1,000 workers, for 4 years

Year	Total number employed in steam laundries in the UK	Accident incidence rate /1,000 workers
1903	52,427	5.6
1904	71,633	4.2
1907	85,686	4.4
1912	104,625	3.8

Available data, therefore, indicate first that there was steady decrease in overall numbers of laundry accidents after 1908 (interrupted only by the unusual situation of 1911), and second, that the actual rate of accidents, taking into account the increase in numbers employed in steam laundries, began to decline earlier, from 1903. Moreover, if one believes Anderson's

[44] The Coronation of George V took place on 23 June 1911.

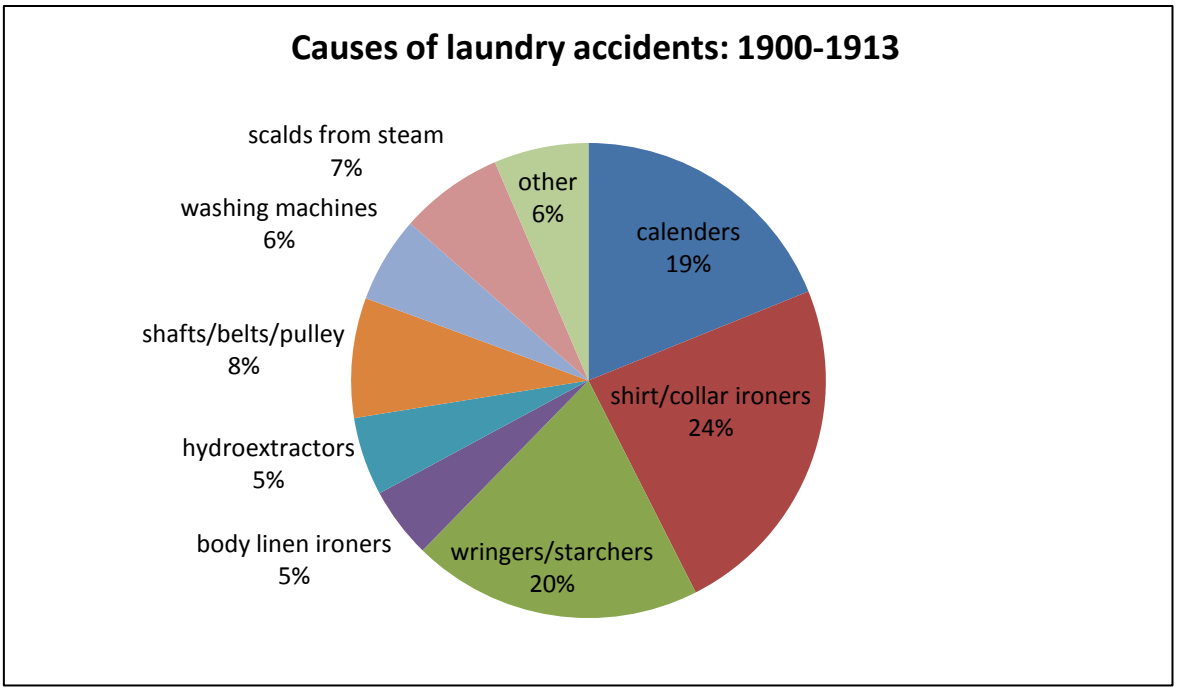
[45] Incidence rates per thousand workers = the number of accidents divided by the number of workers x 1,000.

[46] Data derived from, *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1912*. Cd. 6852 (1913), HMSO, London, pp. 142-4.

claim that compliance with reporting had increased over this period, the decline may have been more marked than is reflected in the figures.

While, therefore, some historians have suggested that the inspectors were too few in number to have effected any real improvements in women's health and safety, it is clear that safety in laundries did improve during this period. It is also clear that the women inspectors took over the major responsibility for this field of work and can be assumed to have played a significant role in this improvement. The question arises, therefore, as to how, with their limited resources, were they able to achieve this. An examination of their annual reports suggests that there were several important elements in their approach. First, they invested considerable time and effort in carrying out a detailed analysis of the causes of the problem. Figure 5.3 (below) summarises Tracey's data on the distribution of accidents between different causes, averaged over the whole period 1900-1913.

Figure 5.3 [47]

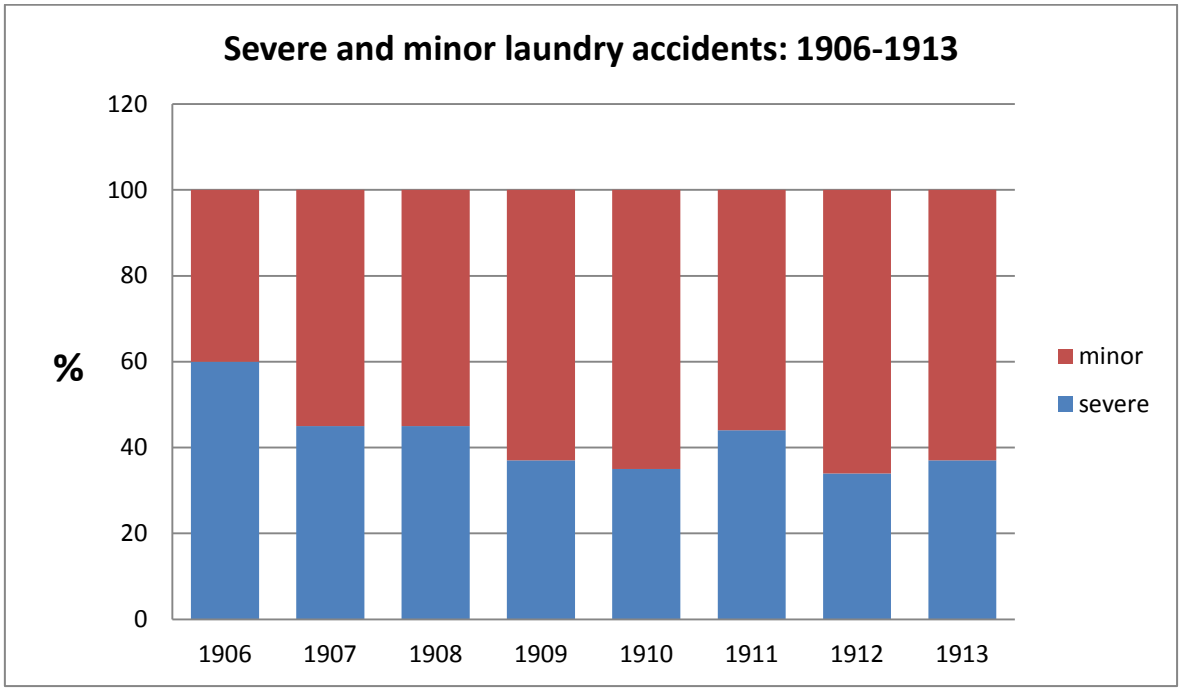


In adopting this approach and supplementing their findings with regular monitoring to determine the extent of any improvement the inspectors were employing a methodology

[47] Data derived from, *Annual Reports of the Chief Inspector of Factories and Workshops for the Years 1900-1913.* Special reports of Inspector Anna Tracey.

which was at the forefront of developments in occupational health at the time. Thus Tracey's annual analyses highlighted that the majority of accidents were associated with indrawing hot rollers (calenders, shirt and collar ironers) and indrawing cold rollers (wringers and starchers). There was a relatively high incidence of accidents involving machinery where limbs or clothing were drawn into rollers or a revolving drum. Accidents involving hydroextractors or shafts, belts and pulleys were less common but invariably very serious when they did occur and often fatal. Hand irons, which were used for clothes not amenable to machine ironing, were responsible for frequent burns but these often resulted in less than two days absence from work and thus went unreported. From 1906 Tracey also included in her report the percentage of injuries classified as severe or minor (Figure 5.4, below).

Figure 5.4 [48]



*From 1909 institutional laundries were included in the figures. For that year there were 31 accidents recorded in these laundries of which 16 were classified as severe.

Although all reported accidents are likely to have been relatively serious, given the two days absence rule, Certifying Surgeons nevertheless classified accidents in this way. No definition of 'severe' is provided in Tracey's compilation of these figures but surrounding text suggests

[48] *Ibid.*

that the classification was based on the permanence of the injury. The pattern of severe injuries between the years of 1906 and 1913 largely mirrored that of injuries as a whole, (as shown in Figure 5.2, above), with a reduction after 1908, a rise in 1911 and a resumption of the gradual decline after this date. Perhaps the most striking feature, however, is the very high percentage of injuries considered by the Certifying Surgeon to be severe. These were presumably injuries which led to a degree of permanent disablement and, as such, are likely to have been caused by machinery.

Taken together, therefore, the data indicated that the major priority for accident reduction was the development of effective machinery guarding and it was on this that the inspectors focussed much of their attention. The mainstay of their approach in this respect was a programme of workplace visiting. Prosecutions were relatively rare (averaging only two or three per year) and appeared to reflect a growing ethos within the inspectorate that the maximum deterrent impact was achieved by a limited number of highly publicised actions. Thus Mabel Vines considered that a successful prosecution of an Edinburgh laundry, in which a young girl lost the use of her hand as a result of an unfenced calender, 'materially strengthened administration of fencing requirements in Scotland'. [49] Most effective prevention work, however, was achieved by means of advice and education. Despite their small numbers the inspectors carried out an extensive programme of workplace visiting. In 1904, there were eight women inspectors, each working six days per week, who made a total of 2,100 visits to factories and 3,776 visits to workshops, travelling 47,671 miles in the process. Inspector Emily Sadler, who during that year took over responsibility for the West London Special District, visited 271 power-driven laundries and 300 hand laundries. [50] Anderson appears to have combined administrative duties with continuing hands-on inspection and in particular preferred to undertake the training of new inspectors herself. One new recruit described how 'after a long morning of most energetic inspection of laundries in one of the least salubrious of suburbs, and when the inner man called for refreshment as one o'clock came, Miss Anderson said brightly: "Now we can take the

[49] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1913,* Cd. 7491 (1914), HMSO, London, p. 110.

[50] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904*, Cd. 2569 (1905), HMSO, London, p. 229.

opportunity to pay some mealtime visits." It was not until nearly three o'clock that she said, "I think a cup of tea somewhere would be pleasant before we go on to the next place."' [51] Inspections were also combined with the delivery of circulars to employers advising them of the dangers of laundry machinery, pointing out their obligations under the factory law and drawing attention to the availability of suitable guarding equipment. [52]

Machinery guarding had long been part of the safety measures introduced into factories where male workers predominated. However, it is possible to discern certain differences in approach between the male and female inspectors in their relations with employers. For many male inspectors the notion that working men were largely responsible for their own health and safety remained the dominant ethos. Officially the responsibilities of workers and employers operated in tandem but in practice inspectors varied in the degree to which they attached blame to workers who experienced accidents. For example, many would have agreed with Mr Seymour, inspector for East London who argued that:

> so many accidents occur purely through carelessness or inattention on the part of the operatives. Calender hands in laundries are constantly getting one or more fingers drawn in between the roller and the iron, and on enquiry I am generally told that the girl was turning her head to speak to someone else and not watching her work. [53]

By contrast, there is a noticeable absence in the reports of the women inspectors of any tendency to censure the behaviour of individual women workers. Rather there appears to have been a presumption that the duty of care lay entirely with the employer. Thus Anderson pointed out on numerous occasions that it was unreasonable to lay the responsibility for safety on the shoulders of the workers. She noted, for example, that these were often young, tired girls between the ages of fourteen and eighteen who could be found feeding the rollers of calenders for up to sixteen hours a day. 'For a moment's inattention to

[51] Martindale, H. *Some Victorian Portraits and Others* (1948, republished 1970), Books for Libraries Press, New York, pp. 48-9.
[52] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904*, Cd. 2569 (1905), HMSO, London, p. 252.
[53] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, p. 164.

their dangerous charge', she declared, 'they may have to pay by the loss of the right hand in the most horribly painful manner'. [54] Inspector Emily Sadler was similarly firm on this point:

> I have been much struck over and over again by the gratuitous comments of occupiers on their accident reports as to the reason for the accident. Again and again the phrase occurs 'due to her own carelessness', or 'the girl had no right to be using this machine'... I have impressed upon the occupier that such phrases should not form part of the report...How can a girl of 15 who has had an accident after working nearly a five hours' spell in a steam-laden factory, vibrating with machinery, be said to be careless; or how can a girl refuse to put clothes through the dangerous ingathering feed rollers of an unfenced wringer if she has been ordered to do so by the forewoman. [55]

The need for worker training was another responsibility which the women inspectors laid at the door of the employer. Inspector Mary Paterson noted in 1901 that 'to the lack of knowledge or appreciation of the dangers one must attribute in some cases the practice of putting young girls to operate the dangerous machines, and that without their having previously learned with an experienced worker'. [56] This assumption of employer responsibility underlined the inspectors' ethos that factory legislation was intended to be protective of women. However, in this they made no distinction between men and women whom they regarded as equally entitled to protection under the law. [57] This uncompromising certainty about where responsibility lay is likely to have enhanced their relations with workers, although no doubt it will have often provoked hostility from employers.

An important element in the women inspectors' success was their ability to secure and maintain an important place for laundry safety on the Home Office agenda. Anderson began by employing the tactic for which she, as a fluent French and German speaker, had a special aptitude, the unfavourable comparison between regulatory control in parts of continental Europe and that in Britain. ' I have already reported' she said, 'on the happy impression

---

[54] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1902,* Cd. 1610 (1903), HMSO, London, p. 167.

[55] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904*, Cd. 2569 (1905), HMSO, London, p. 251.

[56] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1901*, Cd. 1112 (1902), HMSO, London, p. 169.

[57] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1898,* Cd. 27 (1899) HMSO, London, p. 166.

given by better practice in certain countries abroad of not employing young workers on dangerous unguarded machinery, and of most carefully guarding, particularly in France, machinery on which women are employed.' [58] To underline the point she added that, 'In general one must remember that, in the matter of regulation of laundries, Germany (for steam laundries only) and France (all classes of laundry) are several years in advance of England, and that we have still in that industry some of the most elementary problems of regulation to solve.' [59] During this period international exchanges of information in the field of occupational health, particularly in the form of European conferences, occurred with increasing regularity and British deficiencies which might be thus exposed were always prone to create unease within the Home Office. Alongside such reports, statistical summaries of accidents in laundries always featured prominently in the lady inspectors' special section of the Chief Inspector's Annual Report. Moreover these were supplemented by more traditional narratives where specific points were graphically illustrated by descriptions of real events and by suggestions as to the nature of the safety devices which might have prevented the occurrence. Such horror stories would have been difficult to ignore. Two cases recounted by inspector Mabel Vines in 1902 are typical of many others which appeared in subsequent years. The first underlined the need for a safety device which prevented the machine from operating if the cover was open.

> The washer, Mrs T, packed the hydro with dark stockings, started it, forgot to put the cover on, and left the wash house. During her absence Mrs S, another washer, not observing that the hydro was in motion, intending to pack it with the clothes she was washing, caught hold of the revolving cage, with the result that her arm was severed. [60]

The second case was self-explanatory in terms of the safety message it conveyed.

> ...a very bad accident, caused by an unguarded set screw on overhead shafting, and the absence of proper means to adjust overhead belts, resulting in partial strangulation, sprained back, injury to eyes and may lead to paralysis. After the engine had been

[58] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1901*, Cd. 1112 (1902), HMSO, London p. 170.
[59] *Ibid.*
[60] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1902*, Cd. 1610 (1903), HMSO, London, p. 166.

> slowed down, a boy aged 17, ascended a ladder to throw on an overhead belt. There was a small hole in the left hand corner of his coat, which was caught by the set screw of the shafting, and first the coat was wound round, and then, before the engine could be stopped, the lad was partially drawn round the shafting. [61]

In highlighting these individual cases the inspectors were bringing the matter not only to the attention of officials in the Home Office but also to the notice of manufacturers who might have an economic interest in developing new forms of safety guards suitable for the particular machines involved. In 1910 a conference was held at the Annual Laundry Exhibition in Islington's Agricultural Hall, where members of the Factory Department (including lady inspectors), laundry engineers and employers reached an agreement on the most effective methods of safeguarding laundry machinery. This agreement was subsequently embodied in the annual Home Office memorandum to employers on machinery safety. [62] Anderson noted that the agreement was 'greatly helped by the many beautiful examples of fencing exhibited in the Hall, which were the outcome of past years of less formal interchange of ideas between inspectors and engineers'. [63] She maintained close contacts with manufacturers and developed a large information base on safety equipment which inspectors in the field could recommend to employers. By 1913 she was able to report that 'the whole matter is now so well in hand that every variation in operation or construction of machinery, and every variation in method of fencing, is at once brought to my knowledge', adding that 'every specially striking or instructive accident reported to me from one division I bring to the knowledge of the Senior Lady Inspectors in other divisions, in order that all may be working towards similar standards of safety, thus imposing equal requirements on all occupiers'. [64] This type of dialogue with interested manufacturers represented a significant advance on the situation in 1899 when Anna Tracey had remarked

[61] *Ibid.,* p. 167.

[62] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1910,* Cd. 5693 (1911) HMSO, London, p. 119-120.

[63] *Ibid.,*p. 120.

[64] *Annual Report of the Chief Inspector of Factories and Workshops for the Year, 1913*, Cd. 7491 (1914) HMSO, London, p. 81.

that 'surely the manufacturers of England cannot be baffled by the production of an efficient guard for the machines if they give the matter their earnest attention'. [65]

A particular feature of the women inspectors' approach was their tendency to follow up the longer-term consequences of accidents and disease by visiting workers in their own homes. No accounts of such visits appear in the reports of male inspectors who perhaps viewed these as indicative of an involvement beyond that required by their professional duty. Given the middle-class background of all the women inspectors, such visits may have reflected a lingering attachment to philanthropic voluntary social work which continued to occupy many of the more conventional Edwardian middle-class wives and daughters during this period. Certainly many of the inspectors' reports suggest a strong involvement with the personal circumstances of individual workers' lives and an urge to alleviate their distress. Thus Mabel Vines reported that:

> These accidents are terribly pathetic. For not only do they mean pain and suffering, and in many cases, permanent injury, but the worker losing his or her means of livelihood, is very often suddenly plunged into destitution. Such was the case with Mrs. M. whose arm was injured in a steam mangle. When visiting her about three weeks after the accident I found her starving and cold. No fire and no food and her arm was worse than it was a week ago, she told me. [66]
>
> Recently I visited the home of a young girl, who 15 months previously had been injured in an accident. Her left hand was entirely gone, but with the sound right hand she had been doing all she could to help with the family needlework. The family had been nearly starving, the father out of work, there were several little brothers and sisters, and she had been the only one old enough to give substantial help. [67]

Despite the picture of charitable visiting of the sick and needy which these calls perhaps evoke, such follow-up visits also resulted in observations which, although largely unheeded at the time, signalled the first intimations of a new field of medical knowledge. Many laundry workers whose arms were drawn into rollers suffered from crush injuries which were not immediately apparent. These injuries were usually reported as 'slight' by Certifying Surgeons

[65] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899*, Cd. 223 (1900), HMSO, London, p. 266.
[66] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1902,* Cd. 1610 (1903), HMSO, London, p. 167.
[67] *Ibid.*

but often led to amputations weeks or months later. Deane had been informed by a London surgeon who had carried out a number of these amputations that: 'the combination of crushing and burning of the flesh...is so destructive that even where the results are at first not apparently severe a form of mortification follows, necessitating amputation.' [68] This reflected a condition whereby the internal tissue of a crushed limb was virtually destroyed while the external tissue appeared to have suffered only minor bruising. Detailed understanding of this condition only fully emerged during the treatment of soldiers during the First World War. However, in 1902, Deane reported making follow-up visits to determine whether workers were suffering from these longer-term consequences of their injuries. [69] Similarly, laundresses burnt by rollers and irons or scalded by steam suffered injuries which varied in severity according to the thickness of the skin affected and which were often wrongly classified as 'slight'. [70] Classification of the depth of burns and the prognostic implications of this, as well as an understanding of the problems of fluid loss and infection, also awaited advances in medical knowledge acquired during the war. [71] Often, therefore, the seriousness of many of the injuries which occurred in laundries was underestimated, not only by the employer but also by the Certifying Surgeon. Deane's observations did not result in any immediate changes in medical practice and women continued to suffer permanent effects from their injuries. Importantly, however, with the advent of the Workmen's Compensation Act of 1906, [72] many of the follow-up visits carried out by inspectors enabled injured workers to claim compensation payments for injuries which had initially been recorded as minor and non-disabling but which had essentially deprived them of their livelihood.

The reduction of accident in laundries represented one of the most significant achievements of the women inspectors. Moreover, in successfully addressing this problem, they brought

---

[68] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1902,* Cd. 1610 (1903), HMSO, London, p. 167.
[69] *Ibid.,* p. 166.
[70] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1909,* Cd. 5191 (1910), HMSO, London, p. 136.
[71] Prosser White, R. (1928), *The Dermatergoses or Occupational Affections of the Skin,* 3rd Edition, Lewis & Co. Ltd, London, p. 133.
[72] Workmen's Compensation Act ,1897 (60 & 61 Vict. c.37). The Act gave workers (male and female) the right to compensation, paid by their employer, if they suffered a permanent injury as a result of an accident at work.

together a range of new approaches and skills developed as they gained more experience. Some of these, such as the gathering of statistics to inform preventative measures and the engagement with manufacturers to produce effective guarding, reflected on-going developments within the Factory Department, while others, such as their follow-up of individual cases reflected a uniquely female approach which potentially added a new dimension to the knowledge base in this field.

Chapter 6

Ventilation in Small Workshops

> The underground workplaces are being extended and occupied as fast as they are ready. Thus the number of girls working daily for the time allowed by law by artificial light, in places where sunlight never penetrates, and where ventilation is inadequate, is increasing rapidly. [1]

> In workshops where large numbers are employed the atmosphere is often simply horrible. Add to this gas in the evening and one can conceive nothing more unhealthy. ... at the street end of the cellar some air can occasionally be blown in with dust and dirt from the roads and pavements, but just here is placed the gas engine. [2]

During the second half of the 19th century the rapid growth of urban centres and the rising standard of living of many of their inhabitants resulted in an increased demand for ready made goods such as household articles, clothing and small luxury and decorative items. [3] Initially these goods were produced by outworkers working in their own homes and using materials provided by middle-men, who subsequently collected and sold the finished products. However, increasing concerns about the quality of goods produced in squalid domestic conditions resulted in a transition of this form of production to small workshops employing groups of workers. In the less affluent north of England the advantages of economies of scale encouraged the introduction of the 'division of labour' [4] into the process, such that each worker completed only one small part of the operation, and production soon moved into large steam-driven factories. [5] By contrast, in London and some towns in the south of England, where fast changing fashions and the demands of wealthy individual

[1] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899*, Cd. 223 (1900), HMSO, London, p. 255.

[2] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900,* Cd. 668 (1901), HMSO, London, p. 367.

[3] Rappaport, E.D. (2000), *Shopping for Pleasure: Women in the Making of London's West End*, Princeton University Press, Woodstock, Oxfordshire, pp. 6-8, 21.

[4] The introduction of this term is usually attributed to philosopher and economist Adam Smith in, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776, republished 1937), New Editions, New York. Its dominance in industrial production and the consequences of this were further discussed by Frederick Engels in *The Condition of the Working-Class in England. From personal observation and authentic sources* (1845, republished 1962), Foreign Languages Publishing House, Moscow, and by Emile Durkheim in *The Division of Labour in Society* (1893, republished 1933), The Free Press, New York.

[5] Bythell D. (1978), *The Sweated Trades. Outwork in Nineteenth Century Britain,* Batsford, London, pp. 71-72.

clients exerted a stronger influence on the market, the workshop system continued to prevail. Thus by the end of the 19th century large numbers of predominantly female workers in London and southern England, and to a lesser extent in other areas of Britain, were employed in what came to be known as the 'sweated trades', [6] spending long hours in small overcrowded workrooms. These workers were employed in a variety of occupations. In 1897, for example, a total of 249,643 women in the United Kingdom were reported to be employed in small workshops carrying out tailoring, dressmaking, millinery and boot and shoemaking. A further 2,635 were employed in fancy box making, and 2,927 in artificial flower making. [7] A survey carried out in West London by inspector Emily Sadler in 1901 also identified 'sweated' conditions in the preparation of tobacco, the production of confectionary and preserves and in printing and bookbinding. [8] Many workrooms were in basements or semi-basements with little or no access to natural light or ventilation. Some, for example, were in the basement kitchens of the multi-occupancy dwelling houses in which workers ate and slept in similarly overcrowded conditions. Others were housed in lofts over stables or situated below the shops which sold the goods the workers produced. Some of the worst conditions were found in crowded basements beneath the elegant London showrooms of dressmakers in Bond Street and Sloane Street. [9]

At the end of the 19th century, the sole aspect of Factory Law which reached the predominantly female workforce employed in these workshops was that which governed restrictions on working hours. Environmental conditions, covering such matters as space, temperature and ventilation were regulated, not by the Home Office, but by the Sanitary Authorities under the provisions of the Public Health Act. [10] The Factory Act Extension Act of

[6] Defined by the Select Committee of the House of Lords on the Sweating System (1890) as, 'wherever workers spent long hours in poor conditions for only low wages'. Bythell, D. (1978), *The Sweated Trades: Outwork in Nineteenth Century Britain,* Batsford Academic, London, p. 232.

[7] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1903*, Cd. 2139 (1904), HMSO, London, p. 239.

[8] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1901*, Cd. 1112 (1902), HMSO, London, p. 154.

[9] *Annual Report of the Chief Inspector of Factories and Workshops for the year 1897*, Cd. 8965 (1898), HMSO, London, p. 100; *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904.* Cd. 2569 (1905), HMSO, London, p. 245.

[10] Public Health Act, 1875 (38 & 39 Vict. c. 55).

1867 [11] had extended factory regulations, including those relating to air quality, to all workshops employing at least fifty people, and the Factory Act of 1878 [12] had further included all workplaces with any form of motive power. However, very few of the 'sweated trades' fulfilled these requirements and thus their workforce remained outside the protection of these aspects of factory regulation. During the early part of the 20th century, however, conditions in these workshops became a major focus of concern for the women factory inspectors who, as a result of their inspection visits to enforce working hours' regulations, rapidly became acquainted with the poor conditions which prevailed there. In particular, their concerns were centred on the problem of poor air quality and the need for adequate ventilation. The end of the 19th century, marked by a growing belief in the value of fresh air for the promotion of health, provided a fertile climate in which to raise new questions about overcrowded workrooms pervaded by stale air. Moreover, many of the wealthy clients who patronised the millinery and dress shops which relied upon these workshops would have been known to the inspectors personally. In urging the case for reform, therefore, they were able to harness these concerns and also to draw on new scientific knowledge about the constituents of air and emerging technical developments in ventilation measurement. An examination of their work in this field, therefore, is illustrative both of the scientific and technical developments taking place in industrial health at that time and the extent to which the women inspectors embraced these developments and enhanced their own expertise. This case study also highlights the strains which developed between different regulatory authorities charged with overseeing different aspects of a workplace, and considers how the women inspectors attempted to negotiate the transfer of regulatory responsibility for small workshops from the Sanitary Department to the Factory Department. Unlike their activities discussed in the previous two case studies, however, the work of the inspectors in this field was less immediately successful in terms of tangible benefits to the workers concerned, but rather represented a longer term process whereby attitudes towards the working environment and its requirements were significantly changed. Thus, in succeeding years, a new prominence was given to factors such as space, lighting, temperature and, in particular, ventilation.

[11] Factory Acts Extension Act, 1867 (30 & 31 Vict. c.46).

[12] Factory and Workshop Act, 1878 (41 Vict. c.16).

When the first women factory inspectors were appointed in 1893 union and press agitation about 'sweating', which subsequently resulted in the formation of the 'Anti-sweating League' [13] in 1906, was in its early stages. [14] Findings of Board of Trade reports in 1887 and 1888 [15] had led to the establishment, in 1888, of a Select Committee of Enquiry under Earl Dunraven, [16] initially set up to enquire into conditions in the East End of London, but subsequently extended to cover the whole country. Between August 1888 and May 1890 the Committee took evidence from nearly 300 witnesses at 70 sittings and produced five reports. Despite the considerable resources invested in this exercise, however, the final recommendations were disappointing for those who anticipated that reformatory legislation would follow. Members of the committee concluded that legislation was likely to be ineffective and that employer self-regulation could be relied upon to achieve what the State could not, a view which was largely in tune with contemporary *laissez-faire* attitudes towards the regulation of industrial activity. [17] The Royal Commission on Labour, established in the more interventionist political climate of the early 1890s, reached a different conclusion, specifically recommending the use of factory legislation to combat the problem. However, for a variety of reasons, there seems to have been no immediate political will to pursue this. In terms of factory reform it was the industries which used poisonous substances which, from the late 1880s, had claimed major press and public interest. The health problems of women seamstresses and milliners were less obviously dramatic and less well defined than those suffering from the effects of exposure to substances such as lead and phosphorus. In addition, the term 'sweated labour' appears to have encompassed a

[13] In 1906 George Cadbury, chocolate maker, philanthropist and owner of the *Daily News* financed a major exhibition in London's West End, highlighting conditions in the sweated trades leading to the formation of the 'Anti-sweating League'. This campaigned for the abolition of sweated conditions and, in particular, the establishment of a minimum wage. It had strong Trade Union support. In October 1906, the League organized a large conference in London's Guildhall chaired by Charles Dilke and Earl Dunraven. Subsequently other meetings and exhibitions were organized throughout England.

[14] 'The Sweating System'*, Lloyds Weekly Newspaper*, (May 18 1890); 'Labour Notes', *Bristol Mercury* and *Daily Post*, (December 5 1891); 'The Labour Commission and Employment of Women', *Daily News*, (April 3 1894).

[15] *Report to the Board of Trade on the Sweating System at the East End of London (1887, 1888*), Cd 361 (1889), HMSO, London.

[16] *Select Committee of the House of Lords on the Sweating System. First Report with Reports of the Board of Trade* (1887-8*); Second Report* (1888*); Third Report* (1889); *Fourth and Fifth Reports* (1889-1890*),* HMSO, London.

[17] Taylor, A.J. (1972), *Laissez-faire and State Intervention in Nineteenth-century Britain,* MacMillan Press, London, pp. 42-3.

range of concerns which fell within the bailiwick of different regulatory authorities or none at all. This seems to have effectively diluted any focussed action while maintaining an impression that the problem was already the subject of regulatory control. Thus the definition of 'sweating' adopted by the Select Committee of 1888 was that of 'any situation where workers spent long hours in poor conditions for only low wages'. Within this definition, issues relating to excessively long hours lay firmly within the jurisdiction of the Factory Department while low wages, unless they involved the abuses of the 'truck system', were a matter for negotiation between employers and workers. The rather general term 'poor conditions' could include a range of factors which might be considered to fall within the realm of health and safety, for example excessive heat or cold, poor lighting, overcrowding and poor air quality. However, in the early 1890s such issues, as they related to small workshops, were the concern of the local sanitary authorities who, under the provisions of the Public Health Act of 1875, had a duty to deal with 'nuisances'. [18] For hard pressed local sanitary inspectors, struggling with the welter of diverse duties placed upon them by the 1875 Act, their obligation to regulate conditions in the 'sweated trades' must have seemed a relatively low priority. As well as the removal of 'nuisances', sanitary inspectors were, for example, required to carry out the inspection of bakeries, dairies and slaughterhouses, ensure that lodging houses were not overcrowded and that sewerage systems were effective, monitor compliance with building regulations and supervise the notification of infectious diseases. From the beginning of the 20th century they were also involved in the expanding social service of 'health-visiting' to provide assistance and advice to the poor. [19] Perhaps unsurprisingly, therefore, factory inspectors who, in the course of their enforcement of working hours' regulations, made frequent visits to small workshops were often highly critical of their co-inspectors in the Sanitary Department whose approach they regarded as generally ineffective. In 1900 their frequently voiced frustrations prompted Chief Inspector Arthur Whitelegge, himself a former Medical Officer of Health, [20] to note in his Annual Report that 'the inertia of many such bodies, to which reference is made in

[18] A statutory 'nuisance' was an aspect of the environment considered to be injurious to health, and included, for example, smoke, dust, fumes, odours, defective buildings, accumulations of rubbish and the conditions under which animals were kept.

[19] Porter, D. (1999), *Health, Civilisation and the State: A history of public health from ancient to modern times*, Routledge, London, p. 138.

[20] See Appendix 1.

several of the inspectors' reports is to be regretted', [21] adding in 1901 that 'as in former years the reports indicate that the co-operation of the Local Authorities was very unequal' and that 'in most of the smaller districts and in certain important towns there has been neglect'. [22]

By the beginning of the 20th century, therefore, there was little sign of progress in terms of improving the conditions prevalent in small workshops. However, during the years which preceded the First World War, the issue of 'sweating' and the environmental conditions under which it took place, gained a new prominence, promoted not only by the activities of the Anti-sweating League but also, it will be argued here, by those of the women factory inspectors. The report of the four Lady Commissioners appointed as part of the Royal Commission on Labour in1892 [23] included a substantial section on the problems of the 'sweated trades' and from the outset, therefore, the subject was high on the agenda of the women inspectors. From 1894 their annual reports catalogued a range of problems associated with small workshops including extremes of temperature considered to result in chills and fevers and poor lighting which placed excessive strain on the eyes. [24] Moreover, in 1906, inspector Emily Sadler reported as follows: [25]

> In one case a worker whose family history had shown no hereditary tendency towards lunacy had been so affected by the feeling of oppression and lack of proper air in the basement in which she was continually employed that she became very ill and eventually went out of her mind. Others of the workers were also obliged to leave from this same cause. [26]

Particular attention was focussed on the problem of air quality, an emphasis which chimed well with current trends in both public and occupational health. By the late 19th century there was considerable public enthusiasm for the benefits of fresh air, and air quality in

[21] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900,* Cd. 668 (1901), HMSO, London, p. 24.

[22] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1901,* Cd. 1112 (1902), HMSO, London, p. x.

[23] Royal Commission on Labour (1893-4), Employment of Women. Report by Miss Clara E Collet (Lady Assistant Commissioner) on the Conditions of Work in London. PP 1893-4 XXXVII.

[24] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899.* Cd. 223 (1900), HMSO, London, p. 255.

[25] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1906,* Cd. 3586 (1907), HMSO, London, p. 198.

[26] *Ibid.*

towns and cities had become a major preoccupation of the Sanitary Authorities. [27] Moreover, the Home Office had similarly begun to consider that the maintenance of good air was part of the Factory Department's remit of protecting workers' health. Medical and public attitudes at that time, however, incorporated a number of contradictory beliefs about the sources of ill-health, reflecting the fact that the theoretical basis for disease aetiology was in the process of change, shifting from a 'miasmatic' [28] model of disease causation to one based on 'germ theory', which recognised the role of specific bacterial organisms. [29] The terms within which the women inspectors couched their concerns about air quality in small workrooms are highly reflective of these contradictions and demonstrate the extent to which they were operating in a changing medical and scientific environment. Thus they reported initially that many of the women employed in such workrooms were anaemic in appearance and complained of persistent nausea, headaches and excessive fatigue. [30] These symptoms the inspectors attributed to the malodorous vapours emanating from filthy floors and from tightly packed human bodies. They considered that this impure or 'vitiated' [31] air to be responsible for a range of health problems, a conclusion entirely consistent with a miasmatic model of disease aetiology. Elsewhere, however, they showed themselves to be equally well-acquainted with the implications of germ theory, [32] as witnessed by their concerns about the spread of phthisis [33] where individuals worked in close proximity to one another and inhaled each other's air. [34] Moreover, they understood

[27] Porter, D. (1999), *Health, Civilisation and the State: A history of public health from ancient to modern times,* Routledge, London, p. 86.

[28] According to the miasmatic theory of disease aetiology, disease was caused by non-specific contamination of the atmosphere by gaseous material given off by putrifying, decomposing organic matter.

[29] The theory that some diseases resulted from contact with specific bacterial organisms, first published by French chemist, Louis Pasteur, in 1861. In 1882, German physician, Robert Koch, identified the tuberculosis bacillus.

[30] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899,* Cd. 223 (1900), HMSO, London, p. 255; *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1906*, Cd. 3586 (1907), HMSO, London, p. 198.

[31] A term commonly used in the 19th century to describe air contaminated by substances in the environment.

[32] Waller, J. (2004), *Discovery of the Germ*, Icon Books, London, pp. 1-2.

[33] 19th century term for tuberculosis.

[34] Anderson describes discussions with the Medical Officer of Health and the Certifying Surgeon who considered that a particular workshop in West London was 'the main origin of phthisis found among women and girls in this neighbourhood', *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, pp. 366-7.

the risks associated with the inhalation of carbon monoxide emanating from defective gas lights and flueless gas stoves. Such devices were the lighting and heating sources of choice for seamstresses and milliners worried about smuts from candles and open fires which might ruin expensive hats and gowns. [35] In different ways all these problems were associated with contaminated air but the model of disease aetiology adopted by the inspectors varied between the miasmatic, the bacteriological and the toxicological, demonstrating a simultaneous adherence to earlier notions of disease causation and to new scientific developments.

The Factory Act of 1895 was the first to include regulations about ventilation in workplaces, [36] requiring the specific control of certain dusts and fumes and more generally that 'sufficient ventilation shall be maintained in factories and workshops.' [37] 'Sufficient ventilation', which essentially related to the provision of fresh air, was at this stage, defined in terms of the cubic feet of air space allotted to each worker. [38] Like its predecessors, however, the Act was limited in scope, applying only to workplaces where the manufacturing process itself generated specific toxic gases, vapours or dusts. Again this excluded most small workshops where any toxic emissions were likely to be associated with gas heating and lighting. [39] The inspectors' only recourse to action was the notification of ventilation defects to the local Sanitary Authorities, an approach which they appeared to pursue vigorously, as witnessed by the increasing number of notifications each year. In 1897 the inspectors made 286 such notifications. By 1913 this number had risen to 1,533. [40] Numerous comments in the inspectors' reports, however, suggest that in many areas these rarely resulted in any

[35] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1906*, Cd. 3586 (1907), HMSO, London, p. 198.

[36] Factory and Workshop Act, 1895 (58 & 59 Vict. c.37).

[37] *Ibid.*

[38] The standard for factories was 250 cubic feet of airspace per person. In 1898 Lucy Deane drew attention to the flaw in this formulation, arguing that there was a need for a legal limitation on height to address the problem of rooms with high ceilings and very limited floor space. Similarly, Anderson quoted the comments of an employer: 'then all we have to do is build a room with walls up to the sky and we can put as many people as we like into it'. *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1898*, Cd. 27 (1899), HMSO, London, p. 157.

[39] These emissions were primarily carbon dioxide and carbon monoxide. By the end of the 19th century coal gas was passed through a purification process to remove sulphur dioxide before distribution.

[40] *Annual Reports of the Chief Inspector of Factories and Workshops for the Years 1897-1913*, HMSO, London.

form of action, something which appeared to represent a continual source of irritation to the Factory Department. In 1903, for example, Anderson stated that 'sometimes complaints relate to cases where the local authority are of the opinion (until persuaded to the contrary by the Factory Inspector) that the means of ventilation are sufficient.' [41] Return visits to workshops to monitor action following notification appear to have been spasmodic rather than routine, and would presumably have been well beyond the resources of the women inspectors. Nevertheless their reports are peppered with examples of subsequent visits where they express disappointment at the lack of improvement. In 1906, for example, Mary Paterson re-visited a number of small workshops in Glasgow and recorded no evidence of action since her earlier inspection. To underline what she considered to be incompetence on the part of the Sanitary Authorities she highlighted sections of their Annual Report where she noted that of 31,654 visits made by sanitary inspectors to 4,697 workshops in 1905 only eighteen had been found to be defective in light or ventilation. This, she observed, suggested 'a state of near perfection not borne out by the senses or workers' reports'. [42]
In addition to acting dutifully, if often ineffectually, within the terms of the current public health legislation, the women inspectors frequently described how they offered advice to employers. In 1897, for example, Anderson reported that 78 cases of defective ventilation had been identified. In 57 cases the installation of fans had been suggested, while the remainder had been referred to male engineering inspectors for further advice. [43] The following year 69 cases were similarly referred and in 1899 she described her advice to an employer on the installation of an extraction fan. [44] These reports, although serving to bring the problem to the notice of the Chief Inspector, appear to indicate activity that was both beyond their legal remit and probably also beyond their technical expertise.

Shortly after her appointment as Principal Lady Inspector, however, Anderson translated her frustrations into the explicit pursuit of a regulatory goal. In 1897 she included in her Annual

[41] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1903,* Cd. 2139 (1904), HMSO, London, p. 203.
[42] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1906*, Cd. 3586 (1907), HMSO, London, p. 197.
[43] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1897,* Cd. 8965 (1898), HMSO, London, p. 99.
[44] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1898,* Cd. 27 (1899), HMSO, London, p. 157.

Report a proposal that existing ventilation regulations contained in the Act of 1895 should be extended to include all workshops, not just those using some form of motive power or directly producing dust and fumes. [45] She reiterated this proposal every year until 1900, underlining her argument with references to the numerous reports of the women inspectors, and adding, for good measure, that legislation pertaining to small workshops in France was much more comprehensive than that in England. [46] Anderson's persistent lobbying contrasted sharply with the behaviour of junior male inspectors, whose official Civil Service grade she shared, and who confined their activities to routine inspection and reporting. Perhaps as a result of the unique peripatetic position of the women inspectors, and also perhaps by virtue of a confidence emanating from their social class and political connections, Anderson clearly considered that she, at least, had a legitimate role to play in departmental policymaking. Further pressure to bring small workshops under the umbrella of factory legislation was provided by the reports of Lucy Deane, inspector for the West London Metropolitan District. In 1899 Chief Inspector Arthur Whitelegge had set up a 'Factory Staff Committee' [47] to carry out a re-organisation of the divisions and districts of the Factory Inspectorate which had remained unchanged since their original designation by Alexander Redgrave in 1875. Anderson seems to have taken the opportunity to acquire regulatory control for the women inspectors of those parts of London where the problem of small workshops was most acute. Whitelegge accepted her recommendation that, while women inspectors should largely continue in their peripatetic role, it would be useful for them to assume sole responsibility for one particular district, the West London district, which contained scores of small workshops employing women in dressmaking, millinery and also laundry work. Lucy Deane, by this stage the most experienced of the women inspectors, commenced this role in 1900. In keeping with the new departmental preference for systematic recording she immediately began furnishing the annual reports of the women

[45] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1897*, C. 8965 (1898), HMSO, London, p. 100.

[46] *Ibid. Annual Report of the Chief Inspector of Factories and Workshops for the Year 1902,* Cd. 1610 (1903), p. 156. Anderson, who was a fluent French speaker, provided a translation of French law for the Factory Department in 1894 and visited France in 1898 and 1902 to report on the differences between French and British legislation.

[47] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899,* Cd. 223 (1900), HMSO, London, p. 23.

inspectors with statistics on visits and findings, such as those summarised in Table 6.1 (below).

Table 6.1[48]

Defects in small workshops notified to the Sanitary Authorities: 1900

	Overcrowding	Want of cleanliness	Want of ventilation	Want of fire escapes
Acton	0	2	0	2
Chelsea	2	4	2	1
Chiswick	1	1	0	1
Fulham	0	22	10	10
Hammersmith	1	7	3	5
Kensington	0	2	0	0
Marylebone	17	26	20	26
Paddington	7	9	6	4
Westminster	8	13	8	9

These figures illustrated the improvements recorded since 1893 in Kensington, which initially had contained some of the worst workshop conditions. The situations in Fulham, Marylebone and Westminster, by contrast, remained very poor. Deane noted that Kensington had for a number of years been under close inspection by the women's section of the Factory Department and had also benefitted from joint visits by sanitary and factory inspectors. [49] Within this small area, therefore, she was able to demonstrate the value of good co-operation between Factory and Sanitary Departments but, more particularly, the potential benefits of a well-resourced and experienced programme of visits by women factory inspectors. The reports of other inspectors indicated that on a wider scale the co-

[48] Data derived from report of Lucy Deane. *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668, (1901), HMSO, London, pp. 377-386.
[49] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900.* Cd. 668 (1901), HMSO, London, p. 361.

operation and commitment of the hard-pressed local Sanitary Departments could not be relied upon. Thus Anderson remained convinced that legislative change which transferred responsibility for conditions in small workshops to the Factory Department remained the most viable route to reform. She was no doubt aware that during the late 1890s the Home Office had embarked on a comprehensive review of factory legislation, with the intention of consolidating the numerous existing regulations under a single new Factory and Workshop Act. [50] This review offered her an opportunity to press for a change in the law, such that small workrooms would be included under the terms of the legislation.

Paradoxically, however, new scientific and medical developments which had shifted the focus of legislation towards the identification and prevention of the effects of specific toxic agents made it difficult to justify a simple extension of existing ventilation regulations to small workshops. The precise nature of the toxic hazards in such workshops had not been defined. Although the existing law required the maintenance of general ventilation in large factories (in addition to the control of specific toxic fumes) this to some extent reflected earlier beliefs about the general value of fresh air and the importance of avoiding malodorous vapours. In the new scientific climate the question was raised as to whether foul air itself, although unpleasant, actually constituted a hazard to health if it contained no identifiable poisonous substances. If so, which particular constituents were present, did they exist at levels likely to be harmful and did the means to detect and measure these currently exist? In 1900, the Home Secretary asked the Chief Inspector of Factories to set up a committee to consider these questions. Significantly for those concerned about small workshops the 'Inquiry into Ventilation in Factories and Workshops' [51] was to consist of two phases. These reflected a distinction between general ventilation, the constant renewal of air from outside sources to remove 'impurities due to the presence of employees and of lights burning', [52] and local ventilation involving the use of mechanical means to remove

[50] The Factory & Workshops Act of 1901 (1Edw.7 c.22) consolidated all earlier factory legislation that had developed in a piecemeal fashion since 1878. Although subsequently subject to various amendments, the 1901 Act remained as the principle statute for the regulation of factories and workshops until 1937.
[51] Departmental Committee appointed to inquire into Ventilation of Factories and Workshops (1900), Terms of Reference. National Archives HO45/10043/A61612.
[52] *Ibid.*

specific fumes or dust from the breathing zones of workers. [53] The former, the investigation of general ventilation, was essentially the problem of small workrooms, and it was agreed that this should form the subject of the first phase. Given that, prior to 1893, virtually no official attention had been paid to this problem, and that earlier emphasis had concentrated almost exclusively on toxic dusts and fumes in manufacturing industry, [54] this was a surprising decision. It seems reasonable to assume that it owed much to the persistence of Anderson and her team in repeatedly highlighting the subject in their annual reports. Advantageously, the subject also chimed well with a developing scientific enthusiasm for atmospheric measurement, something which may not have escaped the notice of Anderson who appears to have chosen a particularly opportune moment to raise the subject of ventilation. By the late 1890s analytical chemistry had advanced to the point where it was possible to detect and measure low levels of certain contaminants in the air, notably carbon dioxide and carbon monoxide. Added to this, early characterisations of 'dose-effect relationships' [55] had begun to provide more details of specific effects on the body. This methodology, which had been developed to investigate the problem of poisonous and explosive gases in coal mines [56] had recently been applied to address public concerns about the quality of the air in the tunnels of the recently constructed Metropolitan underground railway. In 1897 the Board of Trade had commissioned an investigation in which the various sources of contamination (trains, gas lamps and people) were identified and their various contributions to the release of pollutants (carbonic acid, carbonic oxide and sulphurous acid [57]) were measured. [58] Thus in 1900, the methodology required for the investigation of small workshops was already in place and the Chief Scientist in the railway investigation, Dr

[53] *Ibid.*

[54] Early fans and ducting to remove dust had been developed in the 1850s by Dr George Holland to protect grinders in the Sheffield cutlery industry. By the 1890s, various forms of fans and ducting had been developed to suit the needs of different industries.

[55] The relationship between the amount of a substance ingested or inhaled and the size of a specific biological effect. Graphical representations help to determine whether or not the relationship is, for example, linear or whether there is a specific effect threshold.

[56] *Report to the Secretary of State for the Home Department on the causes of death in colliery explosions and underground fires, with special reference to the explosions at Tylorstown, Brancepath and Micklefield. Reports from Commissioners, Inspectors and others,* Cd. 8112 (1896), HMSO, London, pp. 611-58; Haldane, J.S. (1896), 'A discussion on the pathology of coal gas poisoning', *British Medical Journal* (1896), pp. 903-10.

[57] 19th century terms for respectively, carbon dioxide, carbon monoxide and sulphuric acid.

John Scott Haldane, [59] was ready and willing to conduct a similar inquiry into factory and workshop ventilation.

Drawing on his previous work in mines, Haldane carried out a range of careful experiments to determine the levels of carbonic oxide and carbonic acid present in the air of different types of workshops under different conditions. [60] Working with specialist engineering inspector, Edward Osborn, he concluded that the current criterion for adequate general ventilation, the provision of a minimum of 250 cubic feet of air space per person employed, was inappropriate having found that 'the most highly 'vitiated' air met with by the committee was in rooms with an airspace of 10,000 cubic feet per person'. [61] Instead they proposed a standard based on the proportion of carbonic acid in the air, arguing that previous research had identified this as 'the best objective criterion of the sufficiency of ventilation in ordinary rooms'. [62] They further recommended the use of a new portable method of air sampling, for use by factory inspectors, which had been developed by Haldane in the course of the investigation. [63] Significantly this method had been validated by the analysis of numerous duplicate air samples, many of which were collected by inspector Rose Squire, [64] a factor which both confirms the close involvement of the women inspectors and indicates the respect which Haldane apparently had for their work. Finally, and perhaps most importantly, the committee recommended that, within the terms of the new Factory

---

[58] *Report of the Committee appointed by the Board of Trade to inquire into the system of ventilation of tunnels on the Metropolitan Railway* (1898), Appendix No. 1. Memorandum on the composition of the air in the Metropolitan and other railway tunnels and on means of artificial ventilation of tunnels, by Dr Haldane, Cd. 8684, HMSO, London, pp. 290-301.

[59] Dr. John Scott Haldane, See Appendix 1. He was assisted by Edward Osborn, engineering advisor to the Factory Department, and Worcester-based engineering inspector, Charles Pendock, who acted as secretary.

[60] *First Report of the Departmental Committee appointed to inquire into Ventilation of Factories and Workshops* (15 Aug 1902), Appendix I. Results of the Examination of Ventilation. Appendix II. General Account of the Conditions in Workshops, Cd. 1302 HMSO, London.

[61] *Ibid.*

[62] *Ibid.* These conclusions were based on Haldane's earlier work. Haldane, J. & Lorrain Smith J. (1893), 'The physiological effects of air vitiated by respiration', *Journal of Pathology and Bacteriology,* Vol. 1, 1893, pp. 168-186; Haldane, J. (1895), 'The action of carbonic oxide on man', *Journal of Physiology*, Vol. 18, 1895, pp. 430-462.

[63] See Appendix 4. *First Report of the Departmental Committee appointed to inquire into Ventilation of Factories and Workshops* (15 August 1902), Appendix III. Determination of Carbonic Acid in the Air of Factories and Workshops. Cd. 1302 HMSO, London.

[64] Rose Squire (1861-1938), See Appendix 1.

Act of 1901, [65] the proposed standard of ventilation 'should be prescribed for all classes of factories and workshops'. [66]

Anderson had thus mobilised the skills of one of the most eminent scientists of the day, employing the most advanced scientific techniques, to investigate the problems of small workshops. Moreover, she had also achieved her objective in terms of legislation. However, the subsequent implementation of the regulations, proved to be a difficult challenge. A particularly disappointing element was that the remedying of defects in ventilation, once notified, remained the responsibility of the sanitary authorities. Moreover, there was clearly an initial delay in translating the technical aspects of the regulations to action on the ground. In 1902 Anderson reported that she was still awaiting the recommendations and advice of the Committee. [67] In 1903 she reported that work towards improvement had been 'tentative and halting', although concluded optimistically that 'when we have, to guide us, recognised tests and standards of sufficiency (capable of being enforced) as to "means" and "maintenance" of ventilation ... we shall certainly see a great development'. [68] In 1904 she again reported that 'we wait for recognised tests' and that 'the question of general ventilation in workrooms stands very much as I reported it to be in 1902 and 1903'. [69] By 1905, however, the women inspectors were regularly collecting samples and dispatching these for analysis of carbonic acid levels. This activity was considerably enhanced by the appointment that year of a scientifically qualified inspector, Mildred Power, [70] who began a systematic survey of conditions in West London workshops, measuring space, carbonic acid, temperature and humidity levels. [71] Her appointment was indicative of the educational qualifications, particularly in the field of science, which were increasingly required of women

[65] Factory and Workshop Act, 1901(1 Edw. 7 c.22). 'Effective and suitable provision shall be made for securing and maintaining by the circulation of fresh air in each workroom the adequate ventilation of the room'.

[66] *First Report of the Departmental Committee appointed to inquire into Ventilation of Factories and Workshops* (15 Aug 1902), Cd. 1302 HMSO, London.

[67] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1902,* Cd. 1610 (1903), HMSO, London, p. 155.

[68] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1903,* Cd. 2139 (1904), HMSO, London, p. 203.

[69] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904,* Cd. 2569 (1905), HMSO, London, p. 244.

[70] Mildred Power, appointed in 1905, was formerly assistant bacteriologist to the Royal Commission on Sewage Disposal established in 1898, which finally reported in 1907.

[71] See Appendix 4 for a sample report.

inspectors during this period. Both Miss Power and, a few years later, medically qualified woman inspector, Miss Whitlock, [72] were competent, not only to carry out the necessary sampling procedures, but also the analysis of the samples they collected. Anderson was quick to capitalise on this asset, pointing out in her Annual Report that this provided the department with substantial savings in time and money. [73]

The results of this activity, however, were largely in terms of the identification of the scale of the problem rather than its solution. In 1900 Anderson had clearly anticipated that the recommendations of the Ventilation Committee would provide real direction, not only in terms of measurement but also in relation to intervention. [74] Expectations had been raised and requests for assistance from both workers and employers increased, as did notifications to the sanitary authorities. In 1902 the women inspectors had notified a total of 651 sanitary defects to the sanitary authorities, of which thirty-three related to lack of ventilation. By 1906, these figures had risen to 816 and 60 respectively. [75] Unfortunately practical recommendations from the Ventilation Committee seem to have been confined to the second phase of the enquiry which focussed on dust and fumes and offered detailed technical advice on fans and ducting, entirely inappropriate to the general ventilation of small workrooms which were often situated underground. [76] The difficulty of persuading the sanitary authorities to take action remained, not only no doubt because of other more pressing priorities, but also, as the Ventilation Committee must have discovered, because in many cases practical solutions were difficult to find. Clearly, in recommending the installation in most factories of the latest technology in ventilation engineering, the Committee were on relatively familiar ground. Many basement workrooms, however, simply did not have direct access to outside air and for those above ground the need to keep garments and other goods free from smuts precluded the most obvious solution, the

[72] Miss Whitlock was appointed in 1910. She was a qualified doctor with an additional Diploma in Public Health.
[73] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1911,* Cd. 6239 (1912), HMSO, London, p. 134.
[74] A*nnual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, p. 367.
[75] A*nnual Report of the Chief Inspector of Factories and Workshops for the Year 1906,* Cd. 3586 (1907), HMSO, London, p. 195.
[76] *Final Report of the Departmental Committee appointed to inquire into the Ventilation of Factories and Workshops* (1907), Cd. 3553, HMSO, London.

opening of windows. In 1906 Anderson observed that 'the old difficulty of securing any real maintenance of ventilation...remains very much in the position held by it for many years'. [77] She reiterated this general conclusion in various forms in successive annual reports up to 1914.

Unsurprisingly there was little further progress during the First World War. As Chapter 7 will discuss, compliance with factory regulations in most workplaces deteriorated during the war as the numbers of inspectors was considerably reduced. [78] Moreover, the work of the women inspectors was radically changed during this period, making it difficult for them to focus on issues of previous concern. [79] In 1919 Senior Inspector, Emily Slocock, reported that the use of flueless gas stoves in small workshops had increased during the war, despite the makers' recommendation that they should only be used in places where there is 'full and adequate means of ventilation'. [80] During the same period, the reports of male inspectors also reflected their discouragement in the face of limited progress. In 1921 inspector Mr Lauder in Glasgow commented that 'the paramount importance of fresh air, as an essential for health, is always being urged, but progress towards ideal ventilation is very slow.' [81] Moreover, the problem was not always solved by the construction of new premises. In the same year Mr Pedler, Inspector for Leicester, observed the erection of several large new factories 'without any adequate provision for ventilation'. [82] In terms of immediate benefits to the women workers involved, therefore, the inspectors' efforts to improve ventilation in small workshops appear to have met with little success. From the factory inspectors' point of view, one reason for this was their continued dependence on the ineffective sanitary Authorities. A more fundamental difficulty, however, lay in the intractable nature of the problem. The inspectors were able to record numerous small improvements in the individual workshops they visited personally, but as long as workshops were sited in unsuitable

[77] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1906*, Cd. 3586 (1907), HMSO, London, p. 197.
[78] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1919,* Cmd. 941 (1920), HMSO, London, pp. 3-5.
[79] See Chapter 7.
[80] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1921,* Cmd. 1705 (1922), HMSO, London, p. 54.
[81] *Ibid.,* p. 60.
[82] *Ibid.,*

premises and as long as affordable and safe means of heating and lighting were unavailable, air standards were difficult to maintain. In 1900, for example, Mary Paterson had reported that in Central London the price of land obliged employers to use any area as a workshop which could not be used as a showroom [83] while in 1911 inspector Emily Slocock noted the benefits but also the prohibitive cost of electricity which only large wealthy employers could afford. [84] The on-going tension between economics and health and safety requirements represented a significant obstacle to reform.

The goal of reform was also proving elusive for other organisations interested in the 'sweated trades'. Encouraged by the interventionist political climate which followed the Liberal victory of 1905, a vigorous campaign was mounted by the Anti-sweating League, supported by the TUC. Although this campaign ran concurrently with the activities of the women inspectors, however, its objectives were rather different. Trade union attention during this period, as in later years, was focussed primarily on terms of employment (working hours and wages) and rather less on working conditions. [85] At an early stage, therefore, initial trade union support for factory regulation as the preferred solution to the problem was replaced by the pursuit of the minimum wage. In the event this achieved little in terms of reform. The Trade Boards set up in 1909 to establish minimum wages dealt with only a small number of industries, none of which encompassed the kind of workshops under discussion here. After the war, however, the problem was suddenly and unexpectedly solved when the post-war economic slump resulted in the closure of the majority of small workshops and, with it, the end of many of the 'sweated trades'. In common with members of the Anti-sweating League, the women inspectors could claim no direct credit for this eventual solution to the problem and their practical achievements might, therefore, be seen as relatively limited, confined only to those individual workshops which they personally visited. Their real legacy, however, requires the adoption of a longer term perspective. By 1914, the subject of ventilation in small work premises was firmly established on the Home Office agenda, due largely to the persistence of the women inspectors. After the war,

[83] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900,* Cd. 668 (1901), HMSO, London, p. 367.

[84] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1911*, Cd. 6239 (1912), HMSO, London, p. 135-6.

[85] Pelling, H. (1973), *A History of British Trade Unionism,* Penguin, Harmondsworth, pp. 129-30, 231.

alongside space, lighting and temperature, it would become an important aspect of any good working environment and the subject of major industrial health research. [86] This approach was further reinforced by the legislative change, negotiated by the women inspectors in 1901, which in part shifted responsibility for small workshops from the Local Government Boards of Public Health to the Factory Department. This underlined the principal, which at the beginning of the 20th century was only in its early stages of development, that all workers were entitled to the same protection under factory law.

[86] The Industrial Health Research Board was established in 1921 to continue and expand the work of the Health of Munitions Workers Committee. Shimmin, S, & Wallis, D. (1994), *Fifty Years of Occupational Psychology in Britain*, British Psychological Society, Leicester.

Chapter 7

Health, Safety and Welfare in World War 1

Earning high wages? Yus
Five quid a week
A woman too, mind you,
I call it dim sweet

Ye're asking some questions –
But bless yer, here goes:
I spends the whole racket
On good times and clothes

I've bracelets and jewellery,
Rings envied by friends
A sergeant to swank with,
And something to lend

We're all here today, mate,
Tomorrow- perhaps dead,
If Fate tumbles on us
And blows up our shed.

Extracts from: 'Munition Wages' (1917) by
Madeline Ida Bedford [1]

In August 1914 the outbreak of war brought a sharp rise in unemployment as demand for non-essential goods declined and many factories closed. [2] This situation was short-lived, however, and within months industries began to develop and expand as they adjusted to war-related production. With large numbers of men volunteering, or at a later date being conscripted for military service, many of the workers recruited into industry during the early months of the war were women. In July 1914 only eleven women were employed in the existing Royal Ordnance Factories but by October 1916 this number had risen to nearly 18,000 representing over 20% of the workers employed there. [3] During the same period almost 76,000 women (almost 60% of this workforce) commenced employment in the new

[1] Bedford, M.I. (1997), 'Munition Wages', in Reilly ,C (ed.) *The Virago Book of Women's War Poetry and Verse,* Virago, London, p 7.

[2] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1914,* Cd. 8051 (1915), HMSO, London, p. iii.

[3] Women's War Work. (September 1916), Memorandum issued by the War Office, National Archives. MUN4/2874.

ordnance factories which were established in 1914 and 1915. [4] While those women employed directly in the production of armaments have perhaps received the most historical attention, [5] many others were substituted for men in factories taken into government control to produce items required for the prosecution of the war. These included industries such as electrical, mechanical and marine engineering, aeroplane manufacture and the production of metal, wooden, rubber and leather goods. [6] By October 1916, almost 308,000 women were employed in such factories constituting over 20% of their workforce. [7] Other women were forced to adapt their skills to different types of production as existing industries closed down or changed their manufacturing focus to chime with military needs. Thus in her Annual Report for 1914, [8] Adelaide Anderson described how dressmakers in Leeds moved to the production of army uniforms, mattress covers, canvas knapsacks and even nose-bags for horses, while London furriers received large government orders for fur and skin coats for troops. Similarly Bradford carpet makers adapted their machinery to weave army blankets. In Scotland a combination of enemy action and the requisition of boats by the government effectively closed the Aberdeen fishing industry and large numbers of 'herring girls', who previously gutted and packed fish landing at Peterhead, transferred to the jute works of Dundee. Many female workers underwent extensive retraining, such as the Birmingham pen makers whose employer shifted production to the manufacture of surgical dressings and the factory workers in London who were trained in soldering to meet an unprecedented demand for metal provision boxes. Some industries began producing items which had previously been imported from the continent and were thus no longer available. In Redditch, Worcestershire, for example, fish-hook manufacturers recommenced the production of hosiery needles, a part of the needlemaking industry which had, in earlier

[4] *Ibid.*

[5] Woollacott, A. (1994), *On her their lives depend. Munitions Workers in the Great War*, University of California Press, Berkeley; Braybon, G. (1989), *Women Workers in the First World War.* Routledge, London.

[6] Ministry of Munitions. Memorandum, Munitions Work Successfully Undertaken by Women in Temporary Substitution or Dilution of Male Labour, (Undated). Attached to letter (30 November 1916), addressed to Cyril Longhurst of the War Committee, from the Ministry of Munitions, (unsigned), National Archives, MUN5/70/324/17.

[7] *Ibid.*

[8] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1914*, Cd. 8051 (1915), HMSO, London, p. 32-37.

years, played a central economic role in the town, but which had largely moved to Germany by the end of the 19th century. [9]

These changes in employment patterns seemed likely to provide new challenges for the women's inspectorate. In 1914 Anderson observed that many of the women newly engaged in industrial production had no experience of factory work having previously been employed in domestic service. Others had no experience of paid work at all. [10] In these circumstances increases in accidents and in the incidence of industrial disease seemed almost inevitable. Moreover, as a result of the call to arms the male inspectorate was rapidly becoming depleted. By December 1914, thirty-five inspectors out of a total of 195 had been seconded to other departments for war-related work, while a further thirty had joined the army, alongside thirty-two Home Office clerks responsible for administrative work within the Factory Department. [11] In all 62 inspectors and forty one clerks saw active service during the war, of which eight inspectors and three clerks were killed. [12] These were challenging circumstances for the women's section which, by 1913, still only numbered twenty inspectors of which five were superintendants with district management responsibilities. [13] However, as indicated in the previous sections, the expertise of the women inspectors had developed considerably during the years preceding the war, and by 1914 they were competent to carry out most of the duties of their male colleagues. The huge increase in the female workforce accompanied by a reduction in the size of the male inspectorate might therefore have been expected to offer an unprecedented opportunity for growth in the women's section. An examination of their work during the war, however, indicates that, in the event, this opportunity was denied to them. The much needed increase in numbers did not materialise and, instead of taking up the duties of their absent colleagues, the women inspectors appear to have been diverted away from their traditional role of health and safety promotion and towards a completely different sphere of activity, namely that of welfare

[9] *Ibid.*
[10] *Ibid.,* p. 13.
[11] *Ibid.*, p. iv.
[12] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918,* Cmd. 340 (1919), HMSO, London, Appendix, pp. vii-xiii.
[13] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1913,* Cd. 7491 (1914), HMSO, London, p. 69. The re-organisation of 1906 had created women superintendants based outside London.

provision. This chapter will consider the reasons for this change of direction and its contribution to a widespread neglect of women's industrial health and safety during the war. It will be argued that a degree of national panic about the potentially destabilising effect on women's behaviour of mass female employment, combined with the new enthusiasm among industrialists for enhancing human performance through the provision of social amenities, resulted in a government decision to develop a comprehensive programme of industrial welfare. This programme, which was aimed primarily at women workers, absorbed considerable national resources, including those of the women factory inspectors who were reluctantly drawn into its administration at the expense of their normal duties. At the same time the promotion of industrial health and safety was relatively neglected and there was a rise in industrial accidents and in the incidence of occupationally acquired diseases. This case study, therefore, contrasts sharply with those discussed in the previous three sections in that it charts a discontinuity with the inspectors' earlier progress towards increasing expertise and growing involvement in the prevention of industrial accidents and disease. Largely as a result of government policy the women inspectors' contribution to improvements in women's working conditions was thus reduced during the First World War relative to that in earlier years.

By the middle of 1915 it is clear that the women's inspectorate was struggling to meet the new challenges created by the war and that Anderson considered an expansion of the section to be essential. In June of that year she wrote to Whitelegge, requesting an increase in staff and enclosing a number of inspectors' reports 'to illustrate some of the special problems of women's employment arising out of the war for which the women inspectors have been urgently needed.' [14] It had, she said 'been impossible for the inspectors to overtake more than a fraction of the work necessary for the health and safety of women, and consequently for the nation' adding that 'it is impossible for the position with regard to Factory Department staff to remain as it is'. [15] She pointed to the impossibility of appointing men of above and below military age to replace those on active service whom she considered would be 'useless', while 'women of the right age and qualifications could be

[14] Adelaide Anderson (June 28, 1915), letter to Arthur Whitelegge, National Archives, HO45/10790/300791.
[15] *Ibid*.

obtained'. [16] In August Whitelegge embarked a prolonged battle with the Secretary of State and the Treasury to secure more staff, asking immediately for twelve additional women inspectors. [17] He was initially granted three and offered two volunteers, neither of whom had any relevant qualifications or experience but who were nevertheless considered suitable on the ground that they were both daughters of Earls! [18] The incident serves as a reminder that, despite the level of respect they now commanded within the Factory Department, the women inspectors were nevertheless engaged in a continuing struggle for professional recognition within other parts of the Civil Service. Whitelegge subsequently secured three more women inspectors (who had passed the relevant Civil Service examinations) in January 1916, and an additional six in August of 1917. [19] Throughout the negotiations on staffing levels it was emphasised by Treasury and Home Office officials and agreed, or at least conceded, by Whitelegge, that all the new posts were temporary, for the duration of the war only, a stipulation emphasised by the literal underlining of the word 'temporary' in all official communications on the subject. [20] Moreover salaries were considerably reduced.[21] For her part, Anderson appeared to retain hopes that staff employed during the war might obtain permanent posts, arguing that it would be advantageous in the future to be able to select from those who already had experience. They would, she said 'become very useful with very short training'. [22]

The reluctance of the Treasury to sanction an increase in the number of female factory inspectors, already evident by 1915, suggests that the attention of the government had at an early stage shifted away from the promotion of health and safety and towards the provision of industrial welfare. Moreover, the presumption that any additions to the staff could be sourced from untrained but philanthropic middle-classes ladies, indicated that old attitudes

[16] *Ibid.*

[17] Edward Troup (July 1915), letter on behalf of Secretary of State to the Treasury; Arthur Whitelegge (23 December 1915; 1 January 1916), letters to Secretary of State at the Home Office. National Archives HO45/10790/300791.

[18] The Treasury (30 August, 1915), letter to Edward Troup. National Archives HO45/10790/300791.

[19] The Treasury (January 1916; 15 August 1917), letters to Edward Troup. National Archives, HO45/10790/300791.

[20] *Ibid.*

[21] *Ibid.*

[22] Adelaide Anderson (28 June 1915; October 1915), letters to Arthur Whitelegge. National Archives HO45/10790 300791.

regarding the natural role of female staff had re-surfaced. The assumption that female inspectors were the ideal candidates to police the requirements of the welfare system was first evidenced by the work assigned to them at the beginning of the war, namely the enforcement of 'Emergency Orders'. The 1901 Factory Act had incorporated a facility for the Secretary of State to introduce such Orders, which suspended regulations relating to working hours, in times of national crisis. [23] During the war the relentless demand for military supplies resulted in the issuing of thousands of Emergency Orders, initially to individual firms on a temporary basis, but increasingly, as the war continued, to groups of firms within a particular industry for an indefinite period. The task of policing these Orders, to ensure that employers did not overstep their terms and conditions, fell to the women inspectors. However, the specific focus of this enforcement gave the first intimation of the way priorities were shifting, away from the maintenance of health and safety and towards the moral protection of the nation, and of women in particular. [24] A particular feature of the Emergency Orders was the relaxation of the prohibition of female night work, but only on condition that a 'responsible woman' [25] remained on the premises throughout, to ensure that women and young girls were not left alone with male workers during hours of darkness. Inspector Hilda Martindale, who appears to have entered into her new role with a degree of enthusiasm, [26] reported a typical case where a firm in West Bromwich infringed the regulations by employing 'two young men and three girls aged eighteen, nineteen and twenty from 6.00 p.m. to 6 a.m... Except for these two men and the three girls, and an old watchman, no one was on the premises. None of the girls could be considered a responsible

[23] The Factory and Workshop Act, 1901, Section 150, made provision for special orders in respect of factories and workshops belonging to the Crown or doing work on behalf of the Crown. In 1915, this was extended by the Defence of the Realm Regulations (Clause 6a) to all factories and workshops, where such orders were considered to be required in the national interest.

[24] Other examples were the reduction of licensing hours, restrictions on noise between the hours of 6.a.m. and 6 p.m. and the policing of behaviour in public parks.

[25] No official definition of this post has been identified. It may have referred to a married woman or simply a woman over the age of 21. However, a report by Inspector Hilda Martindale on a firm employing 30 women on the night shift making shell parts and cartridge clips, 'urged the appointment of either a matron or a nurse'. Hilda Martindale (9 February 1915), Report to HM Principal Lady Inspector, re Components Ltd, Dale Road, Bournbrook, Birmingham. National Archives HO45/10790 300791.

[26] A large number of similar reports from this one inspector are contained in the National Archives.

woman', she said. [27] The requirement for such a presence was strongly reminiscent of the moral concerns which had underpinned the original prohibition of night work for women in 1878. [28] The sudden influx of women of all ages and social backgrounds into industry, as well as the geographical displacement of large groups of young girls unused to leading independent, unsupervised lives, appears to have engendered a degree of national panic about the moral corruption which might ensue. The extracts from Madeline Bedford's poem at the head of this chapter neatly summarised these concerns. Bedford was not, as might initially be assumed, a munitions worker but a middle-class lady with no experience of paid employment. As such she was expressing not the sentiments and actual experiences of a worker, but rather a growing national anxiety about the potential consequences of mass female employment.

Alongside these anxieties were new concerns about performance efficiency, emanating from the imperative to maximise the production of armaments and other war-related goods. From an early stage this was a major political priority for a government increasingly under pressure to demonstrate its ability to resource the war. [29] One solution appeared to lie in the concept of 'Taylorism' [30] which during the early years of the 20th century had increasingly pervaded the organisation of larger factories. This philosophy of management relied on the objective analysis of work activities into their smallest components in order to standardise procedures and thus minimise effort and maximise performance. It was an approach eminently suited to the organisation of a large munitions factory inhabited by an inexperienced workforce. Moreover, the notion that human comfort was also necessary to maximise performance had become equally popular with large employers in the years immediately preceding the war. The worker was regarded as analogous to a machine and thus performed better when in good working order. As American writer and lecturer, Budgett Meakin stated '...it is only when high spirits and enthusiasm enter the human

[27] Hilda Martindale (5 February 1915), Report to HM Principal Lady Inspector, re Joseph & Jesse Siddons, Foundry, West Bromwich. National Archives HO45/10790 300791.

[28] Factory and Workshop Act, 1878 (41 Vict. c. 16).

[29] Beckett, I.F.W. (2001), *The Great War. 1914-1918*, Longman, Pearson Education Ltd, London, pp. 355-6.

[30] 'Taylorism' is a system of scientific management originated by Frederick Taylor in 1895. From 1900 it dominated the philosophy of management in the US and was also influential in the UK. Sundstrom E. (1986), *Work Places. The Psychology of the Physical Environment in Offices and Factories,* Cambridge University Press, Cambridge, p. 19.

machine that, like a well-oiled engine, all parts work smoothly and produce the greatest effort with the least friction'. [31]

In the summer of 1915 the government's response to these different strands of anxiety and enthusiasm found expression in the establishment of the Health of Munitions Workers Committee 'to consider and advise on questions of industrial fatigue, hours of labour and other matters affecting the personal health and physical efficiency of workers in munitions factories and workshops' [32] As a consequence of its recommendations, which filtered out in a series of twenty-one separate reports, the government embarked on the development of large scale industrial welfare. Early in 1916 the Home Office and the newly formed Ministry of Munitions jointly established a Welfare Department to develop a system of welfare provision which was to be compulsory in all government controlled factories and 'to be pressed upon the attention of all'. [33] The system provided for the establishment of improved facilities in factories, notably canteens, lavatories, cloakrooms and washrooms and also the provision of housing for geographically displaced workers, necessary transport arrangements to and from work and crèches for young children. The system was to be administered from London and overseen at factory level by newly appointed welfare supervisors. By 1918 the Welfare Department employed over one hundred administrators and many thousands of supervisory welfare officers sited in factories and workshops. In Whitehall it reportedly occupied 'all the houses on one side of Northumberland Street'. [34] Although this system potentially offered better working conditions it also contained significant elements of social control, particularly in respect of communal housing and transport and the supervision of female employers by welfare officers. Moreover, the provision of crèches allowed the government to encourage women to fulfil their patriotic duty by participation in the

[31] Meakin, B. (1905), *Model Factories and Villages: Ideal Conditions of Labour and Housing,* George W. Jacobs, Philadelphia, p. 203.

[32] Ministry of Munitions (1917), Health of Munitions Workers Committee. Interim Report. Industrial Efficiency and Fatigue, Cd. 8511, HMSO, London, p. 2.

[33] Squire, R. (1927), *Thirty Years in Public Service. An Industrial Retrospect*, Nisbet & Co., London, p. 180. The government obtained legal powers to compel all employers to enforce welfare measures in 1916 by means of the Police, Factories and Miscellaneous Provisions Act, 1916 (6 & 7 Geo. V., c.31). The Act was popularly known as the 'Little Police Act'.

[34] *S*quire, R. (1927), *Thirty Years in Public Service. An Industrial Retrospect*, Nisbet & Co., London, p. 180.

workforce, whilst simultaneously addressing lingering social concerns about the adverse effects of female employment on child rearing. [35]

The enforcement of the requirements of the welfare system, like those of the Emergency Orders, fell to the women inspectors, something which had a profound effect on their ability to maintain their role as health and safety professionals. Essentially duties associated with welfare absorbed the major part of their time and resources. In her report for 1916 Anderson began by summarising the year's work, recording the activities which the women inspectors had 'been chiefly engaged in (1) ...promoting and guiding the substitution of women for men in industry... (2) administration of *Emergency Orders* (Anderson's italics) which both modify Factory Act requirements for war needs and attach welfare conditions to such modifications (3) development of more general conditions of welfare in munitions and non-munitions industries, in co-operation with the Welfare Department, Ministry of Munitions, and Local Advisory Committees on Women's War Employment ' Having enumerated these apparently central activities she recorded, almost it seems as an afterthought, that 'in addition to those above' the subject which had also 'engaged the attention' of the women's inspectorate was the investigation of accidents and industrial poisoning. [36] The order of priorities reflected here, presumably dictated by Home Office policy, was highly indicative of the direction in which the limited resources of the women's inspectorate were now to be channelled. There was in fact little mention of accidents and industrial disease in Anderson's reports for the period 1915-1918. Instead she devoted large sections to negotiations with employers and trade unions about the terms and conditions under which women could be substituted for men in a range of different industries. These terms and conditions were essentially composed of welfare requirements. Prior to this however, in 1914, while describing 'the almost breathless endeavour to watch over the application of the incessantly flowing Emergency Orders', [37] she had also expressed her

[35] Thane, P. (1991), 'Visions of gender in the making of the British Welfare State: the case of women in the British Labour Party and social policy, 1906-1914' in Block, G. & Thane, P. (eds) *Maternity and Gender Policies. Women and the Rise of the European Welfare States 1880s-1950s*, Routledge, London, p. 104.

[36] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1915,* Cd. 8276 (1916), HMSO, London, p. 165.

[37] Annual Report of the Chief Inspector of Factories and Workshops for the Year 1914, Cd. 8051 (1915), HMSO, London, p. 39.

concern about the neglect of health and safety, referring to the need 'to overcome the belief which suddenly spread in September that the Factory Acts were 'in abeyance''. [38]

Anderson's concerns about the apparent unofficial suspension of factory law turned out to be well-founded. Although data on the incidence of industrial accidents and disease during the war was more limited than that for earlier years, the available information points to a deterioration in industrial health and safety. The most dramatic manifestation of this occurred in the production of munitions where there were numerous fatalities (see Table 7.1, below).

Table 7.1[39]

Fatalities in major munitions factory explosions: 1916-1918*

Date	Site	Fatalities
1916	Faversham, Kent	105
1916	Low Moor, Bradford	38
1916	Barnbow, Leeds	40
1917	Silvertown, London	73
1917	White Lund, Morecombe	10
1917	Ashton-Under-Lyne, Lancashire	43
1917	Barnbow, Leeds	5
1918	Chilwell, Nottingham	137
Total		451

*A further 19 women, employed breaking up munitions after the war, were killed at Dudley Port Munitions Factory, Tipton, in 1920

[38] *Ibid.*

[39] www.historic-uk.com/HistoryUK/England-History/BarnbowLasses.htm (no updating) (Barnbow); www.lancasterguardian.co.uk/community/nostalgia_2_8642/white_lund_explosion_1_1170802 (updated 3 August 2011) (White Lund); www.enwikipedia.org/wiki/Silvertownexplosion (updated 10 April 2011) (Silvertown); www.enwikipedia.org/wiki/National_Shell_Filling_Factory_Chilwell (updated 19 January 2011) (Chilwell); www.faversham.org/pages/standard.aspx?iPageID=1584 (no updating) (Faversham); www.bradfordhistorical.org.uk/antiquary/third/vol03/lowmoor.html (no updating) (Low Moor); www.ashton-under-lyne.com/history/explosion.htm (no updating) (Ashton-under-Lyne); www.britishpathe.com/record.php?id=18412(video newsreel film, 6 March 1922) (Dudley Port).

A combination of staffing difficulties in the Factory Department and, no doubt, a desire to conceal morale-sapping major incidents means that there are no centralised figures for the total number of deaths due to explosions in armaments factories. However, the figures recorded in Table 7.1, derived from various local sources, represent an approximate, but possibly conservative estimate. These deaths, however, are unlikely to have been the main contributor to the overall total of industrial fatalities during the war. The collation and publication of accident statistics was curtailed between 1915 and 1918 and an indication of the situation elsewhere in industry can only be gleaned from reports in 1919. Although, in that year, the number of reported industrial accidents was relatively few, newly appointed Chief Inspector, R.E. Graves attributed this to an habitual neglect of the reporting system which, he considered, had developed among factory managers during the war. This problem had been further compounded by deficiencies in record keeping due to an absence of trained and experienced clerical staff in the Factory Department. Graves considered that fatal accidents, which showed a marked increase (from 1,287 in 1914 to 1,385 in 1919), provided a more reliable pointer to the real situation since such accidents were less likely to go unreported. [40] Most accident statistics published in 1919, unlike those of pre-war years, offered little analysis in terms of accident severity, cause, type of industry or the sex of the victim. However, the narrative reports of some individual inspectors provided sobering reading. Inspector Wright of the North Eastern Division, for example, reported that 1,040 out of a total of 1,943 accidents which occurred in the Yorkshire woollen industry involved moving machinery. [41] Inspector Jackson, inspecting cotton mills in the North Western Division, reported that approximately 50% of accidents in such mills resulted from cleaning machines in motion. [42] Graves considered that such reports were indicative of a situation where, during the war, many employers and workers had reverted to unsafe practices and abandoned the use of machinery guarding and other safety devices. Many deaths, he observed, occurred in situations reminiscent of those in the early textile factories where

[40] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1919,* Cmd. 941 (1920), HMSO, London, p. 3.
[41] *Ibid.,* pp. 13-4.
[42] *Ibid.,*p. 13.

workers were caught in the moving parts of machinery. [43] Although the number of accidents to women is not recorded separately, both woollen and cotton industries employed a high percentage of female workers [44] and thus they were likely to have been involved in at least some of these incidents. Elsewhere, in the construction and shipbuilding industries, Inspector Jackson recorded that, of 559 crane workers suffering severe injuries involving bone fractures lacerations or crushing of parts of the body, thirty-three were female. [45] Most such accidents involved workers being hit by the load or crushed by the overturning or collapse of the crane and were, according to Inspector Jackson, entirely predictable and therefore preventable. 'The analysis of crane accidents', he noted, 'proves conclusively that many repeat themselves and therefore can be assumed with certainty to occur again. Such types of accidents, when the danger is definitely recognised, can be guarded against'. [46] The prevailing impression, however, is that dangers went unrecognised or were ignored in the face of other pressing priorities. Inexperienced workers were particularly vulnerable and inspection resources were inadequate to address the problem.

Figures for notifiable diseases continued to be collected between 1914 and 1918, although they were not published until 1919. Table 7.2 (below), shows how figures for the period 1914 to 1918 compared with those recorded immediately before and after the war. These figures, however, referred only to notifiable diseases and, as such, can be regarded as only a rough indicator of the more general state of occupational health. The narrative accounts of special problems encountered by the women inspectors, which were such a feature of their reports before the war, were entirely absent between 1914 and 1918. Moreover, given the depletion of staff in the Factory Department, it is impossible to determine how far the published figures represented a reliable estimate of even those few diseases which during this period required notification to the Home Office. Eighty-seven Certifying Surgeons had

[43] *Ibid.,* p. 19.
[44] Numbers employed are not recorded for the war years but in 1912, for example, 63% of the 1,101,577 workers employed in the textile industry were women and girls. This percentage is likely to have risen during the war. *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1912,* Cd. 6852 (1913), HMSO, London, p. 144.
[45] *Ibid.,* p. 20.
[46] *Ibid.,* p. 21.

already left for military service by the end of 1914 [47] and, while other doctors were encouraged to take on this work, they often lacked the necessary training and experience to identify industrial disease. Insofar as the figures can be considered as a marker of the more general situation, however, they provide further evidence of a deteriorating situation during the war.

Table 7.2 [48]

Cases of notifiable diseases: 1912-19*

	1912	1913	1914	1915	1916	1917	1918	1919
Lead poisoning	584[44]	535[27]	445[28]	381[21]	348[21]	317[21]	144[11]	207[26]
Arsenic poisoning	5	6	2[1]	3	0	30[5]	3[1]	4
Mercury poisoning	17	14	10	6	18	17	9	7
Phosphorus poisoning	0	0	0	3	2	3	3	1
Ankylostomisis **	4	2	4	N/A	N/A	N/A	N/A	0
Anthrax	47[6]	70[8]	55[7]	49[6]	106[18]	99[14]	68[7]	57[9]
Toxic jaundice ***	N/A	N/A	N/A	N/A	206[57]	190[44]	34[10]	3[3]

*Numbers in superscript relate to fatalities, which are included in the total.
** Ankylostomiasis (hookworm) occurred largely in tin miners who were exclusively male. The infection spread most often in mines where conditions were warm and damp and where sanitation was inadequate. Figures were not recorded in notification ledgers and those shown here are derived from statistics of compensation cases under the Workman's Compensation Act of 1906. No compensation statistics were available for 1914-18.
*** Most cases of toxic jaundice were as a result of poisoning by TNT. Toxic jaundice did not become a notifiable disease until 1916, following a number of deaths as a result of TNT poisoning.
N/A = figures not available.

While the figures for some diseases were unremarkable, [49] others indicated either an increase after 1914, or a noticeable shift in gender distribution. [50] For example, a number of

[47] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1914,* Cd. 8051 (1915), HMSO, London, p. iv.
[48] Data derived from the *Annual Reports of the Chief Inspector of Factories and Workshops for the Years 1912-1919,* HMSO, London,
[49] See Appendix 5. For example, although lead poisoning continued to contribute disproportionately to the overall total of industrial disease until the 1930s, by 1914 cases numbers were declining and figures for the war

processes involving the use of mercury, notably the production of thermometers, electrical meters and bronzed field glasses, photoengraving and the carotting [51] of fur used in hats and coats, were taken over by women during the war. Thus, while cases notified before 1914 overwhelmingly occurred in men, forty one of the 60 cases of mercury poisoning notified between 1914 and 1918 were in women. [52] The most concerning figures were those relating to the incidence of anthrax in woolsorters [53] and poisoning by trinitrotoluene (TNT) in munitions workers. [54] Like most notifiable diseases anthrax was numerically a small problem compared with that of lead poisoning. It occurred predominantly in male woolsorters and had been the subject of on-going investigations for a number of years. [55] However, there was a sudden steep rise in male cases during 1916 and 1917, and in female cases during the three years 1915 to 1918. [56] The pre-war incidence in woolsorters had largely been attributed to the importation of infected fleeces from the Middle East during the second half of the 19th century. However, wool imports contracted significantly during the war, suggesting that wartime increases in anthrax were unlikely to be explained either by a rise in the number of foreign fleeces arriving in the country or by an overall rise in the numbers employed in the industry. Rather the figures suggest that the cause lay in worsening employment conditions and the fact that women had become involved in work which placed them at increased risk.

Unlike anthrax, TNT poisoning was a new industrial disease, brought about by the replacement of picric acid [57] with TNT as a blasting powder. Picric acid, which had been employed during the Boer War, tended to stain the skin yellow and caused dermatitis in the

---

years appear to have continued the steady downward trend which had begun in 1900. Anderson, A. (1922), *Women in the Factory. An Administrative Adventure 1893-1921*, John Murray, London, Appendix II, pp. 306-7.

[50] *Ibid.*

[51] Brushing with a solution of nitric acid and mercury to separate fur fibres from the pelt.

[52] Anderson, A. (1922), *Women in the Factory. An Administrative Adventure 1893-1921,* John Murray, London, Appendix II, pp. 306-7. See Appendix 5.

[53] See Appendix 5. Anthrax is a disease of both man and animals caused by the bacterial organism, bacillus anthracis. It may enter the body through broken skin, (cutaneous anthrax) or be inhaled, (pulmonary anthrax).

[54] See Appendix 5. TNT, chemical name 2,4,6-trinitrotoluene, was used a blasting powder in shells.

[55] Carter, J.T.' Anthrax in Kidderminster 1900-1914', Unpublished PhD Thesis, University of Birmingham, 2005, pp. 64-6.

[56] See Appendix 5.

[57] Also known as lyddite or melinite and known chemically as 2,4,6-trinitrophenol or phenol trinitrate.

form of an irritant rash. [58] More seriously, however, it was an extremely unstable compound and the risk of explosion during its manufacture or in shell filling was high. [59] By 1915, French munitions factories had already begun to use an alternative compound, dinitrophenol (DNP). [60] However, it rapidly became clear that DNP was highly poisonous and by August 1916 twenty seven fatalities had occurred in French factories. [61] Mindful of the French experience the British government rejected the use of DNP and decided instead to replace picric acid with TNT. [62] Small quantities of this substance had already been used as an explosive before the war. It appeared more stable than picric acid and, although it similarly stained and irritated the skin, no serious health effects had been observed amongst the workers. Thus in one pre-war explosives factory in Lancashire it was reported that TNT had been substituted for DNP 'to the great advantage of the health of the workers concerned'. [63] Confidence in the safety of TNT was short-lived however. The first fatality attributed to its use occurred in a manufacturing plant in February 1915. [64] Dr. Bernard Spilsbury [65] who carried out the post mortem observed that TNT appeared to produce the same changes in the liver and kidneys as another substance, tetrachloroethane, used in the doping (varnishing) of aeroplane wings and already known to cause toxic jaundice. [66] Medical Inspector of Factories, Dr Edward Collis, reported a second case in the summer of 1915 and two further fatalities occurred in August and December of the same year. [67] At this point a further 44 cases (7 fatal) which had occurred in 1914 and 1915 were identified. With unusual speed, toxic jaundice was added

[58] Prosser White, R. (1928), *The Dermatergoses or Occupational Affections of the Skin. Giving Descriptions of the Trade Processes, the Responsible Agents and their Actions.* Third Edition. Lewis & Co Ltd, London, pp. 210-11.

[59] Oliver, T. (ed.), (1902, republished 2004), *Dangerous Trades. The Historical, Social, and Legal Aspects of Industrial Occupations as Affecting Health, by a Number of Experts.* Continuum Press, Bristol, Vol. II, pp. 600-601.

[60] Chemical name 2,4-dinitrophenol.

[61] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918,* Cmd. 340 (1919), HMSO, London, p. 75.

[62] Legge, T.M. (1917), 'Trintrotoluene Poisoning', in *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1917,* Cd. 9108 (1918), HMSO, London, pp. 21-24.

[63] *Ibid.*, p. 31.

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

[65] Dr. Bernard Spilsbury (1877-1947**)** was a widely respected forensic pathologist of the period, made famous by his evidence at prominent trials such as that of Dr. Crippen in 1902.

[66] Legge, T.M. (1917), 'Trintrotoluene Poisoning', in *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1917*, Cd. 9108 (1918), HMSO, London, pp. 21-24.

[67] *Ibid.*

to the list of notifiable diseases on January 1st 1916 and a number of precautions were introduced into factories where it was used. [68] Based on an approximate estimate of 50,000 workers who by this period were likely to come into contact with TNT, Thomas Legge calculated that the incidence rate of the disease was 3.6 per thousand in 1916 and 3.8 per thousand in 1917. The case fatality for toxic jaundice in women peaked at 28.6% in 1917. [69]

Notifiable diseases, however, represented only the most serious end of the spectrum of industrial ill health, not only because of the small number of diseases represented, but also because of certain aspects of the notification process. For example, Legge's stipulation that, for notification purposes, TNT poisoning should be confined only to cases of 'toxic jaundice', effectively masked the incidence of other less serious effects of TNT exposure. In part Legge's approach was to ensure that cases of jaundice arising as a result of exposure to tetrachloroethane and those associated with DNP, still used in two small factories during 1918, would be included in the figures. [70] In addition, he noted that TNT poisoning progressed through a number of stages of varying severity [71] and argued that doctors would vary in the extent to which they notified these symptoms, engendering inconsistency in the definition of a 'case'. [72] As a result, while the figures reported in Table 7.2 (above), are likely to have represented a reliable estimate of the number of cases of final stage TNT poisoning, they provided little information about the true incidence of illness amongst munitions workers. Diseases included in official figures might, therefore, be regarded only as markers of the fact that both men and women experienced ill-health of varying severity in a wide range of industries during the war. Clearly these problems were not new, as indicated by the earlier reports of inspectors, but it seem reasonable to conclude that they were probably exacerbated by the circumstances of the war. Moreover, they extended to a much larger percentage of the female population than hitherto. Both anthrax and TNT poisoning

[68] *Ibid.*
[69] *Ibid.*
[70] *Ibid.* Arsenic poisoning also resulted in 'toxic jaundice' but it was recognised that such cases would be notified under the heading of arsenic poisoning.
[71] *Ibid.* These symptoms included dermatitis (a pink rash and defatting of the skin), gastritis (constipation, nausea and vomiting), anaemia and finally the destruction of liver cells characterised by the appearance of jaundice.
[72] *Ibid.*

attracted a considerable amount of official attention during the war, but significantly there is no evidence that the women inspectors were involved either in their investigation or in the enforcement of preventive measures. Given the diligence with which they had investigated problems relating to women's employment in earlier years, it is reasonable to assume that the increases in these diseases and the propensity for women to be involved in serious accidents would have rapidly occupied the attention of Anderson and her team. However, in the case of anthrax, a prolonged investigation was undertaken by the Anthrax Investigation Board, which included no women inspectors among its members, [73] while the problem of TNT poisoning was addressed by a section of the Health of Munitions Workers Committee, acting on the advice of Thomas Legge. [74] Anderson's annual reports, meanwhile, dealt exclusively with welfare issues.

It is clear that initially the women inspectors were enthusiastic about the development of the welfare system, having emphasised for many years the importance of improving the general working conditions of women. As noted in chapter 6 the inspectors were strong advocates of the need to improve the whole working environment. In her report for 1915 Anderson wrote:

> A question arises, like the riddle of Samson, why has the manufacture of munitions of war on a terrible scale led at last to the systematic introduction of hygienic safeguards that Factory Inspectors have advocated for many years, such as supervision of women by women in factories, provision of means of personal cleanliness, proper meal and rest rooms, and qualified nurses? [75]

Soon, however, the notion of welfare, as it was constituted from 1915 onwards, seemed to have become a source of irritation and frustration. Before the war it had encompassed relatively basic workplace requirements such as the construction of suitable lavatories and cloakrooms and the designation of separate spaces for meal breaks. Now, however, the concept was rapidly expanding beyond conditions within the factory. By 1918 Anderson was

[73] *Report of the Departmental Committee on Anthrax, Summary of Evidence and Appendices*, Vol. 3, (1918), HMSO, London.
[74] Ministry of Munitions. Health of Munitions Workers Committee, *Memorandum No. 8. Special Industrial Diseases*. Cd. 8214 (1916), HMSO, London.
[75] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1915,* Cd. 8276 (1916), HMSO, London, p. 15.

forthright in her criticism of the nature of welfare provision as it developed during the war, considering it to have failed to take account of workers' real needs. In her report for that year she implied that the system operated as a smokescreen, concealing real industrial problems. The system, she said, was 'merely a superimposed factor on unreformed factory life. The workers knew very well where the shoe pinched and that welfare cannot be either a graft or a veneer on poor or bad conditions.' [76] Anderson was not alone in her criticism. The system was unpopular with employers who, mindful of the cost and inconvenience of welfare measures, were generally unenthusiastic and unco-operative. Many workers were similarly hostile, objecting, in particular, to the welfare supervisors appointed to oversee the installation of welfare facilities. These women were selected predominantly from the middle-classes and were inexperienced and untrained (indeed no such training existed until after the war). They were often incompetent in terms of ensuring good working conditions, particularly where their responsibilities merged with aspects of health and safety, for example in the provision of appropriate protective clothing. Moreover, many seemed to have interpreted their role as incorporating not only the provision of good working conditions, but also the supervision of workers' behaviour both inside and outside the workplace. Added to this welfare supervisors were given specific instructions from the Ministry of Munitions to consider themselves as part of management, not workers' representatives. [77] It is unsurprising, therefore, that the relationship between supervisors and workers was frequently an antagonistic one. The appointment of the paternalistic employer, Seebohm Rowntree, [78] as the first director of the Welfare Department appears to have brought to the welfare system certain values and attitudes which, by 1916, were somewhat out of step with the independence engendered among women workers by wartime employment. Women were frequently resentful of the authority exercised by supervisors whom they considered both patronising and ignorant of industrial conditions.

---

[76] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918,* Cmd. 340 (1919), HMSO, London, p. 43.

[77] Ineson, A. & Thom, D. (1985), 'T.N.T Poisoning and the Employment of Women Workers in the First World War', in Weindling, P (ed) *The Social History of Occupational Health*, Croom Helm, London, p. 98.

[78] Benjamin (Seebohm) Rowntree, (1871-1954**)** was member of the Quaker Rowntree family of chocolate makers of York, which was committed to an enlightened, paternalistic style of management. In 1902, inspired by the work of Charles Booth in London, he had published the results of an extensive survey of poverty in York entitled '*Poverty: A study of town life'.*

Munitions worker, Peggy Hamilton, for example, who worked in a number of different armaments factories reported that welfare supervisors were often bullying and insensitive as well as ineffective.

> The welfare department was staffed by women largely unaccustomed to the work. They were asked to design clothes for women doing work they had never done... I felt the relationship was too much like that between matron and schoolgirls... this caused much frustration and annoyance. We were adult women, working very long hours, some were married...I remember taking a girl to her with a bad attack of asthma brought on by gas escaping from the furnace. She said it was purely psychological... [79]

Hamilton's views were echoed by Inspector Isabel Taylor who considered that many supervisors were unsuited to the work. 'It has', she said 'become no uncommon thing to hear of some stupid act of petty tyranny quoted as an example of welfare'. [80] Welfare supervisors, themselves, were often aware of the resentment their presence provoked. Thus the supervisor at Armstrong Whitworth's Munitions Works in Newcastle reported to the company management that welfare supervisors 'appeared to the workers in the light of spies who were going to watch and report to management...or as goody-goody people who were going to poke their noses into the workers' private affairs and interfere with their liberty and independence'. [81]

This lack of enthusiasm on the factory floor was mirrored by an equal measure of inter-departmental strife between the Welfare Department and the Factory Department, and it is clear that Anderson's lack of enthusiasm for the system itself was also underpinned by her frustration at the role the inspectors were forced to play. These frustrations were evident from an early stage. In 1915, at the request of the recently constituted Ministry of Munitions, Anderson's staff had expended considerable time and resources in supplying Rowntree with 1,396 surveys relating to 200,000 women detailing the size, structure and

[79] Hamilton, P. (1978), *Three Years or the Duration. The Memoirs of a Munitions Worker*, Peter Owen, London, p. 75.

[80] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918,* Cmd. 340 (1919), HMSO, London

[81] Quoted in: Ineson, A. & Thom, D. (1985), 'T.N.T Poisoning and the Employment of Women Workers in the First World War', in Weindling, P. (ed.) *The Social History of Occupational Health*, Croom Helm, London, p. 98.

welfare needs of the munitions workforce. [82] However, the ensuing Welfare Department was set up within the Ministry of Munitions with welfare supervisors assuming the role of advisors to determine the facilities, including health and safety facilities, required in each factory. It was the enforcement of the 'Welfare Orders', issued to employers requiring them to establish such facilities, which fell to the women inspectors. An account by Anderson's deputy and long-term colleague, Rose Squire, indicated that from the outset there were considerable tensions as a result of the 'overlapping responsibilities of the two departments.' [83] It is clear that the inspectorate resented direction from the Ministry of Munitions and considered that welfare should have fallen within the remit of the Home Office. Squire noted that supervisors appointed by the Ministry of Munitions lacked experience of industry and of the 'traditions and status appertaining to officers of an old department'. [84] 'Welfare officers', she said, 'had to go into great factories managed by autocratic military officers without any of the legal sanctions to secure the maintenance of welfare standards decided on by ministries'. [85] Moreover they were inexperienced in 'the handling of large numbers of women'. [86] She was of the opinion that it was unnecessary to set up a new department to administer the welfare system. Thus it seemed that a field of activity which the women inspectors had been working to promote for several years, had effectively been taken out of their hands and given to a new department composed of inexperienced staff. The large increase in their workload, which would have considerably compromised their ability to focus on the prevention of accidents and disease, must have compounded their resentment at having no part in the design of the measures they were required to enforce. In her report for 1918 Anderson recorded, if somewhat obliquely, her dissatisfaction with this situation, noting that, 'During the war, while new Departments set up large staffs for the new kinds of duties, the Factory Department remained simply expert advisers as regards conditions in factories without any net increases in staff'. [87]

---

[82] Anderson, A. (1922), *Women in the Factory. An Administrative Adventure 1893-1921,* John Murray, London, p. 273.
[83] Squire, R. (1927), *Thirty Years in Public Service. An Industrial Retrospect*, Nisbet & Co., London, p. 178.
[84] *Ibid.*
[85] *Ibid.,* p. 181.
[86] *Ibid.*
[87] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918*, Cmd. 340 (1919), HMSO, London, p. 31.

The fact that the Welfare Department itself was beset by internal conflicts and inefficiencies would have offered little solace to Anderson, especially since the proposed solution to these problems was the removal of her deputy, Rose Squire, on secondment to the troubled department. The suggestion came from her former colleague, May Tennant (née Abraham), now a government advisor to the Welfare Department and, with Squire, a member of the section of the Health of Munitions Workers Committee which dealt specifically with Welfare Provision. In 1916 Medical Inspector of Factories, Dr Edward Collis, had succeeded Rowntree as Head of the Welfare Department and had recruited Irene Drury, one of the women inspectors, on secondment as a special advisor. The appointment was clearly unsuccessful, underlining serious conflicts between factory inspectors and welfare officers, and Drury returned to the Factory Department within weeks. Squire reported diplomatically that 'her position among many female welfare officers was too indefinite for her experience and gifts of organisation to take effect and she returned to take her place in the Factory Department staff, where her services were invaluable'. [88] In the face of a deteriorating situation in the Welfare Department Tennant began lobbying a reluctant Home Secretary and an equally resistant Chief Inspector of Factories for the deployment of Squire. When, in March 1918, they finally agreed and Squire was asked to join Collis as co-director of the department she was clearly unenthusiastic about the idea. 'I knew very well, 'she said, 'the troubles that beset the Welfare Department, but I doubted whether anyone could put right what, in my private judgement, was due to the fundamental mistake of setting up a separate organisation to deal with industrial conditions'. [89] Squire was eventually persuaded to accept the post following a long interview with Winston Churchill [90] where she 'fell victim to his importunity'. [91] On her appointment as Director in 1918 she described the staff of over 100 as 'an inharmonious crowd', observing 'jealousies and gossip', 'disintegrating forces' and difficulties which were 'of mushroom growth'. [92] A few months later, however, the end of the war effectively brought the activities of the Welfare Department to a close. Significantly, shortly before this, Squire and Anderson appear to have had plans to create a system more

[88] Squire, R. (1927), *Thirty Years in Public Service. An Industrial Retrospect*, Nisbet & Co., London, p. 178.
[89] *Ibid.*
[90] Winston Churchill was Minister of Munitions from July 1917 to January 1919.
[91] Squire, R. (1927), *Thirty Years in Public Service. An Industrial Retrospect*, Nisbet & Co., London, p. 179.
[92] *Ibid.,* p. 180.

conducive to the objectives of the women inspectors. Anderson reported in 1918 that 'a scheme was devised in the Autumn of 1918 which would, if the Armistice had not intervened with the consequent closing down of most munitions factories, have resulted in enabling the Women's Factory Department and the Women Welfare Officers to co-operate more fully in the controlled factories'. [93] In the event, however, although Squire remained as Director for two years, the post-war imperative to provide jobs for returning troops and thus to remove large numbers of women from industrial employment, meant that the Welfare Department was subject to a number of policy changes. In the process its role moved away from responsibilities associated with employment conditions in factories and towards the more general issue of the future employment of women. Within a few days of the armistice in November 1918, welfare matters were transferred to the newly created Department of Demobilisation and Resettlement, which in turn was absorbed into the new Ministry of Labour early in 1919. Squire and her staff assumed responsibility for the Women's Training Branch, an organisation required to establish facilities whereby women who had been discharged from industry could be trained for future work in what were considered to be appropriate fields of female employment, namely tailoring, dressmaking and domestic skills. Squire again appears to have been unenthusiastic, recording in her subsequent memoir that domestic service was 'inevitably distasteful to most women' and that she enlisted the support of women trade unionists Mary Macarthur and Margaret Bondfield [94] in an attempt to organise more attractive forms of employment and better working conditions. Ultimately however the scheme was a failure. Only approximately 2,000 women in total took up the opportunity for training, indicative no doubt of the shift in women's employment aspirations which took place after 1918.

In conclusion, it is safe to assume that the health and safety of women workers deteriorated during the war and that the women inspectors were relatively powerless to prevent this. Their capacity to highlight specific issues in the workplace, lobby for action and contribute to

[93] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918,* Cmd. 340 (1919), HMSO, London, p. 31.

[94] Margaret Bondfield (1873-1953**)** was a member of the executive committee of the WTUL, a member of the National Union of Shop Assistants, Warehousemen and Clerks and a founder member of the National Federation of Women Workers. She was critical of government welfare policies during the war and supported the position of total equality between male and female workers.

policy-making, all features of their activity in earlier years seems to have diminished considerably. Instead their resources were absorbed into the welfare system which became a major focus of government policy. In reality, however, it is unlikely that they would have been able to make significant inroads into the escalating problems of industrial disease and injury during the war, even if all their resources had been focussed in this direction. Their numbers were small and, as a result of the depletion of the male inspectorate, the demands made upon them were greater than in pre-war years. For this period, therefore, their progress as health and safety professionals and their ability to contribute to the health and safety of women workers appears to have been largely suspended.

Chapter 8

Conclusions

This thesis has investigated the ways in which women factory inspectors contributed to improvements in women's' occupational health and safety between 1893 and 1921. In the process it has sought to challenge the prevailing historiographical view that the inspectors were unlikely to have contributed to any significant improvements in women's working conditions. It is argued here that this interpretation of the inspectors' work derives primarily from analyses which place the development and enforcement of factory legislation within a feminist theoretical framework. In particular, these analyses have focussed on the relationship between aspects of factory reform and particular state agenda, notably those to improve national efficiency, to safeguard the position of the male breadwinner and to reduce female employment. Within this framework the inspectors' social position relative to most women workers is considered to have precluded or negated any practical achievements. Moreover, their support for protective legislation has been represented as a threat to the employment conditions of working-class women. The present study, however, has attempted to examine the inspectors' work in terms of the way in which factory regulation and the work of the Factory Department was evolving at that time. This is seen primarily as a reflexive process, driven by the need to address specific problems as they arrived and with new methods as these were developed, rather than a process which was necessarily underpinned by broader ideological goals. Within this context, it is argued, a detailed consideration of some specific aspects of the women inspectors' work presents a picture which is strongly contradictory of the prevailing negative view. Rather it demonstrates that the women's section achieved some notable successes, both in highlighting the risks to women workers and implementing measures to reduce those risks. In three of those areas studied there was a reduction in women's occupational ill-health and in the rate of industrially-related accidents, improvements to which the women inspectors made a significant contribution. Moreover, their work was highly reflective of current developments in occupational health and safety practice during the period and, as a result, their own professional expertise was considerably enhanced.

Four case studies were selected which were considered to illustrate different aspects of the work of the women inspectors and to reflect how their activities were representative of policy and practice within the Factory Department at the time. The first of these dealt with the subject of lead poisoning. This was not a new disease, its association with certain work processes having been identified as early as 370 B.C. [1] What was new, however, was the notion that the prevention of industrial disease formed a part of the responsibilities of the Factory Department. When the first women inspectors were appointed in 1893 the subject of lead poisoning, specifically in women employed in white lead works, was a matter of major press interest and public concern. The two newly appointed women inspectors were immediately drawn into the investigation of the problem, collecting data, writing reports and giving evidence at inquests and it is clear that the evidence they provided was seminal to the decision, in 1894, to exclude women from parts of the trade. Within the wider context of the history of occupational health, this particular action represents a very rare example of use of employment exclusion to address a problem of industrial disease. The previous implementation of this measure, in relation to women and young children in mining in 1842, has lead some historians to interpret this as a continuation of a state agenda to restrict the employment of women. However, the physical, social and moral environment which formed the background to the exclusion of women from the mines in the 1840s was very different to that prevailing fifty years later. Although, no doubt, the decision to exclude women from parts of the white lead trade was encouraged by a degree of social unease about female employment in general, it is also possible to see this measure as a largely pragmatic solution to an immediate problem, based on current medical beliefs about the special susceptibility of women to the problem of lead poisoning. These beliefs were shared by the women inspectors. In addition, the decision was indicative of contemporary attitudes towards the rights of industrial workers, notably the assumption that the needs of such workers were subordinate to the needs of production. Essentially, exclusion reflected an approach to disease prevention whereby the onus was not on the employer to provide a fit place to work, but on the worker to withstand the existing working conditions. In relation to health

[1] In 370 B.C. Hippocrates described the symptoms of lead poisoning in a man who extracted metal from rock. In the second century B.C. Pliny described the disease in ship painters who used lead-based paint. Hunter, D. (1975), *The Diseases of Occupations,* 5th Edition, The English Universities Press Ltd, London, p. 240.

issues this view was prevalent throughout the 19th century. However, the long drawn out dispute provoked by the decision to exclude women from parts of the white lead trade marked the first seeds of change whereby attention was gradually shifting towards the need to improve conditions in the workplace. In the case of lead poisoning, this focussed on dust control, informed by emerging medical understanding that lead absorption in an industrial setting was largely the result of dust and fume inhalation, and to a lesser extent the ingestion of dust on the hands via smoking and food consumption. While female exclusion reduced poisoning cases in the immediate term, therefore, a more sustained improvement in worker's health depended on the introduction of preventative measures within the workplace. Thus when attention turned to another major source of industrial lead poisoning, the production of earthenware and ceramics, a solution was sought in the introduction of safe working practices and eventually on the development of a leadless glaze. This approach was no doubt encouraged by the realisation that, in an industry which employed 46,000 people of whom over half were women, [2] female exclusion could never seriously be entertained. However, it also represented the beginning of a shift in the underlying principles of occupational health practice.

The newly appointed women inspectors were working on the cusp of this change. Immediately after women's exclusion from parts of the white lead trade, therefore, they were occupied in the development and enforcement of measures in other parts of the white lead industry which reflected a different approach, namely workplace improvement by means of dust control. A few years later they were central figures in the development of a similar policy in the potteries. [3] Lead poisoning was the first major industrial disease to confront a Home Office inexperienced in the matter of industrial disease prevention and lacking much of the medical and technical knowledge which informed later decisions in this field. Thus in contributing to the case for female exclusion, the inspectors were not, as has been suggested, acting out of an ideological attachment to the removal of women from the workplace. Rather they were supporting the first tentative governmental steps towards

[2] Whipp, R. (1990), *Patterns of Labour. Work and Social Change in the Pottery Industry,* Routledge, London, p. 18.

[3] Bartrip, P. (1996), 'Petticoat pestering: the Women's Trade Union League and lead poisoning in the Staffordshire Potteries, 1890-1914', *Historical Studies in Industrial Relations*, Vol. 2, pp. 3-25.

intervention in the field of occupational health, within a climate where public concern was great and options were limited. The approach adopted in 1898 was undoubtedly informed largely by 19th century assumptions about the importance of the worker relative to production, but the lessons learned in implementing this policy paved the way for a different approach to industrial disease prevention in the future.

In contrast to disease control, accident prevention, the subject of the second case study, had been an overriding concern of the Factory Department since its inception. Accident reduction, however, had focussed primarily on male workers who predominated in the more dangerous industries and as a consequence suffered many more accidents than women. [4] When the women inspectors were appointed there was an assumption that this subject would not fall within their remit. Accident prevention was considered to be a minor issue for most women workers and, in those parts of the textile trades where it had greater prominence, it was assumed that the problem would continue to be addressed by male inspectors. Moreover, women inspectors would be unlikely to possess the necessary mechanical skills to understand machinery and machinery guarding. Their discovery of a rising toll of accidents in laundries, however, unexpectedly thrust the issue of industrial accidents onto their agenda and provided them with an opportunity to develop a new level of competence in the field of investigation and prevention. To address the problem they harnessed a range of approaches which were rapidly gaining currency within the Factory Department. Notably they carried out research on a representative sample of laundries to determine the number and types of accidents. The primary objective here was to identify the main causes of accidents rather than the specific nature and severity of the injuries, although it is clear that they used the latter descriptively and anecdotally in order to draw attention to their concerns. As a result they were able to mobilise the interests of manufacturers in developing machinery guarding and to provide advice and education to employers. The result was a heightened awareness of the risks to laundry workers amongst employers, government officials and manufacturers and, importantly, a marked reduction in the number of serious accidents. In the process the inspectors also acquired for themselves

[4] For example, in 1889 there were 432 fatal accidents reported of which 11 were in women. *Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1889,* C. 6060 (1890), HMSO, London, p. 217.

considerable experience in the use of statistics and a level of expertise in the field of machinery safety, both factors which helped to reinforce their credentials as progressive health and safety professionals.

Two aspects of their work during this period presaged future changes in the approach of the Factory Inspectorate and contrasted sharply with the approach taken by many of their male colleagues at the time. The first was their propensity to follow-up accident cases, an approach which gave the first indication that the physical effects of accidents were not always immediately apparent. This observation, which pre-dated current medical knowledge, had limited implications for treatment and prognosis. However, it had immediate implications for the award of compensation payments, since an important element of injury definition in this context was the degree of disablement, as well as the amount of time away from work which ensued. Secondly, the women inspectors were consistent in their view that it was inappropriate to blame the worker when an accident occurred. Although, in principle, safety was a joint responsibility of worker and employer, as reflected in the terms of contemporary factory regulations, it is clear from the comments of many male inspectors that they frequently considered the workers to be largely responsible for their own misfortunes. This placing of the primary responsibility for safety on the worker was a concept that changed only slowly in succeeding years, but it was clearly one to which the women inspectors were strongly committed at an early stage.

Although the situation in laundries left room for considerable further improvements, the accident figures derived from notifications after 1895 suggested an on-going reduction from 1900 to the beginning of the First World War. Anderson generously observed that this reflected 'credit on the way laundry occupiers and engineers have responded to Inspectors' demands for better fencing'. [5] It is reasonable to argue that it also reflected credit on the persistence of the women inspectors in highlighting and tackling the problem. Perhaps one of the best personal legacies of their work came in 1921 when a Miss Miriam Pease was appointed as District Inspector for Nottingham. Several employers and trade unionists

[5] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1913*, Cd. 7491 (1914), HMSO, London, p. 82.

complained that women were not competent to inspect the work of men. In his reply Sir Malcolm Delevingne, Head of the Industrial Branch of the Home Office, stated unequivocally that the work of factory inspection could be dealt with as well by women as by men, reminding them, in particular, that women inspectors had been dealing with machines and machinery guarding for a long time. [6]

The 19th century focus on the working hours of women and children meant that the early routine work of the women inspectors was dominated by the requirement to enforce these regulations. Much of this aspect of their work was concerned with the regulation of the so-called 'sweated trades'. The progressive movement of these trades out of the home during the early part of the 20th century meant that, increasingly, they came within the remit of the Factory Department, enabling existing public concern to be translated into state intervention. The women factory inspectors were central to the enforcement of regulations which initially focussed on working hours but subsequently extended to aspects of the physical working environment. One such aspect was the question of air quality and ventilation, the subject of the third case study. It is clear from the inspectors' work in this field that here they were operating at the forefront of changes in medical knowledge, moving from an essentially miasmatic model of disease causation to an understanding of the associations between certain bacterial and chemical factors and the development of specific diseases. Moreover, this field of work further enhanced their scientific and technical knowledge as they engaged with problems of flueless gas stoves, defective gas lighting and ventilation ducting. In the immediate term they were able to effect many improvements in the workshops they visited personally, although the number of these was inevitably rather few and the wider problem remained. The real legacy of the inspectors' work in this field requires the adoption of a longer term perspective which looks beyond the tangible effects on the specific workshops with which they were personally concerned and considers the wider implications both for the working environment and for the technical expertise of the women inspectors themselves. The economic depression of the 1920s which followed the brief industrial boom created by the need for post-war reconstruction, resulted in the closure of thousands of the small workshops discussed here. Ironically, therefore, the

[6] Malcolm Delevinge (15 December 1921), Response to the Federation of Lace and Embroidery Employers' Association on behalf of the Secretary of State. National Archives HO87/52.

problem, which for many years the women inspectors had struggled to solve, disappeared within a few months. Importantly, however, by that stage, the question of general workplace ventilation, beyond the specific consideration of poisonous dusts and fumes, had been placed irreversibly on the agenda of the Factory Department. This had been instigated in 1900 when Anderson's persistent lobbying had resulted in its inclusion in the terms of reference of the Ventilation Committee. The basic principle, that unventilated workrooms of any type were unhealthy and unacceptable, had been firmly established and thus general ventilation and related factors such as space, temperature and lighting came to be accepted as basic constituents of a good working environment.

By 1914, the Annual Report of the Chief Inspector contained a section entitled 'Sanitation' which covered all these factors as well as sanitary arrangements, a section which, after the war, became a permanent feature. Significantly, it was written by a male inspector, underlining the fact that the subject had assumed an importance beyond that normally accorded to issues affecting only women workers. [7] Its importance had been further enhanced during the war with the establishment of the Health of Munitions Workers Committee, which considered diverse aspects of the workplace in terms of their effects on the health and performance of the workers. During the 1920s this work was continued with the establishment of the Industrial Fatigue Board, later transformed into the Industrial Health Research Board in order to reflect the wider scope of its investigations. [8] The nature of the Board's work signalled a new attitude towards the working environment which aspired to standards of comfort well beyond those which were considered acceptable in earlier years. The requirement for good ventilation was a central feature of these standards. These developments were thus part of longer-term process which had begun several years before the war when the women inspectors were one of the first official bodies to draw attention to the subject. Importantly, the requirement for good general ventilation in the workplace was underpinned by a new regulatory position, an achievement also attributable to the work of the women inspectors. In 1901 Anderson had successfully spearheaded a

[7] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1914*, Cd. 8051 (1915), HMSO, London, pp. 1-9.

[8] Shimmin, S. & Wallis, D. (1994), *Fifty Years of Occupational Psychology in Britain*. British Psychological Society, Leicester, pp. 3-6.

change in factory legislation, such that the standards of air quality already required in large factories should be applied equally in small workshops, thus opening the way for such workplaces to be regulated for the first time by the Home Office.

Despite the activities of the aforementioned Health of Munitions Workers Committee the evidence suggests that the health and safety of women workers, which previously had undergone steady improvement, deteriorated considerably during the First World War. The last case study, which dealt with this period, showed that the women inspectors were diverted, increasingly reluctantly, into activities associated with a burgeoning industrial welfare system and that their role in the maintenance of health and safety correspondingly diminished. The extensive development of welfare provision, encompassing measures which went well beyond the relatively modest pre-war proposals of the women inspectors, was perhaps an unexpected consequence of the First World War. If one examines the concept of welfare, as historian Helen Jones has suggested, first in terms of its aims and second in terms of its amenities, [9] it would seem that in the early part of the war two separate aims, the protection of women from moral danger and the maximisation of industrial performance came together to create a single agenda, that of providing a range of workplace facilities. These exceeded, and perhaps in the process neglected, the basic requirements of a safe and healthy workplace. For the women inspectors the provision of welfare measures initially appeared to represent the fulfilment of a long-held aspiration. Paradoxically, however, they became highly critical of the system established during the war and appear to have been marginalised in terms of its organisation.

It is difficult to assess how far welfare provision itself, particularly as it was constituted during the war, could be considered as contributing to the health and safety of women workers or indeed of workers in general. H A Waldron, in his discussion of occupational health during the Second World War, argues that certain aspects of the welfare system which were developed during World War 1 both contributed to the health of the workforce and influenced the introduction of similar measures when war broke out again in 1939. [10]

[9] Jones, H. (1983), 'Employers' Welfare Schemes and Industrial Relations in Inter-War Britain', *Business History*, Vol. 25, pp. 61-75.

[10] Waldron, H. A. (1997), 'Occupational Health during the Second World War: Hope Deferred or Hope Abandoned?' *Medical History*, Vol. 41, pp. 197-212.

Waldron's analysis, however, focuses specifically on the role of occupational physicians and the consequences of wartime welfare activities for the subsequent development of the profession. There is an assumption that such activities were the remit of the factory medical officers whereas the evidence presented here suggests that it was the specially appointed welfare officers who were charged with administering the various elements of the welfare service, while it was the women factory inspectors who advised on the nature of these measures and monitored the compliance of employers. Medical officers, by contrast, were situated primarily in large factories and were preoccupied with the prevention and control of specific diseases such as TNT poisoning. As Waldron concedes, when health is defined in these terms, the notion that it improved during either war is more difficult to sustain.

The reference to the 'health and efficiency' [11] of the workers as interpreted in the work of the Health of Munitions Workers Committee appeared to imply that welfare engendered a sense of general well-being rather than offering protection from specific industrial diseases or accidents. Although welfare supervisors in large armament factories were responsible for certain aspects of health and safety such as the provision of overalls, masks and gloves and of milky drinks [12] they were relatively untrained, inexperienced and prone to focus on the moral rather than the physical protection of women. Moreover, it is clear from the reports of Thomas Legge that the prevention and control of industrial disease in these factories was administered primarily by medical doctors, permanently installed on site and advised by the Home Office. [13] The reduction in cases of toxic jaundice between 1915 and 1918, largely as a result of dust control measures and regular medical examinations, represents the only evidence of successful disease prevention during the war and anecdotal reports suggest that many workers continued to suffer from less severe symptoms. There was little information on disease and accident prevention in other industries recorded in the Chief Inspector's

[11] The Health of Munitions Committee was appointed to 'consider and advise on questions of industrial fatigue, hours of labour, and other matters affecting the personal health and physical efficiency of workers in munitions factories and workshops'. Ministry of Munitions (1917*)*, *Interim Report of the Health of Munition Workers Committee,* Cd. 8511, HMSO, London, p. 2.

[12] Milky drinks were thought to ameliorate the effects of TNT exposure. Ministry of Munitions. Health of Munitions Workers Committee (1916), *Memorandum No. 8. Special Industrial Diseases,* Cd. 8214 (1916), HMSO, London, p. 7.

[13] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1917*, Cd. 9108 (1918), HMSO, London, p. 22.

Annual Reports during the war and data on inspection visits went unreported. A perhaps telling indicator of the low priority accorded to most areas of industrial health and safety was the recourse to a policy of self-regulation in an attempt to compensate for the reduction in inspection. This took the form of the establishment of local Safety Committees and the proposed joint involvement of workers and employers in the promotion of a safety culture. Unsurprisingly the policy appears to have met with little success. Despite an extensive Home Office campaign involving the distribution of thousands of information leaflets to employers and Trade Union representatives, neither group showed much enthusiasm for the scheme. Inspector Brothers of Warrington reported that 'safety committees are not at present much in favour with employers owing to the reluctance to add to the number of committees of one sort or another', adding that 'workers are not keen to join...when they aim rather at a share in the control or conduct of the business itself'. [14] Meanwhile Inspector Lauder of Newcastle-Upon-Tyne recorded his disappointment at overhearing the Safety Committee referred to by one workman as 'the whitewash committee'. [15]

The limited effectiveness of the women inspectors during this period, therefore, is perhaps not entirely explained by the demands of the welfare system. Given their small numbers, it is unlikely that they would have been able to make significant inroads into the escalating problems of disease and injury during the war. Throughout the period the Treasury refused to sanction significant increases in the number of either male or female inspectors, reflecting both the financial constraints imposed by the war and the low priority accorded to industrial health and safety, relative to the needs of the military and the unprecedented slaughter on the battlefields. The paucity of information in the Annual Reports of the Chief Inspector underlines the extent to which the work of the Factory Department as a whole contracted between 1914 and 1918. Moreover, of the two specialist medical inspectors in post at the beginning of the war, only one remained in the Factory Department between 1914 and 1918. Like Rose Squire, Dr. Edward Collis, who for many years had assisted Dr. Thomas Legge, was seconded to the Welfare Department. In a sense, therefore, the limited achievements of the women inspectors during the war simply mirrored those of the Factory Inspectorate as a whole.

[14] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1919*, Cmd. 941 (1919), p. 16.
[15] *Ibid.*

These case studies serve only as a snapshot of the work of the women inspectors during the period in which they operated as a separate section of the Factory Department. The full range of issues with which they were involved is beyond the size and scope of the current thesis. It is acknowledged that the contribution of the inspectorate may have been insignificant in some of these other workplaces and thus the examination of such industries might have resulted in different conclusions about the women inspectors' overall effectiveness. The intention here, however, has been to highlight some areas where they do appear to have made a substantial contribution, primarily in order to challenge suggestions in the existing historiography that their appointment was largely symbolic and their work insignificant. Moreover, the women inspectors' reports for the period indicate that some of the approaches described here were, in fact, applied to a range of other problems. For example, the problem of lacerations from shattering bottles in aereated water factories was addressed in a very similar fashion to that adopted in laundries, with the routine collection and collation of statistics and the progressive introduction of machinery guarding. [16] The women inspectors also contributed to a substantial and ultimately successful programme of work to reduce lead poisoning in the earthenware and china industry, as noted in chapter 1. Other work involved the installation of exhaust ventilation where women were exposed to neurotoxic carbon disulphide in the vulcanisation of rubber. A report by Rose Squire, that in 1911 she had visited every vulcanising works in the North West, testifies to substantial coverage of at least some industries where there were serious health risks. [17] Meanwhile in the area of policy development, Anderson worked with medical inspector Thomas Legge to produce a report on lead poisoning in the tinning of metals, the recommendations of which formed the basis of special rules developed the following year. [18] Like the first three case studies described here, therefore, the response of the women inspectors to different problems demonstrate how their activities went far beyond the routine inspection of

[16] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900*, Cd. 668 (1901), HMSO, London, p. 372; *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1910*, Cd. 5693 (1911), HMSO, London, p.124.

[17] *Annual Report of the Chief Inspector of Factories and Workshops for the Year 1911,* Cd. 6239 (1912), HMSO, London, p.147.

[18] Anderson, A.M. & Legge, T.M. (1907), *Tinning of metals, a special report on the dangerous or injurious processes in the coating of metal with lead or a mixture of lead and tin,* HMSO, London.

individual workplaces. Indeed, given their limited numbers, it is unlikely that such an approach would have produced much in the way of workplace improvements. Rather they were involved in a much wider range of activities which included investigative work, worker education, liaison with employers and equipment manufacturers and, significantly, with policy development. They were forced to be selective in the projects they undertook and, no doubt, some of their activities had little immediate benefit for many of the workers concerned. Indeed, their attempt to solve the problem of ventilation in basement workshops might be viewed as one such project. However, in the approaches they adopted their work largely mirrored the developments taking place within the Factory Department as a whole, where advances in medical and technical knowledge were, with varying degrees of success, increasingly being incorporated into the way new health and safety problems were addressed. Working within this process the women inspectors increased their own knowledge and skill and on many occasions were able to effect some real improvements in women's working conditions.

Perhaps unsurprisingly, these developments, both in the women's inspectorate and in the inspectorate as a whole, were arrested during the First World War with the inevitable shift in government priorities. The final case study has shown how the resource problems of the women inspectors during this period were compounded by a government policy which emphasised the provision of wider welfare measures over the basic needs for industrial health and safety. Essentially, therefore, the inspectors' role appears to have degenerated into something resembling that of a moral police force and their ability to effect improvements in terms of disease and accident prevention was significantly curtailed. Despite this, however, the legacy of the pre-war years remained, both in terms of inspectors' expertise and the respect which increasingly they commanded within the Factory Department. Somewhat ironically these attributes appear to have contributed to the decision, in 1921, to amalgamate the men's and women's sections into a single Factory Inspectorate, thus removing the special duty of women inspectors to safeguard the interests of women workers.

Works Cited

Books published before 1922

Arlidge,J.T. (1892), *Hygiene, Disease and Mortality of Occupations*, Percival, London

Booth, C. (1892), *Life and Labour of the People in London, 1892-1897*, MacMillan, London.

Drake, B. (1920, republished 1984)), *Women in Trade Unions,* Virago, London.

Durkheim, E. (1893, republished 1933), *The Division of Labour in Society,* The Free Press, New York.

Engels, F. (1845, republished 1962), *The Condition of the Working-Class in England. From personal observation and authentic sources*, Foreign Languages Publishing House, Moscow.

Hutchins, B. L. & Harrison, A. (1903), *A History of Factory Legislation*, P.S.King & Son, Orchard House, Westminster.

Legge, T. M. & Goadby, K. W. (1912), *Lead Poisoning and Lead Absorption. The symptoms, pathology and prevention, with special reference to their industrial origin and an account of the principal processes Involving risk*. Arnold, London.

Marx, K. (1906), *Capital: A critique of political economy*. Vol 1. Modern Library, New York.

Oliver, T. (1902, reprinted 2004) *Dangerous Trades: History of Health and Safety at Work*, Continuum Press, Chippenham.

Oliver, T. (1916), *Diseases of Occupation from the Legislative, Social and Medical Points of View*, 3rd Edition. Methuen & Co Ltd, London.

Meakin, B. (1905), *Model Factories and Villages: Ideal Conditions of Labour and Housing,* George W Jacobs, Philadelphia.

Reynolds, S. (1908, republished 1982), *A Poor Man's House*, Oxford University Press, Oxford.

Routledge's Manual of Etiquette, (1860), Routledge, London.

Smith A, (1776, republished 1937), *An Inquiry into the Nature and Causes of the Wealth of Nations*, New Editions, New York.

Thackrah C.T. (1832), *The Effects of Arts, Trades and Professions and of Civic States and Habits of Living, on Health and Longevity: with Suggestions for the Removal of Many of the Agents which Produce Disease and Shorten the Duration of Life,* Longman, London.

Wing C (1837), *Evils of the Factory System Demonstrated by Parliamentary Evidence,* Saunders & Otley, London.

Books published 1922 – present

Anderson, A. (1922), *Women in the Factory. An Administrative Adventure 1893-1921*, John Murray, London.

Asquith, H.H. (1928), *Memories and Reflections, 1852-1927,* Little Brown, Boston.

Bartrip, P.W.J. (2002), *The Home Office and the Dangerous Trades: Regulating Occupational Disease in Victorian and Edwardian Britain,* Rodopi, Amsterdam.

Beckett ,I.F.W. (2001), *The Great War. 1914-1918*, Longman, Pearson Education Ltd, London.

Braybon, G. (1989), *Women Workers in the First World War.* Routledge, London.

Brock, W.H. (1997), *Justus von Liebig: The Chemical Gatekeeper*, Cambridge University Press, Cambridge.

Bronstein, J.L. (2008), *Caught in the machinery. Workplace Accidents and Injured Workers in Nineteenth-Century Britain*, Stanford University Press, Stanford, California.

Bryan, Sir A. (1975), *The Evolution of Health and Safety in Mines,* Ashire Publishing Ltd, Lechworth.

Bythell, D. (1978), *The Sweated Trades: Outwork in Nineteenth Century Britain,* Batsford Academic, London.

Crookes E. (2005), *The Factory Inspectors. A Legacy of the Industrial Revolution.* Tempus Books, Stroud, Gloucestershire.

Earl of Oxford and Asquith, (1926), *Fifty Years of Parliament*, Cassell, London.

Fraser, D. (1973), *The Evolution of the British Welfare State: A History of Social Policy since the Industrial Revolution,* Palgrave MacMillan, Basingstoke.

Gray, R. (1996), *The Factory Question and Industrial England, 1830-1860,* Cambridge University Press, Cambridge.

Hamilton A. (1929), *Industrial Poisons in the United States*, MacMillan, New York.

Hamilton, P. (1978), *Three Years or the Duration. The Memoirs of a Munitions Worker*, Peter Owen, London.

Harrison, B. (1996), *Not only the Dangerous Trades: Women's Work and Health in Britain, 1880-1914,* Taylor and Francis, Abingdon, Oxon.

Health and Safety Executive, (1983), *Her Majesty's Inspectors of Factories, 1883-1983. Essays to commemorate 150 years of Health and Safety Inspection,* HMSO, London.

Hobsbawn E. J. (1968), *Industry and Empire. The Pelican Economic History of Britain.Vol. 3,* Penguin Books, Harmondsworth.

Holcombe, L. (1973), *Victorian Ladies at Work: Middle Class Working Women in England and Wales, 1850-1914,* David & Charles, Newton Abbott.

Holloway, G. (2005), *Women and Work in Britain since 1840,* Routledge, London.

Honeyman, K. (2007), *Child Workers in England. 1780-1820. Parish Apprentices and the Making of the Early Industrial Labour Force.* Ashgate, Aldershot.

Hunter, D. (1975), *The Diseases of Occupations.* 5th edition, The English Universities Press, London.

Jones, S.D. (2010), *Death in a Small Packet. A Short History of Anthrax*, John Hopkins University Press, Maryland.

Kessler- Harris, A. (2003), *Out to Work. A History of Wage- Earning Women in the United States,* Oxford University Press, Oxford.

Kitson Clark, G. (1962), *The Making of Victorian England*, Methuen, London.

Legge, T. M. (1934). *Industrial Maladies,* Oxford University Press, Oxford.

Malcolmson, P. (1986), *English Laundresses: A Social History, 1850-1930,* University of Illinois Press, Illinois.

Malone, C. (2003), *Women's Bodies and Dangerous Trades in England, 1880-1914*, Boydell Press, Woodbridge, Suffolk.

Martindale, H. (1938), W*omen Servants of the State, 1870-1938*, Allen & Unwin, London.

Martindale, H. (1948, republished 1970), *Some Victorian Portraits and Others,* Books for Libraries Press, New York, pp. 48-9.

McFeely, M.D. (1991)*, Lady Inspectors: The Campaign for a Better Workplace, 1893-1921*, University of Georgia Press, Athens and London.

Midwinter, E.C. (1968), *Victorian Social Reform,* Longman, London.

Mohun, A.P. (1999), *Steam Laundries. Gender, Technology and Work in the United States and Great Britain, 1880-1940.* John Hopkins University Press, Baltimore.

Pennington, S. & Westover, B. (1989), *A Hidden Workforce. Homeworkers in England, 1850-1985,* MacMillan Education Ltd, Basingstoke, Hampshire.

Porter, D. (1999), *Health, Civilisation and the State. A History of Public Health from Ancient to Modern Times.* Routledge, London.

Pelling, H. (1973), *A History of British Trade Unionism,* Penguin, Harmondsworth.

Pellow, J. (1982), *The Home Office, 1848-1914. From Clerks to Bureaucrats*, Heinmann Educational Books, London.

Phillips, A. (1987), *Divided Loyalties. Dilemmas of Sex and Class,* Virago, London.

Rappaport, E.D. (2000), *Shopping for Pleasure. Women in the Making of London's West End*, Princeton University Press, Woodstock, Oxfordshire.

Prosser White, R. (1928), *The Dermatergoses or Occupational Affections of the Skin. Giving Descriptions of the Trade Processes, the Responsible Agents and their Actions.* Third Edition. Lewis & Co Ltd, London.

Raw, L. (2009), *Striking a Light: The Bryant and May Matchwomen and their Place in History,* London, Continuum International Publishing, London.

Roberts, R. (1971), *The Classic Slum: Salford Life in the First Quarter of the Century*, University of Manchester Press, Manchester.

Rosner, D. & Markowitz, G. (1991), *Deadly Dust. Silicosis and the Politics of Occupational Disease in Twentieth Century America,* Princeton University Press, Princeton.

Rowe, D.J. (1983), *Lead Manufacturing in Great Britain,* Croom Helm, Beckenham.

Shiach, M. (2004), *Modernism*, *Labour and Selfhood in British Literature and Culture 1890-1930*, Cambridge University Press, Cambridge.

Shimmin, S. & Wallis, D. (1994), *Fifty Years of Occupational Psychology in Britain*, British Psychological Society, Leicester.

Smith, J.M. (2007), *Ireland's Magdalen Laundries and the Nation's Architecture of Containment*. Notre Dame University Press, Notre Dame, Illinois.

Squire, R. (1927), *Thirty Years in Public Service. An Industrial Retrospect*, Nisbet & Co., London.

Steedman, C. (1990), *Childhood, Culture and Class in Britain. Margaret MacMillan, 1860-1931*, Virago, London.

Strachey, R. (1928, republished 1978), *The Cause*, Virago, London.

Sundstrom E. (1986), *Work Places. The Psychology of the Physical Environment in Offices and Factories,* Cambridge University Press, Cambridge.

Taylor, A.J. (1972), *Laissez-faire and State Intervention in Nineteenth-century Britain*, MacMillan Press Ltd, London.
Troup, C.E. (1925), *The Home Office,* Putnam & Sons Ltd, London.
Waller, J. (2004), *Discovery of the Germ*, Icon Books, London.
Whipp, R. (1990), *Patterns of Labour. Work and Social Change in the Pottery Industry,* Routledge, London.
Wohl, A.S. (1984), *Endangered Lives. Public Health in Victorian Britain,* Methuen University Paperbacks, London.
Woollacott, A. (1994), *On her their lives depend. Munitions Workers in the Great War*, University of California Press, Berkeley.
Yeandle, S. (1993), *Women of Courage: 100 Years of Women Factory Inspectors*, HMSO, London.

Journal articles published before 1922

Haldane, J. & Lorrain Smith J. (1893), 'The physiological effects of air vitiated by respiration', *Journal of Pathology and Bacteriology,* Vol 1, pp. 168-186.
Haldane, J. (1895), 'The action of carbonic oxide on man', *Journal of Physiology*, Vol. 18, pp. 430-462.
Haldane, J.S. (1896), 'A discussion on the pathology of coal gas poisoning', *British Medical Journal*, pp. 903-10.
Lancet, (1905), Vol. I, p. 292.
Ransom, W.B. (1900), 'On lead encephalopathy and the use of diachylon as an abortifacient', *British Medical Journal,* pp. 1590-1.

Journal articles published 1922 – present

Bartrip, P. (1996) 'Petticoat pestering: the Women's Trade Union League and lead poisoning in the Staffordshire Potteries, 1890-1914', *Historical Studies in Industrial Relations*, Vol. 2, pp. 3-25.
Blackburn, S. (1991), 'Ideology and Social Policy: The Origins of the Trade Boards Act', *The Historical Journal,* Vol. 34, Part 1, pp. 43-64.
Davin, A. (1978), 'Imperialism and Motherhood', *History Workshop*, No. 5, Spring pp. 9-65.
Harrison, B. (1989), '" Some of them gets lead poisoned": Occupational lead exposure in women, 1880-1914', *Social History of Medicine,* Vol. 2, pp. 171-193.
Harrison, B. (1991), Women's health or social control? The role of the medical profession in relation to factory legislation in late nineteenth century Britain, *Sociology of Health and Illness,* Vol. 13, No. 4, pp. 469-490.
Harrison, B. & Nolan, M. (2004), 'Reflections in Colonial Glass? Women Factory Inspectors in Britain and New Zealand, 1893-1921', *Women's History Review,* Vol. 13, Part 2, pp. 263-287.
Hatton, T. J. and Williamson, J. G. (1994). 'What Drove the Mass Migrations from Europe in the Late Nineteenth Century?'*Population and Development Review*, Vol. 20, Part 3, pp. 553-559.

Heesom, A. (1981), 'The Coal Mines Act of 1842, Social Reform, and Social Control', *The Historical Journal ,* Vol. 24, Part 1, pp. 69-88.

Holdsworth, C. (1997), 'Women's work and family health: evidence from the Staffordshire Potteries, 1890-1920', *Continuity and Change,* Vol.12, Part 1, pp.103-128.

Hussey, L. Turner, S. Thorley, K. *et al* (2010), **'**Surveillance of work-related ill-health; a comparison of occupational physicians' and general practitioners' reporting'**,** *Occupational Medicine,* Vol. 60, Part 4, pp. 294-300.

Jones, H. (1983), 'Employers' Welfare Schemes and Industrial Relations in Inter-War Britain', *Business History*, Vol. 25, pp. 61-75.

Jones, H. (1988), 'Women Health Workers: the Case of the First Women Factory Inspectors in Britain', *Social History of Medicine*, Vol. 1, Part 2, pp. 165-181.

Lewis, J. & Davies, C. (1991), 'Protective legislation in Britain, 1870-1990: Equality, Difference and their Implications for Women', *Policy and Politics*, Vol. 19, Part 1, pp. 13-25.

Livesey, R. (2004), 'The Politics of Work: Feminism, Professionalisation and Women Inspectors of Factories and Workshops', *Women's History Review,* Vol.13, Part 2, pp. 233-255.

Long, J. (1998), 'The Colour of Disorder: Women's employment and 'protective' intervention in the lead industry in Victorian England', *Women's History Review,* Vol. 7, Part 4, pp. 521-545.

Malone, C. (1996), 'The Gendering of Dangerous Trades: Government Regulation of Women's Work in the White Lead Trade in England, 1892-1898', *Journal of Women's History,* Vol. 8, Part 1, pp. 15-29.

Mills, C. (2008), 'The Emergence of Statutory Hygiene Precautions in the British Mining Industries, 1890-1914', *The Historical Journal,* Vol. 51, Part 1, pp. 145-168.

MacDonagh, O. (1958), 'The Nineteenth Century Revolution in Government: A Re-appraisal', *Historical Journal,* Vol.1, pp. 52-67.

Musson, A.E. (1959), 'The Great Depression in Britain, 1873-1896: A Reappraisal'. *The Journal of Economic History* , Vol. 19, Part 2, pp. 199–228.

Rose, S.O. (1991), 'From behind the women's petticoats: The movement for a legislated nine hour day and state protection of working women in Britain, 1870-1878', *Journal of Historical Sociology,* Vol. iv, pp. 32-51.

Waldron, H. A. (1997), 'Occupational Health during the Second World War: Hope Deferred or Hope Abandoned?' *Medical History,* Vol. 41, pp. 197-21.

Factory Acts & Other Legislation (in date order)

Health and Morals of Apprentices Act, 1802 (42 Geo. III c.73).

The Representation of the People Act, 1832 (2 & 3 Will. IV c.45).

Slavery Abolition Act, 1833 (3 & 4 Will. IV c. 73).

Factory Act, 1833 (3 & 4 Will. IV c.103).

Mines Act, 1842 (5 & 6 Vict. c.99).

Factory Act, 1844 (7 & 8 Vict. c.15).

Factory Act, 1847 (10 & 11 Vict. c. 29).

Factory Acts Extension Act, 1867 (30 & 31 Vict. c.46).

Elementary Education Act (The 'Forster' Act), 1870 (33 & 34 Vict. c.75).

Public Health Act, 1875 (38 & 39 Vict. c. 55).

Factory Act, 1878 (41 Vict. c.16).

Factory and Workshop Act, 1883 (46 & 47 Vict. c. 53).

Factory and Workshop Act, 1891 (54 & 55 Vict. c.75).

Factory and Workshop Act, 1895 (58 & 59, Vict. c. 37).

Amended Special Rules. White Lead Works (1898) under the Factory and Workshop Act, 1891 (54 & 55 Vict. c.75).

Amended Special Rules, (1899) under the Factory and Workshop Act, 1891 (54 & 55 Vict. c.75).

Factory and Workshop Act, 1901 (1 Edw.7 c.22).

The Sanitary Accommodation Order (1903), under Section 9 of the Factory and Workshop Act, 1901 (1 Edw. 7 c.22).

Workmen's Compensation Act, 1906 (6 Edw.7 c.58).

White Phosphorus Matches Prohibition Act, 1910 (8 Edw.7 c.42).

Amended special rules, Special order 79, (1911) under the Factory and Workshop Act, 1901(1 Edw. 7 c.22).

Police, Factories and Miscellaneous Provisions Act, 1916 (6 & 7 Geo. V c.31).

Reports of Chief Inspector of Factories and Workshops (in date order)

Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1879, C. 2489 (1880), HMSO, London.

Report of the Chief Inspector of Factories and Workshops to the Principal Secretary of State for the Home Department, for the Year 1889, C. 6060 (1890), HMSO, London.

Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1892, C. 6978 (1893), HMSO, London.

Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1893, C.7638 (1894), HMSO, London.

Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, the Year 1894, C. 7745 (1895), HMSO, London.
Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1895, C. 8067 (1896), HMSO, London.
Report of the Chief Inspector of Factories and Workshops to HM Principal Secretary of State for the Home Department, for the Year 1896, C. 8561 (1897), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1897, C. 8965 (1898), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1898, Cd. 27 (1899), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1899, Cd. 223 (1900), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1900, Cd. 668 (1901), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1901, Cd. 1112 (1902), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1902, Cd. 1610 (1903), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1903, Cd. 2139 (1904), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1904, Cd. 2569 (1905), HMSO, London.
Annual Report of HM Chief Inspector of Factories and Workshops for the Year 1905, Cd. 3036 (1906), HMSO, London,
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1906, Cd. 3586 (1907), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1907. Cd. 4166 (1908), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1908, Cd. 4664 (1909), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1909. Cd. 5191 (1910), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1910, Cd. 5693 (1911), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1911, Cd. 6239 (1912), HMSO, London.

Annual Report of the Chief Inspector of Factories and Workshops for the Year 1912, Cd. 6852 (1913), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1913, Cd. 7491 (1914), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1914, Cd. 8051 (1915), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1915, Cd. 8276 (1916), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1916, Cd. 8570 (1917), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1917, Cd. 9108 (1918), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1918, Cmd. 340 (1919), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1919, Cmd. 941 (1920), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1920, Cmd. 1403 (1921), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1921, Cmd. 1705 (1922), HMSO, London.
Annual Report of the Chief Inspector of Factories and Workshops for the Year 1932 (Including a Review of the Years 1833-1932), Cmd. 4377 (1933), HMSO, London.

Other Official Reports (in date order)

First Report of the Central Board of His Majesty's Commissioners for the Inquiry into the Employment of Children in Factories; with Minutes of Evidence and Reports by Medical Commissioners (1833). PP 1833 XX & XXI.
Select Committee of the House of Lords on the Sweating System. First Report with Reports of the Board of Trade (1887-8); *Second Report* (1888); *Third Report,* (1889); *Fourth and Fifth Reports,* (1889-1890*),* HMSO, London.
Report to the Board of Trade on the Sweating System at the East End of London, (1887, 1888), Cd. 361 (1889), HMSO, London.
Royal Commission on Labour. Conditions of Work in Various Industries in England, Wales, Scotland and Ireland (1892-4), National Archives HO45/98421/B11168.
Report of M. A. Abraham as part of an enquiry into the death of Annie Case a white lead worker in the employment of the Millwall White lead Company (1893), National Archives HO45/9848/B12393A.

Royal Commission on Labour Report of the Assistant Lady Commissioners (1893-4), The Employment of Women. PP 1893-4 XXXVI.
Royal Commission on Labour (1893-4), Employment of Women. Report by Miss Clara E Collet (Lady Assistant Commissioner) on the Conditions of Work in London. PP 1893-4 XXXVII.
Report of May Abraham on the results of her enquiry into the employment of women in the white lead trade in Newcastle (1895), National Archives HO 45/9848/B12393A.
Report from the Departmental Committee on the Various Lead Industries, (1895), C. 7239, HMSO, London.
Departmental Committee Appointed to Inquire into and Report upon Certain Miscellaneous Dangerous Trades (1895-1899), National Archives HO45/9856/B123930.
Report to the Secretary of State for the Home Department on the causes of death in colliery explosions and underground fires, with special reference to the explosions at Tylorstown, Brancepath and Micklefield. Reports from Commissioners, Inspectors and others (1896), Cd. 8112, HMSO, London.
Report of the Committee appointed by the Board of Trade to inquire into the system of ventilation of tunnels on the Metropolitan Railway, (1898), *Appendix No. 1. Memorandum on the composition of the air in the Metropolitan and other railway tunnels and on means of artificial ventilation of tunnels, by Dr. Haldane,* Cd. 8684, HMSO, London.
First Report of the Departmental Committee appointed to inquire into Ventilation of Factories and Workshops (15 Aug 1902). *Appendix I. Results of the Examination of Ventilation. Appendix II. General Account of the Conditions in Workshops. Appendix III. Determination of Carbonic Acid in the Air of Factories and Workshops.* Cd. 1302, HMSO, London.
Final Report of the Departmental Committee appointed to inquire into the Ventilation of Factories and Workshops (1907), Cd. 3553, HMSO, London.
Tinning of metals, a special report on the dangerous or injurious processes in the coating of metal with lead or a mixture of lead and tin, by A.M. Anderson & T.M. Legge (1907*),* HMSO, London.
Ministry of Munitions (1916*) Health of Munitions Workers Committee*, *Memorandum No. 8. Special Industrial Diseases,* Cd. 8214. HMSO, London.
Ministry of Munitions (1917), *Health of Munitions Workers Committee. Interim Report. Industrial Efficiency and Fatigue,* Cd. 8511, HMSO, London.
Report of the Departmental Committee on Anthrax, Summary of Evidence and Appendices (1918), Vol. 3, HMSO, London.

Letters/Memoranda (in date order)

W. Moore Eden (5 April 1882), letter to Thomas Burt MP. National Archives HO/45/A15330.
William Dawkins-Cramp, Superintendant Inspector for the Midlands (9 February 1893), letter to Edward Dunn. National Archives HO45/9851/B12393E.
Reverend Newland (1893), letter to the East London Coroner, National Archives HO/45/9848/B12393A.

Edward Troup (April 1896), memorandum to the Home Secretary. National Archives HO45/9856/B12393AC.
L Tudor & Co of Hull, (May 1896), letter to the Home Secretary. National Archives HO45/9856/B12393AC.
Locke, Lancaster and WWR Johnson & Co, (May 1896), letter to the Home Secretary. National Archives HO45/9856/B12393AC.
Edward Troup (12 June 1896), memorandum to the Chief Inspector of Factories, National Archives HO45/9856/B12393AC.
Adelaide Anderson, (28 June, 1915), letter to Arthur Whitelegge, National Archives HO45/10790/300791.
Edward Troup (July 1915), on behalf of Secretary of State, letter to the Treasury. National Archives HO45/10790/300791.
The Treasury (30 August 1915), letter to Edward Troup. National Archives HO45/10790/300791.
Adelaide Anderson (October 1915), letter to Arthur Whitelegge. National Archives HO45/10790 300791.
Arthur Whitelegge (23 December 1915), letter to Secretary of State at the Home Office. National Archives HO45/10790/300791.
Arthur Whitelegge (1 January 1916), letter to Secretary of State at the Home Office. National Archives HO45/10790/300791.
The Treasury (January 1916), letter to Edward Troup. National Archives HO45/10790/300791.
Women's War Work (Sept. 1916), Memorandum issued by the War Office, National Archives MUN4/2874.
Ministry of Munitions (30 November 1916), letter to Cyril Longhurst of the War Committee, National Archives MUN5/70/324/17.
The Treasury (15 August 1917), letter to Edward Troup. National Archives HO45/10790/300791.
Malcolm Delevinge (15 December, 1921), letter to the Federation of Lace and Embroidery Employers' Association on behalf of the Secretary of State. National Archives HO87/52.
Ministry of Munitions, Memorandum (undated), Munitions Work Successfully Undertaken by Women in Temporary Substitution or Dilution of Male Labour. National Archives MUN4/2874.
J.O.Caris (undated), letter to Thomas Burt MP. National Archives HO/45/A15330.

Parliamentary debates

Hansard's Parliamentary Debates (4 April 1882), Vol. 268.
Hansard's Parliamentary Debates (19 June 1891), Vol.354.

Other Archive material (in date order)

Instructions by the Secretary of State for her Majesty's Inspectors of Factories and Workshops as to the duties of Female Inspectors in the Inspection of Factories and Workshops(1893), National Archives HO45/9772B1137AF.
Male Inspectors of Factories (20 July 1895), Subjects of Examination, National Archives CSC 10/3015.

Petition to Home Secretary from female lead workers of Newcastle on Tyne (June 1896), National Archives HO45/9856/B12393AC.

Departmental Committee appointed to inquire into Ventilation of Factories and Workshops (1900). Terms of Reference, National Archives HO45/10043/A61612.

Hilda Martindale (9 February 1915), Inspector's Report to HM Principal Lady Inspector, re Components Ltd, Dale Road, Bournbrook, Birmingham, National Archives HO45/10790 300791.

Hilda Martindale (5 February 1915), Inspector's Report to HM Principal Lady Inspector, re Joseph & Jesse Siddons, Foundry, West Bromwich, National Archives HO45/10790 300791.

Pamphlets/Booklets

Harper-Smith, T. (1990), Kensal New Town, Local History Booklet, Kensington and Chelsea Local Studies Department, London.

Mallett, C. (1893), Dangerous Trades for Women, Humanitarian League, Pamphlet No. 9, William Reeves, London.

Newspaper and periodicals

Daily Chronicle (1892).

Daily News (1882, 1894).

Leeds Mercury (1830).

Lloyds Weekly Newspaper (1890).

Stratford Express (1893).

The Bristol Mercury and Daily Post (1891).

The Times (1891).

Women's Union Journal (1889).

Personal papers

Deane, Lucy (30 March 1894), Personal Diary. Modern Records Centre, University of Warwick, MSS.69/1/1-24.

World Wide Web

www.historic-uk.com/HistoryUK/England-History/BarnbowLasses.htm (no updating)

www.lancasterguardian.co.uk/community/nostalgia_2_8642/white_lund_explosion_1_1170802 (last updated 3 August 2011).

www.enwikipedia.org/wiki/Silvertownexplosion (last updated 10 April 2011).

www.enwikipedia.org/wiki/National_Shell_Filling_Factory_Chilwell (last updated 19 January 2011).

www.faversham.org/pages/standard.aspx?iPageID=1584 (no updating).
www.bradfordhistorical.org.uk/antiquary/third/vol03/lowmoor.html (no updating).
www.ashton-under-lyne.com/history/explosion.htm (no updating).
www.britishpathe.com/record.php?id=18412 (video newsreel film, 6 March 1922) (no updating).

Chapters/poems in edited books

Bedford, M.I. (1917), 'Munition Wages', in Reilly ,C. (ed.), *The Virago Book of Women's War Poetry and Verse,* Virago, London, pp. 7-8.
Bryder, L. 'Tuberculosis, silicosis, and the slate industry in North Wales, 1927-1939', in Weindling, P. (ed.), *The Social History of Occupational Health*, Croom Helm, London, pp. 108-126.
Figlio, K. (1985), 'What is an accident?' in Weindling, P. (ed.), *The Social History of Occupational Health*, Croom Helm, London, pp. 180-206.
Ineson, A. & Thom, D. (1985), 'T.N.T Poisoning and the Employment of Women Workers in the First World War', in Weindling, P. (ed.), *The Social History of Occupational Health,* Croom Helm, London. pp. 89-107.
Milles, D. (1997), 'What are occupational diseases? Risk and risk management in industrial medicine in Germany, c. 1880-1920', in Cooter, R. and Luckin, B. (eds.), *Accidents in History: Injuries, Fatalities and Social Relations,* Rodopi, Amsterdam, pp. 179-195.
Thane, P. (1991), 'Visions of gender in the making of the British Welfare State: the case of women in the British Labour Party and social policy, 1906-1914' in Block, G. & Thane, P. (eds.), *Maternity and Gender Policies. Women and the Rise of the European Welfare States 1880s-1950s,* Routledge, London, pp. 93-118.
Weindling, P. (1985), 'Linking Self-help and Medical Science', in Weindling, P. (ed.), *The Social History of Occupational Health,* Croom Helm, London, pp. 2-31.

Theses

Carter, J.T. 'Anthrax in Kidderminster 1900-1914', Unpublished PhD Thesis, University of Birmingham, 2005.

Sources cited from other works

Dickson, G.B. (1852), Sermon 'On Cleanliness', Edinburgh. Quoted in Mohun, A.P. (1999), *Steam Laundries. Gender, Technology and Work in the United States and Great Britain, 1880-1940,* John Hopkins University Press, Baltimore, p. 35.
Ure, A. (1835), 'Statistical Table of the Textile factories of the United Kingdom', from Philosophy of Manufactures, reproduced in Crookes E. (2005), *The Factory Inspectors. A Legacy of the Industrial Revolution,* Tempus Books, Stroud, Gloucestershire, p.39.

Appendix 1

Biographical notes on selected individuals

Women factory inspectors

May Abraham, (Tennant), (1869-1946), was born in Dublin, the daughter of a barrister. She arrived in London in 1888 with letters of introduction to Lady Dilke, who employed her as a secretary. On Lady Dilke's recommendation, she was appointed to the Labour Commission in 1892, and became the first woman factory inspector in 1893. She married Jack Tennant in 1896 and resigned from the inspectorate in 1897 on the birth of her first child. She subsequently became a member of the Dangerous Trades Committee and had a long career in public service, serving on various official committees concerned with women's employment, health and welfare. These included the Royal Commission on Divorce on 1909, the Central Committee on Women's Employment in 1914, sections of the Health of Munitions Workers Committee in 1916 and the Maternal Mortality Committee set up in 1928 to investigate ways of reducing the risks to women in childbirth.

Mary Muirhead Paterson, (1864-1941), was born in Glasgow, the daughter of a prosperous boot manufacturer. She studied at Queen Margaret's College, Glasgow and subsequently travelled extensively in America, surveying industrial conditions with her uncle, Henry Muirhead, who later became a member of the Independent Labour Party. Mary Paterson began her career as a London schoolboard teacher and in 1892 was appointed as a clerk and précis writer for the Labour Commission. In 1893 she was appointed as one of the first two women factory inspectors, based in Scotland. In 1908 she became Deputy Principle Lady Inspector but resigned in 1911 when, following the National Insurance Act, she became one of the first National Health Insurance Commissioners for Scotland. She was particularly keen to bring women into the scheme. During the 1920s and 30s she held various public offices and was awarded a CBE in 1920.

Lucy Deane (Streatfeild), (1860-1950), was born in India, the daughter of an army officer who was killed in the Anglo-Transvaal war in South Africa in 1881. During the 1880s she trained at the National Health Society, a charitable institution set up to train women for health-related voluntary work and worked as a nurse at the Chelsea Infirmary before becoming a sanitary inspector for Kensington and Chelsea. She applied for the post of factory inspector in 1894. She retired because of ill health in 1906. In 1911 she married former army officer and architect, Major Granville Streatfeid. Subsequently she worked as a commissioner for the National Health Insurance Service. She was a socialist by conviction, a member of the WTUL and of the National Union of Women's Suffrage Societies and held various public appointments following her retirement from the Factory Inspectorate.

Adelaide Anderson, (1863-1936), was born in Australia, the daughter of a banker and shipping merchant, and came to England as a young child. She was educated at Queens College, Harley Street and subsequently studied Moral Sciences at Girton College, Cambridge, and French and German in Dresden. She developed a commitment to the reform of labour conditions when she began lecturing to the Women's Co-operative Guild in the 1880s. She was appointed as a clerk and précis writer to the Royal Commission on Labour in 1892 and subsequently applied for a position as a factory inspector in 1894. She became Principal Lady Inspector in 1897. She retired from the Inspectorate in 1921 following the amalgamation of the men's and women's sections which she opposed. During the 1920s and early 1930s she carried out investigations on behalf of the League of Nations into child labour conditions in the International Settlement in Shanghai, China and in Egypt. She was awarded a DBE in 1921.

Rose Squire, (1861-1938), was the daughter of a Harley street physician who was well-known for his work in the field of public health and preventive medicine. In 1893 she trained as a lecturer in hygiene and first aid and subsequently worked as a nurse. In 1894 she gained a qualifying certificate as a sanitary inspector and became the first woman to be allowed to practice in this capacity. Her work brought her into close contact with the newly appointed women factory inspectors. She considered that their work offered more opportunities to improve conditions and she applied successfully for a post as a factory inspector in 1895. In

1906 she served on the Royal Commission on the Poor Laws, investigating the relationships between industrial and sanitary conditions and pauperism. In 1912 she was appointed Deputy Principal Lady Inspector. Following her secondment to the Ministry of Munitions during the First World War she did not return to the Factory Inspectorate but became a senior administrator in the Home Office, the first woman to hold such a position. She was awarded an OBE in 1918.

Male factory inspectors

Sir Alexander Redgrave, (1818-1894), was the son of a manufacturer of wire fencing. His family were poor and he attended a local day school. He joined the Home Office as a clerk in 1834, becoming a clerk in the Factory Department in 1844. He became a sub-inspector in 1847 and a full inspector in 1852. From 1861 to 1878 he was joint Chief Inspector with Dr Robert Baker and became sole Chief Inspector in 1879. He was conservative in his attitudes towards issues such as gender equality and female education but radical and progressive in his organisation and development of the Factory Department. He was particularly concerned to address the problems of those occupations which became known as the 'Dangerous Trades', and also keen to introduce the collection and use of statistics into the department. He was made a Fellow of the Royal Statistical Society in 1856. He was a capable administrator and is widely credited with the development of the Factory Department into a professional organisation with an efficient organisational structure, which formed the basis for the present day Health and Safety Executive. [1] He was knighted in 1877and retired in 1891, having spent 57 years in the Home Office.

Richard E Sprague Oram, (1830-1909), was born in Devon, the son of a Superintendant Registrar and from a strongly non-conformist background. He initially joined the Customs Department in Devonport but, in 1861, moved to London and became a sub-inspector of Factories. By 1871 he was a full inspector and by 1881 a superintendant. When Redgrave retired, in September 1891, Frederick Whymper was initially appointed as his successor but

[1] His continued importance is underlined by the naming of the building, opened in 2006, in Bootle, Liverpool, to house the new headquarters of today's Health and Safety Executive, 'Redgrave Court'.

retired through ill-health four months later and Oram was appointed to replace him. He served as Chief Inspector for only four years, retiring in 1896, following the appointment of a new Conservative Home Secretary. However, he presided over major changes in the Factory Department instituted when Herbert Asquith became Home Secretary as part of the Liberal Government of 1892-5. Labour activist, Violet Markham, in her biography of May Abraham, presented a picture of Oram as rather old-fashioned and eccentric. [2] However, he was a strongly committed social reformer and friend of influential Liberals such as Sir Charles and Lady Dilke. In particular, he was a strong supporter of the appointment of women inspectors, standing firm against criticism and opposition and effectively establishing their position within the Home Office.

Dr (Sir) Arthur Whitelegge, (1852-1933), was born into a relatively wealthy family in Manchester. He was educated at a grammar school and subsequently obtained a BSc and medical qualifications at London University. He was particularly interested in infectious diseases and public health and in 1881, following various hospital appointments, he obtained a Diploma in Public Health from Cambridge. He subsequently took up appointments as Medical Officer of Health for Nottingham and for Yorkshire. As a result of his experience in public health administration in industrial districts and his growing reputation in the field of epidemiology he was appointed Chief Inspector of Factories in 1896. The appointment of a medical doctor from outside the Factory Department was initially unpopular amongst existing inspectors. However, under his leadership the Factory Inspectorate was greatly expanded and was re-organised into districts which more closely mirrored those of the local Sanitary Departments, in order to facilitate better co-operation between the two. He also greatly expanded the use of statistics and epidemiology to inform the policies of the Factory Department, working closely with Dr. Thomas Legge, the first specialist Medical Inspector of Factories, appointed in 1898. Whitelegge was knighted in 1911 and retired in 1917.

[2] Markham described how he wrote with an enormous quill pen and had a tendency to wave this about enthusiastically when talking, spattering ink over the floor. Markham, V. R. (1949), *May Tennant, A Portrait,* Falcon Press, London, p. 25.

Dr (Sir) Thomas Legge, (1863-1932), was born in Hong Kong the son of a missionary and Oxford academic. He was educated at Trinity College, Oxford and St Bartholomew's Hospital, London and subsequently trained in public health. He initially travelled widely in continental Europe investigating the different causes of public health problems. In 1896 he was appointed Secretary to the Royal Commission on Tuberculosis. He was appointed as the first Medical Inspector of Factories in 1898 and in subsequent years became a highly respected expert on the identification, treatment and prevention of industrial disease. He established the use of statistics to inform preventative measures and is credited, in particular, with significantly reducing the incidence of lead poisoning in the potteries and anthrax in the wool industry. He received a CBE in 1918 and was knighted in 1925. However, in 1926 he resigned from the Factory Inspectorate on a point of principle when the British government bowed to pressure from manufacturers and refused to implement an International Labour Association agreement to limit the use of lead in paint. Subsequently he became an advisor to the TUC.

Women trade unionists

Emma Smith (Paterson), (1848-1886), was the daughter of the headmaster of a National School, who educated her at home. Subsequently she became an assistant in the school. She believed strongly that women should achieve equality through trade unionism rather than government intervention and, assisted by Emilia Dilke, she contributed to the establishment of five women's trade unions. She also strove to persuade men to allow women to join existing unions on equal terms. She was responsible for the establishment of the WPPL, the forerunner of the WTUL and served as its first President. As a result of its activities, a number of other women's trade unions were established during the 1880s. However, they struggled to attract members and few survived more than a few years. Paterson experienced considerable poverty following the early death of her husband, cabinet maker Thomas Paterson, in 1882, and lived primarily on a small income from the Women's Printing Society Ltd. which she had founded in 1876. She continued to work for the development of women's trade unionism but reluctantly conceded that protective

legislation offered the best prospect for improving women's working conditions. She died relatively young, as a result of diabetes, in 1886.

Lady Emilia Dilke, (1840-1904), was born in Devon and brought up in Oxford where her father was the manager of the London and County Bank. Her father was also an amateur artist and friendly with many of the leading artistic figures of the Victorian period and she grew up in an atmosphere dominated by artistic and cultural pursuits and radical politics. She studied at the Government School of Design in Kensington and subsequently developed a significant career as an art critic and historian. She was committed to social reform and, in particular, concerned about the rights and working conditions of women. In 1885 she married Sir Charles Dilke who had been a Liberal reformist MP in Gladstone's second government. His ambition to become Prime Minister had been curtailed by a scandalous divorce case and he had resigned his seat. However, he returned to Parliament in 1892 as the member for the Forest of Dean and continued to campaign for reforms such as women's suffrage, the legalisation of labour unions and universal schooling. Emilia Dilke became President of the WTUL in 1886, a position she held until her death, and the Dilkes' house in Sloane Square, London, became the League's headquarters. In addition to presiding over the activities of the League she pursued a career of writing and public speaking to promote the interests of women workers and the formation of women's trade unions.

Women labour commissioners

May Abraham (see above)

Eliza Orme, (1848-1937), was the daughter of a wealthy distiller and educated at Bedford College and the University of London, becoming the first woman in England to gain a law degree, in 1888. She had a prosperous law practice and was also a prominent writer and lecturer on feminist issues. She was a supporter of women's suffrage and of increasing women's educational and employment opportunities. She opposed protective legislation for women, arguing that women should not be excluded from any workplace. She was a

member of the Society for the Protection of Women's Employment Opportunities which remained committed to total equality for women. In 1892 she was chosen to supervise the work of the other three lady Commissioners on the Labour Commission, while herself carrying out investigations into women's work in Ireland, the Black Country iron industry and in London's public houses.

Clara Collet,(1860-1948), was the daughter of a non-conformist journalist who ran a radical monthly journal called the *The Free Press: A Diplomatic Review.* She was a close friend of Karl Marx's daughter, Eleanor and of reformer Beatrice Webb. She received a Unitarian education and subsequently was one of the early women graduates of London University. Initially she worked as a teacher and campaigned for the provision of secondary education for girls and for working class women. Following her work with Charles Booth during the 1880s and her service on the Royal Commission on Labour, she gained a post at the Board of Trade and remained there as a statistician and economist, eventually being elected as a Fellow of the Royal Statistical Society.

Margaret Irwin, (1858-1940), was born at sea, the daughter of a Scottish Master Mariner. She studied French, German and English at St Andrews University and in 1880 gained a 'Lady Literate in Arts', the only degree equivalent then available to women at Scottish universities. She subsequently studied political economy at Queen Margaret's College, Glasgow and in 1890 was appointed as full-time organiser of the Scottish branch of the Women's Protective and Provident League (WPPL), the forerunner of the WTUL. It was during this period she was appointed as one of the Lady Commissioners on the Labour Commission. In 1895 she became the secretary of the Scottish Council for Women's Trades and worked to promote the formation of the Scottish Trade Union Congress in 1897. She was committed to the suffrage movements and the rights of women workers and particularly interested in the conditions of rural seasonal workers. She owned a fruit farm in Scotland and established model working and housing conditions there.

Medical/scientific experts

Dr (Sir) Thomas Oliver, (1853-1942), was born in Ayrshire the son of a grocer. He received his medical education at Glasgow University and, after a short period of medical practice in Lancashire, he moved to the Newcastle upon Tyne where he became physician to the Royal Victoria Infirmary and the Princess Mary Maternity Hospital. He became Professor of Medicine in 1911. He developed a strong interest in industrial disease, particularly lead poisoning which he encountered in the white lead works in the area, but also other dangerous trades. During his career he served on a number of official enquiries and conducted numerous investigations both in Britain and abroad. He was widely renowned as a world expert on industrial poisoning, receiving numerous awards for his work in improving industrial conditions, for example the Freedom of the City of Boston, USA in 1923 and the Légion D'honneur in France in 1929. He was knighted in 1908. He was also JP for Newcastle upon Tyne and Deputy Lieutenant for Northumberland. He retired from medicine in 1927 but became Vice-Chancellor of the University of Durham in 1928.

Dr. John Scott Haldane, (1860-1936), was born in Edinburgh and studied medicine at the University of Edinburgh, qualifying in 1883. He was interested in medical research rather than medical practice and in 1887 obtained a post at the Department of Physiology at Oxford University, remaining there for the next twenty-six years. He carried out numerous experiments on the composition and physiological effects of expired air, work which had direct applications in the field of public and occupational health. During the war he worked on the treatment of gas poisoning and the design of respirators. However, much of his research focussed on the various gases contained in coal mines and he is regarded as a significant contributor to mine safety. From 1917 -1924 he was a member of the mine rescue apparatus research committee set up by the newly established Department of Scientific and Industrial Research. In 1921 he became Honorary Professor at the Mining Research Laboratory when this was transferred to the University of Birmingham and was responsible for initiating and supervising a wide range of health and safety projects relating to the mining industry. He was elected President of the Institution of Mining Engineers in 1924.

Appendix 2

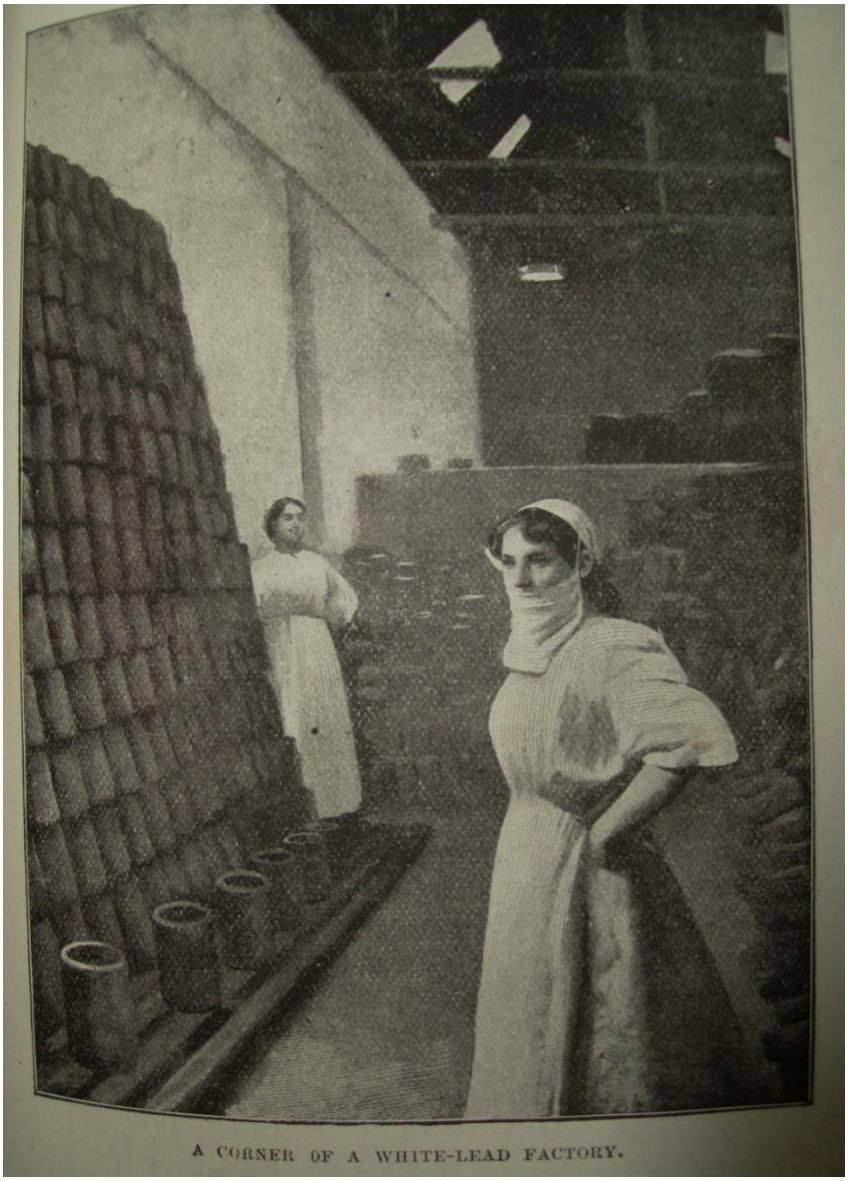
White lead manufacture

The 'Dutch method'

White lead, otherwise known as lead carbonate, was used primarily as a paint additive. The process used in the 19th and early 20th century, whereby metallic lead was converted into white lead, was known as the 'Dutch method'. Thin sheets of metallic lead were formed into coils and placed in earthenware pots containing vinegar (acetic acid), such that the lead was held slightly above the level of the vinegar. The pots were covered with a further sheet of metallic lead and placed in a bed of tanbark. This first layer of pots was then covered with boards and a further layer was placed on top. Several layers formed a 'stack'. This stack was also known as the 'blue beds' because of the bluish colour of the metallic lead. Since the lead was in sheet form at this stage little dust was generated and working in the 'blue beds' was not, therefore, considered to be particularly hazardous. The 'stack' was then left for several weeks during which time the metallic lead reacted with the acetic acid to form lead acetate and, in the presence of the carbon dioxide generated by the fermenting tanbark, was converted to lead carbonate. When the conversion process was complete, women workers shovelled the white lead carbonate out of the stacks, which were then known as 'white beds'. This process generated large amounts of dust and therefore produced high exposure to lead. Subsequently the lead carbonate was crushed to a uniformly fine dust between rollers and washed in the 'washbecks' and then dried in the 'stoves'. Women then shovelled the white lead out of the stoves and into sacks. Thus women carried out the work which involved the highest exposure to lead dust and it was from these parts of the process that they were excluded in 1898. In 1883 special rules had been introduced which required the watering down of the 'white beds' during shovelling, thus accounting for Abraham's observation in 1893 that Annie Case would not have been exposed to lead dust during the shovelling process. Subsequently, however, the continuing toll of disease and death indicated that watering down was inadequate as a preventive measure.

White lead works showing the ‘stacks’

Source: Robert H. Sherard, (1897), ‘The White Slaves of England, Being true pictures of certain social conditions in the Kingdom of England in the Year 1897’, James Bowden, London.



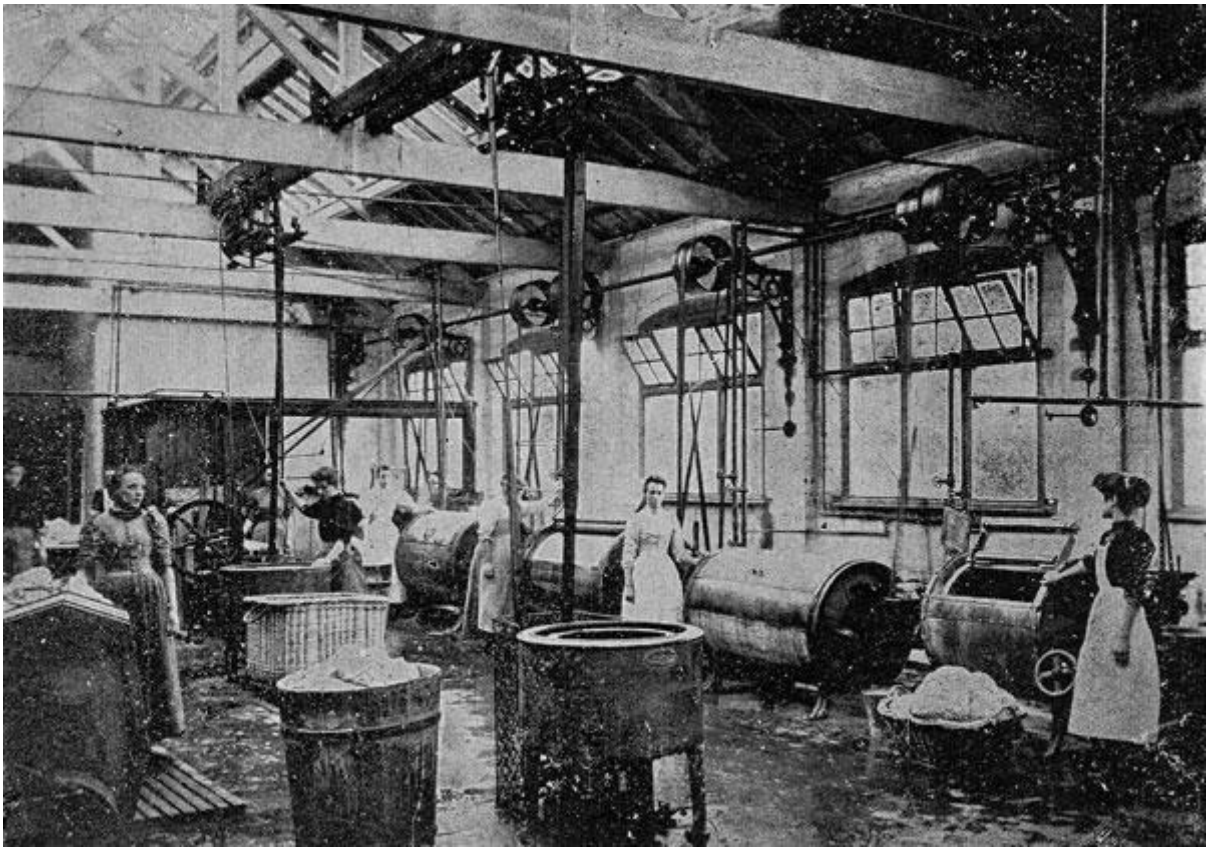
A CORNER OF A WHITE-LEAD FACTORY.

Appendix 3

Laundry equipment

Views of Wolverhampton Steam Laundry during the 1890s.

Photographs reproduced with the permission of Wolverhampton Archives & Local Studies Department.



Area showing washing machines, powered by steam with unguarded belts and pulleys.

Area showing large for drying and pressing sheets and table linen, powered by steam, with unguarded belts and pulleys.

Area showing ironing of small items using gas-powered irons.

Appendix 4

Ventilation measurement

Portable monitor for measuring 'carbonic oxide' (carbon dioxide) levels in the air, developed by J.S.Haldane

Source: University of Dundee Museum.
www.dundee.ac.uk/museum/collections/physiology/index.htm

Table of results obtained by Inspector Mildred Power, inspecting workshops in West London in December 1906.

Source: Annual Report of the Chief Inspector of Factories and Workshops for the Year 1906, Cd. 3586. (1907), HMSO, London, pp 155-6.

Conditions in dressmakers' workshops in West London.

Samples taken 18th December 1906, 6 pm to 8 pm, Barometer, 30.38 (anticyclone);
dry bulb 50˚F; wet bulb 49˚F; humidity, 93 per cent.

Room	Space (cubic feet)	Persons employed	Space per head (cubic feet)	CO_2 parts per 1,000	Hygrometric state (percentage saturation)	Air temperature	Wet bulb	Subjective quality of air
1	9,758	15	650.5	14.1	67	65˚F	55˚F	close
2	5,760	14	411	12.4	54	72˚F	62˚F	very close
3	4,784	13	368	15.9	57	70˚F	61˚F	close
4	4,000	10	400	12.2	63	63˚F	56˚F	musty, cellar- like smell

Notes

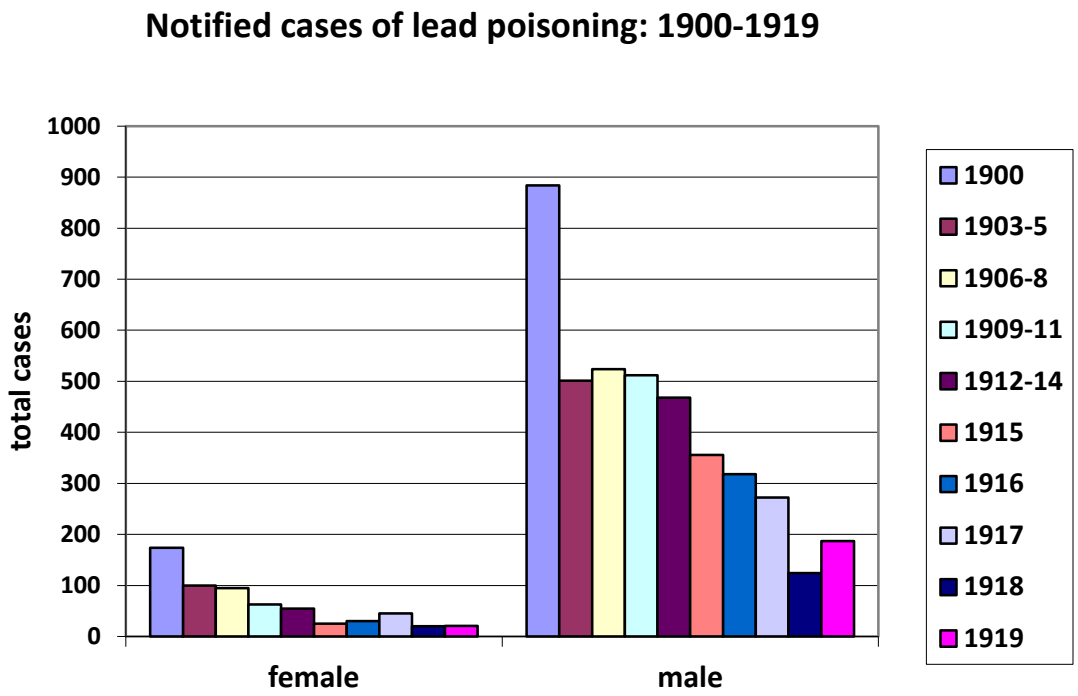
Dry bulb temperature is the temperature measured with a normal thermometer. Wet bulb temperature takes account of the water vapour in the air. It is the minimum temperature which can be reached when there is cooling of a ventilated surface by evaporation of the water in the air. A wet bulb thermometer has its bulb wrapped in a cloth which is kept wet.

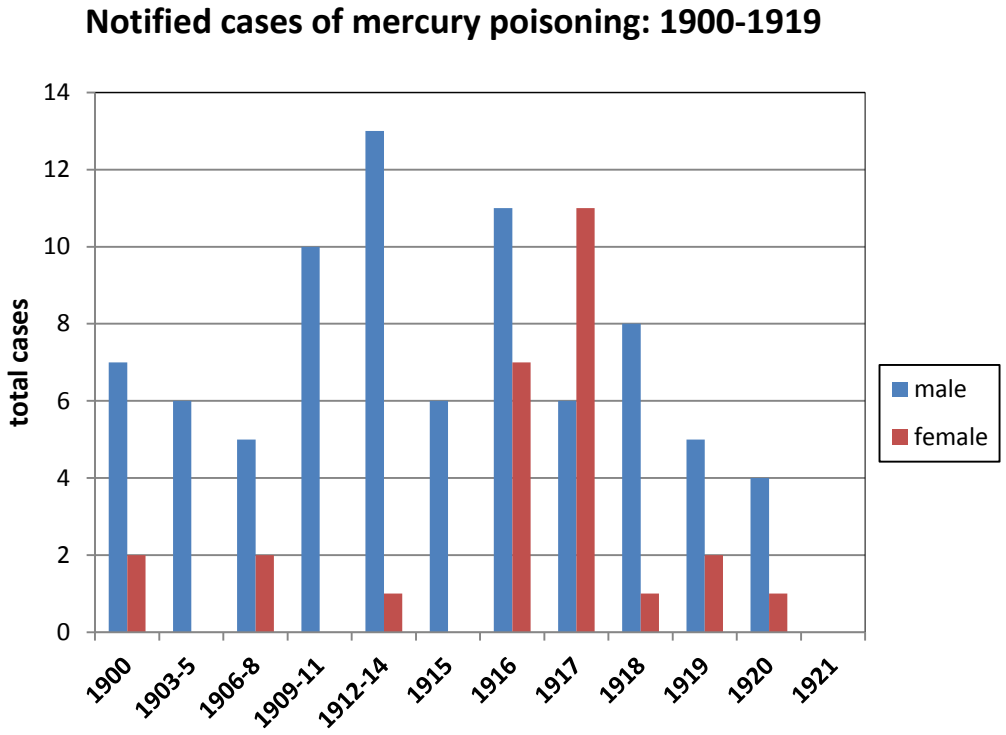
The moisture content of the air, relative to its content when saturated, was measured with a hygrometer.

Appendix 5:

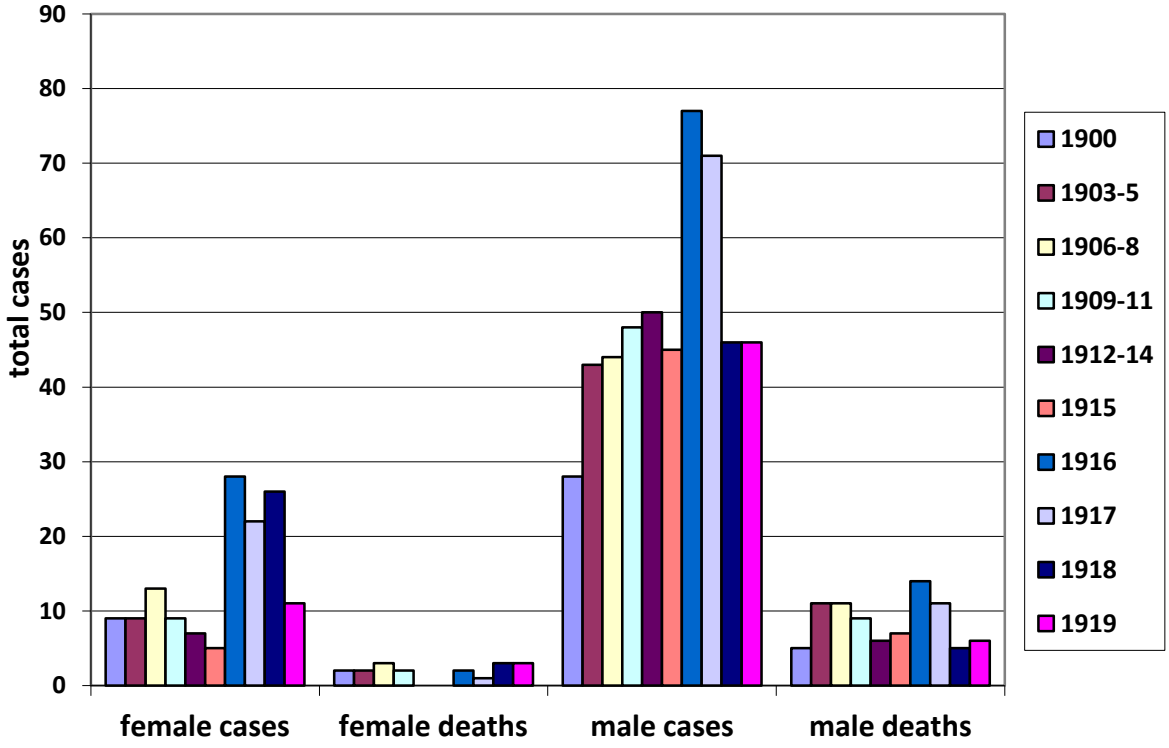
Notified industrial diseases during World War 1

Source: Data derived from Anderson, A. (1922), *Women in the Factory. An Administrative Adventure 1893-1921,* John Murray, London, Appendix II.





Notified cases and deaths from anthrax: 1900-1919



Notified cases and deaths from toxic jaundice: 1916-1919