XIV International Economic History Congress, Helsinki 2006
SESSION 47
Risks at Work in Europe: Perception, Repair and Prevention (18th-20th Centuries)

Peter BARTRIP (University of Northampton, UK) :

Asbestos and Health in Twentieth Century Britain. Motives and Outcomes

Asbestos is the generic term for a number of naturally-occurring, fibrous minerals. Commercially the most important are the white, blue and brown varieties, otherwise known as chrysotile, crocidolite and amosite. These minerals are widely distributed. In Europe the largest deposits are in Italy, but these are dwarfed by those of Western Australia, southern Africa, and, especially, Canada and Russia.

Asbestos possesses amazing characteristics. Uniquely among minerals, it can be spun into a thread and then woven into a cloth. Clothes and soft furnishings can be made from asbestos—even though it is literally a rock. But why make such products out of a mineral except as a curiosity? The answer mainly lies in the material's unparalleled capabilities for fire-proofing and insulating. However, asbestos also possesses other attractive qualities: it is relatively lightweight (an important consideration when fireproofing naval vessels), abundant and cheap to mine and process, resistant to water and acids (and hence corrosion), durable to the point of indestructibility, electrically non-conductive, and unattractive to vermin. When blended with resins, plastics or other materials it can be put to a vast number of uses. In many respects asbestos was the perfect material for an industrialising and electrifying world of heat, combustion and high-speed locomotion. Not surprisingly, it came to be viewed, for the first two-thirds of the twentieth century as the "indispensable" and even the "magic" mineral.

By the mid-twentieth century it was an ingredient in all manner of things including motor cars (as an ingredient of brakes, clutch linings and gaskets), buildings

(for insulation and fire-proofing), warships (also for insulation and fire-proofing), domestic products (such as ironing boards) and electrical distribution systems. The product range of the largest asbestos companies ran to scores of pages. So asbestos had many "upsides." Unfortunately, it also has a very significant "downside" in that exposure to its dust can cause three fatal diseases: asbestosis, lung cancer and mesothelioma of the pleura and peritoneum.

It has long been known that asbestos dust constitutes a danger to health; however, some issues, including the relative hazards of different types of asbestos and whether there is a safe level of exposure to any of them, remain in scientific dispute. Since the 1960s crocidolite has been regarded as a particular hazard, chiefly because of its strong association with mesothelioma. Amosite is widely regarded as scarcely less dangerous. In contrast, some have argued that pure chrysotile "may present little or no carcinogenic hazard" if uncontaminated by amphiboles. As recently as 2000, pure chrysotile was termed "a remarkably safe and valuable natural resource" which could be used to substantial public health advantage in the Third World. Others dismiss such views and demand an international ban on all forms of asbestos. Such disputes and uncertainties conform to a long-standing pattern whereby medical knowledge about the health hazards of asbestos dust has emerged slowly and sometimes falteringly since the early 20th century. As Irving Selikoff, one of the foremost authorities on asbestos-related disease in late-twentieth century America once said, nature long held "some secrets…rather close to its vest."

The sequence of developing knowledge about asbestos and disease has generated historical controversy. Some maintain that the health hazards of asbestos dust were appreciated in the Ancient World. However, such claims have been convincingly refuted. Those doyens of British occupational medicine, Thomas Arlidge and Thomas Oliver, ignored the hazards of asbestos in the late-Victorian and Edwardian periods (though Oliver addressed them subsequently). The first medical paper on the subject appeared in the British Medical Journal in 1924. Written by William Cooke of Wigan Infirmary's Department of Pathology, it briefly dealt with the illness and death from fibrosis of the lungs and tuberculosis of Nellie Kershaw, who had worked in the spinning room of a Rochdale asbestos factory. Following this case report, other papers soon appeared. These

included articles by Oliver who coined the word “asbestosis” in 1925. In 1928, following the discovery of a case of pulmonary fibrosis affecting a Glasgow asbestos worker, the factory inspectorate took up the issue. Edward Merewether, a medical inspector was instructed to ascertain “whether the occurrence of this disease in an asbestos worker was merely a coincidence, or evidence of a definite health risk in the [asbestos] industry.”

An initial survey was followed by a full-scale investigation completed in October 1929. Merewether found that occupational exposure to asbestos dust, for prolonged periods at high concentrations, constituted a “definite occupational risk among asbestos workers as a class.” The fibrosis of the lungs that could result might lead to “complete disablement” and death. His report endorsed a view expressed a few months earlier that a “new” disease, pulmonary asbestosis, had been discovered.

Merewether had confirmed the existence of a new fatal disease, but he also believed that this disease was preventable. Dust control, he anticipated, “will cause, firstly, a great increase in the length of time before workers develop a disabling fibrosis, and secondly, the almost total disappearance of the disease, as the measures for the suppression of dust are perfected.” At this point, Merewether’s colleague, the engineering inspector of factories, Charles Price, investigated and recommended practical dust control measures.

Following negotiations between representatives of the asbestos industry, the Trades Union Congress (largely in the person of its eminent medical adviser, Thomas Legge, the first ever medical inspector of factories), individual unions, the factory inspectorate and senior Home Office officials, the government enacted the Asbestos Industry Regulations, 1931. Implemented in full in 1933, these required the suppression of dust in the dustiest and hence, apparently, the hazardous, areas of asbestos factories. With these measures in place, and for decades to come, it was widely agreed that the 1931 Regulations had solved the problem of asbestosis in British asbestos factories. Thus, in 1955 Richard Doll referred to the infrequency of asbestosis and attributed its rarity to the “great reduction in the amount of dust in asbestos works” since the early thirties. In the same year Donald Hunter, one of the leading authorities on occupational health, observed that the legislation had been “effective in controlling the disease” of asbestosis.

Other distinguished figures, including Georgiana Bonser of Leeds University and Andrew Meiklejohn of Glasgow University, expressed similar views.

Suspicion that asbestosis might be linked with lung cancer began to emerge in the 1930s. This link became more persuasive in the 1940s, even though doubts remained. Then, in 1955 Doll established to the satisfaction of most informed observers that asbestosis and lung cancer were causally connected. He believed, however, that the Asbestos Industry Regulations had greatly reduced the risk of lung cancer for those who worked in Britain's asbestos factories. As he wrote in 1960, "It seems likely that the risk may now be largely eliminated."

At this time, notwithstanding the discovery of a second asbestos-related disease, there was every reason to suppose that the asbestos industry could continue to produce the fire-proofing, insulation and friction materials widely regarded as indispensable to modern life, provided workers were protected from the heavy and prolonged exposures associated with both asbestosis and lung cancer. In 1956 Meiklejohn dismissed the notion of an asbestos ban as "completely futile and absurd." Such views remained prevalent during the 1970s and even the 1980s. Selikoff, along with the editorial pages of the Lancet, BMJ and JAMA and other commentators, emphasised precautions over proscription of the mineral.

The 1960s saw several important developments in the story of asbestos and disease. First, a third asbestos-related disease, mesothelioma, was discovered. Second, it was shown, especially by Selikoff and fellow researchers in the USA, that the hazards of asbestos dust were not confined to heavily exposed workers in asbestos factories, but extended to insulation workers, other users of asbestos-containing products and people who lived close to asbestos factories. There were even suggestions that urban dwellers, even in towns and cities remote from asbestos mines or factories, might face a hazard simply because they lived among asbestos-containing buildings and cars. In other words, brief and light exposure could give rise to fatal disease. Third, even in Britain, with its well-established and relatively high degree of regulation, some evidence suggested that asbestos-related disease had ceased to decline and was possibly increasing. Fourth, the hazards of asbestos began to attract increased media attention. Between 1964 and 1967 stories about the health hazards of asbestos appeared in such national newspapers as The

Times, Sunday Times, Daily Herald, Guardian, Daily Telegraph, and Morning Star, as well as in local and regional papers. In January 1967 the BBC broadcast a film on the subject in its early evening news programme, 24 Hours. Thereafter, asbestos health hazards regularly featured in newspaper and television reports.

Probably the key development was the discovery of mesothelioma as an asbestos-related disease. Cases of pleural mesothelioma were apparently detected in the nineteenth century, but the term itself had not appeared, and its occurrence was "so rare that some pathologists doubted its existence." However, during the 1950s South African researchers, JC Wagner, Christopher Sleggs and Paul Marchand, began to identify cases of mesothelioma in a crocidolite mining district. They first presented their findings at a conference in Johannesburg in 1959. Papers published between 1960 and 1962 established a "possible association between the development of mesotheliomas of the pleura and exposure to asbestos dust in people living in the Cape asbestos fields." As this quotation indicates, the researchers had not established a clear, causal association between exposure to crocidolite dust (let alone other forms of asbestos dust) and cases of mesothelioma among people who had never visited the north-west Cape. There was not long to wait. Papers published in 1964-5 resulted in the general medical recognition of mesothelioma as an asbestos-related disease. Scepticism remained in some quarters but, as a leading article in the BMJ later put it, by "the end of 1965 it was clear that asbestos workers are at special risk of developing…mesothelioma."

In Britain the emergence of knowledge about mesothelioma and the hazards of insulation work coincided with the first doubts about the 1931 Regulations. As a result, the factory inspectorate began revising those regulations in 1964. Five years later, following extensive consultation with business, scientists and trade unionists, the Asbestos Regulations, 1969 were established. These allowed continued use of asbestos provided maximum allowable concentrations (MAC) of dust were not exceeded and other precautions were observed. The regulations applied to all work sites and not, as previously, to asbestos factories alone. The MAC for crocidolite was set so low that its use was effectively eliminated. In the seventies, eighties and nineties further restrictions, voluntary and statutory, were introduced on the importation and use of asbestos. At their peak, in 1973, UK asbestos imports stood at some 190,000 tonnes pa; by 1998, the

amount had fallen to 1,840 tonnes of chrysotile, by then the only form allowed. Then, in July 1999, subject to one minor exception, the European Commission announced an EU ban on all remaining chrysotile use by 1 January 2005. Britain implemented the ban some five years ahead of schedule in October 1999. Other EU members also beat the deadline and other countries introduced their own bans. Elsewhere, including many parts of Africa, Asia, and South America, asbestos use remains widespread.

Even if a worldwide ban on asbestos were introduced forthwith, past exposures will ensure that asbestos related death and disease continue for the foreseeable future. In 1995 Julian Peto et al predicted that male mesothelioma deaths in Britain will peak at between 2,700 and 3,300 pa around the year 2020. Peto et al also forecast some 250,000 male mesothelioma deaths in Western Europe as a whole by about 2035. Most of these deaths are expected to occur among roofers, plumbers, electricians, carpenters, gas fitters and others employed in the building trades. Others anticipate figures as high as 10,000 per year among British males alone by 2020. So it appears that the history of asbestos-related disease still has some distance to travel.

Could more have been done to protect those exposed to asbestos dust over the course of the 20th century and to prevent the legacy of death and disease that will stretch well into the present century? Some of those who have written on this issue have answered this question in the affirmative. Ignoring the undoubted benefits that asbestos, especially in terms of fire-proofing and its many other safety applications, including in brake manufacture, they argue that the asbestos industry should have been strangled at birth. That it was not, it has been alleged, was because greedy manufacturers suppressed knowledge and impeded lax regulators. The fact is, however, that the existence of asbestosis was not established until the late 1920s. Health regulations were then promptly enacted. Until the 1960s these regulations were widely regarded as effective. In the intervening decades calls for an asbestos ban were notable by their absence. Even with the discovery of a causal association between asbestos dust and mesothelioma and recognition that people other than workers in the dustiest parts of asbestos factories were at risk, it was generally recognised that health hazards could be controlled provided crocidolite was banned. This view proved incorrect, but only in light of experience and through acquisition of scientific knowledge. In short, to have proscribed the asbestos

industry at the first hint that asbestos dust was a health hazard would have required a lavish amount of that most beguiling yet misleading of faculties: hindsight.

Bibliography

Arlidge, T. The Hygiene, Diseases and Mortality of Occupations (London: Percival, 1892).

'Asbestos in the Air' Lancet 1 (1976) 944-5.

Barclay, W. 'Asbestos. An Industrial Asset with a Health Cost' Journal of the American Medical Association 252 (1984). 96.

Bartrip P. The Way from Dusty Death. Turner & Newall and the Regulation of Occupational Health in the British Asbestos Industry, 1890s-1970s (London and New York: Athlone Press, 2001).

Bonser, G. Faulds, J. Stewart, M. 'Occupational Cancer of the Urinary Bladder in Dyestuffs Operatives and of the Lung in Asbestos Textile Workers and Iron-Ore Miners' American Journal of Clinical Pathology 25 (1955) 126-34.

Browne, K. and Murray, R. 'Asbestos and the Romans' Lancet 336 (1990) 445.

'Cancer and Asbestos' BMJ 3 (1968) 448.

Castleman, B. Asbestos: Medical and Legal Aspects (Englewood Cliffs: Aspen Law & Business 4th edn, 1996).

Cooke, W. Fibrosis of the Lungs due to the Inhalation of Asbestos Dust. British Medical Journal 2 (1924) 147.

Cooke, W. 'Pulmonary Asbestosis' BMJ 2 (1927) 1024-5.

Doll, R. 'Mortality from Lung Cancer in Asbestos Workers' British Journal of Industrial Medicine 12 (1955) 81-6.

Doll, R. 'Occupational Lung Cancer' in King, E, Fletcher, C. (eds.) Industrial Pulmonary Diseases (London: J&A Churchill, 1960).

Dunnigan, J. 'Linking Chrysotile Asbestos with Mesothelioma' American Journal of Industrial Medicine 14 (1988) 205-9.

Elmes, P. McCaughey, W. Wade, O. 'Diffuse Mesothelioma of the Pleura and Asbestos' BMJ 1 (1965) 350-53.

Enticknap, J. Smither, W. 'Peritoneal Tumours in Asbestosis' British Journal of Industrial Medicine 21 (1964) 20-31.

'Exposure to Asbestos Dust' BMJ 1 (1976) 1361-2.

Greenberg, M. 'Knowledge of the Health Hazard of Asbestos Prior to the Merewether and Price Report of 1930' Social History of Medicine 7 (1994) 493-516.

Hunter, D. The Diseases of Occupations. (London: English Universities Press Ltd., 1955).

Jeremy, D. 'Corporate Responses to the Emergent Recognition of a Health Hazard in the UK Asbestos Industry: the Case of Turner & Newall, 1920-1960' Business and Economic History 24 (1995) 254-65.

LaDou, J. et al. 'A Call for an International Ban on Asbestos' Canadian Medical Association Journal 164 (2001) 489-90.

Lynch, K. and Smith W. 'Pulmonary Asbestosis III: Carcinoma of Lung in Asbesto-Silicosis' American Journal of Cancer 24 (1935) 56-64.

McCulloch, J. Asbestos Blues. Labour, Capital., Physicians & the State in South Africa (Oxford: James Currey, 2002).

McDonald, J. 'RE: Call for an International Ban on Asbestos. Why not Ban Asbestos?' American Journal of Industrial Medicine 37 (2000) 235.

Maltoni, C. 'RE: Call for an International Ban on Asbestos' American Journal of Industrial Medicine 37 **(**2000) 230-1.

Manville Trust Archive, Denver, Colorado. Asbestos Disease in the Construction Industry. Speech to the Construction Safety Association by Irving J. Selikoff (15 Nov. 1976).

Meiklejohn, A. 'Silicosis and other Fibrotic Pneumoconioses' in Merewether E. (ed.), Industrial Medicine and Hygiene (3 vols. London: Butterworth, 1956) vol. 3 pp.116-17.

Merewether, E. and Price C. Report on Effects of Asbestos Dust on the Lungs and Dust Suppression in the Asbestos Industry (London: HMSO, 1930).

Newhouse, M. Thompson, H. 'Mesothelioma of Pleura and Peritoneum following Exposure to Asbestos in the London Area' British Journal of Industrial Medicine 22 (1965) 261-69.

Newhouse, M. Thompson, H. 'Epidemiology of Mesothelial Tumors in the London Area' Annals of the New York Academy of Sciences 132 (1965-6) 579-88.

Oliver, T. (ed). Diseases of Occupation from the Legislative, Social and Medical Points of View (London: Methuen, 1908).

Oliver, T. 'Some Dusty Occupations and their Effects upon the Lungs' Journal of the Royal Sanitary Institute 46 (1925-6) 224-30.

Owen, W. 'Diffuse Mesothelioma and Exposure to Asbestos Dust in the Merseyside Area' BMJ 2 (1964) 214-18.

Owen, W. 'Mesothelial Tumors and Exposure to Asbestos Dust' Annals of the New York Academy of Sciences 132 (1965-6) 674-79.

Peto, J. et al. 'Continuing Increase in Mesothelioma Mortality in Britain' Lancet 345 (1995) 535-39.

Peto, J. et al. 'The European Mesothelioma Epidemic' British Journal of Cancer 79 (1999) 666-72.

Selikoff, I, Hammond, E. Churg, J. 'Asbestos Exposure and Neoplasia' Journal of the American Medical Association 188 (1964) 22-6.

Selikoff, I. Hammond, E. Churg, J. 'Relation between Exposure to Asbestos and Mesothelioma' New England Journal of Medicine 272 (1965) 560-5.

Selikoff, I. Hammond, E. Churg, J. 'The Occurrence of Asbestosis Among Insulation Workers in the United States' Annals of the New York Academy of Sciences 132 (1965-6) 139-55.

Stayner, L. Dankovic, D. Lemen, R. 'Occupational Exposure to Chrysotile Asbestos and Cancer Risk: a Review of the Amphibole Hypothesis' American Journal of Public Health 86 (1996) 179-86.

Thomson, J. 'Asbestos and the Urban Dweller' Annals of the New York Academy of Sciences 132 (1965-6) pp.196-214.

Tweedale, G. Magic Mineral to Killer Dust: Turner & Newall and the Asbestos Hazard (Oxford: Oxford University Press, 2000).

Wagner, J. Sleggs, C. Marchand, P. 'Diffuse Pleural Mesothelioma and Asbestos Exposure in the North Western Cape Province' British Journal of Industrial Medicine 17 (1960) 260-71.

Wagner, J. 'Epidemiology of Diffuse Mesothelial Tumors: Evidence of an Association from Studies in South Africa and the United Kingdom' Annals of the New York Academy of Sciences 132 (1965-66) 575-88.

Wagner, J. 'Some Pathological Aspects of Asbestosis in the Union of South Africa' in Orenstein, A. (ed.). Proceedings of the Pneumoconiosis Conference held at the University of Witswatersrand, Johannesburg, 9-24 February, 1959 (London: Churchill, 1960).

Wikeley, N. 'The Asbestos Regulations 1931: A Licence to Kill?' Journal of Law and Society 19 (1992) 252-75.

Willis, R. Pathology of Tumours. (London: Butterworths, 1967 edn).

Yano, E. Wang, Z. Wang, X. Wang, M. Lan, Y. 'Cancer Mortality among Workers Exposed to Amphibole-Free Chrysotile Asbestos' American Journal of Epidemiology 154 (2001) 538-43.