Emergence of occupational medicine in Victorian times¹

W. R. LEE

Department of Occupational Health, University of Manchester

Lee, W. R. (1973). *British Journal of Industrial Medicine*, 30, 118-124. **Emergence of occupational medicine in Victorian times.** The events surrounding the establishment and development of legislation to protect the health of people at work in Victorian times are already well documented. This paper deals with some other aspects of the development of occupational medicine.

Medical opinions at the time did not always see the misuse of child labour as due simply to avaricious mill owners, but in part due to the parents and in part to the workmen sub-contractors. The establishment of the certifying surgeons is briefly reviewed and their coming together to form an association in 1868 may be related to questions about the need for medical certificates of age which were being requested by the many factory owners brought under factory legislation for the first time in 1864 and 1867.

The plight of injured workmen and their dependents was early recognized, although it was late in the Victorian era before any statutory provision was made for them. The idea of linking compensation with preventive measures came to the fore in 1845 when some Manchester doctors, later supported by Edwin Chadwick, examined the workings at the Woodhead railway tunnel across the Pennines. When compensation legislation was passed some half a century later the idea was lost, and to this day compensation for and prevention of industrial injury and disease remain separated.

The change of industrial diseases from a medical curiosity to a problem requiring State intervention is traced over the latter part of the Victorian era.

The whole piecemeal pattern illustrating the precept that 'social problems come first, social philosophy after' has persisted until the far-reaching changes in health and safety legislation of the present day.

To the present-day practitioner of occupational medicine the Victorian era is of interest because it serves to explain the present structure of his specialty. That era saw the emergence of most of the medical problems which arise when men work in industry in large numbers. The Victorians recognized these and in an ad hoc manner (Merewether, 1950) attempted to deal with them so that by the end of their era most of the agencies which we use today to deal with these problems had already been founded. The early developments of the different Acts to deal

with safety, health, and welfare have been described before, those for factories by Hutchins and Harrison (1903) and Thomas (1948), for mines by Edmonds and Edmonds (1965), and for agriculture by Lee (1968a). The only problems to be discussed in this connection will be those which arose among the doctors themselves who were brought into the agencies that were set up.

During this era the increasing awareness by the State of its responsibility for controlling industrial disease led eventually to the establishment of the Medical Inspectorate of Factories. Finally, despite the efforts to prevent industrial accidents, many

¹Based on a paper read to the Society for the Social History of Medicine at Leicester, 15 July 1972

men were killed and injured, and the developing humanitarianism of the age resulted in the introduction of a scheme for compensation for injured workmen.

Prologue

It is convenient to think of the so-called industrial revolution taking place in two successive phases influenced by the technological advances. In the early years mills sprang up in small valleys where water power could be harnessed while traditional agriculture continued on the nearby hills (Davies, 1963). Much of the work in factories required attention rather than labour and could perfectly well be executed by the local women and their children, supplemented by the parish apprentice system. The development of steam power changed this scene and saw the transference of the textile industry from the rural areas into the towns. Here the supply of labour was easier and the former apprentice system declined.

Each of these two phases produced a different set of medical problems and of measures to cope with them. Although occupational medicine in Victorian times is concerned only with the second phase, many problems, and in particular the measures to deal with them, had been inherited from the first phase, and it is necessary to start with those. They were essentially twofold.

First, the fear of epidemics of infectious disease was very real. The arrival in the northern villages of hordes of unkempt 'foreign' apprentices from the south living herded together in the apprentice houses could well have led to real fears of outbreaks of infection (Baker, 1837). While it may have been that suspicion and hostility toward the 'foreign' immigrants was expressed as concern that they might become the source of an epidemic, it should be remembered that the population of this country had good reason to fear epidemics. The Great Plague and the story of the Derbyshire village of Eyam were barely a hundred years old (Shrewsbury, 1970). Another outbreak of plague had crossed from Africa and ravaged Marseilles in the early eighteenth century, and in 1804 the 'Gibraltar sickness' (an outbreak of yellow fever) crossed into Spain from North Africa, wiping out one-third of the population of Gibraltar on the way. This led the British Government to set up, through the Privy Council and the Royal College of Physicians, a short-lived Board of Health to examine the threat (Brockington, 1965a).

The other problem inherited from the first part of the industrial revolution was concern over the misuses of the children caught up as apprentices. When, therefore, there was in 1784 an outbreak of 'malignant fever' in one of Sir Robert Peel's mills at Radcliffe, Thomas Percival, a physician at the

Manchester Royal Infirmary, was called in to advise. He believed, probably correctly, that the two problems were related, and his recommendations (Meiklejohn, 1959) formed the basis of the Health and Morals of Apprentices Act of 1802. Although that Act became a dead letter for want of a means for enforcement, it is interesting to note one of Percival's recommendations for the control of the spread of infection which was incorporated into that Act.

'And be it enacted, that all and every Rooms and Apartments in or belonging to any such Mill or Factory shall, Twice at least in every year, be well and sufficiently washed with Quick Lime and Water over every Part of the Walls and Ceiling thereof, and that due care and attention shall be paid by the Master or Mistress of such Mills or Factories, to provide a sufficient number of Windows and Openings in such Rooms or Apartments, to insure a proper Supply of fresh Air in and through the same.'

This requirement for the whitewashing of factories has continued down through successive Factories Acts and still appears in Section I of the current Factories Act of 1961:

'3(c) in any other case they shall be kept whitewashed or colourwashed and the whitewashing or colourwashing shall be repeated at least once in every period of fourteen months.'

The move of manufacturers into towns, together with the greatly increased power of the machines in factories, increased the demand for labour which was supplied by women and children from the towns. The first Act to curb this abuse, 'An Act for the Regulation of Cotton Mills and Factories' in 1819, failed for want of machinery for either enforcement or verification of ages (Djang, 1942). Another Factory Act was passed in 1825 'to make further provisions for the Regulation of Cotton Mills and Factories and for the better Preservation of the Health of Young Persons employed therein'. Under section 9 of this Act every mill occupier had to enter in a book the name of every child whom he considered might be under the age of 9, together with the names of the parents. The parent had to sign a statement that the child was over the minimum age and thereby the employer became exempted from proceedings if it was later claimed that the child was in fact too young to be employed.

This clumsy procedure was obviously open to abuse. Some later commentators writing on that period have laid particular stress on the faults of the avaricious mill owners. However, as we have seen, this 1825 Act put the responsibility of certifying the ages of their children on the parents and there is much evidence in the reports of commissions at that time (Thomas, 1948) that they abused this responsibility. The *Medico-Chirurgical Review* (1833)

was one of the contemporary medical journals which pointed this out, although it was prepared to grant that in some instances the cruelty of the parent was unavoidable. The *Edinburgh Medical and Surgical Journal* (1834) berated more forcibly:

'But what shall we say of those parents who would rob their children of all their gains, and, while they locked them up with a scanty allowance of loathsome food, adjourned to the tavern to spend in disgusting debauchery the pittance obtained by the moral and physical degradation of their offspring.'

The contention that some of the evils of the system were due to causes other than the employers, coming from the *Edinburgh Medical and Surgical Journal*, may be the more significant, for, as Flinn (1965) and Rose (1971) have pointed out, many of the doctors most prominent in the developing humanitarianism of the age were graduates of the Edinburgh medical school. Edinburgh and Glasgow universities in the second half of the eighteenth century had been the homes of the 'classical sociologists' of the eighteenth century Scottish Historical School (Perkin, 1969).

There seems to be little doubt that children were suffering as a consequence of factory labour, and it is probable that the responsibility for this lay partly with the mill owners, partly with the overlookers (who were often contractors to rather than employees of the mill owner), and partly with the parents. It is possible that at that time (and since) people tended to emphasize the faults of the other groups according to their own interests. The solution, as we see throughout the history of industrial medicine up to the present day, was partly by voluntary effort, generally on the part of a few enlightened employers, followed by intervention by the State to bring the others into line.

Early stages

The 1833 Factories Act 'To Regulate the Labour of Children and Young Persons in the Mills and Factories of the United Kingdom' required that no child was to be employed in the specified mills unless there was a medical certificate, countersigned by the inspector or magistrate, that the child was of ordinary strength and appearance of a child of nine'. Thus medical men were brought into the administration of factory legislation. It might be worth considering who were these medical men, for another 25 years were to pass before the first Medical Registration Act of 1858. In the 1830s medical men could take the examination to become a Member of the Royal College of Surgeons, usually after training, in one of the London schools. Alternatively, they could follow an apprenticeship with an apothecary,

the forerunner of our general practitioners, after which since 1815 they were able to take the examination to become licentiates of the Society of Apothecaries. However, in the absence of any formal system of medical registration, the profession was not yet clearly delineated, and as Thomas (1948) so delicately put it, 'upon the fringe there practised many men whose technical knowledge and skill were of the slenderest'. A Report of the Select Committee on Mills and Factories in 1840 was more forthright: 'certificates were tendered from cow doctors, dentists and various other persons by no means qualified for the work'. The four inspectors who had been appointed under the Act met this difficulty by appointing surgeons from whom alone they would accept certificates. There were certain vicissitudes, but eventually they got their way and the Factories Act of 1844 gave the inspectors power to appoint their own surgeons. This office has continued since then (the title was changed to Appointed Factory Doctor in 1948) until it was abolished in 1973 by the Employment Medical Advisory Service Act of 1972.

The history of these certifying surgeons will make an interesting study. The original idea in 1833 had been for them to provide independent medical evidence, because birth certificates did not exist, that a child was, to quote the words of the Act, 'of the ordinary strength and appearance of a child of the (stipulated) age', 8 or 9 years as the case may be. This phraseology had been used to avoid asking medical practitioners to certify the age of a child, something which is notoriously difficult, if not impossible, from physical examination alone. The introduction of the Registration of Births Act in 1836 was, of course, to make a difference, but not at once. Children having these new birth certificates did not start to enter the factories until about 1846, by which time the system of medical examination had been running for some 13 years and presumably the employers had become used to it. Furthermore, Smiley (1971) has recently drawn attention to the fact that the Registration Act did not apply to Ireland and that this evidence of children's age was not available either in Ireland or for Irish children coming to England.

It was the extension of factory legislation by the Factories Acts of 1864 and 1867 which required large numbers of employers, unaccustomed to the system, suddenly to start paying doctors for certificates. These certificates, the employers claimed, could readily be dispensed with and a birth certificate used instead (Lee, 1968b). One very forthright and closely argued attack on the system was made in two letters published over the initials of their author in the *Birmingham Daily Post* ('T.S.W.', 1868). He was able to make good play of a bungling reply given during a debate on Supply in the Civil Estimates in

July of that year (Hansard, 1868) by a Government spokesman, Mr. Gathorne Hardy, who said 'The fees paid to certifying surgeons under the Factory Acts were for examining children to see that they were of age to be employed, and the House could not expect this expense to be paid by the factory owners'. It was, of course, and it remained the factory owners who paid the fees.

It is interesting, if perhaps unwise, to speculate on the causes that have led to the formation of medical societies. We could, however, note that the Association of Certifying Medical Officers of Great Britain and Ireland was formed at that time (*British Medical Journal*, 1868; Arlidge, 1868) with the objects of:

1. the observation and collection of facts tending to promote the advance of sanitary science and the relief and prevention of disease incident to the various processes of manufacture; and
2. the consolidation and improvement of the position of the certifying surgeons in relation to the Government and the public.

The circumstances were the more interesting because there were at that time two Inspectors of Factories, Alexander Redgrave and Robert Baker, each responsible for about one half of the British Isles. Alexander Redgrave was 50 years old and was a life-time civil servant, having started as a clerk in the Home Office in 1834 (Boase, 1901). Robert Baker was 65 and, after training as a doctor and practising in Leeds, he had entered the Factory Inspectorate, also in 1834, as a 'Superintendent' under the Factory Inspector (Lee, 1964). The nearest present-day equivalent would be a District Inspector of Factories. Baker was a factory inspector and was in no way employed as a medical man. When one reads the half-yearly inspectors' reports by Baker and Redgrave there seems to be little concurrence of ideas between them. In fact the Factory and Workshop Commissioners in their report of 1876 remarked: 'Even the old staff of four inspectors, holding their periodical board meetings, was probably a better arrangement than the present, under which, of two inspectors, one resides in London, and the other in the Midland district; and all contact between them, as is shown by their half-yearly reports, is limited to the bare necessities of their official duty'.

We find this division coming out very clearly in the opening Presidential address by Dr. John Arlidge (1868), an eminent physician at Stoke (Posner, 1973), at this first meeting of the Association of Certifying Medical Officers.

'We should have had a much larger meeting and have enrolled some hundreds of members, could we have addressed our circular letter to all the certifying medical officers throughout Great Britain. The fact is, we have

been able at present only to get half, viz., those who are in Mr. Inspector Baker's district. The other inspector, Mr. Redgrave, declined to furnish a list of those holding office in his district, very suggestively referring me, as a medical man, to *The Medical Directory*, which contains no such list; for had it done so I should never have exposed myself to his want of courtesy in refusing my written application . . . ' Arlidge continued . . . 'Having no flattering remarks called for in the case of one factory inspector, I have the more scope and better opportunity to ask your recognition of the courtesy of the other in aiding us in this movement by most readily furnishing a list of the certifying surgeons within his district. But this represents but a small fraction of your indebtedness to Mr. Baker, who is the indefatigable advocate of the importance of medical agency in the operation of Factory Acts, and who fails not in his most valuable Reports to exhibit how largely medical knowledge and observation may be put into requisition.'

The Association continued active for about 10 years. There was a succession of printed annual reports from the first in 1868 until 1876 and the Association is listed among the professional societies in *The Medical Directory* from 1871 to 1883. It is worth noting that the major Act consolidating all factory legislation was passed in 1878 (Factory and Workshop Act, 1878) and this confirmed the office of certifying surgeons. Perhaps because the second of their objects, 'the consolidation and improvement of the position of the Certifying Surgeons', had been achieved, there was insufficient interest to keep the Association going in order to further its first object, 'the relief and prevention of disease incident to the various processes of manufacture'.

According to *The Medical Directory*, the Association of Certifying Factory Surgeons was established in 1889. A number of its office bearers were the same people who had been the leaders of the earlier Association of Certifying Medical Officers. The minute books from 1891 onwards are still in existence. Further research will be needed to find what caused the resurrection of the Association at that time.

It would be wrong to leave the impression that the Inspector of Factories, Robert Baker, was a traditionalist merely intent on preserving the status of certifying medical officers many years after the medical certification of age had become unnecessary. He wrote in one of his half-yearly reports in 1868, 'Once a month the certifying surgeon should be required by the mill owner, for his own sake and for the welfare of his hands, and for securing to himself efficient labour, to pass through all his rooms when the workers were at work, to notice them carefully and to point out any that were suffering from the kind of labour or dust or gases to which they were exposed. Nobody can doubt but that young hands and even old ones, sometimes need this sort of medical supervision'. There is much in common

between those ideas and the main duties of the newly established Employment Medical Advisory Service (Gracey, 1973) which will include:

- advice to employers, trade unions, employees, and others concerned about medical matters related to work;
- study of health hazards in factories and advice to HM Factory Inspectorate;
- medical examinations, investigations, and surveys of workers in connection with their employment.

Compensation

Another part of occupational medicine which developed during Victorian times was compensation for the workman injured as the result of his occupation. As with many things in an evolving system or society, it seems to be an arbitrary matter what to take as the starting point. Quite probably there were a number of threads which fused together to form the strand which we recognize.

Rose (1971) has pointed out how in the first half of the nineteenth century young doctors were often compelled from financial necessity to start their medical careers as club doctors, treating the members of working men's sick clubs or friendly societies in return for a low remuneration. It was by this means that Mr. Pomfret, a surgeon from Hollingworth near Glossop, discovered the appalling conditions of work of the railway navvies excavating the Summit Tunnel at Woodhead in Cheshire in the early 1840s. He was paid by a fund from the workers themselves for attending them in accident and disease (Coleman, 1965). Another Manchester doctor, John Roberton, visited these workings and wrote to Edwin Chadwick about his findings. Chadwick's consequent paper titled 'On the Demoralization and Injuries occasioned by want of proper regulations of Labourers engaged in the Construction and Working of Railways' was read before the Statistical Society of Manchester on 16 January 1846. In this paper Chadwick advocated the burden of compensation as a means of accident prevention. 'It may, however, be confidently alleged that the effect of thus making the parties responsible for the whole of the pecuniary consequences of their own works or acts, would in a very short time be to show that the large proportion of the so-called "accidents" are preventable'. That paper resulted in a parliamentary enquiry into the working conditions of railway labourers (Lewis, 1950). The committee favoured not only making the railway companies pay compensation for accidents but also advocated the power of the purse as an incentive to accident prevention 'By making the companies liable, Your Committee contemplates fixing that party with the liability, who had the greatest power to prevent the injury and the greatest means to repair it'

(Report of the Select Committee on Railway Labourers, 1846). This proposal, as the committee pointed out, was only an extension of a provision in the 1844 Factory Act (Sect. 60) that in case of injury to any one from unfenced machinery the whole or part of the penalty may be applied for the benefit of the injured person.

Some 30 years later a miners' leader at the Trades Union Council advocated making employers pay the cost of accidents, not only for the benefit of the injured and their dependents, but also as a means of accident prevention (Young, 1964a).

This idea of using the financial burden of compensation as a means of accident prevention, which had in fact been put forward by Chadwick as early as 1833 but had apparently been overlooked (First Report from Factory Commissioners, 1833; Lewis, 1950), recurred at intervals during the Victorian period. Another school of thought, which Young has called the compensationists (Young, 1964b), held that because a well-developed and efficient system of factory inspection concerned with prevention already existed, any movement for the payment of compensation should concentrate on that rather than on prevention. The compensationists prevailed and with the passing, towards the end of the Victorian era, of the *Workman's Compensation Act* (1897) the law in this country separated compensation from prevention. Despite the fact that the Beveridge Committee in 1942 tried to bring these two parts together again, the division persists in this country to this day (Lee, 1973).

Control of industrial disease

Diseases caused by occupation had been recognized long before the industrial revolution in England but, to become matters of concern calling for active steps for their prevention, they had to take their turn along with all the other causes of mortality resulting from the urbanization accompanying the industrial revolution. It might form an interesting line of study to examine when and how with the spread of industrialization the rising numbers of deaths from industrial disease became a problem requiring control when compared with the mortality of what we might call 'social' or non-occupational diseases as these fell due to the measures introduced by Chadwick and others.

In his study of the report published during the period 1858 to 1871 by Sir John Simon and his team of the Medical Department of the Privy Council, Brockington (1965b) states, 'The problems of health in industry by the middle of the last century had become extremely serious'. Among potters there had been a manifest deterioration in physique, each successive generation becoming more dwarfed and less robust. The death rate from pulmonary diseases among metal workers in

Worcestershire was between 500 and 600 per 100 000; in the lead mining districts for men at age 40 to 50 years it was 1 400, and over 50 years of age 2 200. In a jeweller's factory in Birmingham one shop had 32 young girls working with the blow pipe at an average of 96 cubic feet (2.7 m³) of room per person. Those are Headlam Greenhow's figures, collected presumably in the later part of the 1850s.

Already under the Nuisance Removal Act of 1855 employers could be brought before the Justices if they had not used the best practical means to control effluvia which caused a nuisance. However, that measure was ineffective within factories. In 1857, Dr. J. C. Hall wrote about the grinders in Sheffield in a manner well beyond the mere cataloguing of diseases and measurement of mortality: 'To send a boy of eight or nine years into a grinding hall is an act of refined cruelty which the powerful arm of the law ought to restrain. The application of the Factory Act to the grinders of Sheffield would be most wise and salutary'. In fact that process was soon under way. The 1864 Factories Act (Sect. 2) which extended factory legislation beyond the textile trade into 'six dangerous trades' had a requirement that: 'Every factory to which this Act applies shall be kept in a cleanly state and shall be ventilated in such a manner as to render harmless so far as is practicable any gases, dust or other impurities generated in the process of manufacture that may be injurious to health'.

This provision, in a somewhat extended form, is still clearly recognizable in the present (1961) Factories Act (Sect. 63).

Two years later came an example of the confusion existing in the legislation in this field at that time, for the Sanitary Act of 1866 sought to extend the scope of that idea by stating:

'Any factory, Workshop or Workplace not already under the operation of any General Act for the Regulation of Factories or Bakehouses, not kept in a cleanly state, or not ventilated in such a manner as to render harmless as far as practicable any Gases, Vapours, Dust or other impurities generated in the course of the work carried on therein, that are a Nuisance or injurious or dangerous to Health'

was to be regarded as a nuisance under the Nuisance Removal Act of 1855. But sanitary legislation was in the same difficulties as factory legislation had been half a century earlier through lack of adequate enforcement. However, in this case the problem was short-lived, for the next year, 1867, the new comprehensive factory legislation extended the ventilation requirements to all factories and brought it clearly under the control of the already well-established factory inspectorate.

Apart, however, from this question of dust disease, there are only scattered references to ill health in the

Factory Inspectors' Reports from 1833 onwards until the Chief Inspector's Report for 1879 (Chief Inspector, 1880) which had a section on 'Occupations Injurious to Health'. Under the new Factory and Workshop Act of 1878 young persons were prohibited from employment in certain industries. Incidentally, one of these was the silvering of mirrors which had given rise to serious mercurial poisoning, more particularly on the continent, but our legislation of 1878 was somewhat belated for by then the trade was already rapidly dying out (Legge, 1902).

It was not until near the end of the Victorian era that an entirely new measure of control was introduced. This was the introduction in the 1895 Factory Act of the compulsory notification by medical practitioners and the factory occupier of four industrial diseases: lead, arsenic, and phosphorus poisoning, and anthrax. In the next year the story of Robert Baker, the Guy's Hospital trained factory inspector of the early years, was repeated by the appointment as Chief Inspector of Factories, a non-medical post, of Dr. A. Whitelegge. It is perhaps not surprising that with him in control and an increasing awareness not just of industrial disease but of the duty of the factory inspectorate to prevent it, the first Medical Inspector, Dr. Thomas Legge, was appointed in 1898. From that beginning we can trace the development, through the Medical Inspectorate of Factories, to the Employment Medical Advisory Service of the present day.

Conclusion

The pattern of occupational medical services which emerged from the Victorian era was a series of separate developments designed to deal with different problems as each arose. Acts were passed to deal with safety, health, and welfare in different occupations. The office of certifying surgeon was created to deal with abuses of child labour which had been taking place from the end of the previous century. As this problem and others receded into the background, occupational disease became more prominent and a different group of doctors assisted by the certifying surgeons was recruited to deal with it. Although the connection between the prevention of and the compensation for industrial accidents had been recognized throughout the era, the century closed with separate organizations to deal with them.

It may be that this piecemeal approach to assorted problems, rather than a policy based on a coherent system of thought and belief, was by no means unique to occupational medicine. Goldthorpe (1961) has described the views of some analysts of the Victorian social scene as 'Social problems come first, social philosophy after'. Certainly we can see, in at least part of this field, the development of social

policy being influenced, as Goldthorpe suggests, to meet the ends of individuals and groups in addition to meeting the demands of social situations.

I would like to thank the Society for the Social History of Medicine for inviting me to deliver a paper on this subject. I am grateful to Dr. M. E. Rose of the Department of History, University of Manchester, for his advice.

References

- Act for the Regulation of Cotton Mills and Factories (1819). 59 Geo. III, c. 66 secs. 1 and 2.
- Arlidge, J. T. (1868). The sanitary regulation of factories, being an address inaugurating the Association of Certifying Surgeons. *British Medical Journal*, 2, 57-58.
- Baker, R. (1837). Letter dated 14 June 1837. MH 12/15224. Public Record Office, London.
- (1868). Factory Inspector's Report for period ending 31 October, 1868, p. 199.
- Boase, F. (1901). *Modern English Biography*, Vol. 3, p. 74. Netherton and Worth, Truro. See also, *Parliamentary Papers*, 1864, LVIII, 147.
- British Medical Journal* (1868). Association of Certifying Medical Officers of Great Britain and Ireland. *British Medical Journal*, 2, 65.
- Brockington, C. F. (1965a). *Public Health in the Nineteenth Century*, p. 2. Livingstone, Edinburgh and London.
- (1965b). loc. cit., p. 211.
- Chadwick, E. (1846). On the Demoralization & Injuries occasioned by the Want of proper Regulations of labourers engaged in the construction and Working of Railways. Paper read before Statistical Society of Manchester. In Manchester Central Reference Library, Manchester 311, M.5.
- Chief Inspector (1880). Annual Report of the Chief Inspector of Factories and Workshops for the year 1879, p. 37. H.M.S.O., London.
- Coleman, T. (1965). *The Railway Navvies*, p. 106. Hutchinson, London.
- Davies, C. Stella (1963). *North Country Bred*, p. 16. Routledge and Kegan Paul, London.
- Djang, T. K. (1942). *Factory Inspection in Great Britain*, pp. 28-30. Allen and Unwin, London.
- Edinburgh Medical and Surgical Journal* (1834). Reports on the Factory Systems, 41, 199-211.
- Edmonds, E. L., and Edmonds, O. P. (1965). *I Was There: The Memoirs of H. S. Tremeneheere*. Shakespeare Head Press, Eton, Windsor.
- Employment Medical Advisory Service Act (1972). c. 28.
- Factory Act (1825). 6 Geo. IV, c. 63 sec. 9.
- (1833). 3 & 4 Will. IV, c. 103.
- (1844). 7 & 8 Vict., c. 15 sec. 8.
- (1895). 58 & 59 Vict., c. 37 sec. 29.
- Factories Act (1961). 9 & 10 Eliz. 2, c. 34.
- Factories Acts Extension Act (1864). 27 & 28 Vict., c. 48 sec. 2.
- Factory and Workshop Act (1878). 41 Vict., c. 16 sec. 38.
- Factory and Workshop Commissioners (1876). Report of Commissions to enquire into the Working of the Factory & Workshop Acts with a view to their consolidation and amendment, 1876, Vol. 1, p. 1.
- First Report from Factory Commissioners (1833). Parliamentary Paper XX, pp. 77-78.
- Flinn, M. W. (1965). *Introduction to Report on the Sanitary Condition of the Labouring Population of Great Britain*, by Edwin Chadwick, 1842, p. 18. University Press, Edinburgh.
- Goldthorpe, J. G. (1961). The development of social policy in England 1800-1914. Notes on a sociological approach to a problem in historical explanation. *Transactions of Fifth World Congress of Sociology*.
- Gracey, M. (1973). The Employment Medical Advisory Service. *British Journal of Industrial Medicine*, 30, 92-94.
- Hall, J. C. (1857). *On the Prevention & Treatment of the Sheffield Grinders' Disease*. Longman, Brown, Green, Longman, and Roberts, London.
- Hansard (1868). Parliamentary Debates 3rd Series CXCI, 1202-1203; 14 July 1868.
- Health and Morals of Apprentices Act (1802). 42 Geo. III, c. 73 sec. 2.
- Hutchins, B. L., and Harrison, A. (1903). *A History of Factory Legislation*. P. S. King and Son, Westminster.
- Lee, W. R. (1964). Robert Baker: the first doctor in the Factory Department. *British Journal of Industrial Medicine*, 21, 85-93.
- (1968a). Occupational medicine. Chapter in *Medicine and Science in the 1860s*, Proc. 6th British Congress on the History of Medicine, 1967, edited by F. N. L. Poynter, pp. 168-173. Wellcome Institute of the History of Medicine, London.
- (1968b). loc. cit., p. 175.
- (1973). An anatomy of occupational medicine. *British Journal of Industrial Medicine*, 30, 111-117.
- Legge, T. M. (1902). Dangers in the use of mercury and its salts. In *Dangerous Trades*, edited by T. Oliver, p. 434. John Murray, London.
- Lewis, R. A. (1950). Edwin Chadwick and the railway labourers. *Economic History Review*, 2nd series, 3, 107-118.
- Medico-Chirurgical Review* (1833). The Factories Regulation Bill, 19, 181-183.
- Meiklejohn, A. (1959). Outbreak of fever in cotton mills at Radcliffe, 1784. *British Journal of Industrial Medicine*, 16, 68-69.
- Merewether, E. R. A. (1948). The British tradition in industrial health. *British Journal of Industrial Medicine*, 5, 175-179.
- Nuisance Removal Act (1855). 18 & 19 Vict., c. 121 sec. 27.
- Perkin, H. (1969). *The Origins of Modern English Society, 1780-1880*, pp. 26-27. Routledge and Kegan Paul, London.
- Posner, E. (1973). John Thomas Arlidge (1822-1899) and the potteries. *British Journal of Industrial Medicine* (in press).
- Registering of Births, Deaths & Marriages (1836). 6 & 7 Will., c. 86.
- Report of the Select Committee on Mills & Factories (1840). Parliamentary Papers, X, 44.
- Report of the Select Committee on Railway Labourers (1846). Parliamentary Papers XIII, pp. 434-435.
- Robertson, J. (1845). Paper to Manchester Statistical Society. See Chadwick (1846).
- Rose, M. E. (1971). The doctor in the industrial revolution. *British Journal of Industrial Medicine*, 28, 22-26.
- Sanitary Act (1866). 29 & 30 Vict., c. 90 sec. 19.
- Shrewsbury, J. F. D. (1970). *A History of Bubonic Plague in the British Isles*, pp. 522-529. Cambridge University Press, Cambridge.
- Smiley, J. A. (1971). Some aspects of the early evolution of the Appointed Factory Doctor Service. *British Journal of Industrial Medicine*, 28, 315-322.
- 'T. S. W.' (1868). Taxes on manufacturers. *Birmingham Daily Post*, 26 Nov. p. 5 and 2 Dec. p. 7.
- Thomas, M. W. (1948). *The Early Factory Legislation*, pp. 27, 28. Thames Bank Publishing Co., Leigh-on-Sea, Essex.
- Young, A. F. (1964a). *Industrial Injuries Insurance*, p. 39. Routledge and Kegan Paul, London.
- (1964b). loc. cit., p. 59.

Received for publication 5 October 1972.

Accepted for publication 4 December 1972.