8 Occupational health in the UK gas industry

A study of employer, medical and worker knowledge and action on occupational health in the late nineteenth and early twentieth century

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Introduction

This chapter attempts to locate aspects of British occupational health in historical context and explore the processes by which occupational diseases are identified, compensated for and defined. Foucault observed that a disease entity was the product of medical discourse which reflected the dominant mode of thinking in a society. In this context, he specifically looked at the relationship between medicine and the exercise of power in society (Turner 1987:9–17). The social construction of knowledge on occupational health is therefore examined and equally important, so are the mechanisms which lead to 'the social construction of ignorance' (Otway 1985:7).

Research from the United States, Germany, Italy, Australia, France, Canada, Poland and Hungary reveals significant under-reporting of worker action on health and safety (Navarro and Berman 1983; Berman 1978; Gersuny 1981; Nelkin and Brown 1984; Creighton and Gunningham 1985; Nelkin 1985; Bagnara, Misiti and Wintersberger 1985; Judkins 1986; Elling 1986; Rowland 1980). Close attention to the experience of workers, using interviews and other methods, produces valuable studies of workforce problems, attitudes to and actions on occupational health and safety (Nelkin and Brown 1984). Many medical practitioners surprisingly still appear to view this approach as a revolutionary medical method. The exhortations of Bernard Ramazzini in seventeenth century Italy, calling for doctors to ask patients who visited them one question among many – 'What do you do?' – and listen to their replies – seem to have been ignored.

Research findings on worker health and safety action link in with developments in 'popular epidemiology', which has recently been defined as:

the process by which laypersons gather statistics and other information and also direct and marshal the knowledge and resources of experts in order to understand the epidemiology of disease (Brown 1989:618).

The case study of gas worker action on occupational health presented here is an early example of popular epidemiology which, post-Sellafield and post-Camelford, is springing up in many places to challenge not only traditional epidemiology but also traditional occupational and environmental health. Worker epidemiology has a long history in Western Europe. The Berlin Health Care Association founded by Salomon Neumanns in 1849, and banned four years later, with 9,000 members, because of its 'political' demands for health improvements, involved co-operative medical care between doctors and workers, with workers carrying out their own epidemiological surveys (Labisch 1985:36). The investigations of occupational health issues in Britain by social scientists in an historical context have, however, been limited until recently (Weindling 1985; Watterson 1988). This chapter looks at how occupational health problems were recognized, raised but infrequently solved, by workers and employers in the gas industry.

There have been few studies of health and safety and industrial relations in specific industries: Carson's work on the off-shore oil industry and Codrington and Henley's study of the construction industry are perhaps the most useful. Carson stresses the importance of the Weberian view that 'bureaucracy tends to turn problems of politics into problems of administration' (Carson 1981:9). He looked at how the off-shore oil industry, the legislature, the executive and enforcement agencies dealt with the high fatality and serious injury rate in the industry. The analysis is an important one with reference to the role of the state on health and safety, the close relationship between industry and the government – effectively synonymous, of course, in the gas industry after nationalization – and the 'relative weakness of the organised labour movement'.

Studies on safety representatives in the construction industry after 1974 show the importance of trade union site organization for effective worker involvement on health and safety issues, including problems posed by subcontraction of work, the weaknesses of national union health and safety organization and the problems unions face in maintaining health and safety standards in an economic recession (Codrington and Henley 1981:308).

Recent detailed studies of safety self-regulation since 1974 in the chemicals, construction and retail industries have highlighted the need for more effective health and safety systems at a local level and more national trade union support for trade union safety representatives linked to better information and wider rights – if health and safety at work was to be improved in the UK (Dawson *et al.* 1988:244–281). A study of the chemical industry revealed that no personnel managers questioned about their priorities mentioned either health and safety or working conditions in their lists. First priority was given to labour costs, then strike free production, then low absenteeism and labour turnover (Gill *et al.* 1978:138, 68, 133). This raises doubts about the consultative approach to health and safety based on the Joint Consultative Committee system, joint safety committees which lacked worker confidence and Gill observed that:

> ...identity of interest is a myth, for health and safety considerations are often sacrificed to the demands of production and costs. Health and safety issues demand strong countervailing bargaining powers for employees from union organisation and shop stewards with a willingness to learn and go on learning about safety hazards and hazardous processes (Gill 1978:240).

The Gill analysis confirms earlier work on the chemicals industry (Nichols and Armstrong 1973:6–29) and has much validity for developments in the gas industry too.

Aims and methodology

This study concentrates exclusively on the occupational health problems faced by manual workers in the gas industry, primarily in the General and Municipal Workers Union and does not examine the hazards faced by managerial and office staffs. The key questions raised relate to an attempt to understand the extent to which employers, government, medicine and workers fulfilled Sir Thomas Legge's four axioms of occupational health, particularly the fourth and first axioms. Legge had been the UK's Senior Government Medical Factory Inspector in the early 1920s, and in 1934 in his book 'Industrial Maladies' he noted:

1. Unless and until an employer has done everything – and everything means a good deal – workers can do next to nothing to protect themselves from occupational ill-health although they will be willing to do their share.
2. If influence can be brought to bear on those occupational health factors external to a worker, factors the worker cannot control, occupational hazards can be successfully reduced or removed. If this cannot be done, occupational health policies will never be wholly successful.
3. In cases of dust and fume problems [lead was the case Legge cited], if you stop inhalation, you will stop poisoning.
4. All workers should be told something of the danger of the materials with which they come into contact and not be left to find out for themselves – sometimes at the cost of their lives (Legge 1934:3).

The chapter, therefore, looks at when and why evidence about industrial diseases in the gas industry emerged; how that evidence was gathered and

by whom; what obstacles existed to prevent the dissemination of the information; and how the evidence was interpreted, used and by whom.

In 1987, Turner called for sociological eclecticism in the study of diseases. He suggested, for instance, that a sociology of an occupational disease like Repetitive Strain Injury would require:

1 'A phenomenology of pain with a specific inquiry into the sufferer's interpretations and perceptions of the disorder';
2 'an analysis of the social processes by which the 'disease' is constituted as a topic by conflicting professional groups with their own vested interests in the existence or disappearance of the problem';
3 'a political economy of the conditions' ... in modern capitalism which through pressure on the worker, create work processes which produce occupational injuries (Turner 1987:15–16).

The phenomenology of pain is not dealt with here, although the perceptions of gas workers about occupational disease are explored. Turner's other two categories in the context of industrial rather than specifically capitalist society are examined.

Research findings from the Department of Employment's Manuscript books recording industrial disputes, relevant parliamentary papers, medical papers, focused interviews with gas managers at a national level, interviews with and questionnaires from trade union safety representatives and safety officers, and searches of manuscript and secondary literature on various joint gas management/union committees at regional and national level have all been used. These sources contain a wide selection of material, ranging from workers' accounts of work experiences in the gas industry before mechanization, through official records of national joint negotiation on health and safety and records of regional gas boards, relating to health and safety practices to interviews with senior managers in British Gas.

The gas industry had occupational hazards which were relatively well-researched in pre-nationalization days, and it is possible to make some assessment of occupational health information impacts on the workforce and relate this to workplace and trade union organization and the recommendations and actions of occupational physicians, employers and government agencies.

Some study qualifications

Industries, and indeed companies within industries, and plants within companies, vary considerably in their health and safety activity and effectiveness. There may be differences in employer and employee perceptions of health and safety's industrial relations importance (Batstone, Boraston and Frenkel 1978; Edwards and Scullion 1982). Some industrial sectors and plants will have better health and safety records than others; some will have more occupational physicians and effective safety committees than others. Differences in the ways that professional groups like physicians, engineers and scientists tackle occupational health hazards may have industrial relations ramifications.

Production engineers may be more committed to production requirements because of their training, job descriptions and professional codes; physicians and research scientists may not face day-to-day production pressures and may have tighter ethical guidance on dealing with potential occupational health problems (Bayer 1988:3–11).

The gas industry cannot be assumed to be typical of all UK industry during the period in question. This case study, therefore, simply casts some light on aspects of those occupational health policies and practices of the period. The gas industry contained many hundreds of enterprises in the early years, which merit individual studies to assess the particular methods of handling health and safety disputes.

State and parliamentary activities on hazards at work provide a valuable, if limited, part of the picture of health and safety and industrial relations. MPs' and civil servants' debates and reports on factory legislation are useful, but do not provide any insight into what actually happened in the workplace and are one dimension of a multi-dimensional picture. Likewise, studies of national activity of trade unions, employers and managers on health and safety in the gas industry, although providing us with important evidence and impressions of experiences of occupational hazards, fail to give a very complete or coherent analysis of what precisely was happening in the workplace and why.

The gas industry, with its white, male, manual engineering workers in the period in question, would not represent a typical group of workers taking action on hazards in the 1990s. Studies of the health and safety organization and disputes which have involved women workers, non-trade unionists and black workers have been relatively rare (Watterson 1982, 1986).

The history of health hazards in the gas industry

In 1909, the gas industry consisted of 500 private companies and 292 local authorities working under statutory monopoly powers conferred, either by an Act of Parliament or a Provisional Order. A few local authorities and over 800 small gas companies produced gas without these powers. The workforce of the gas industry (production, distribution and service) was estimated at 80,000 in 1907 (Popplewell 1912:145–146).

Town gas was originally made through coal distillation and the original gasifiers were either vertical or horizontal retorts: the most hazardous retort for certain toxic gases, from the operators point of view, was the horizontal retort which was developed first, widely used in Britain, and which exposed workers to high fume levels well into the 1960s.

Medical evidence on health hazards

Considerable data on the hazards of the coal gas industry have now been collected (IARC 1984:82–99). Deelman, in 1923, found tar from horizontal gas retorts to be carcinogenic in mice, more rapidly than those from vertical retort houses. Doll, in 1965, found that death rates from lung cancer and bronchitis were highest in those gas workers most heavily exposed in the retorts, and lowest in those with no exposure. Retort-house operators apparently did not smoke more than other workers (IARC 1984:88). Henry, in 1931, had found elevated Standard Mortality Rates (SMRs hereafter) from bladder cancers for gas workers and in 1936 and 1947, Kennaway found elevated SMRs from lung cancer in gas stokers and coke over chargers, also in gas works engine drivers, gas works foremen, gas producers and gas fitters: gas stokers and coke oven chargers also had excess SMRs for laryngeal cancers (IARC 1984:90).

The retort house was the main method of gas production in the early part of the twentieth century and the carbonizing process used was one which entailed 24 hours production. The three key groups of gas workers were the 'Retort-house men', the 'Yardmen' and the 'Outside men'; the former group constituted a third of the total gas workforce. The introduction of machinery during the nineteenth century helped to lighten the workload of stokers, but nevertheless the jobs of retort-house operators and yardmen remained physically demanding and occupationally hazardous. Gas production was increased significantly in the 1880s, primarily through speed-ups and increased work pressure.

Between 1890 and 1910, profound changes occurred in the industry linked to 'the almost complete supersession of hand labour by machinery and mechanical devices generally' (Popplewell 1912:148–175; Hobsbawn 1968:158–178). Manual stoking machines were introduced in the 1890s and so too were mechanical conveyors for the transference of coal from yard to retort-house, and coke from retort-house to yard.

Employer evidence on health hazards

Despite these changes, retort-house operators, stokers and firemen still had heavy workloads in fume-filled gas works. One of the major arguments used by the 'new unions' in the late 1880s and early 1890s to support the introduction of the eight hour day, was that:

> there is an especial need for it [the eight hour day] in those industries where the conditions are dangerous or unhealthy, and that it would be generally desirable on physical and moral grounds (Royal Commission on Labour 1893–4:305; Radice and Radice 1974:20–29).

The gas employers, represented by the Incorporated Gas Institute, maintained in this same period that their industry was a healthy and safe one where, because directors of gas companies knew fit old gas workers, there was no need to produce and collate health statistics for the industry. The argument is, of course, fallacious because the health of the industry could only be assessed by looking at the numbers of gas workers who were ill of had died and therefore would not be seen by their former employers.

Worker evidence on health hazards

The non-scientific approach of the industry to occupational mortality and morbidity did not convince the gas workers' trade unions, although the Gas, Light and Coke Company produced a half yearly report from their consulting physician, George Hastings, which indicated that Metropolitan Gas Workers were only marginally less healthy than the Metropolitan Police force. The report fails to take account of the well-known, known now not then, confounding factor that has invalidated so many epidemiological studies which apparently show that there are no health risks to workers in a particular industry: namely the 'healthy worker' effect. In short, only relatively fit workers could become gas workers in the first place; so initially they would be healthier than the general population. When gas workers became ill, they often had to leave the gas industry and would not necessarily show up in that industry's morbidity and mortality figures. Such studies often failed to pick up the illnesses contracted by gas workers after they had retired, but such illnesses could be occupationally related.

The lack of accurate, systematically-collected statistics on gas workers' health creates a problem in assessing the health and safety record of the gas industry at this time. There is some evidence that chest diseases, particularly amongst stokers, were high, as well as evidence of an unusually high incidence of liver cancer, but these figures may simply reflect the hazards of the gas worker's general environment, rather than the work environment. What is beyond doubt, is that gas works at this time were hot, dusty and fume-filled places where men often 'took their meals close to ammonia and tar pumps with a gutter filled with liquid running close by' (Royal Commission 1893–4:29). We now know that those industries which have high fume and dust levels often tend to have excesses of lung and stomach diseases and those using tars and oil tend to have dermatitis problems. These sorts of problems were not uncommon in nineteenth and early twentieth century gas workers.

After much mechanization in 1912, an informed commentator on the gas industry still observed that 'the conditions as to temperature remain and only men of muscle and physique can stand the strain of retort-house work' (Popplewell 1912:157). In the same period, research in Berlin, Copenhagen, Magdeburg and Vienna revealed higher than average morbidity and mortality rates for all gas workers when compared with other occupational groups in those towns. Respiratory disease was particularly prevalent among gas workers.

This research was available to British gas workers in the 1920s through international trade union publications and shows that several European doctors perceived the hazards of the Victorian gas industry in a very different way to UK employers. The research also indicated that gas workers or their officials in Britain were well-informed about the hazards of the gas industry. The figures from the European report are in stark contrast to those offered by the London gas companies in the 1880s and may help to explain the scepticism shown by some gas workers in Britain during the 1920s and 1930s to the constant assurances from employers on the healthy state of their industry. Professor Loriga of Rome pointed out the health problems created by the contaminants in non-purified gas and the fume hazards in the purification problem in the 1920s:

> Feeding furnaces is very exhausting work because the workmen breathe coal dust and are also seriously affected by the heat ... Cleaning fire bars is always dangerous and unhealthy when it is done by hand. This is particularly the case when combustion goes on in the retort which allows fumes and gases to be inhaled. Other dangerous operations are the cleaning of smoke flues; and repairing fractures in retorts. Mass coke from horizontal and inclined retorts has to be drawn sometimes with a rake in works where machines are not used. Conveying, quenching and emptying retorts may be regarded as most unhealthy and dangerous in the gas making process (Loriga 1928:2).

Information on hazards was a prerequisite for any effective workplace health and safety action. The gas workers recognized the polluted nature of their environment but, like the scientists of the time, lacked the knowledge to identify precisely which pollutants were damaging them. Later work has since revealed that polycyclic aromatic hydrocarbons in gas production presented a major occupational cancer danger (Doll *et al.* 1965, 1972; Case 1975).

The chronology of gas hazard recognition is also important in the analysis of trade union, employer and medical response to workplace health and safety. The initial general impression given by the first two groups in the scientific and medical literature during the late nineteenth and early twentieth centuries, is that health and safety problems were either non-existent or of very little concern to the workers. Sources reveal that this

impression is inaccurate for gas workers in the same period. Trade unionists like Will Thorne, commentators on labour like Frank Popplewell and worker advisers like Professor Loriga all described the hazards of dust and fumes faced by gas workers in the mechanized town gas industry.

Government evidence on health hazards

During the 1940s, new and more specific hazards were identified in the industry. In 1948, the General Register Office compiled a confidential report which stated that the makers of coal gas, coke and by-products (excluding tar distilling) had a mean annual death rate caused by tumours of the bladder, for the years 1945–47, over three times the average death rate for males over 14 in England and Wales (378 per million compared with 118 per million). A medical research worker investigating bladder tumours in retort-house workers during 1949 made the following observations on both vertical and horizontal retort working conditions:

> The general hazards in a retort house are 1. Minute dust from coal and coke. 2. Tar risks from tar deposits. 3. Coal gas which escapes from open and leaking valves. At some undertakings many sources of leak were present, ventilation was bad and raw coal gas fumes pervaded the whole house, whereas in other works the retort houses were extremely airy and a negative pressure was kept in the pipes at any sign of a leak. The vertical retorts and therefore the fumes are more concentrated than the horizontal. [When stokers either cleared the off-takes or ensured the coal was travelling through the retort, they were exposed to raw coal gas.] I am told that new stokers cough and splutter when doing these jobs but old hands develop a knack of avoiding the fumes as much as possible. However, I feel it is inevitable that considerable quantities would be inhaled in the course of a day's work and that much would condense on the men's clothing and hands. Depending on the Construction of the works and the direction of the wind, fumes may reach other men not employed in the retort house and it must be remembered that the whole plan and arrangement of many of the undertakings has been radically changed since the commencement date of employment of the men concerned (Kosker 1975:16–17).

Recognition of hazards and potential hazards was not restricted to 'expert' researchers in the field, but came much earlier through workers and, in some instances, their representatives too (Table 1). The extent to which individual employers and employers federations received, digested and disseminated this information is difficult to assess.

Table 1 Gas retort-house workers and cancer: A history of GMBATU worker and scientific knowledge

A Gas worker knowledge

1920/1	GMWU representatives at Gas NJIC ask employers for an enquiry into deaths and disease amongst gas workers especially 'top men' on retort houses. Employers say records inadequate to do this.
1929	GMWU officials in Nottingham circulate Public Service Employees' Federation report on gas industry pitch cancers – employers dismiss it.
1938	TUC Medical Advisor sends GMWU evidence on lung and digestive problems in gas workers.
1944	Birmingham Region GMWU refers problems of fumes from retort houses to a Worcester GP via a member's case.
1946/7	GMWU delegates at Conference raise problems of bronchitis and appalling conditions in retort houses. Union journal carries article on adverse effects of coal gas.
1956	Doll sends GMWU National Officer his report on lung cancer in gas workers.
1962	GMWU Scottish Region win one bladder case of compensation for bladder cancer from DHSS for a gas worker using the disease that was prescribed following the rubber industry cancer tragedy.
1975	TGWU win £4,500 tort compensation against Southern Gas for kidney cancer in retort worker, using Case's evidence.

B Scientific knowledge

1906	Skin cancer from pitch and tar covered by Compensation Acts.
1924	Kennaway discovers tar carcinogens in gas works.
1931	Henry and Kennaway show excess bladder cancer in gas and tar distillation workers.
1933/9	Coal tar and pitch found to contain alpha and betanaphthylamine which were known to cause bladder cancer in the dyestuffs industry.
1947	Kennaway shows excess lung cancer in gas workers.
1948	Report from General Registry Office confirm coal gas workers had three times expected bladder cancer rate.
1952	Doll reports on coal carbonization workers who have lung cancer risk.
1956	Doll sends GMWU National his report on lung cancer in gas.
1958	Registrar General's Office Report for 1949–53 showed that makers of coal gas and coke had twice the expected rate of bladder cancer.
1965	Doll studies gas boards and concludes that retort-house work causes lung cancer and bronchitis.
1975	Doll's further studies lead him to conclude that bladder and lung cancer are caused by work both on horizontal and vertical retort houses.

Source: Gee and Watterson, 1988.

Formal structures for dealing with or 'ducking' industrial disease questions: worker and medical action and employer responses on gas hazards in the early twentieth century

In 1919, a Whitley Council National Joint Industrial Council (hereafter NJIC) was established for bargaining between gas employers and the Gas Workers Union. Prior to this date, gas companies had used profit-sharing schemes and co-partnership projects as a method of excluding independent Trade Unions and maintaining company unions (Clegg 1954:152, 160). Unions like the GMWU had to talk to the 1,200 gas producing undertakings individually. The first formally agreed function of the Gas NJIC was to consider 'the wages, hours and working conditions in the industry as a whole'; its second function was to consider the means of maximizing production and employment; its third function was to settle disputes, and its fourth function was 'the improvement of the health conditions obtaining in the industry and the provision of special treatment, where necessary, for workers in the industry' (Williamson 1939:101–119).

In 1921 the NJIC proposed a Joint Works Committee Model Constitution which referred to 'improving and ameliorating working conditions', including questions relating to the health and safety of the workpeople. However, very few such committees were ever formed. The change in attitudes of employers and trade unions to the various consultative bodies between 1920 and 1940 is illustrative of the national pattern of political change.

Trade union actions and employer responses

The Gas NJIC made several references to the hazards of the industry in the 1920s and 1930s and showed some concern about working conditions. Employees requested data from the employers on the death rate of gas workers prior to the introduction of vertical gas retorts and after the new methods of gas carbonization came in during the late 1920s. The GMWU worker representatives reported complaints from the 'top men' on the vertical retorts relating to high fumes and temperature levels. The employers confessed such requests would be difficult to accede to, because illness records in the past were very fragmentary and incomplete, and comparisons would be most misleading, but they were willing to ascertain the 'actual facts' (NJIC 10th Annual Report 1928–9:7). Any worker request for health and safety information involved employers in the expenditure of time and money and therefore, in the short-term, affected profits to a lesser or greater extent.

The gas employers' response in 1928 contrasts significantly with the industry view of the 1890s, when firm assurances were given about the

absence of risk in the industry and the fullness of statistical information. As Professor Robert Case has pointed out, however:

> There would have been reason to be aware since at the latest 1907 that one form of cancer was an occupational hazard in occupations where coal tar was encountered, and reason since 1931 to believe that cancer of the bladder should now so be regarded. Subsequent periodical 'monitoring' of the gas industry in the reports from the Registrar-General consistently supported this viewpoint (Case 1975:22–23).

Sir Ernest Kennaway identified a risk of bladder cancer in 1931 among coal production workers. Gas works chemists should have known, at the latest in 1933, that alpha- and betanaphthylamine (the carcinogens of the bladder) were produced in gas retorts. These facts are important in considering gas employer responses on the NJIC during 1928/9 to workers requests for information and further investigation of the subject.

Employers must have been aware of the typical conditions in their industry and the degree to which their workforce might be exposed either to tar or to fumes containing carcinogens. Herbert Mannion, a gas worker in the inter-war years, gives a graphic account of his job charging retorts:

> The place is now filled with the coal dust and breeze from the coke which is hot when it falls on our faces, arms and chests. As one retort-cover after another is opened, the atmosphere becomes poisonous with sulphur; heavy smoke pours out of the retorts before they can be closed, making the place pitch-black ... Smoke rises to the roof slowly and more of it rushes from out of the charged and uncharged retorts: an infernal mixture of crude gas, sulphur, smoke and tar, enough to suffocate a whole regiment of soldiers. Our eyes are full of coal-dust, frantically we wipe them with our sweat rags; breeze, dust, and God knows-what-else gets up our noses, into our mouths; we cough and splutter and sneeze – truly, this is the shift of shifts! (Each shift did ten firings of the retort) ..... Sweating, taking breath with difficulty in the mixture of steam and 'smuge' from the top of the stack like devils in Hell we carry on till the last fire is full (Mannion 1938:157–159).

The gas workers again raised the question of occupational ill-health and the hazards of pitch tar in 1938. Yet there is no reference by the gas manufacturers to bladder cancer risks, the work of industrial chemists and Kennaway on amines in retort houses or of any other health and safety issue, for that matter, between 1920 and 1944.

Employer inaction – despite, in Case's opinion, the fact that the industry had knowledge of the skin cancer hazards in gas production in 1907 and bladder cancer in 1931 – contrasts starkly with worker calls for action. These calls came through the formal structure of the NJIC and National Office of the GMWU, and probably emanated from the lay members. In

1929, the Gas Workers Union, the GMWU, was aware of the higher mortality of gas workers in Europe and some parts of the union had particular worries. The Midland Region of the GMWU was particularly concerned about the new carbonization processes in the 1920s and 1930s and wanted an ILO survey of hazards in gas production. In addition to the European reports on hazards (NJIC GMWU Ms. Minutes, 1929, 1/19/1), the union knew that in Dortmund in 1927 Professor B. Chajes had referred to the dangers of smoke, fumes and gas in coke and gas works and the high incidence of cancer in the same group of workers (GMWU Mss 1927/8,1/19/3).

The Medical Adviser to the TUC, Dr Morgan, produced a report on sulphur poisoning and examined not just sulphur dioxide and carbon monoxide poisoning but other gases like hydrogen sulphide and the by-products of tar produced in coal gas manufacture. Morgan knew of German work on the industry's hazards and also referred to Austrian and Danish evidence on the above average incidences of respiratory diseases and digestive problems of gas workers in his report (GMWU Ms. 1938 1/19/4).

Limits of formal trade union action on hazards

From 1938 to 1965 there were no further references to occupational health in the NJIC minutes, although certain developments did take place behind the scenes. In the 1930s, the TUC produced a pamphlet on dermatitis in industry and in 1935 numerous dermatitis cases were reported by gas workers exposed to tar and paints in GMWU Districts. In 1938, London gas workers called for action on pitch and tar but by the mid-1940s, the union complaints about dermatitis had declined significantly (GMWU Ms. 1/19/2).

In 1944, the Social Insurance Department of the TUC began an investigation into the harmful effects of dust and fumes in a range of industries, and informed the GMWU of the work. There are no details about any union follow-up, although Tom Williamson, the GMWU National Gas Officer, received the papers on the subject. In July 1944, Williamson had been contacted by the Joint Manager of the Federation of Gas Employers in London on a similar issue. The Company had been informed that a Worcester GP was carrying out an investigation, allegedly for the GMWU, on the effects of fumes and coke dust on men working in the Worcester retort house and gas works. The company manager observed that:

> it is unfortunate, to say the least of it, if in Wartime any of your Union Officials are taking action such as is alleged. As you know conditions are abnormal, but I am sure that Engineers throughout the country are doing everything possible to improve conditions (GMWU NJIC Ms. 1944, 1/19/1).

Lay action by GMWU workers and the limits of those actions

The union at a national level may well have been unaware of this case but it is generally true to state that, at the time, health and safety had a low priority with many British national union officials for a variety of reasons. Compensation rather than hazard removal was probably the most that workers expected at the time. Even then, however, there were many difficulties. The Worcester GMWU Branch Secretary who worked in the gas industry, had been certified a pneumoconiosis sufferer, but the gas industry lay outside this scheme for the purposes of workmen's compensation. Charles Dukes of the GMWU raised the matter and contacted the TUC to pressurize for additions to the appropriate schedule. The member's own doctor had suggested to the GMWU Midland District Secretary that it would help the case if data could be obtained on the subject, and had so started his own enquiry. The letter from the employers' side revealed a considerable sensitivity on the subject and the minutes of the NJIC in the previous decades revealed no interest and no action reported by the employers.

These events do not indicate a low-risk industry with quiescent workers, nor ineffective union officials satisfied with working conditions. The pressure for improvements on health and safety increased at the GMWU's Annual Congress in 1946 when gas workers called for chronic bronchitis to be placed on the prescribed industrial disease schedule.

In 1947 and 1949 lay members of the same union, also at Congresses, openly criticized the appalling conditions in retort houses and gas purification plants (GMWU Congress Reports 1950, 1954). In 1950 the GMWU received details from, and attended the International Conference for Employees in the Gas and Electricity Industries in Blackpool. Occupational illnesses of gas workers were raised and the Conference wanted details of preventive health measures taken to safeguard gas workers (GMWU Ms. 1951, 1/19/3). Criticisms of the gas industry were made during the transitional period of nationalization in Britain: the Gas Act reached the statute book in 1948 and the new structures, particularly on health and safety, worked their way through from 1950 onwards.

Sir Richard Doll's pioneering paper on increased risks of lung cancer deaths in gas workers appeared in the *British Journal of Industrial Medicine* in 1952. Two years earlier, a gas worker had criticized conditions of work in British industry, called for general health and safety improvements in the country and, at the GMWU's Congress of 1954, raised the question of gas workers' particular susceptibility to lung cancer. The worker wanted an investigation of the disease amongst gas workers and a joint committee of inquiry with the Union and Gas Council (GMWU Congress Reports 1950, 1954). Nothing happened until 1956 when Sir Fred Heyday, the GMWU National Gas Officer, contacted Doll and asked for his paper on lung cancer, which Heyday had heard about from a TUC General Council

colleague at the Gas NJIC. Doll complied with the request in July 1956 (GMWU Ms. 1/19/5/A).

Closing the stable door ... the familiar consequences of neglecting industrial diseases

The problems of occupational cancer, especially bladder and lung cancer, and the gas workers lingered on. The gas industry hazards raised by workers and scientists in the 1920s and 1930s were still unresolved in the 1960s. In September 1962, the *Daily Express* reported the continuing existence of an above average incidence of cancer in gas workers. Lay gas members of the GMWU in the Athol gas station in Liverpool raised the matter with their District Secretary who in turn yet again contacted the union's National Gas Officer, Sir Fred Heyday. He responded by telling the Liverpool members that he was unaware of the press reports on the hazard, but that several years ago the union had investigated the subject when Doll's work showed tar irritants in gas work air were the cause of slightly increased gas cancer rates! (GMWU Ms. 1962, 1/19/5). No action appeared to have been taken at the national level of the union at this time despite Dr Murray, the TUC's Medical Adviser, sending Heyday a copy of Doll's 1965 article from the *British Journal of Industrial Medicine*. The article revealed further evidence of the health risks run by gas workers.

The gas workers themselves continued to highlight the hazards they faced, in spite of the apparent reluctance by their national officer to get involved in any formal action. In 1959, three years before the Liverpool workers were to call for an enquiry, the Canning Town Engineering Branch had proposed at the GMWU Congress that the NEC should do all they could to get chest complaints and bronchitis in gas workers prescribed as an industrial disease. These gas workers, cited, firstly, evidence of chest troubles in gas workers gathered by Dr Harris Jones at the Middlesex Hospital in 1959 and, secondly, the mortality rate of vertical gas house operators who were unusually largely recruited from fit ex-guardsmen and, thirdly, evidence collected in 1954 from the Compensation Department in Liverpool. The union called for further information, not action on the matter (GMWU Congress Report 1959).

The tragic consequences of exposure to retort-house fumes was fully revealed in the GMWU's journal of 1963, following a report in *The Scotsman* of January that year, when a bladder cancer fatality was recorded in a gas worker. In 1960 a Scottish retort-house worker had died of bladder cancer which his surgeon believed was occupationally caused. The union claimed state compensation but this was initially rejected by the insurance officer. After medical evidence had been submitted on the effects of betanaphthylamine and coal tar in the gas industry, the Ministry of Health

finally accepted the claim, but said it would only consider future cases on an individual basis (GMWU Journal, 1963:2).

Doll's last paper on coal carbonizing plant workers was published in 1972 and he confirmed the increased risk of bladder and lung cancer for those working in or near vertical and horizontal retort houses. In 1975 a gas retort worker finally received £4,500 for an occupationally contracted kidney cancer. The judge concluded that gas employers should have been aware of hazards in the industry and taken steps to eliminate them when the retort operator was at work.

Gas production technology has moved on and there are no longer operational gas retort houses across the country. There are, however, still significant numbers of retort-house workers in the 1990s who have worked with the old technology and who may have contracted occupationally-related disease. Knowledge about their occupational disease claims is limited and it appears likely that many in the 1980s and 1990s did not get compensation for their illnesses.

The political economy of occupational disease in the gas industry

The reasons for the failure of union full-time officers to gain compensation and remedial action for the gas workers in the first part of the twentieth century are not totally clear. Factors may have included the nature and purpose of the NJIC; the lack of knowledge of the union full-time officers on hazards; a combination of attitudes to health and safety which accorded the subject low priority on union 'shopping lists'. Occupational safety and related production issues were short-term, tangible subjects more easily dealt with by union officials familiar with wage bargaining issues than long-term industrial disease prevention campaigns. Similarly, trade union efforts to obtain industrial injury compensation for members were relatively easier to manage for a full-time officer than dealing with occupational illnesses and getting an industrial disease prescribed.

Several health risks of the gas industry were ignored in the NJIC between the 1940s and 1960s, and instead the body considered organization of safety committees (1949), overalls and protective clothing (1949), sick pay and injury procedures (1961–2), conditions payments (1967), natural gas safety (1970) and the hazards of electrical cables for gas road workers (1970). The only major hazard dealt with between 1945 and 1976 was that of asbestos where information was gained from the TUCCIOH (TUC Centenary Institute of Occupational Health) and the unions pressed for asbestos substitutes, masks and a Code of Practice on the material (GMWU NJIC Ms. 1976/1453). The NJIC seemed to have a limited effect on health and safety between 1945 and the early 1970s: issues which employers wished to ignore were apparently usually ignored. The health and safety issues raised, tended to relate to production requirements, safety clothing – which

emphasized worker responsibility for accidents and illnesses at work – and compensation issues. Even here, formal questions of compensation for lung and bladder cancer were apparently not raised at the NJIC by the unions until the 1970s.

The unions in the gas industry (primarily the GMWU and TGWU) were not inactive on health and safety outside the NJIC. In 1977, the GMWU and TGWU with British Gas, ICI and the British rubber industry funded the Royal Marsden Hospital Cancer Project which looked at a range of occupations involved in bladder cancer cases (NJIC Gas File 1/19/1).

With the passage of the Health and Safety at Work Act (HASAWA) in 1974 the GMWU examined its health and safety organization and then began to look more closely at the potential role of safety representatives and the value of safety committees in effecting health and safety improvements at the workplace.

Informal worker action on hazards

There is no record of any official stoppage on a gas health and safety issue between 1920 and 1970. This does not show that there were no disputes, but simply that there were no officially recorded strikes (Department of Employment Manuscript Books; Watterson 1988:193–258). In the records of nineteenth century gas works, there are occasional accounts of strife. In 1888 at the New Street gas works in Edinburgh, stokers protested about their working conditions to the Edinburgh Commissioners and complained of excessive heat from the four ovens in the eight retorts and called for the operation of only three ovens, otherwise they would strike; the threat was sufficient to get an agreement from management to improve conditions (Thompson 1953:28).

The campaigns for shorter working hours in the nineteenth century have been much under-estimated for their contribution to health and safety, because reduced hours reduced the exposure of workers to dust and fumes; health, safety and welfare are in a sense an implicit and integral part of any trade union campaign to reduce the working week. The lack of strike action in an industry full of hazards might indicate the powerful control the employers exercised in the labour market relationships with the potential workforce: perhaps further enhanced by the policy in some regions of recruiting mainly ex-Guards Regiment workers into retort houses. This ploy certainly did not produce a passive workforce in those regions. But the impact of the economic depressions and the failure of the General Strike weakened all trade unionists in the 1920s and 1930s in their efforts to improve conditions by industrial action.

Gas companies had well-established paternalist traditions, epitomized by the Metropolitan Gas Company welfare and accident committees and the profit-sharing programmes and anti-trade union schemes which operated in other gas companies before 1919. These developments had something in common with the schemes operated by Renold's in Manchester and the Rowntree and Cadbury's factories, as well as the policies of a number of American companies in the 1920s and 1930s. After 1919, the NJIC served to focus trade union activity on health and safety issues and then neutralize that interest. Despite trade union opposition at a local level to consultative committees, the NJIC did very little, if any, negotiation on hazards, preferring what appears to have been a desultory form of behind the scenes consultation with employers on the subject.

In theory, eleven regional councils of the NJIC existed to discuss wages, hours and conditions. In practice, the Federation of Gas Employers (established in 1919 but originating in the National Gas Council established in 1916 and the Institute of Gas Engineers established in 1863) maintained control of the machinery. Many companies set up co-partnership schemes to neutralize worker action, in some cases including worker representatives on the Board of Directors (Chantler, 1938:32–33). Thompson found that after 1920 in the Scottish gas industry, little worked well in the field of consultation except the Canteen and Safety Committee in Edinburgh. Here the safety committee had no budget and the worker members were nominated by management, who for their part, thought the safety committee worked well (Thompson:367).

There are dangers in trying to read history selectively and the gas industry may well not have been typical of other industries at the time. However, the gas industry does appear to fall in the category of Whitley Council industries

> associated with diluted bargaining industries and other areas of employment with weak union organisation [where it was common] to find joint consultation grafted on top of these arrangements (Ramsay, 1980:385).

World War II, with its emphasis on production, saw a resurgence of interest in joint consultation, a policy which had never waned in the gas industry. In 1943 there were no fewer than 4,169 Joint Production Committees established, covering two million workers in British industry and able to discuss efficiency and production, but not matters covered by the negotiating machinery (Ramsay 1980:388). Between 1950 and 1965, the dangers of lung cancer, bladder cancer and bronchitis had all been identified in retort-house workers and yet, except in the West Midlands Research Centre, no time was apparently devoted to the subject in official reports. One wonders what

the response of the industry would have been if the public had run a similar risk to the retort-house operators and had received information to that effect?

An analysis of health and safety issues

The explanations for inaction on health hazards in the early twentieth century gas industry are complex and relate to a wide range of factors prevailing at the time. Crudely put, there was an obvious conflict between production and productivity on the one hand, and health and safety on the other hand, in terms of resources, time and knowledge. How this worked out in practice was a very complex process indeed. Attitudes varied from region to region and group to group but emanated from explicit and implicit values within industry, the socialization of managers and workers before and after entering the gas industry, the weight of national campaigns, the balance of power between capital and labour, the relatively low status given to occupational health in the UK, the control of the use of occupational medical knowledge by the state and employers, the dominance of the medical model in occupational health and the lack of interest in or downright hostility to occupational health education in the workplace for much of this time (Watterson 1986; Watterson 1990).

The gas industry was known for its hot, dusty and fume-filled work well into the 1960s. The research of Ms Hosker, Case's assistant in the 1975 bladder cancer case, revealed that standards in gas works did vary considerably and some were well-ventilated and well-maintained establishments. However, industry standards tended to reflect the average or less good works rather than the better works. The wider social factors – workers' expectations, factory inspectors' expectations, local, family and school adjustment to and acceptance of industries which had 'traditions' of certain types of poor working conditions – were important influences on worker action or adjustment to low health and safety standards.

The environmental factors linked to the state of the local labour market – with very limited job choices for working-class kids – led many working in dirty, dangerous industries to accept, at least initially, the existence of those conditions as normal and unchangeable. It is therefore surprising that, in some respects, gas workers in the GMWU did demonstrate their concern about health hazards from the 1920s through to the 1960s.

Conclusion

Gas workers recognized some of the occupational disease hazards in their industry in the late nineteenth and early twentieth centuries. Worker epidemi-

ology picked up hazards in coal gas production and, where it could, incorporated research from mainstream epidemiology and occupational medicine. The gas workers struggled against, and indeed wrote accounts of, their working conditions to combat the social construction of ignorance about occupational ill-health in their industry. Nevertheless, the gas workers were, in terms of Turner's sociology of occupational disease, neither able to alter the dominant established social processes for defining occupational diseases, nor overcome the political economy of the time which created particular gas industry health hazards.

Demands for preventive action against hazards and compensation for workers adversely affected, emerged from lay trade unionists in the early part of the twentieth century. Despite this, the political economy of the gas industry and the social processes – not necessarily of constituting diseases related to gas production but rather of bringing these diseases to the attention of those at risk and compensating them – were sufficiently powerful to thwart those demands. In terms of conflicting professional groups, the work of the few toxicologists and epidemiologists who identified the occupational diseases related to coal gas production, was never able to overcome the economic and political power of the gas companies and the government departments controlling the regulation of health and safety and compensation schemes for industrial diseases between the late 1890s and the 1960s.

Occupational medicine lost the struggle to political economy at an early date. None of Legge's four basic occupational health axioms in 1934 were fully implemented. The gas industry at the time did not do everything it could to protect retort-house workers at risk; removal of hazards at source and engineering controls of dust and fumes were not introduced across the industry; and workers were still not told of the hazards of working on retort houses well after those hazards had been documented in the scientific literature.

The ability of the gas industry's consultative mechanisms to turn worker health and safety concerns into meetings about productivity, efficiency and safety flag awards was considerable. This transformation was achieved through an elaborate structure of joint consultative committees, local joint industrial councils and regional joint industrial councils (Gas NJIC minutes and gas regional reports). Many of the obstacles to improved health and safety identified in Codrington and Henley's study of the construction industry are becoming commonplace and now exist in the gas industry. They include problems with weak union organization, economic recession, the impact of sub-contractors and privatization with all that potentially entails for health and safety standards.

By the time the serious occupational hazards in the industry had been identified, officially recognized and accepted for the purposes of prescribed industrial disease benefit, technology had moved on to new gas production

processes and new potential hazards. The risks to gas workers in the pre-natural gas period were not as high as those in mining, chemicals and foundries but nevertheless they were substantial and affected the retort-house workers, to a high degree. Now the health hazards of natural gas are less and there are far fewer production workers. Detailed research on natural gas processing hazards, however, is not widely available and some gas workers are still exposed to potentially toxic chemicals.

The story is not unique: similar tales exist for asbestos workers, plastics workers, textile workers – with mule spinners cancer and byssinosis, welders and foundry workers with respiratory diseases, engineering workers with vibration-induced white finger, shipbuilders with occupational deafness, data processors with repetitive strain injuries ... and so on.

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