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'One Fibre Can Kill'
The Great Asbestos Scam

Asbestos … the world's most wonderful mineral.
A. L. Summers, *Asbestos and the Asbestos Industry*, 1919

Asbestos litigation has come to consist, mainly, of non-sick people … claiming compensation for non-existent injuries, often testifying according to prepared scripts with perjurious contents, and often supported by specious medical evidence … it is … a massively fraudulent enterprise that can rightly take its place among the pantheon of … great American swindles.
Professor Lester Brickman, 2002[1]

No story in this book is stranger than that of the great asbestos scare that, by the closing years of the twentieth century, had spread across much of the western world.

Like other scares, this one originated in a genuine and serious problem. Asbestos, it had been confirmed beyond doubt in the 1950s and 1960s, was a multiple killer. Breathed in, its sharp fibres had the capacity to inflict horrible damage on human lungs, leading to three fatal diseases, including two forms of cancer.

This naturally aroused acute concern. By this time, asbestos was being put to so many uses – for everything from brake linings and oven gloves to water pipes, guttering, roof slates and many other building materials – that its presence in the human environment was well-nigh universal. Scarcely anyone in the developed world did not in some way have contact with it.

Gradually the impression grew that this fibrous mineral was one of the most dangerous substances known to man. By the 1970s, lawyers in the USA were bringing thousands of compensation

claims on behalf of people whose health had been damaged by exposure to asbestos at work. In 1978 a report signed by senior officials of the US government predicted that, within 30 years, asbestos would have killed an additional two million people in the USA alone. Anti-asbestos campaigners began to lobby not just for much tighter controls on its use, but for it to be banned altogether.

By the 1980s and 1990s, the campaigners had been so successful in putting over their message that its use was being prohibited in one part of the world after another, from the USA to the European Union.

By the early years of the twenty-first century, the number of compensation claims posted in the USA had soared above 700,000, worth more than $200 billion. Scores of companies had been forced into bankruptcy, and it was predicted that the total number of claims might eventually top three million. In Britain new laws were passed which would encourage the removal of asbestos from millions of buildings, at a cost to property owners running to many billions of pounds.

But, as alarm over the dangers of asbestos had steadily mounted, the claims made to justify that concern had become increasingly extreme, shrouding the whole issue in an ever-greater fog of misunderstanding. Two misconceptions in particular had allowed that original genuine problem to be exaggerated into a monumental scare.

The first of these was the belief that asbestos in any form was a substance inherently so dangerous that any contact with it might pose a threat to human health. Undoubtedly, reckless exposure to asbestos had led to the deaths of thousands of people. But these had never represented more than a relatively small proportion of the population, and almost all those affected had been exposed to very high levels of asbestos in the course of their work. Despite the prediction of that US report in 1978 that, within 30 years, asbestos would have killed two million Americans, the actual number of deaths attributed to asbestos in those decades turned out to be only a fraction of that figure.

This was because, in order to inflict damage on the human lung, certain conditions must be met. The people most likely to be killed by asbestos have always been those exposed to its fibres in concentrated doses over a long period. Furthermore, it is not enough just to inhale the fibres; the human body has enough natural

defences to reject the vast majority of them. To cause serious damage, the fibres must be 'respirable'; of a type, dimensions and quantity sufficient to overwhelm those defences, penetrating the lung tissue in such a way as to trigger off a pathogenic reaction.

Nothing demonstrates this more vividly than the realization that asbestos is, in fact, a substance which naturally occurs so ubiquitously in the earth's atmosphere that each of us breathes in some 14,000 microscopic fibres of it every day.[2] Thanks to microphages and other defence mechanisms of the human body, these are rendered quite harmless. The lungs of anyone over 50 may contain as many as 200 million asbestos fibres. Yet they do not affect our health, because they have not met the conditions needed to cause damage.

This was the first essential point that got lost sight of as the scare over asbestos gathered its momentum. So comprehensively did the campaigners manage to demonize asbestos – not least with their slogan 'one fibre can kill' – that many people were led to believe that the slightest exposure to this 'deadly' substance might be almost as dangerous as contact with anthrax.

The second misconception that played a crucial part in helping to promote the scare centred on a verbal confusion. This arose from the historical accident by which a single word, 'asbestos', had come to be used to describe two quite different types of mineral.

One form of what is generically but loosely called 'asbestos' includes five varieties of iron silicate, known collectively as 'amphiboles'. Of these the most widely used are known as 'blue' and 'brown asbestos'. When breathed in, the longer of their straight, narrow, sharp, acid-resistant fibres can penetrate the lungs and surrounding tissue in such a way that they cannot be dissolved or removed by the body's defences. They are so persistent in the lungs that their 'half-life' is estimated at up to 150 years or more. It is the build-up of such ineradicable fibres which gives rise to potentially fatal disease.*

A much commoner and very different substance is that known as 'chrysotile' or 'white asbestos'. This is a serpentine mineral, a

* The five amphiboles are: crocidolite (known from its colour as 'blue' asbestos) and amosite ('brown' asbestos), both of which were in extensive commercial use; and the much rarer forms tremolite, actinolite and anthophyllite.

form of magnesium silicate, and closely related to talcum powder. It shares some of the physical properties of the amphiboles but in other respects they have nothing in common. Its soft, silky, curved fibres are readily destroyed by acids, so that in even the weakly acid environment of the human lung the fibres will quickly be dissolved, with a half-life of only a few days. Very heavy occupational exposure to the longer fibres of chrysotile can cause lung damage and maybe cancer, but very short fibres are not dangerous.

Furthermore, by far the most extensive use of white asbestos fibres has been as a bonding agent in cement and plaster, as in roof slates and decorative wall coatings. Around 90 per cent of all the asbestos ever used has been to make 'white asbestos cement' products. When chrysotile is mixed with calcium-rich cement in this way the surface of the fibres goes through a chemical change. This helps the cement matrix to bond tightly to the fibre. A consequence is that, even when it is sawn or drilled, the fibres, bonded to the cement, cannot easily escape in a respirable form. Thus, by far the most widely used form of asbestos-containing material on the planet, comprising almost all the asbestos with which most people are ever likely to come in contact, poses no measurable risk to human health.

Yet the blurring of language that allowed this essentially harmless material to be given the same name as the chemically quite different and potentially dangerous amphiboles was used to create one of the most damaging scares the modern world has seen. Not only did this confusion play a central part in inflating the scare in the first place; it opened the door to financial exploitation of the resulting panic, on a scale without precedent.

Top of the list in this respect were the lawyers, particularly in the USA, who specialized in bringing compensation claims on behalf of 'asbestos victims'. Initially, most of the claimants they represented were demonstrably ill. But when it became clear that courts in certain states were prepared to award huge sums in compensation without questioning the evidence, the lawyers began to recruit ever more claimants who could show no damage at all. Eventually the vast majority of the claims being upheld by the courts were exposed as being wholly bogus.

Dubbed the '$200 billion miscarriage of justice' – which played its part in bringing Lloyd's of London to its knees – this fraud would come to be ranked as one of the most notorious scandals in American legal history. This extraordinary story received

surprisingly little coverage across the Atlantic although similar practices were copied on a less blatant scale by law firms in Britain.

Almost as high on the list were the contractors who, spotting a highly lucrative new source of business, chose to specialize in removing asbestos from buildings. Many lost no opportunity to exaggerate the dangers of asbestos, even when it posed no risk to health and its removal was not required by law. In both America and Britain, where their dubious practices were actively condoned by the government, they made fortunes from charging hugely inflated sums to homeowners, businesses, local authorities, housing associations, schools, charities, churches and organizations of all kinds, for removing 'deadly' asbestos that in most cases was nothing of the kind.

Also helping to promote the wholesale demonization of asbestos were the multinational companies that became the main manufacturers of the fibrous materials marketed as 'asbestos substitutes'. These substances had often not been subjected to proper safety tests, and turned out in some instances to be potentially as dangerous as asbestos itself.

Other beneficiaries from the scare included all those who fed off it in supporting roles, from trade unions and doctors endorsing bogus compensation claims, to surveyors who earned hefty commissions from passing on work to fraudulent contractors. Between them, unwittingly aided and abetted by politicians, officials and the media, they became parties to one of the greatest scams of the age.

This remarkable saga has unfolded through five main stages.

Stage One: The Emergence of a Tragedy

Naturally occurring in many places across the world, as a by-product of the pressures produced by the shifting of tectonic plates, asbestos is a material like no other. As a rock, it comes in two main forms, massive and fibrous. In this latter form, giving it the properties which made it so useful to mankind, it is made up of a mass of fibres so tiny that, until electron microscopy at last made it possible in the 1960s to count them, no one had any idea how many there were.*

* Fibrous asbestos is called 'asbestiform'. In its non-fibrous or 'massive' form it makes up a sixth of the earth's crust (all amphiboles).

So literally microscopic are these threads of rock that one the width of a human hair – say 0.0015 inches thick, or 40 microns – may actually contain 2 million lesser fibres or 'fibrils'. The same number can fit on the head of a pin. If the fibres in a cubic inch of asbestos were placed end to end they might stretch for 15 million miles.[3] It is this which gives asbestos that unique combination of three attributes for which, in the human world, it was valued so highly for so long.

Its best-known property is that it is resistant to fire, hence its name. 'Asbestos' in ancient Greek meant 'unquenchable or 'inextinguishable' (its other Greek name, 'amiantos', meant 'pure, undefiled'). Then, uniquely among rocks, its fibres can be woven into a material, like silk, linen or wool. Lastly its fibres can bind together other substances, such as cement, with a tensile strength greater than that of steel.

The first recorded use of asbestos was in Finland more than four thousand years ago, where a rare amphibole form known as anthophyilite was used to strengthen earthenware pots and cooking utensils.[4]

Probably around the same time in the Mediterranean world, where there are extensive deposits of chrysotile (from the Greek for 'golden hair'), it came to be valued for the way it could be woven into a soft, silky cloth, which was also resistant to fire. It was used for oil lamp wicks, which never burned away, and cremation cloths, which enabled the bodily remains to be gathered up unpolluted by the ashes of the fire.

In later, classical times, it was praised by a succession of Greek and Latin authors, from Herodotus to Strabo and Plutarch. Rich Romans liked to show off how napkins made from white asbestos could be cleaned simply by throwing them into the flames. In a famous passage in his *Natural History*, the Elder Pliny (AD 23–79) wrote that, because asbestos was rare, when any was found it was regarded as equal in value to 'exceptionally fine pearls', and that linen woven from it 'holds the highest rank in the whole of the world'.[5]

In the Middle Ages the miraculous properties of asbestos cloth were known in India and China, and written about by several authors, including Marco Polo who saw it on his visit to the Great Khan. In post-Renaissance times it was increasingly referred to by scholars, such as Sir Thomas Browne. In 1684 a sample,

supposedly procured from China and described as 'Salamander's Wool', was presented for examination by the newly founded Royal Society.[6] In 1725 young Benjamin Franklin, visiting London, was paid handsomely by the famous collector of curiosities Sir Hans Sloane for a small purse woven in Massachusetts from chrysotile, which he knew as 'Salamander's Cotton'.*

It was at this same time, however, that asbestos first began to be put to a wider range of more mundane and practical purposes (although in Greece and Turkey it had long been used to strengthen the white plaster or stucco applied to the outside of houses). In the Russian Urals in the eighteenth century chrysotile began to be mined to make fireproof aprons and gloves for local metalworkers. In 1827 an Italian physicist, Giovanni Aldini, used a combination of chrysotile with a metallic gauze developed by Sir Humphrey Davy to create a complete set of protective clothing for firemen which soon caught on across Europe. Over the next 50 years asbestos found a plethora of new uses.

Far outshining them all was the part played by asbestos in the advance of the nineteenth-century industrial revolution. At its heart, in factories, mills, mines, ships and locomotives, was the steam engine. Boilers meant heat, heat needed to be kept in by insulation, and here more than anywhere asbestos earned its newfound reputation as 'the magic mineral'.

In 1871 a small calico-weaving firm in the Lancashire cotton town of Rochdale, Turner Brothers, decided to specialize in supplying cotton seals to prevent steam escaping from engine cylinders. But cotton proved far from ideal for the purpose. In 1879 one of the brothers, Samuel Turner, decided that more effective results would be obtained from using asbestos.[7]

His timing was impeccable. Only the previous year, mining had begun of huge deposits of chrysotile recently discovered in Canada. In 1884 similar large-scale mining began in the Urals. In the same year, in South Africa's Cape Province, the first mine was opened producing 'blue asbestos'. Otherwise known as 'crocidolite' (from the Greek for 'woolly hair') or riebeckite, this was the first

* Sloane's collection came to form the original basis of the British Museum (and his name was given to London's Sloane Square).

amphibole form of asbestos to come into large-scale commercial use.*

Turner developed the first power-driven weaving process for asbestos fibres, which enabled him to mass-produce asbestos textiles on a scale never seen before. He was able to take advantage of the cheap asbestos now available from the new overseas sources of supply. So great was the demand for his rapidly expanding variety of products that, by 1900, the firm's workforce of five had grown to 50 working on asbestos alone.

Ten years later this figure was over 300, making everything from protective clothing to brake linings; and asbestos was now finding yet another new use, which would eventually overshadow even its value as a source of insulation against heat. In 1900 an Austrian, Ludwig Hatschek, had discovered how to use asbestos fibres as a binding agent in cement. This was to provide one of the twentieth century's most useful and popular building materials.** In 1913 Turner opened Britain's first factory mass-producing asbestos cement. The following year, with his firm now completely dominating the British asbestos market, he was, as Mayor of Rochdale, honoured with a knighthood.

But already a shadow had begun to intrude. In 1898, Lucy Deane, one of the first Lady Inspectors of Factories, took part in a study of industries in which workers were so heavily exposed to dust that this might damage their lungs. What particularly caught her notice were 'the evil effects of asbestos dust'. 'Microscopic examination' clearly revealed 'the sharp, glass-like jagged nature of the particles'. Where these were suspended in the air, 'the effects have been found to be injurious'.[8]

* Being acid-resistant, unlike chrysotile, blue and brown asbestos, the two main amphibole forms, made a much more effective insulation material for coal-fired boilers, because their steam combined with sulphur from the coal smoke to make sulphuric acid. Herein lay the seeds of a twentieth-century health disaster. No group of workers was to be more damaged than those using amphiboles for insulation purposes, because acids in the human lungs could not dissolve the amphibole fibres. The very property that gave amphiboles their industrial advantage also helped to make them medically much more damaging (letter from Dr Kevin Browne).

** Another very widespread use for asbestos in the twentieth century was to be in the making of seamless cement pipes for water and sewage, a process discovered by an Italian, Adolfo Mazza, in 1911. This became, from the 1920s, the material most commonly used for these purposes.

The following year Dr Montague Murray of Charing Cross Hospital saw a 33-year-old man who was dying of lung disease after working with raw asbestos for 14 years, 10 in the carding room where dust was most intense. In 1906 Murray told a government inquiry that this witness had said, 'of the ten men who worked in the room when he went into it, he was the only survivor'.[9] A French factory inspector the same year reported some 50 deaths among female asbestos textile workers.[10] As with Deane and Murray in Britain, his findings were ignored.

During World War One Sir Samuel Turner's firm continued its rapid expansion, not least thanks to the boom in shipbuilding required by the war effort. In Africa the company opened the first asbestos mines of its own, although it was not involved when, in 1917, mining began in the Transvaal for 'brown asbestos', or grunerite. As another amphibole, known as amosite (from 'Asbestos Mines of South Africa'), this, like crocidolite, was to play its own part in the tragedy that lay ahead.

In 1918 a Turner advertising campaign featured 'Lady Asbestos' as a Greek goddess, defending 'civilization' (shipbuilding, engineering, buildings, electricity) against the perils of fire. A major selling point was the thousands of lives a year now being saved by asbestos in ships, vehicles, skyscrapers, offices, theatres and buildings of every kind. In 1920, following a merger, the firm became known as Turner and Newall. When in August 1924 Sir Samuel Turner died, aged 84, he was given an imposing funeral as one of Rochdale's most successful sons. The firm he had built up virtually from nothing now had a workforce of 5,000.[11]

Six months before Turner was buried, the body of a 33-year-old woman was consigned to an unmarked grave in the same cemetery. Born in 1891, Nellie Kershaw had worked with asbestos much of her life, since 1917 for Turner's. Afflicted by chronic and worsening ill health, she had in 1922 been diagnosed by a local GP, Dr Walter Joss, as suffering from 'asbestos poisoning'. It was a disease with which he had become familiar, from seeing up to a dozen such cases every year.

Unable to work, and destitute, she had appealed, with Dr Joss's support, for help. The response from her employers was to invite Dr Joss to visit the factory to inspect their dust-control measures ('we have been repeatedly congratulated by the Home Office'). They denied that Mrs Kershaw's condition could have any

connection with her work. 'We repudiate the term "asbestos poisoning",' they wrote, 'asbestos is not poisonous and no definition or knowledge of such a disease exists.' [12]

When Nellie Kershaw died, the coroner nevertheless found that she had died of 'asbestos poisoning': a verdict which made local headlines and which the company strongly challenged (refusing also to make a contribution to her funeral expenses). The coroner had ordered a microscopic examination of her lungs. The pathologist, Dr William Crookes, saw that they were horribly stiffened and scarred by asbestos fibres: a condition he was to name when he wrote up his findings as 'pulmonary asbestosis'.[13]

It would later be more fully understood how, after years of intense exposure to the fibres, the victims of asbestosis can eventually find breathing so difficult that they may in effect be suffocated to death. Although this was the disease that had already affected many Rochdale textile workers, it had never previously been properly identified. Nellie Kershaw's cruel death had earned her a place in history.

Dr Crookes's publication of his findings helped to prompt an inquiry by two senior factory inspectors, Dr E. R. A. Merewether and C. W. Price. They found that a quarter of all the asbestos workers they studied suffered from asbestosis. None employed for less than four years showed signs of the disease, but among workers employed for 25 years or more the figure was 66 per cent. This led in 1931 to Britain becoming the first country in the world to regulate the asbestos industry. Protection was given to workers entering those 'scheduled zones' where the fibrous dust was most intense. They were to be given regular medical checks and the right to compensation for injury.[14]

None of this, however, hindered the triumphant onward march of Turner and Newall. By the end of the 1930s, thanks to the soaring sales of asbestos-containing building materials, the company, now trading across the globe, controlled 20 per cent of the world asbestos market, employing 10,000 people. Its Rochdale works was the world's largest asbestos factory.

World War Two, like its predecessor, created further boom times for the asbestos industry on both sides of the Atlantic, in everything from the need for thousands of new ships to the demand for tens of millions of gas masks (in the UK, civilian gas masks were made from chrysotile, those for the military used crocidolite).

Apart from Turner and Newall, another prime beneficiary, particularly from the massive use of asbestos in shipyards, was its US opposite number, the giant Johns-Manville Corporation. Only decades later, during the litigation of the 1970s and 1980s, did it emerge how this and other corporations had been aware at the time of the risks to which asbestos exposed tens of thousands of shipyard workers, but had kept quiet about it.

In the post-war building boom, demand for asbestos surged to even more spectacular levels. As Turner and Newall continued to expand its interests across the world, its profits broke all records. In 1953, confident that it had overcome the 'dust problems' which were earlier arousing concern, the firm decided to commission a study of the health of workers in its Rochdale factory. The epidemiologist it chose was Richard Doll, now becoming known for his work showing the connection between smoking and lung cancer. But when Doll revealed his findings, the company was far from pleased.

Doll based his study on 113 Turner and Newall employees, all of whom had been heavily exposed for 20 years or more to what he assumed were exclusively raw chrysotile fibres. Eleven, he found, suffered not only from asbestosis but also from lung cancer. This was an incidence of cancer eleven times higher than would be expected in a non-exposed population. For more than 20 years other observers had been suggesting a possible link between asbestos and lung cancer (not least in Germany in 1943). Here at last it seemed was the proof.

Since they were paying for Doll's study, Turner and Newall tried to suppress it. He arranged for it to be published independently.[15] As yet, however, it was not enough to dent the firm's continued expansion. At the end of the 1950s, as the asbestos industry was enjoying its greatest-ever prosperity, Turner and Newall briefly overtook Johns-Manville as the largest asbestos firm in the world.[16]

Then, in 1960, came a further shock. Dr Christopher Wagner, a South African pathologist, had been studying the abnormally high incidence around the 'blue asbestos' mines in Cape Province of a very rare form of cancer known as mesothelioma. Unlike lung cancer, which affects the inner lining of the lung, this creates tumours on the membranes surrounding the outside of the lungs, the heart and the abdominal cavity. In examining 47 cases of

mesothelioma, Wagner found that all but two had followed heavy exposure to crocidolite. Almost all were men who had worked in the mines.[17]

The three potentially fatal diseases associated with asbestos had all now been firmly identified. It was a turning point for the fortunes of what had become one of the most successful industries in the world.

Stage Two: A Tragedy Becomes a Scare

Asbestos now became the focus of considerable scientific attention. Among the researchers who showed particular interest were Dr Muriel Newhouse of London and Dr Irving Selikoff of New York. Following Wagner's paper linking 'blue asbestos' with mesothelioma, Newhouse examined the records of a hospital serving the Barking area in east London, where Cape Asbestos had a factory that processed large amounts of crocidolite. Of 76 recorded mesothelioma cases, she found that two thirds had either worked in the factory, lived with someone who did or lived within half a mile of it.[18]

Selikoff of the Mount Sinai Medical Center was a specialist in lung diseases, who had made his name in the 1950s with researches into tuberculosis. But he had then been struck by the abnormally high incidence of lung diseases, both in asbestos workers and in the former employees of shipyards, particularly Hampton Roads in Virginia, where thousands of workers had been heavily exposed to asbestos while building and repairing ships during World War Two.

Selikoff and his team had difficulty tracking down a sufficient sample of former shipyard workers for study, because their employers refused him access to their records. But eventually, thanks to information provided by their unions, he was able to investigate more than 1,500 shipyard workers, all of whom had been first exposed to asbestos at least 20 years earlier. Almost all the asbestos used in US shipyards for insulation of pipes and boilers had been amosite, as had been made mandatory by the US Navy since 1937.

So significant did Selikoff consider the results that in 1964 he persuaded the UICC (l'Union Internationale Contre le Cancer, or International Union Against Cancer) to set up a working group,

which led to the convening in October of an international symposium under the auspices of the New York Academy of Sciences. Newhouse, Wagner and many others in the field attended this event. Selikoff revealed his own findings: that, in the 1,522 cases he examined, asbestosis was found in 339. The incidence of lung cancer and mesothelioma were seven times and three times higher than would normally be expected in the population as a whole.[19]

It was clear from heated exchanges that something of a division was emerging between those scientists, like Selikoff and Newhouse, who were convinced they were uncovering a really major public health disaster, and those, like Wagner, who took a less alarmist line. Selikoff reportedly made startling predictions of the kind of sums the insurance industry might be looking at, running into tens of billions of dollars.[20]

In March 1965, the working group produced a report. This accepted that exposure to asbestos dust was associated with both lung cancer and mesothelioma, and that the latency period before tumours emerged could be so long, up to 60 years, that, even if dust exposure was reduced, further cases would be occurring for many years to come. Nevertheless, it also accepted that much was not yet known. Further research was needed, not least to evaluate the risks attached to different types of asbestos. Equally important was to establish the relationship to disease of the scale and duration of exposure. More information was also required on other factors, such as how many of those suffering from asbestos-related cancers were smokers.[21]

The first serious response to this report was a major study set up in 1966 by John Corbett McDonald of McGill University in Canada, based on workers in the Canadian chrysotile industry, which was to last more than 30 years. But in 1971 McDonald and his team came out with their first preliminary findings. They had traced 9,981 men who had worked in the Quebec industry between 1891 and 1920. By November 1966 2,413 of these were dead, but only 97 (4 per cent) had died of lung cancer and three (0.1 per cent) from mesothelioma.[22]

So different were these results from those reported by Selikoff and Newhouse that McDonald's findings were greeted with scorn by the Mount Sinai team, not least when they discovered that McDonald had accepted a grant towards the cost of his researches from the Quebec Asbestos Mining Association.[23] Their bitter

personal criticism of McDonald was picked up in a series of crusading articles in *The New Yorker*, later published in a book.[24]

This marked a new stage in the widening gulf between the 'anti-asbestos lobby', led by the Mount Sinai group, and those scientists who they believed were deliberately downplaying the risks of asbestos. But what got lost in this increasingly heated conflict was the fact that McDonald's researches were based on 'white asbestos', while those of Selikoff and Newhouse centred on exposure to 'brown' and 'blue': the amphiboles. This failure to distinguish between two different types of mineral, just because both were called 'asbestos', reflected a fundamental confusion that was to bedevil the debate for decades to come.

By now, the idea that asbestos might have been responsible for a hidden public health disaster was attracting media attention on both sides of the Atlantic. In 1971 a *World In Action* documentary focused on Castle Acre, a Cape Asbestos factory at Hebden Bridge in Yorkshire, opened in 1939 to make 100 million gas masks from crocidolite for the armed forces. The programme's claim that a growing number of former employees were now dying from asbestos-related diseases made it a political cause célèbre.

In the USA the growing notoriety of asbestos was already leading to scores of claims for compensation by former insulation workers. Under existing state and federal law, a claim could only be made against the employer, on a no-fault basis. A successful claim was passed on to the employer's insurer, and awards were fairly limited.

In 1973, however, all this was changed, by a ruling in the case of Borel v. Fiberboard Paper Products, involving a worker who had died from asbestosis. A federal appeal court ruled that a claimant need not sue his employer but could claim instead against the manufacturer who produced the asbestos in the first place. The manufacturer could also be held liable for having failed adequately to warn workers that inhaling asbestos could cause fatal illness. The court further found that the asbestos industry had been aware of these dangers as early as the 1930s, but had suppressed the information. Damages in such cases could thus now be unlimited. The court noted that the number of people in the USA who had been exposed to asbestos could be as high as 21 million.

So dramatically did the Borel judgement widen the opportunities for seeking compensation that some of those at the heart of

the insurance industry privately foresaw an apocalypse. One senior underwriter with Lloyd's of London, the world's largest re-insurance group, with which many other insurance companies took out cover against their own liabilities, reportedly warned a colleague, in words later to be widely quoted, 'asbestosis is going to change the wealth of nations'.

Citing Selikoff's 1964 paper, he roughed out on a piece of paper his calculation that, by 1990, claims could reach $66 billion. By 2000 this could have reached $120 billion. In the last resort, he said, 'Lloyd's will probably be bankrupted'.[25]

From the time of the Borel judgement, the number of US compensation claims began to soar, directed particularly at the Johns-Manville Corporation, the world's largest asbestos manufacturer. US asbestos sales also began a rapid decline from their all-time peak in 1973 of 801,000 tons.[26]

In Britain in 1976 the parliamentary ombudsman Sir Alan Marre reported on the Hebden Bridge disaster. Finding that 12 per cent of its workforce of 2,200 had now been affected by asbestos-related diseases, he blamed this on a serious failure of health and safety regulation. The government's Health and Safety Commission (HSC) appointed an advisory committee to review asbestos policy. In 1979 this recommended a complete ban on crocidolite (which the industry itself had already withdrawn in 1970); and that maximum permissible levels of exposure to amosite and chrysotile should be halved to 1 million fibres per cubic metre of air (1 fibre per millilitre).[27]

Meanwhile, across the Atlantic, the 'war' between McDonald and the Mount Sinai team was hotting up still further. In a bid to discredit McDonald's 1971 findings on chrysotile, Selikoff had crossed the Canadian border to carry out a small 'mortality' study on workers who, before their deaths, had worked in the Thetford white asbestos mines. He organized a symposium at which McDonald was invited to read a paper updating his earlier findings. This was followed by the Mount Sinai team revealing their own findings, which appeared to contradict McDonald's. But Selikoff then unveiled his blockbuster: a study of 17,800 insulation workers in the USA and Canada, who had been followed for ten years between 1967 and 1976. Up to that time it was easily the largest asbestos study ever carried out.

The results of Selikoff's latest study appeared to be sensational.

During those ten years, 2,271 of his subjects had died, 612 (or 27 per cent) more than would have been expected on the basis of normal white male death rates in the USA. In fact the number of deaths that could be attributed to asbestos, he claimed, was even higher: 843 or a staggering 37 per cent.[28]

As one expert observer was to comment on Selikoff's figures 20 years later, 'no other studies before or since' had ever come up with a cancer rate 'even approaching such an order'.* Their influence was to spread rapidly across the world.

Yet even Selikoff was about to be outbid by an initiative launched the same year in Washington DC.

Stage Three: The Scare Takes Off

On 11 September 1978 a mimeographed 'paper' was circulated to the US media, in the name of two of the USA's leading health agencies, the National Institute of Environmental Health Sciences (NIESH) and the National Cancer Institute (NIC). It was headed 'Estimates of the Fraction of Cancer Incidence in the United States Attributable to Occupational Factors'.[29]

The paper named nine examples of 'occupational carcinogens', including nickel, PVC, gasoline and asbestos, claiming that in 'forthcoming decades' these might be responsible for as much as 38 per cent of all cancers in the USA. This was certainly shocking, since it was astronomically higher than any normally accepted estimates for cancer attributable to occupational exposure (the Royal Society's figure was 1 per cent). Even more shocking, however, was the paper's projection on exposure to asbestos, which would 'result in over 2 million premature cancer deaths in the next three decades'. This, the paper claimed, would represent 17 per

* F. M. K. Liddell, 'Magic, menace, myth and malice', *Annals of Occupational Hygiene*, 41, 1 (British Occupational Hygiene Society, 1997). Professor Liddell, of the Department of Epidemiology and Biostatistics at McGill University (and a colleague of Corbett McDonald) also highlighted Selikoff's claim that the average level of asbestos to which his workers would have been exposed was as small as 4–12 fibres per millilitre. In fact, as Liddell explained, insulation work was one of the 'dustiest' of all occupations, probably involving fibre levels as high as 50 fibres or more per millilitre.

cent of all US cancer deaths between 1978 and 2008: an average of 66,000 deaths a year.

This curious document was clearly part of a carefully planned political initiative, since its release was timed to coincide with the exact moment when the US Secretary of Health, Education and Welfare, Joseph Califano, electrified a major national trade union conference by announcing the same 'alarming facts'. The 'new study', he said, was shortly to be presented to the Occupational Safety and Health Administration (the US equivalent of Britain's HSC and HSE). Four days later a more detailed version of the paper was released to the press and the scientific community, signed by nine top officials of three health agencies, including the directors of the NIESH and the NIC.

Although the paper made headline news, everything about it was odd. It was not clear who had written it. It had not been through any of the normal processes attending a scientific paper. Most striking of all, it produced no new data to support its startling claims.

The document triggered off an explosion of criticism from all corners of the scientific community. Richard Peto of Oxford University called its asbestos figures 'comical', noting that they were 'possibly 1,000 per cent' higher even than those claimed by Selikoff and his Mount Sinai colleague E. C. Hammond. Hammond himself declared himself 'slightly puzzled'. Others described it as 'manifestly silly', 'stupid', a '*scandale*'. Richard Doll called it 'scientific nonsense', and Califano's speech 'absurd'.

In 1981 Doll and Richard Peto published a detailed attack on what they scornfully called 'the OSHA paper'. Its estimated figures, they wrote, 'were so grossly in error that no arguments based even loosely on them should be taken seriously'. The paper's fundamental error had been to extrapolate from the risks faced by a small minority who had been heavily exposed over many years and to apply this to all workers, however slight their exposure. 'This disregard of both dose and duration of exposure is indefensible.' While the paper 'should not be treated as a serious contribution to scientific thought', it was obvious that those responsible for it had produced it 'for political rather than for scientific purposes'. Doll and Peto feared that it would continue to be used for such purposes in the future, not least by the media.[30]

Their fears were borne out. The paper would be widely quoted

for years to come, not least by the trade union movement, which was fast becoming one of the most active champions of the 'anti-asbestos lobby'. One union quick to publicize the paper's predictions was Britain's ASTMS (Association of Scientific, Technical and Management Staff), then, under its general secretary Clive Jenkins, much in evidence.

Ironically, however, if much less publicly, it was earlier work by Doll himself which was now called into question: no less than the basis of the ground-breaking 1955 paper by which he had made his reputation in the epidemiology of asbestos by confirming the link between asbestos and lung cancer. One reason why chrysotile had continued to be seen as potentially so dangerous was that Doll was under the impression that all the cases of lung cancer he studied in Turner and Newall's Rochdale factory 30 years earlier resulted from exposure only to white asbestos.

Since at the time of Doll's study mesothelioma had not been identified as an asbestos disease, in the late 1970s a further study of workers at the factory had been carried out by Julian Peto, Richard's brother. Like Doll, the younger Peto believed that only chrysotile had been used in the factory. When he found several cases of mesothelioma, this significantly changed the perception of chrysotile, which had not hitherto been suspected as a cause of this disease. So unexpected was his finding that it heavily influenced the new 'safe limits' proposed for chrysotile by the Simpson committee in 1979,[31] which in turn helped to shape new asbestos regulations that were to be introduced in the UK in the 1980s.

Peto's paper was included in a book edited by Dr Wagner, who was so struck by this new angle on the disease he had been first to identify that he decided to carry out a further study himself. He and two colleagues, including the future professor Fred Pooley, were able to take full advantage of the advances made in electron microscopy since Doll's study 30 years earlier. When they examined tissue samples from the lungs of 103 men and women who had worked at Turner and Newall's textile factory, and had died between 1964 and 1975, they were surprised to find considerable quantities of crocidolite fibres, at 300 times the UK's average level. It turned out that, far from using only chrysotile, the factory had between 1931 and 1970 processed around 60 tons of crocidolite a year, to assist the weaving process.

This was highly significant, because it was crocidolite, much

more than any other type of asbestos, which had been linked to mesothelioma. Tactfully, the team's paper did not suggest that crocidolite was necessarily the cause of the mesothelioma found by Peto. But they suggested that the disease could no longer 'be attributed with any certainty' to chrysotile.[32] What also remained unspoken was the very considerable doubt this discovery cast on the reliability of Doll's 1955 finding that chrysotile was the exclusive cause of the Rochdale lung cancers.*

These revelations prompted Peto himself, with Doll's support, to carry out yet a further study of 3,639 Rochdale workers, which by 1985 had led him drastically, if reluctantly, to revise his earlier findings. He naturally found it impossible to abandon entirely his belief that chrysotile might be a cause of mesothelioma, but in the face of the new evidence he now suggested that 35 years of exposure at 1 fibre per millilitre 'might eventually cause mesothelioma in about one worker in 200'. Although even this prediction, he admitted, was 'of doubtful accuracy'.[33]

Behind the scenes, some of the basic science on asbestos was beginning to look distinctly wobbly. More publicly, however, Doll and Peto in the same year published an extensive general review for the Health and Safety Commission of 'the effects on health of exposure to asbestos'. This acknowledged that the various studies carried out in recent years had sometimes come up with contradictory findings. Nevertheless, they accepted that the 'blue' and 'brown' amphiboles posed a significantly greater risk than chrysotile. While questioning the basis for some of Selikoff's findings in 1979, they indicated that insulation workers exposed to amphiboles were clearly more at risk than any other group in the population.

Right at the bottom of the hierarchy of risks Doll and Peto placed that vast majority of the population who might be 'exposed' to white asbestos cement products in their daily work. Their

* Oddly, another factor Doll had failed to take into account in 1955 was the part played in the incidence of lung cancer by smoking. In 1979 Selikoff and Hammond published a paper suggesting that the synergistic effect between asbestos and tobacco was so great that, whereas asbestos exposure alone increased lung cancer risk five-fold and smoking alone increased it ten-fold, the combination of both increased the risk by 50 times (E. C. Hammond, *et al.*, 'Asbestos exposure, cigarette smoking and death rates', *Annals of New York Academy of Sciences*, pp. 473–90).

lifetime risk of death could be estimated at one in 100,000. Even if a fifth of the population were exposed to asbestos cement in the buildings around them for 20 years, this would be unlikely to cause more than 'one death a year' in the whole country. In effect, the risk was so close to zero as to be 'negligible'.[34]

This last claim was greeted with derision by Britain's anti-asbestos campaigners, who regarded all types of asbestos as equally dangerous and who were now becoming increasingly vocal. In 1981 widespread interest had been aroused by a two-hour documentary broadcast by Yorkshire Television, *Alice – a Fight for Life*, presenting in harrowing terms the story of Alice Jefferson, who had died of mesothelioma after only comparatively brief exposure to crocidolite at the Hebden Bridge factory. After the programme, Richard Peto had predicted that Britain would see some 50,000 deaths from asbestos-induced diseases in the next 30 years. He was attacked in the *New Statesman* for grossly underestimating the scale of the impending disaster by two leading campaigners, David Gee, the national health and safety officer for the GMB union, and Nancy Tait, whose husband had died of an asbestos-related disease in 1968.

In response to the recommendations of the advisory committee set up after the ombudsman's report on Hebden Bridge, the government now introduced three new measures, imposing a new regulatory regime over almost every aspect of the use of asbestos in Britain.

For a start, a new profession was called into being: the specialist asbestos removal contractor. From now on almost all work involving the handling or removal of asbestos insulation or sprayed coatings could only be carried out by contractors holding a licence from the HSE.[35] Second, there was to be a complete ban on the importing, supply or use of amphibole asbestos for any purpose (the impact of this was fairly minimal since the industry had already imposed its own ban).[36] Thirdly, the Control of Asbestos at Work Regulations (1987) required employers to ensure that their workforce was not exposed to any risk from asbestos, laying down much stricter limits on the number of fibres per millilitre permissible in any workplace.

All this might have seemed like a measured response to a genuine problem. In this respect, it bore no comparison to what was now happening in the USA, where the anti-asbestos crusade was

now carrying all before it. The first sign of this was what was happening in the US courts. Since the Borel judgement, the main target of lawyers for asbestos plaintiffs had been the Johns-Manville Corporation, as the largest asbestos producer in the world. But by 1982, when the number of claimants had reached 16,000, the company foresaw that its liabilities would soon exceed its ability to pay (even though its turnover that year was still more than $2 billion). It therefore filed for what was known as a Chapter 11 bankruptcy, easily the largest and most successful company ever to do so. This meant that it could set aside a trust fund to put a cap on its total liabilities, and also delay paying out for years while a complex litigation process unfolded.

The lawyers thus had to begin looking elsewhere for firms to sue. They began with those, such as construction companies, which had expected their employees to work directly with asbestos. They were aided by a further series of judgements (such as Keene Corp. v. INA, 1981) that allowed defendants to claim even just for exposure to asbestos, without having to prove damage. They were further aided by courts that, particularly in certain states, such as Mississippi, Texas and West Virginia, had been persuaded by the growing alarm over the dangers of asbestos to treat plaintiffs in such cases with particular favour.[37] In 1982, for instance, a young South Carolina attorney, Ron Motley, won $1 million in a Mississippi court for a shipyard worker suffering from mild asbestosis, by arguing that his client should be compensated simply for his fear that this might one day develop into cancer.

By the mid-1980s, as the number of cases continued to soar, the handful of law firms specializing in asbestos injury cases were actively trawling for new clients in all directions. Often with the co-operation of trade unions, they would send out X-ray vans – known as 'examobiles' – to screen hundreds of workers at a time. Each would be asked to sign an agreement promising only to use that law firm. The X-rays would then be sent to the firm's tame radiologist, who would sift them for any sign of an asbestos-related disease that could result in hefty damages.

In 1985 came a further development in this assembly-line justice when, to save time, a federal appeal court allowed the cases of four plaintiffs to be joined together as one, because they had all been part of the same work team. The precedent caught on, to the point where, within two years, a federal judge in Texas was

consolidating 3,031 separate plaintiffs into a single case. He said he would hold trials for representative plaintiffs, then extrapolate any compensation awards across the rest.*

Thanks to such strategies, by the end of the 1980s the number of new cases was rising exponentially. This was aided by the growing impression across the nation that asbestos in any form was like an infectious disease, the slightest contact with which could inflict hidden and potentially fatal damage on someone's health. No one did more to foster this than certain US government agencies that had now joined the ranks of the asbestos scare's most active 'pushers'.

In the 1970s, following the publicity given to Selikoff's findings, both the EPA and OSHA had shown a growing interest in regulating use of asbestos, and in 1979, following the release of 'the OSHA paper', the EPA had embarked on a $10 million study of its own, which would eventually run to 100,000 pages.[38] In the early 1980s pressure grew for a total ban on asbestos, but initially this was strongly opposed by the Reagan administration at the behest of the government of Canada, from which 95 per cent of US asbestos was imported.

At least, as a compromise, until this argument was finally resolved, the Reagan administration bowed to the generally mounting alarm over asbestos by accepting, in 1987, Congress's Asbestos Hazard Emergency Response Act (AHERA), the most stringent law on asbestos the USA had yet seen. This required every school in the country to be inspected. Wherever asbestos was found, 'abatement measures' should be taken to eliminate the risk.[39]

The EPA, tasked with enforcing the new Act, estimated that no more than 45,000 schools would be affected, and that the total cost would be $3.1 billion. But until the 1970s asbestos had been so commonly used in school construction, for thermal and pipe insulation, floor and ceiling tiles and fireproofing, that it soon became obvious that the total number of schools affected would be very much higher. In California alone, the state authorities estimated that the cost of abatement in 7,000 schools would be $1

* This particular judge was overruled by a federal appeal court, but the practice of what became known as 'jumbo consolidations' became increasingly popular.

billion. The National Schools Board gave a nationwide estimate of $6 billion (towards which the EPA had allocated only $202,000 in federal aid).

Then, in July 1989, the EPA finally got its way over its wish to impose a total ban. It announced that almost any further importing or use of asbestos or asbestos-containing materials would be prohibited. The grounds it gave were that asbestos was 'a human carcinogen' and 'one of the most hazardous substances to which humans are exposed in both occupational and non-occupational settings'.

The EPA ban represented easily the greatest victory the anti-asbestos campaigners had won to date. No other country had gone anything like so far. In effect the ban applied almost exclusively to white asbestos, since imports of blue and brown had already long since been halted (total use of asbestos in the USA had now collapsed to only a tenth of its 1973 figure).

It was notable that the chief reason the EPA gave for its ban was that asbestos was a 'carcinogen'. It was only two years since IARC (the International Agency for Research into Cancer) had put asbestos on its list of 'Class 1 carcinogens'. From then on no argument was to be heard more often from the anti-asbestos campaigners. They would continue to cite the fact that 'asbestos' had been classified as a Class 1 carcinogen as if this was the ultimate irrefutable evidence in support of banning asbestos in all its forms.

What they never mentioned was that the same list of Class 1 carcinogens included nickel compounds, leather, alcohol, chromium, sawdust, oral contraceptives, polyvinyl chloride, solar radiation and a wide range of other substances in universal, everyday use.

None of these substances is banned as unsafe so long as exposure to them remains within safe limits. There is no prohibition on using nickel coins, or drinking a glass of beer, or sawing logs, or walking in the sunshine. What matters is the form in which these substances are presented, determining the nature and intensity of human exposure to them. It is this which can transform a potential hazard into a genuine risk; or, conversely, may turn something that is in itself potentially dangerous into something harmless.

Such was the fundamental principle which the anti-asbestos campaigners had lost sight of, with their constantly reiterated

mantras that 'a single asbestos fibre can kill you' or 'one fibre can kill'. Such was the article of faith that the EPA had now enshrined in the law of the land. But before it could become irrevocably established as law, the US Toxic Substances Control Act required that within 60 days it must face legal challenge in any one of the twelve US Courts of Appeals.

Many different industries and environmental groups lined up to mount the necessary challenge, in several courts. But that chosen to give a definitive ruling was the Fifth Circuit Court of Appeals, covering Texas, Louisiana and Mississippi (in which many of the most costly awards had been made in favour of asbestos plaintiffs).[40]

Defending its new law, the EPA itself testified that banning the use of asbestos cement pipes and roofing materials would, over the next three decades, save half a dozen lives. But the agency's own calculations showed that the cost of saving each of those lives, in terms of the expense incurred in replacing those asbestos-containing materials, would amount, in the case of the pipes, to $72 million, and in that of roof shingles to $151 million. The court noted that 'over the next 13 years we can expect more than a dozen deaths from ingested toothpicks'. This was more than twice as many deaths as the EPA was hoping to prevent with its 'quarter billion-dollar bans on asbestos pipe, shingles and roof coatings'.

The EPA conceded that the risks posed by asbestos substitutes, such as PVC and ductile iron pipes, were closely comparable to those posed by asbestos cement pipes themselves. The court concluded that the ban's net saving of human life would probably be zero.

On banning the use of asbestos for brake linings and other friction materials, the court noted that the EPA had failed to take account of either the cancer risk from non-asbestos substitutes or the risk of increased automobile deaths through the use of less efficient braking materials. It feared that banning asbestos brakes would actually do more harm than good.

Overall, the court ruled, on 18 October 1991, that the EPA had 'failed to muster sufficient evidence' to support its ban. Its costs were not justified, in terms either of its claimed benefits or of more productive ways in which such immense sums might be spent. More lives, the court suggested, could be saved by spending part of that money on new hospitals or providing doctors for the poor.

The EPA's ban was thus rejected as unlawful. The only hope of keeping it on the statute book was to appeal to the US Supreme Court. Since much of the evidence on which the ban had been quashed came from the EPA itself, the chances of such an appeal succeeding were considered so slim that the verdict was accepted as final.

Scarcely had the much-vaunted ban been imposed than it was ended. But in no way was the great asbestos scare over. In terms of the damage it was to inflict, the story had scarcely begun.

Stage Four: Counting the Cost (1)

It was one thing to wish to ban the future use of asbestos. Quite another was the cost of dealing with the hundreds of millions of tons of asbestos-containing materials in existing buildings. As early as 1974 the EPA had ruled that no public or commercial building could be renovated unless all 'friable asbestos' had been removed. And so universal now was the fear which had been whipped up over asbestos that millions of property owners and managers were forced to consider the financial risks they faced if they did not 'abate' the asbestos in their buildings.[41]

The trouble was that this was a very costly exercise. In the 1960s asbestos which had been sprayed around vast numbers of buildings as a fire retardant at a cost of 25 cents a foot was now costing $25 dollars a foot, 100 times as much, to remove.

Even the EPA itself had estimated that the cost of 'abatement' in all the country's public and commercial buildings would be as high as $51 billion. Yet in New York, the owners of the World Trade Center and La Guardia airport alone faced a bill of $1 billion. In California, officials estimated the costs of removing asbestos in their state as $20 billion. Industry analysts put the nationwide figure way above that quoted by the EPA: as high as $200 billion. This was hardly surprising since the EPA itself had estimated in 1988 that no fewer than a fifth of the public and commercial buildings in the country, 733,000 in all, contained asbestos in such a potentially dangerous state that, unless it was removed, it could cause 25 deaths every year.

Horror stories abounded, such as the $50 million which had to be knocked off the price of a Los Angeles office building when, just before it was sold to a Japanese buyer, asbestos was discovered

which would cost that much to remove. When another Japanese firm wanted to buy the Exxon building in New York, it slashed its offer by $100 million for the same reason.

A long and well-researched exposé of this disaster by Michael Fumento, published in 1989 by the *American Spectator*, opened with the story of a San Francisco high school which had to close for three terms while asbestos was removed, at a cost of $18 million: only for the school authorities to be later expertly advised that the pupils had not after all been exposed to any danger, and that the removal had not been necessary.

So widely had the alarm over asbestos now spread that America was far from alone in facing such massive problems. In 1991 the European Commission discovered that the steel beams of the Berlaymont, its vast headquarters building in Brussels, had been sprayed with white asbestos as a fire retardant when it was constructed in the 1960s. Its staff of 3,500 officials were evacuated to other premises across the city. It would be 13 years before the building could again be occupied, leaving EU taxpayers with a bill for over £1 billion.[42]

The chief beneficiaries of this particular bonanza were an army of specialist asbestos removal contractors, who had now sprung up in every country affected by the asbestos scare, free to charge their uncomprehending customers almost any sum they wished, for work generally regarded as highly dangerous but desperately necessary. For their owners, the profits for these specialist firms were astronomic. Between 1983 and 1988 the declared turnover of the 4,000 firms registered in the US rose more than thirteen-fold, from $200 million to $2.7 billion, and was still hurtling upwards. But for many of their tens of thousands of employees there might be a distinct downside to this work. If asbestos contained fibres which were potentially dangerous, nothing was more likely to increase that danger than constant exposure to those fibres as they were disturbed by hacking out or stripping off the asbestos to be removed.

Although it was by now customary for operatives handling asbestos to wear full protective clothing (generally known as 'space suits'), OSHA itself estimated that removal work under its own pre-1986 safety standards could still cause 64 lung cancers for every 1,000 men employed. Even under new and stricter protocols introduced that year, it still put the cancer risk at six deaths in

every 1,000. And so much money was now involved in asbestos removal work that the pressure to cut corners was intense.

The removal industry itself was notoriously corrupt. In 1988 alone, officials of 23 companies, representing the majority of firms officially registered to carry out the removal and disposal of asbestos in the New York area, were charged with bribing EPA inspectors, usually to persuade them to overlook safety standards. Lower down the scale there flourished hundreds of 'cowboy operations' (known as 'rip and skippers'), which disregarded safety rules even more flagrantly.[43] In New York and other cities, thousands of immigrant workers were prepared to carry out asbestos removal work for $50 an hour, often using no safety precautions at all.

Simply on the basis of estimates published by the official agencies themselves, it seemed that many more lives were being put at risk by removing asbestos than by leaving it in place. One of the odder statistics thrown up by the EPA's attempts to measure the size of the health risk posed by asbestos in buildings was that which showed airborne fibre counts in buildings where asbestos was in good repair at 3.5 nanograms per cubic metre (0.001 fibres per millilitre); whereas those around buildings where asbestos was damaged averaged only 0.25 nanograms (0.0001 fibres per millilitre) or 14 times lower. [44]

Yet asbestos workers in the shipyards of the 1940s had faced exposures at up to a million times these levels. A Harvard University study in 1988 compared the official projection that one person in 100,000 faced a lifetime risk of dying from exposure to asbestos in buildings with the statistical incidence of other types of death. The chances of being run over by a car as a pedestrian were 290 times higher; of dying in an air crash 730 times higher; in a motor accident 1,600 times higher; of being killed by smoking 21,900 times higher.

Naturally few people were calling for the complete banning of motorcars or air travel, or even the right to smoke. But to those now caught up in the general fear over asbestos, egged on by the alarmism of the mass media, such estimates of comparative risk were not of the slightest concern.* It was now a near-universal

* Typical of an endless stream of mass-media scare stories at this time (quoted by Fumento) was an article in *Good Housekeeping* headed, 'I

assumption in the public mind that all forms of 'asbestos' posed similar risks.

This had of course been the key to how the whole scare had taken off in the first place. All the most extreme examples of damage to health that had come to light, triggering the original alarm over asbestos, had been caused by massive and prolonged exposure to concentrations as high as 50 fibres per millilitre or more, particularly of amphiboles (as in those shipyard workers of the 1940s or the crocidolite miners of South Africa).

Yet this had become confused with the effects of exposure to a material so different in every way that, if it were not for the historical accident that it was also commonly referred to as 'asbestos', no one would have shown any concern. More than 90 per cent of all the 'asbestos' in America's buildings was high-density white asbestos cement – around 12 per cent chrysotile to 88 per cent cement – the fibre release from which, for all practical purposes, was non-existent (those EPA air samples taken in and around buildings in fact reflected the ambient level of fibres arising from natural causes which can be found anywhere in the world).

Far from seeking to restore some perspective to the debate, however, increasingly frenzied efforts were made in the 1990s to show that chrysotile was far more dangerous than had been supposed. This was vital to the campaigners, since chrysotile was now the only type of asbestos still in serious commercial production. Not only might this enable the EPA to reinstate its total ban on asbestos in the USA, there was now a strong lobbying campaign across the Atlantic to have chrysotile banned by the European Union (which had already banned the importing and use of crocidolite in 1983, followed by amosite in 1991).

In 1991 a meeting at the European Parliament in Strasbourg set up a new European lobby group, Ban Asbestos, with its own secretariat. In 1994, at an international seminar in Sao Paulo,

Saved My Family From Asbestos Contamination'. A woman who had found 'death-dealing' asbestos wrapped round some pipes in her home described how this had given her 'many sleepless night wondering if asbestos particles hadn't already escaped into the air and endangered my family'. Only at the end of the article did she admit that tests had eventually shown no fibres being released into the air. Asked where she had first learned of the dangers of asbestos, she said it was from an earlier article in *Good Housekeeping*.

Brazil, this was expanded into a global organization to campaign for a completely 'asbestos-free world'. Its support came from trade unions, 'progressive' politicians, 'concerned scientists', environmental pressure groups, such as Greenpeace, and 'asbestos victim support groups'.

The campaign also, however, found an unlikely ally in two multinational companies: Eternit based in Belgium and St Gobain in France. These two corporate giants had long been major asbestos producers themselves. But they supported the campaign for a ban because they were now hoping to dominate the fast-emerging world market in the materials being promoted as substitutes for asbestos, from cement made with synthetic or glass fibres to rockwool.*

A number of scientists lent support to the campaign with studies purporting to show that chrysotile was much more dangerous than had hitherto been supposed, particularly in causing mesothelioma. A team led by John Dement reported on a group of textile workers in South Carolina, concluding in 1994 that 'chrysotile asbestos is by far the main contributor to pleural mesothelioma causation in the US'.[45] In 1996 another paper (Smith and Wright) was actually given the title 'Chrysotile asbestos is the main cause of pleural mesothelioma'.[46]

These studies were eagerly publicized by the anti-asbestos campaigners, and in 1999 helped inspire a paper by Julian Peto, now a professor at the London School of Hygiene and Tropical

* The prime mover in this, by his own account, was the late Eric Menghem, the managing director of Eternit (UK) and a director of the group, Eternit Belgium. Eternit was having problems with the prices charged by its Canadian suppliers of chrysotile. Menghem's plan was for Eternit to get out of white asbestos production and to concentrate instead on manufacturing cement made from asbestos substitutes. A good way to further this aim, he calculated, was to give support to the campaign for a ban on chrysotile. His chief concern was that, if Eternit backed the ban by supporting claims that chrysotile was harmful to health, this would be used as evidence by US lawyers to claim compensation against his company. At a meeting in Chicago he reached an agreement with a group of top US claims lawyers that, if he supported the ban (which would help their cause), they in return would not bring any claims against Eternit in respect of asbestos products the company had supplied in the past. Both sides kept their word, and Eternit remained immune to compensation claims (based on testimony from Menghem to a business colleague).

Medicine, predicting that asbestos-related cancer cases in western Europe would soar over the next 35 years, causing half a million deaths. Half these would be from mesothelioma. These were figures far higher than any previous projections.[47]

All this helped bring about another landmark victory for the 'Ban Asbestos' lobby. Several EU countries had already banned chrysotile in the 1990s, including Germany, Italy and the Netherlands. But now, in its directive 1999/77, the EU ruled that 'no threshold level of exposure has yet been identified below which chrysotile asbestos does not pose carcinogenic risks'. In effect this was enshrining in law that central article of the campaigners' faith that just one fibre was enough to kill. The directive accordingly imposed a ban on the importing, manufacture or sale of any products containing white asbestos, to be made absolute throughout the EU by 2005.

In Britain, the environment minister John Prescott rushed to implement the EU ban almost immediately. It would be enforced by the Health and Safety Executive, which in 1996 had commissioned its own in-house 'review of fibre toxicology' from Maureen Meldrum. After setting out the basic fact that the 'degree of hazard' posed by asbestos depended on the type of fibre ('greater with amphiboles than with chrysotile') and the size and length of the fibres (long fibres more hazardous than short), she went on to state that 'the balance of toxicological evidence does not support the no-threshold model for asbestos-induced lung cancer. A practical threshold is likely'.

In other words, Meldrum accepted on behalf of the HSE that there was a threshold level of exposure below which asbestos was not dangerous. She went on to assert that

> *very few cases of mesothelioma can be reliably attributed to chrysotile, despite the many thousands of workers who have had massive and prolonged exposure to this type of asbestos. In contrast, mesotheliomas have been observed among some workers who experienced only brief exposures to amphiboles. These differences are most likely explained by the limited durability of chrysotile in the lungs.*

Each of her statements ran directly counter to the central claims of the anti-asbestos lobby, that one type of asbestos was as dangerous

as another; that 'one fibre can kill'; and that chrysotile was a major cause of mesothelioma.[48]

Four years later, the HSE published a much more comprehensive paper by two of its leading statisticians, John Hodgson and Andrew Darnton. This was based on a comprehensive review of all the major studies carried out on different types of asbestos over the previous 20 years that had included data on exposure levels: more than 70 in all. Their conclusions were considerably more detailed than Meldrum's. So slight was the risk of incurring mesothelioma from chrysotile, their consensus of researches showed, that crocidolite was 500 times more dangerous than white asbestos; the risk from amosite 300 times greater. Although they suggested that it was not so easy to reach firm conclusions on the risk ratios for lung cancer, their survey indicated that the risk posed by crocidolite was at least 50 times greater than that from chrysotile, and that by amosite 10 times greater.[49]

However, these figures were chiefly drawn from studies based on highly exposed groups, such as insulation workers, textile workers and miners. When it came to assessing the risks from exposure at much lower levels, such as those faced by the vast majority of the population from contact with asbestos in the average home or workplace, the levels of danger fell very dramatically. Hodgson and Darnton's 'best estimate' for the risk of contracting mesothelioma from the kind of exposure caused by contact with asbestos cement was that this was so low as to be 'probably insignificant'. As for the risk of contracting lung cancer it was 'strongly arguable' that this was 'zero'. Yet this represented the scientific consensus on the risk to health posed by more than 90 per cent of all the asbestos-containing materials in existence.

The significance of these conclusions was not just that they contradicted almost every article of faith on which the anti-asbestos campaigners based their case. It was that they now represented the considered official view of the HSE. Yet this was the body now charged with enforcing in Britain legislation based on precisely those beliefs that the HSE's own researches had so comprehensively refuted.

Over the next few years this contradiction, between its own science-based assessment and the EU-derived law it was now bound to enforce, was to place the HSE in a very anomalous position. But before we consider the consequences of this we must

recap on another drama that had been unfolding in the same years: one so remarkable that it merits a section to itself.

Counting the Cost (2): 'the largest fraud in history'

Since the early 1970s, the growing panic over asbestos had been leading to two immense financial disasters which for many years had been developing largely away from public view. The first was the explosion in compensation claims in the US courts, which by the 1990s were annually doubling in number.

The other arose from the matter of who was to pay these astronomic bills, now rising at billions of dollars a year. The firms against whom claims were successful were suffering damage enough. But much of the compensation awarded against them was covered by insurance; and this rendered no organization more vulnerable than Lloyd's of London, the ancient and unique institution which much of the international insurance industry used to provide reinsurance cover for its own liabilities.

To pay its own bills, Lloyd's could ultimately make unlimited call on the assets of its 6,000 members, known as 'Names'. But with the Borel case in 1973 greatly magnifying the potential scale of compensation claims, a few senior members of Lloyd's had been quick to appreciate that the implications for their own business were catastrophic. As one had predicted, in words eventually to become famous, 'it will bankrupt Lloyd's of London and there is nothing we can do to stop it'.[50]

Those senior insiders did, however, take steps to minimize their own liability. While concealing how serious the losses threatened to become, they drastically relaxed the financial conditions needed to qualify as a 'Name' and actively trawled for new members, not least in the USA itself, thus vastly expanding the number of people liable to cover those losses. They then, in the early 1980s, unloaded their own personal potential losses from asbestos claims, and those of syndicates of which they were members, by reinsuring them with other syndicates from whom the scale of the approaching disaster had been concealed. Among the documents they withheld was a new report from Selikoff in 1982, now estimating that the total number of Americans exposed to asbestos was 27 million.[51]

By 1988, when the number of Names had risen more than five-fold to 34,000, Lloyd's for the first time made a brief public

admission that it was faced by an 'asbestos problem'. Over the next twelve months, the coincidence of the growing weight of asbestos claims with a succession of other disasters, such as the sinking of the tanker *Exxon Valdez* and an earthquake in San Francisco, began to bring the crisis out into the open.

Lloyd's deficits for 1988, 1989 and 1990 totalled £4.5 billion. For the new Names in particular, whose liabilities were more than twice those of existing members, the losses were devastating. Scores were bankrupted, an estimated 30 committed suicide, ancient estates had to be sold up. It sent a wave of shock through the upper reaches of society, on both sides of the Atlantic. In four years the number of Names almost halved.

In 1995 the New York State Insurance Department reported that the Lloyd's American Trust Fund alone was showing a deficit of $18 billion. In 1996 the Lloyd's chief executive Peter Middleton resigned, admitting that there had been fraud at the top of the organization.

Faced with a deluge of legal claims from its own members, Lloyd's launched a 'Reconstruction and Renewal' plan, setting aside £12 billion for a new company, Equitas, to take responsibility for all its pre-1993 asbestos obligations. Names were offered a reduction in their own liabilities, so long as they paid up immediately and waived their claims.

Sir William Jaffray, one of many former Names who persisted in his demands for legal redress, said of the prolonged cover-up, 'we were the victims of a massive swindle'. Another called it, 'one of the greatest commercial and political crimes of the twentieth century'. Thomas Seifert, a New York lawyer representing a group of US Names, claimed in a letter to Tony Blair on 7 October 1997, 'Lloyd's has committed the largest, most extensive and pervasive fraud in history'.[52]

How had the most respected insurance institution in the world been thus brought to the edge of ruin? Much of the answer lay in the extraordinary drama which had been unfolding in the US court system in the 1990s, the truth of which did not receive the full glare of publicity until 2002.

In March 2002 the leading US business magazine *Fortune* ran a long cover story by Roger Parloff headed, 'The $200 Billion Miscarriage of Justice'.[53] It opened with the story of a case heard the previous October in a small rural courthouse in Mississippi. The

jury had awarded damages to six plaintiffs. Their lawyers had only been able to produce the flimsiest of evidence that any of the six men had been damaged by exposure to asbestos in their work. None had ever needed to visit a doctor or lost a day off work. Four doctors for the defence, after examining them, testified that they showed no sign of lung damage whatever.

Yet the jury awarded the men damages of $150 million; $25 million for each plaintiff. Sixty per cent of the damages were awarded against a tiny Pennsylvania insulation company which had never had offices in Mississippi, never carried out contracts on any of the sites where the plaintiffs worked and had sold few products containing asbestos. The $83 million damages awarded against the firm were more than all its earnings in the 43 years since it was founded. The bill was to be picked up by the insurers.

As Parloff went on to explain, this case was only too typical of what had recently been happening in the US court system, turning asbestos litigation into 'the ultimate mass farce'. The relatively small number of law firms specializing in compensation claims had created a major industry, one of the most lucrative in America.

The lawyers had been able to expand their business for two chief reasons. Firstly, as many of the firms which had been the original focus of most compensation claims went bankrupt, such as big asbestos producers, the lawyers gradually widened out the nature of the firms and industries they targeted to extract money. Eventually more than 1,000 corporations were being sued, covering such a wide range of industries that they included 44 of the 82 sectors into which the US economy was officially divided.

'The concept is picking low-hanging fruit', as it was put by one of the country's leading plaintiffs' lawyers, Steven Kazan of Oakland, California. 'In the early days of the litigation, you had Manville, Manville goes away. Next in line are the regional distributors. If they go away, next in line are the contractors who bought from them. If these guys disappear, there are cases where we very legitimately are suing the neighbourhood hardware store, because that's where the guy bought asbestos joint compound; or the lumberyard where he bought asbestos shingles; or the floor company where he bought floor tiles. They say, "all of a sudden, why me?" One answer is "consider yourselves lucky you were left alone for 20 years". We're now higher in the tree.'

The second reason for the explosion in claims was that judges and juries, carried away by the publicity given to the dangers of asbestos, became increasingly relaxed about the standards of proof they needed to show that a plaintiff had suffered genuine damage.

Through mass X-ray sessions, advertisements and trawling union records, the law firms recruited tens of thousands of clients from whom often the only evidence required was an indication that, sometime in the past, they might have worked in the vicinity of some form of asbestos. The plaintiffs were carefully coached in how to respond to questions. A memo from one leading law firm, which inadvertently fell into the hands of defence lawyers in 1997, included such instructions as 'have a family member quiz you until you know ALL the products listed on your Work Sheet by heart'. These were merely asbestos-containing products which the lawyers planned to allege had been used in the plaintiff's place of work.

In 1990, when independent researchers checked the lung X-rays of 439 former tyre workers who had brought claims against a now bankrupt defendant, they found that 'possibly 16, but more realistically 11 of the 439' might have had 'a condition consistent with exposure to asbestiform minerals'.* A Kansas judge called this 'a mockery of the practices of law and medicine'. It was later to be established that as many as 90 per cent or more of all compensation claims were at best dubious and at worst downright fraudulent.

Claims filed against just one defendant rose from 31,000 in 1999 to 91,000 in 2001, almost all alleging mild and non-malignant 'asbestos-related conditions'. As ever more defendant companies went bankrupt, the lawyers were having to draw their net ever wider for firms to sue, although any connection they had with asbestos might have been very slight. Cases brought against firms in the textile industry jumped by 721 per cent in 2000 and

* R. B. Reger, *et al.*, 'Cases of alleged asbestos-related diseases: a radiologic re-evaluation', *Journal of Occupational Medicine*, 32 (1990), 1088–90. Another study of 114 power workers who had been subject to 'significant exposure to asbestos' over many years found that only seven showed impaired lung function, six of these being heavy smokers and the seventh an ex-smoker (Dr Joseph Miller, 'Benign exposure to asbestos among power plant workers' (1990), cited by Brickman, see note 1).

2001; in the paper industry by 296 per cent; against food and drink companies by 284 per cent. A defence lawyer called this 'the search for the solvent bystander'.

The law firms had long since discovered, however, that, if they brought their claims in certain jurisdictions across the USA, they had every chance of winning. By the start of 2002, the cases of 49,000 plaintiffs were awaiting trial in Mississippi alone, few having any connection with a state in some counties of which there were now more asbestos-claims before the courts than they had inhabitants. This was the state in which, in October 2001, six plaintiffs had been awarded $25 million each, not one of whom could produce convincing evidence that he had suffered any damage to his health.

In June 2001 the worldwide business consultancy Towers Perrin estimated that the total corporate liability to US asbestos plaintiffs was likely to rise to $200 billion. Sixty per cent of this bill would be paid by the insurance industry, to be passed on to the public at large in higher premiums. It was forecast that the total number of claims might eventually rise as high as 3.1 million, of which only 570,000 had yet been filed.

By now the corporations filing for bankruptcy included some of the bigger names in US business, including the glass makers Pittsburgh Corning, the boiler makers Babcock and Wilcox, the chemicals giant W.R. Grace and the auto-parts conglomerate Federal-Mogul. What finally brought down this last, ironically enough, was not so much its own activities but the fact that it had recently bought what remained of Turner and Newall, once the largest asbestos firm in the world. At the time Federal-Mogul entered on Chapter 11 bankruptcy proceedings in October 2001, it had been inundated with 360,000 asbestos claims, most of them since acquiring the British company in 1998.

The significance of Parloff's article was that it at last brought to public attention what many observers, including not a few lawyers, had come to see as one of the greatest scandals in America's legal history. One of these who had long been expressing outrage at the practices of his fellow lawyers was a New York law professor, Lester Brickman, who summed up what had happened, in the words quoted at the head of this chapter, as 'a massively fraudulent enterprise that can rightfully take its place among the pantheon of great American swindles'.[54]

The story had begun all those years before with a genuine tragedy, and with a shocking and systematic cover-up by certain companies of the damage they were knowingly inflicting on their workers. But this had then been used to promote a scare that parted all company with reality, ending in wholesale fraud on a scale for which it was hard to recall a precedent.

There had been three chief beneficiaries of the scare, whom it had enriched beyond their wildest dreams. The first was those plaintiffs awarded huge sums in compensation for damage to their health that was imaginary (known in the trade as 'unimpaireds'). The second was their lawyers, who were estimated to retain between 30 and 40 per cent of the damages they succeeded in winning.[55] The third were the specialist contractors who also made billions by talking up the scare to encourage the removal of very much more asbestos than for legal or safety reasons was necessary.

So far we have looked at this largely in the context of what was happening in the USA. But it was also happening in Britain, as we ourselves were about to discover.

Stage Five: The Scare Is Challenged (1)

A few weeks before *Fortune* published Parloff's article in March 2002, we were contacted by a senior member of the Federation of Small Businesses. He wanted to put us in touch with someone he thought had a remarkable story to tell.

John Bridle had been working in the asbestos industry for 40 years. His practical knowledge of asbestos products was second to none. Until the mid-1990s, when he sold his companies, he had been one of the biggest importers of white-asbestos cement-products in the country. But he had continued to follow with amazement the campaign by the anti-asbestos lobby to portray white asbestos as a mass killer. He had been in contact with many of the leading independent academic experts on asbestos, who shared his dismay at how the science was being distorted.*

* These included Professor Fred Pooley of Cardiff University; toxicologist Dr John Hoskins; pathologist Dr Alan Gibbs; Dr Kevin Browne, who had worked with Wagner; and Dr David Bernstein, an international consultant based in Geneva.

What was particularly alarming Bridle in January 2002 was a set of new regulations proposed by the HSE, after close consultation with the Asbestos Removal Contractors Association (ARCA). This was the body that represented most of the 800 specialist firms licensed by the HSE who had the exclusive right to handle or remove most forms of asbestos. Even on the HSE's own original estimate, the cost of its new Control of Asbestos at Work (CAW) regulations would be £8 billion. This would make them one of the two most expensive laws ever introduced in Britain.*

In theory, the purpose of these regulations, nominally implementing a series of EU directives, might have seemed entirely reasonable. This was to require everyone owning or managing Britain's five million commercial or public buildings, including blocks of flats, to identify any asbestos in their properties, and to ensure that it posed no risk.

In practice, however, so great was the general fear and confusion now surrounding everything to do with asbestos that most property owners would wish to call in the supposed official 'experts': the asbestos removal firms. What Bridle feared, with good reason, was that this would repeat what had already happened in America. The contractors (or surveyors working for them on hefty commissions) would have every incentive to talk up the dangers of any asbestos they found, even to invent its presence. They would then insist that it needed to be removed, demanding vastly inflated sums which their customers would find it hard to question.

Bridle showed us considerable evidence that this was already happening, even before the new law came into force. In his role as a consultant, he had been called in to advise on a whole series of cases where contractors had grossly exaggerated the dangers of real or imaginary asbestos in a building; and then demanded anything up to £100,000 or more, for work which could in fact have been carried out, safely and legally, for a fraction of that figure. In many instances they were charging for work that was not necessary at all.

So widespread were such practices that Bridle had tried to raise them with senior officials of the HSE. Not once had any action

* Their only possible competitor was the Working Time Regulations 1998, also introduced to implement an EU directive, which the government estimated would cost £2.1 billion every year.

been taken to call these rogue contractors to account. Indeed, in certain parts of the country, it was only too obvious that local HSE inspectors were working hand in glove with contractors to uphold their fraudulent claims.

In every way, it appeared, the system set up by the HSE in consultation with the contractors, was designed to maximize their profits at the expense of the public. To work with asbestos, the HSE, based on information supplied by the removal industry, had drawn up a 'protocol', MDHS100, which was heavily skewed in favour of removal, even when this was not necessary. It was widely promoted to the industry that, to qualify to carry out the work, it was now necessary to have a certificate called a P402. This required no expertise in asbestos other than familiarity with the procedures laid down in MDHS100. The P402 was administered by the British Institute of Occupational Hygienists (BIOH), which sounded like an official body but was in fact a private charitable organization closely linked to the contractors and other anti-asbestos campaigners. There was in fact no legal requirement to hold one of its certificates.

Whenever samples of asbestos needed testing these had to be sent to a laboratory approved by the 'UK Accreditation Service' (UKAS). Again this sounded like an official body but was in fact a private company closely linked to the contractors, who owned many of its 'approved' laboratories. Even the HSE's own 'asbestos helpline', to advise members of the public, was run by one of the largest of the contractors.

Such was the potentially fraudulent system which was about to be greatly reinforced by the new CAW regulations, drawing millions more property owners into the net. What would make the new rules particularly damaging was the opportunity they would give to contractors to treat white asbestos products on the same basis as the dangerous amphiboles, since these comprised well over 90 per cent of all the asbestos-containing materials in the country.

Nothing better illustrated the influence of the contractors over the drafting of the new law than its inclusion of 'decorative textured coatings', such as Artex, used in the walls and ceilings of millions of homes built between the 1950s and the 1970s. These coatings were made of plaster mixed with amounts of white asbestos so small that they posed no conceivable threat to health. The chairman of ARCA told a conference in 2000 how, when the

HSE originally proposed that Artex should be listed in the regulations as a 'high risk material', he had expressed surprise, pointing out that Artex posed virtually no risk. The HSE had nevertheless asked him whether ARCA would still like to see Artex retained on the list. The chairman's reply was that, since it was potentially a very lucrative source of income, they would be very grateful.[56]

In January 2002 we began reporting all this in a long series of articles in the *Sunday Telegraph*.[57] When we gave Bridle's contact details, the response from readers was startling. First hundreds, eventually thousands of emails poured in from members of the public, describing their shock at the exorbitant sums demanded of them by asbestos contractors. Particularly interesting was how many of these were private homeowners, who were not supposed to be affected by the HSE's proposed regulations. But already, it was clear, they were falling foul of the system, often at the behest of surveyors, estate agents and building societies, telling them that, unless all asbestos was removed (even if it was only an asbestos cement roof on their garage), their homes would be devalued by up to £50,000.

So committed was Bridle to his role as 'whistleblower' that, in many instances, he was happy to give the practical advice needed to resolve such problems for nothing (most cases involved white asbestos cement, which householders, unlike businesses, were still legally entitled to remove themselves). In more serious cases, requiring an inspection, Bridle would charge for his time; but invariably this still resulted in huge savings for the customer over the sums demanded by contractors.

It was not long before we calculated that he had saved readers of the *Sunday Telegraph* several million pounds. One, a London businessman, who had been saved over £1 million on work needed to his properties in Mayfair and Birmingham, was so impressed that he agreed to set up Asbestos Watchdog, a company dedicated to saving members of the public from the wholesale frauds being practised under the officially approved system.

Inevitably our campaign to expose the inadequacies of the HSE's proposed regulations (and the misinformation being put about over the dangers of white asbestos cement) provoked a storm of protest from the anti-asbestos lobby. This provided a curious picture of the coalition of interests it represented. On one

hand were the asbestos contractors, supported by the HSE (which dismissed our campaign as 'irresponsible'). On the other were Labour MPs, such as Michael Clapham, who had long been a strident champion of the 'ban asbestos' campaign; trade unions, such as the GMB (which published a glossy booklet attacking our campaign); 'asbestos victim support groups'; and, in the background, the International Ban Asbestos Secretariat, now being run from London by Laurie Kazan-Allen, whose brother Stephen Kazan was one of the most prominent asbestos plaintiffs' lawyers in the USA.

It might have seemed odd, thus, to see left-wing politicians and trade unions lining up in support of a lobby whose real purpose was to enrich various commercial interests: first, the asbestos removal industry; second, the lawyers who, increasingly in Britain as in America, were making a fortune from often dubious compensation claims; and thirdly the multinational companies which only supported the cause because they thought it would help them to sell 'asbestos substitutes'.

What angered these critics even more was when our campaign won the support of the Conservative Party, then under the leadership of Iain Duncan Smith. In August 2002, when it emerged that the HSE was hoping to sneak through Parliament the statutory instrument which would put its CAW regulations into law before the end of the summer holiday, Duncan Smith wrote to Nick Brown, the minister responsible for the HSE, demanding that this should not happen until MPs had been given a chance to debate the regulations.

The government had already reduced its estimate of the cost of the CAW regulations from £8 billion, first to £5.1 billion, then to £3.4 billion. Now, faced with this demand from the leader of the opposition, it gave way. In October the Tories' front-bench spokesman John Bercow moved, in a trenchant speech, that the regulations should be withdrawn for redrafting, on the grounds that in their existing form they would merely act as a 'cowboys' charter'.[58] He cited several examples of how the public was already being ripped off by the very people to whom the new law would give even more opportunity to exploit public ignorance. The Minister promised to look at Bercow's examples. But he then claimed, without explanation, that the cost of the regulations had now miraculously come down even further, to only £1.5 billion.

No sooner was the debate over than he left the Commons chamber to sign the regulations, unamended, into law.*

Two months later a further lengthy debate was initiated in the House of Lords by a Conservative peer, Lord Onslow. He again emphasized how the dangers of white-asbestos cement had been wildly exaggerated and that this could lead to the public being defrauded on a colossal scale.[59]

By now the anti-asbestos lobby was becoming so irked by Bridle's attempts to expose what they were up to that they concocted a strange little plot to discredit him. Three years earlier, after a meeting at the HSE when Bridle had revealed in confidence to those present some commercial details about a large overseas company he was acting for, these had immediately been leaked to Eternit. So embarrassed by this breach of confidentiality was the head of the HSE, Tim Walker, that, by way of making up to Bridle he said he could help him obtain one of the new P402 certificates, which the HSE itself had advised Bridle was to become a legal requirement for working with asbestos. Bridle went on a course, to be taught about the HSE's MDHS100 protocol by someone who turned out to have virtually no knowledge of asbestos science. When he was told he had qualified, he ran off two sample letterheads, including a reference to P402, sending one to the BIOH to inform them that he had passed.

He was then informed, however, that he was not qualified after all, because he regarded the MDHS100 as so flawed that he would not use it. He never used the BIOH's qualification again. But two years later, after his whistleblowing campaign had attracted such attention, the BIOH brought pressure on his local trading standards office to prosecute him for fraudulent use of its certificate

* Bercow's successor as Tory spokesman supplied Brown with the details of six typical cases of fraudulent behaviour by HSE-licensed contractors. These included, for instance, a public library in Wales where two small white asbestos ceiling panels had been damaged. An ARCA contractor had said that it would be necessary to remove the entire roof, at a cost of £100,000. The panels were legally replaced for less than £100. In west London HSE-licensed contractors had claimed that a block of flats was riddled with 'dangerous asbestos' that would cost more than £60,000 to remove. When the building was inspected the alleged 'asbestos' turned out to be horsehair. After these case studies were presented to the Minister, no more was heard.

under the Trade Descriptions Act. Out of the blue, Bridle was faced with five criminal charges, all relating to his innocuous use of the P402 qualification on the letterhead he had sent to the BIOH.

This seemed so surreal he assumed the court would throw it out. But the story then became ever murkier. The HSE claimed to have lost its notes on the meeting at which Walker had suggested to Bridle that he should obtain a P402 qualification. In Bridle's absence, while he was lecturing in America, his solicitor, without authorization, pleaded guilty on his behalf to all charges (the solicitor was later struck off). In 2004 the case was reheard, in front of a judge who found its arcane details so confusing that he settled on what he thought was a compromise fair to both sides. He accepted that Bridle was 'honest', of 'impeccable character' and had not 'attempted to deceive', striking out four of the charges. But on the two remaining counts he found Bridle technically guilty.

Bridle's enemies were overjoyed. A lurid version of his conviction was immediately given wide circulation round the industry and the trade press. From then on, whenever he was involved in any asbestos-related battle, details of his 'criminal record' were anonymously sent to everyone involved, from judges to the local papers.

Undeterred, Bridle carried on as before. His opponents therefore now tried a different tack. The chairman of ARCA privately said he now wished to support the campaign to 'clean up the industry', providing Asbestos Watchdog with offices and funding. Bridle was also suddenly treated by the HSE with much more respect. In November 2004 it appointed him as an official 'stakeholder', to be consulted by the HSE on future asbestos policy.*

In his now regular meetings with senior HSE officials, Bridle lost no opportunity to report some of the more flagrant cases of fraud and overcharging that he and Asbestos Watchdog were continuing to come across. The victims ranged from private homeowners, churches and charities to businesses so big that they were household names. On just one large factory in the Midlands, thanks to the intervention of Asbestos Watchdog, the makers of JCB earthmoving equipment were able to save nearly £6 million

* The proposal that Bridle should become a 'stakeholder' was made by Bill McDonald, the HSE's Head of Asbestos Policy, and confirmed in a letter from their legal department dated 27 November 2004.

over the price quoted by contractors. One of Britain's largest housebuilders was quoted £8 million as the cost of clearing a prospective building site in the east of England. When a Watchdog inspection revealed only a scattering of asbestos cement fragments, these were removed by an honest contractor for less than £10,000.

It was clear that, for many of the firms and organizations that could see no alternative to dealing with licensed contractors, the cost of dealing with asbestos had become precisely the disaster Bridle had predicted. It was reported, for instance, that the Royal Albert Hall alone had faced a bill of £70 million for the removal of asbestos, much of it probably quite unnecessary. According to another report, the bill faced by the Royal Palaces was £10 million, most of which, with proper advice, could again probably have been saved.

Among the organizations falling foul of this disaster were local authorities and housing associations, which between them owned and managed millions of properties. One of their most serious problems was that presented by Artex, which, under the CAW regulations, only licensed contractors were now permitted to handle. It also had to be sent for expensive analysis to a UKAS-approved laboratory. For this alone the housing associations estimated that their bill could end up at more than £1.3 billion. Asbestos Watchdog inspected a typical block of council flats in Hammersmith, where each flat contained small quantities of Artex below the windows. The cost of removing this from the flats had been quoted at £700,000. The council owned dozens of similar blocks across the borough.[60]

The HSE's senior officials still refused to take any action on the specific examples of fraud with which they were presented. But so huge and unnecessary was 'the Artex problem' that they eventually agreed to review the requirement that it could only be handled by licensed contractors.

This would be a devastating blow to ARCA, for whose members Artex work contributed as much as a third of their income. They therefore lobbied the HSE relentlessly for it to be retained in the regulations. In June 2005, when Bridle was due to meet senior ARCA members at a London hotel, they boasted to him that they had just had a successful private meeting upstairs with the current HSE minister, Lord Hunt of Kings Heath, unaccompanied by his officials. They were now confident that they would get their way.[61]

Over the following year, however, the HSE's own laboratory, the Health and Safety Laboratory (HSL) carried out exhaustive tests on Artex that confirmed research carried out for Asbestos Watchdog showing that it posed no measurable risk to health. In July 2006 the HSC issued a press release announcing that, to implement EC directive 2003/18, it would shortly be introducing a new, amended version of the CAW regulations.

On one hand, as a concession to the campaigners, the maximum permissible exposure limit for all forms of asbestos was reduced to one fibre per millilitre. This was a change for which the campaigners had long been lobbying Brussels, because it rated chrysotile as just as dangerous as amphiboles. On the other hand, Artex was to be 'removed from the licensing regime as research shows that the levels of exposure to asbestos fibres from such work are low'.[62]

For at least part of Bridle's campaign, this was a considerable victory. He had enjoyed a good year. In November 2005, his international work on behalf of a better understanding of chrysotile had been recognized with the award of an honorary professorship from the prestigious Russian Academy of Medical Science (Russia and Canada being the largest producers of white asbestos in the world).

In June 2006 he had enjoyed another victory, after being invited by Thailand's health minister to speak at a conference in Bangkok. A fellow speaker was to be Dr David Bernstein, an internationally respected, independent toxicologist based in Geneva, whose work on asbestos was recognized all over the world (he had been used as a consultant by, among others, the European Commission).

It then turned out that the conference was organized by Laurie Kazan-Allen's International Ban Asbestos Secretariat, to lobby the Thai government into banning white asbestos. When she heard that the Thai government had invited Bernstein and Bridle to put an alternative point of view, she insisted there was no way they could be allowed to attend.

When Kazan-Allen spoke, she flashed up large pictures of Bridle and Bernstein, attacking them both as spokesmen for the Canadian chrysotile industry and describing Bridle as a charlatan. The following day, Bernstein and Bridle had a long meeting with the minister, who was sufficiently impressed by their evidence to

announce that his country would now be reconsidering its decision to ban white asbestos.

To the anti-asbestos campaigners, this made Bridle more of a hate-figure than ever. A concerted effort must be made, it was decided, to destroy his reputation so effectively that he could inflict no more damage on the cause.

A first puzzling sign came when the senior officials of the HSE suddenly broke off the friendly relations he had enjoyed with them for two years, without explanation. But he only discovered what was really afoot when friends in two of the more honest removal companies warned him that a researcher for a BBC radio consumer affairs programme, *You and Yours*, had been trawling around the industry for anything damning about him she could dig up. It seemed she was being advised by a particularly zealous anti-asbestos activist, an ally of Kazan-Allen, who had himself worked for a firm of lawyers specializing in compensation claims.

When Bridle contacted her to find out what she was up to, it became obvious that nothing he said was going to influence the slant of the planned programme. Even when he invited her to look at documentary evidence that would disprove some of her wilder charges, her response was that this would not be necessary.

When *You and Yours* went out on 18 October, it was one of the most bizarrely partisan programmes the BBC can ever have broadcast. Echoing the points made by Kazan-Allen in Bangkok, Bridle was attacked as a charlatan, a liar and a fraud. Every point ever made against him by his enemies was presented again in the most distorted fashion. Inevitably, full play was made of his conviction in 2004, to portray him as a crooked 'businessman' with a criminal record. Spokesmen for every group opposed to his campaign were wheeled on to say their piece, including two asbestos-removal contractors, two senior HSE officials and the veteran anti-asbestos lobbyist MP Michael Clapham.

The programme was full of factual errors. One HSE official denied that Bridle had ever been appointed a HSE 'stakeholder' (the letter officially confirming this had been among the evidence the researcher had refused to look at). But the most damaging allegation was that he routinely broke the law by 'testing' asbestos himself, instead of sending it off to be analysed by a UKAS-approved laboratory.

Had the programme bothered to check the hearsay evidence it

was given by Bridle's enemies, it would soon have discovered that there was not a shred of truth in this charge. If asbestos could be accurately identified on sight, the law did not require it to be analysed. So experienced was Bridle in recognizing almost every type of asbestos product that in most instances he did not need to 'test' it. Wherever there was any doubt, however, he sent it to be analysed by one of the greatest experts in the country, Professor Fred Pooley of Cardiff University (whose laboratory was accredited by UKAS).

What was particularly odd about this farrago of make-believe was not just that it should be broadcast by the supposedly impartial BBC, but that it should appear on a programme which claimed to champion 'the consumer'. Bridle's sole crime was that for four years he had been trying to expose a major commercial racket. Instead of investigating the facts and supporting the man who was trying to save 'consumers' from this scam, *You and Yours* had allowed itself to be used as a mouthpiece by the very interests which were defrauding the public to the tune of hundreds of millions of pounds a year.

By all those who stood to lose from Bridle's campaign, this carefully planned operation to discredit him was regarded as a major coup. Transcripts and CDs of the programme were instantly distributed throughout the trade, publicized on the internet and, as on the previous occasion, sent to anyone who had professional dealings with Bridle: from companies for which he had acted, to the judge in a case in which he was an expert witness.

Bridle was legally advised that, although the programme was blatantly defamatory, to sue the BBC for libel would be a gamble. With a bottomless purse of licence-payers' money, its lawyers could afford to run up the costs to such an astronomic level that, on a limited budget, he would find it hard to stay in the game. More effective, he was advised, would be first to mount a complaint to the broadcasting regulator Ofcom, on the grounds that the BBC had broken pretty well every professional rule in the book. An official rebuke would force the BBC to withdraw.

A formal complaint was duly lodged. For months, the BBC continued to spin out the resulting exchanges. By the time this book went to press, Ofcom had not yet given its verdict. Meanwhile Bridle's campaign continued. He received dozens of messages from people and companies he had helped, shocked at how the

BBC had been used to discredit him. In the weeks following the broadcast, enquiries to Asbestos Watchdog rose by a third.

Challenging the Scare (2)

With the exception of the *Sunday Telegraph*, the media in Britain had been almost wholly gullible in falling for the misinformation put out by the promoters of the scare. Typical of many examples had been a shock-horror story run over three pages by the *Sunday Express* in April 2006, under a huge front-page headline 'Asbestos kills 147 teachers'. This claimed that, between 1991 and 2000, 147 British teachers had died of mesothelioma, because they worked in 'death-trap classrooms' that were 'riddled with asbestos'.[63] This 'death toll', the paper reported, had been 'discovered by the Government's Health and Safety Executive', after it had been prodded into a study by Michael Lees, whose wife, a teacher, had died of mesothelioma.

What the paper could have learned from a quick look at the HSE's website, was that, on investigating Mr Lees's claim, the HSE found that his belief that 'the number of deaths of primary school teachers from mesothelioma was disproportionately high' was 'not borne out by the facts'. The mortality rate for female teachers was 'in line with the average for the whole of the female working population'.[64]

In the USA, however, where the standards of investigative journalism were rather more rigorous, Roger Parloff's famous *Fortune* article in 2002 had been followed by a succession of other exposés. In August 2004, for instance, the professional journal of US radiologists published a devastating study led by Professor Joseph Gitlin of the Johns Hopkins School of Medicine. Four hundred and ninety-two chest X-rays used by plaintiffs' lawyers in support of compensation claims were submitted for re-evaluation to a group of six independent radiologists. The lawyers' 'B readers' had found that 96 per cent of the radiographs showed signs of damage compatible with exposure to asbestos. The independent team found that only 4.5 per cent showed any 'abnormalities', and these were mostly non-malignant scarring which probably had little connection with asbestos.*

* Gitlin, *et al.*, 'Comparison of B Readers' Interpretations of Chest Radiographs for Asbestos Related Changes', *Academic Radiology*, August

The following month the *St Louis Post-Dispatch* shone the spotlight on how, in just one small county in Missouri, a single local law firm, headed by Randall Bono, had since 2000 earned hundreds of millions of dollars bringing claims on behalf of supposed asbestos victims. In 2003 alone more than $1 billion-worth of new claims had been filed in Madison County, where the courts were run by elected Democrat judges, whose campaigns were lavishly funded by Democrat plaintiff lawyers. Of 1,500 mesothelioma suits filed in the whole of the USA in 2003, 457 had been filed in Madison County, 375 by Bono's firm.[65]

In the same month, Parloff himself returned to the charge with another major investigation in *Fortune*, updating on his earlier exposé in 2002. He focused on another law firm, Motley Rice, which had made billions of dollars out of both asbestos and tobacco compensation cases. Ron Motley had first sprung to prominence as a young asbestos lawyer in the early 1980s when he had won $1 million to compensate a client just for the fear that he might one day get cancer. In 1998, he and his partner Joe Rice negotiated a settlement with the tobacco industry that would ultimately cost $246 billion, earning $2–3 billion in fees for Motley Rice. In 1999 Motley was glowingly portrayed for his role in fighting the tobacco barons in a Hollywood film, *The Insider*.

Since Parloff's first article, the legal asbestos scam had become even more fanciful. Not only were the vast majority of claims now being made on behalf of the 'unimpaireds'. Having bankrupted more than 70 major firms, the lawyers had extended their targets to include corporations whose connection with asbestos was vestigial or non-existent, such as the mail-order giant Sears Roebuck, sued because it had sold asbestos-containing products. 3M was sued for selling dust masks which allegedly failed to protect workers from asbestos, even though the masks were never designed for this purpose.

The consequences for the insurance industry, which had to pick up most of the bills, were proving catastrophic. Typical of the continuing disaster was an announcement in 2002 by just one insurance firm, Royal Sun Alliance, that, 'due to asbestos claims',

2004. A 'B reader' held a certificate from the Institute of Occupational Safety and Health (IOSH) entitling the holder to testify on the basis of interpreting radiographic evidence.

its six-monthly profit figure had fallen from £459 million to zero.[66]

Even some of the lawyers themselves had become alarmed by the implications of what was happening. In 2000, Laurie Kazan-Allen's brother Steven Kazan had set up a committee to campaign against the way so many billions of dollars were being siphoned off by the firms who filed mass-claims on behalf of the unimpaireds. This, Kazan argued, meant that there was very much less money available to compensate those, such as his own clients, who were genuinely damaged.[67]

In a desperate bid to provide some final resolution to this unending nightmare Senator Orrin Hatch, Chairman of the Senate Judiciary Committee, in 2003 introduced a bill known as the Fairness in Asbestos Injury Resolution Act (FAIR). Funded by industry, this would set up a $140 billion trust fund to pay off all present and future asbestos claims. It was resolutely opposed by a caucus of Democrat senators who had each received huge sums in campaign funding from law firms, and in 2004 they prevented the bill from coming to a vote.*

This prompted President George W. Bush, in his State of the Union speech in January 2005, to deplore the way 'justice is distorted and our economy is held back' by 'frivolous asbestos claims'.

Not until June 2005 was the scandal finally brought to a head when, in a court in Corpus Christi, Texas, Judge Janis Graham Jack delivered a trenchant 249-page judgement in a case involving 20,000 compensation claims against 250 companies for silicosis. As a former nurse, Jack could not understand how a disease that officially caused fewer than 200 deaths annually in the entire country could result in so many claims. Her suspicions were further aroused by the fact that 99 per cent of the diagnoses of silicosis had been carried out on behalf of the law firms involved by just nine doctors. She had become even more suspicious when she learned from the defence that 60 per cent of the plaintiffs had already claimed, through the same law firms, for lung-damage caused by

* Among those senators who worked to defeat the FAIR Act, with the funding registered as having been contributed to their campaigns by law firms, were Joe Biden (Delaware, $873,116), Edward Kennedy (Massachusetts, $654,000), John Kerry (Massachusetts, $1.4 million), Hillary Clinton (New York, $2 million) and John Edwards (North Carolina, $4.66 million): *www.asbestoscrisis.com*.

asbestosis, since she was aware that it was clinically all but impossible to differentiate between the two diseases.[68]

Even as early as February, Jack had characterized the evidence being laid before her as raising 'great red flags of fraud'. Of the 8,179 'silicosis victims' whose X-ray details had been put to the court, 78 per cent had been diagnosed by a single doctor, who had also been responsible for diagnosis in 52,600 asbestos claims against the Manville Trust. He charged a minimum of $10,000 a day to take part in screenings, and it was estimated that his diagnoses had probably over the years cost asbestos defendants more than $3 billion.*

In her judgement, Jack noted that statistics alone should have shown that the case before her defied 'all medical knowledge and logic'. She was withering about the conduct of the doctors, one of whom openly admitted that he did not even know the criteria for diagnosing silicosis but had merely inserted in each of his reports a paragraph dictated by the screening company acting for the lawyers. 'These diagnoses', she said, 'were driven by neither health nor justice: they were manufactured for money.'[69]

But Jack reserved her most damning criticism for the law firms themselves. In showing 'reckless disregard of the duty owed to the court', their 'clear motivation' had been 'to inflate the number of plaintiffs and overwhelm the defendants and the judicial system'.

Although the case before Jack centred on silicosis, she left no doubt that its implications extended to the infinitely larger number of cases brought in relation to asbestos. Within months grand Juries had been empanelled in Texas and New York to investigate the conduct of law firms and medical witnesses involved in asbestos claims.

Whatever serious or lasting effect this might have on the scandal that had been corrupting America's legal system for three decades, the fact remained that, for the first time, a diligent judge, aided by the skilful researches of the defence team, had called the bluff of what had become the greatest single collective fraud in legal history. In that respect, her judgement recalled the trenchancy of that

* R. Parloff, 'Diagnosing for dollars', *Fortune*, 13 June 2005. Parloff described how certain law firms had moved on to silicosis cases when, around 2001, the future of the asbestos claims industry became shadowed by the possibility of Congressional action to halt the scam.

ruling by the federal appeal court in 1991 which had thrown out the EPA's bid to ban almost all forms of asbestos, on the grounds, *inter alia*, that this would lead to spending $250 million just to avert a risk considerably less than that of dying from swallowing toothpicks.

The Most Expensive Word in History

No one can ever know the true overall cost of the great asbestos scare, except that it will certainly amount to hundreds of billions of pounds. So many different groups of people have been affected by it in so many ways, ranging from the giant corporations brought to their knees by what President Bush called 'frivolous asbestos claims', to householders told by mortgage companies that their homes are unsaleable because they have asbestos cement on their roof. Ultimately almost everyone in the western world will have been financially affected, through higher premiums from the insurance industry, which has had to foot so much of the bill.

The key to the scare was that confusion between the different minerals passing under the same name. In earlier times, possibly tens of thousands of people suffered often-fatal damage to their health through prolonged workplace exposure to very high doses of amphiboles. But by the twenty-first century amphiboles had so long been withdrawn from common use that very few people born after 1940 would be affected.

The greatest trick of the scaremongers had been to ascribe those same dangers to white asbestos: in particular to the cement products which formed 90 per cent of all asbestos-containing materials. For years there had been confusion even among the scientists themselves as to how the risks posed by the different types of 'asbestos' were actually caused. But in the early twenty-first century a series of studies by a small number of independent scientists established this very much more clearly.

In 2005, for instance, Dr Bernstein and others showed by a series of experiments using electron microscopy that even longer chrysotile fibres were cleared so soon from the lung that their half-life was only 11.4 days.[70] In a further study, they found that chrysotile fibres showed no significant pathological response even at exposure concentrations 5,000 times greater than the USA's maximum permissible limit.[71]

A separate study by Dr Bernstein and Dr John Hoskins showed how chrysotile fibres rapidly break up in the human lung into fibrils so small that their effect is similar to that of dust particles. This was why 'heavy and prolonged exposure to chrysotile can produce lung cancer'. Proper scientific understanding had been confused by animal experiments, which had 'unfortunately been performed at very high fibre concentrations resulting in lung overload'. The relevance of these to human exposures was thus 'extremely limited'. They concluded that 'low exposures to chrysotile', of the type likely to be experienced by anyone not working industrially with huge quantities of raw chrysotile (such as those factory workers a century ago), present no 'detectable risk to health'.[72]

In 2007 Bernstein, Hoskins, Professor Pooley and four other respected scientists published a further magisterial paper on 'misconceptions' arising from the classification of white asbestos by the IARC as a Class 1 carcinogen. They criticized the IARC for drawing insufficient distinction between a 'hazard' and a 'risk', leading 'governments and pressure groups' to misrepresent 'hazard data' as 'risk data'. They particularly blamed the IARC for failing to distinguish between chrysotile and amphiboles, when 'the overwhelming weight of evidence available indicates that chrysotile can be used safely with low risk'. They emphasized the damage that any further bans on white asbestos could do to the developing world, where 'cement products such as water pipes and boards for housing' have proved invaluable. If these were no longer available, this would 'cost rather than save lives'.[73]

What had been lost, as much as anything else, in all the years when the scare swept all before it, was the chief reason why asbestos had originally been hailed as the 'magic mineral'. This was because, thanks to its fire-resistant properties, it saved human lives. It had then become a life-saver in a quite different fashion, on an even greater scale, by providing the cheapest and most efficient means to supply water to those billions of people across the world for whom this is one of the biggest problems they face.

Even now there is no scientific evidence that the fibres from the synthetic materials advertised as 'asbestos substitutes' are in fact any safer than the asbestos they are intended to replace.* Not only

* A report in 1998 on 'Health effects of asbestos substitute fibres' by INSERM, France's leading institute for medical research, stated that

is there overwhelming evidence that cement made from white asbestos is safe. It is probably very much safer than many of its substitutes.

Thus, in every possible way, thanks to the linguistic confusion which allowed the same term to be used for two quite different minerals, did the scare make 'asbestos' arguably the single most expensive word in history.

Notes

1. Lester Brickman, 'Asbestos litigation: malignancy in the courts', *Civil Justice Forum*, 40, August 2002.
2. 'Asbestos and other natural mineral fibres', *Environmental Health Criteria*, 53 (WHO, Geneva, 1986).
3. Geoffrey Tweedale, *Magic Mineral to Killer Dust: Turner and Newall and the Asbestos Hazard* (Oxford University Press, 2001), to which this section is particularly indebted.
4. Malcom Ross and Robert P. Nolan, 'History of asbestos discovery and use and asbestos-related diseases in context with the occurrence of asbestos within ophiolite complexes', Geological Society of America, special paper 373 (2003).
5. Pliny, *Natural History*, Book XIX, 4. Anti-asbestos campaigners have tried to claim that Pliny described the dangers of asbestos to those who mined it (Bk.33.122), but this was based on a misreading. Pliny was describing those who worked with cinnabar or mercury ore (K. Browne and R. Murray, 'Asbestos and the Romans', *The Lancet*, 336, p. 445). For a history of asbestos textiles from the ancient world to modern times, see Clare Browne, 'Salamander's Wool: the historical evidence for textiles woven with asbestos fibre', *Textile History*, 34, (1), 64–73 (2003) (drawing also on the extensive knowledge of her father Dr Kevin Browne, a leading medical expert on asbestos).
6. Browne, 'Salamander's Wool' (2003).
7. We are particularly indebted in this section to Tweedale, *Magic Mineral to Killer Dust* (2001).
8. Lucy Deane, 'Report on the health of workers in asbestos and other

'because the fibre structure of asbestos is a major pathogenic factor, any new fibre proposed as an asbestos substitute (or for any other use) should automatically be suspected as being pathogenic because of its structure'. It is remarkable how little research has been carried out into the risks posed by these materials, which it is safe to predict will one day be the subject of a major 'scare'.

dusty trades', *Annual Report for 1898*, HM Chief Inspector of Factories and Workshops.
9. Montague Murray, *Minutes of Evidence*, HM Departmental Committee on Compensation for Industrial Diseases (1907), p. 127.
10. M. Auribault, 'Sur l'hygiene et la sécurité des ouvriers dans la filature et tissage d'amiante', *Annual Report of the French Labour Inspectorate*, *1906*.
11. Tweedale (2001).
12. *Ibid.*
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14. David Gee and Morris Greenberg 'Asbestos: from "magic" to malevolent mineral', in *Late Lessons from Early Warnings: the Precautionary Principle 1896–2000* (European Environment Agency, 2001).
15. R. Doll, 'Mortality from lung cancer in asbestos workers', *British Journal of Independent Medicine*, 12, (1955), 81–6.
16. 'UK asbestos: the definitive guide', compiled by a Working Group of Actuaries and presented to GIRO Convention, Killarney, 2004 (available on *www.actuaries.org.uk*).
17. J. C. Wagner, *et al.*, 'Diffuse pleural mesothelioma and asbestos exposure in the North Western Cape Province', *British Journal of Industrial Medicine*, Vol. 17 (1960), pp. 260–71.
18. M. Newhouse and H. Thompson, 'Mesothelioma of pleura and peritoneum following exposure to asbestos in the London area', *British Journal of Industrial Medicine* (1965). See also, D. Gee and M. Greenberg (2001).
19. I. J. Selikoff, *et al.*, 'The occurrence of asbestosis among insulation workers in the United States', *Annals of the New York Academy of Science*, 132 (1965) 139–55.
20. Witness statement by Roger Bradley, in Utah v. Lloyd's of London, 19 July 1996 (*www.truthaboutlloyds.com/litigation*).
21. 'Working Group on Asbestos and Cancer: Report and recommendations of the working group convened under the auspices of the International Union Against Cancer', *Annals of the New York Academy of Sciences*, 132 (1965), 706–21.
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23. F. M. K. Liddell, 'Magic, menace, myth and malice', *Annals of Occupational Hygiene*, 41, 1 (British Occupational Hygiene Society, 1997), pp. 3–17.

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25. Bradley, witness statement, *op. cit*. Bradley was reporting on a conversation with Ralph Rokeby-Johnson, a leading underwriter, while they were playing golf in October 1973 (see also 'The decline and fall of Lloyd's of London', *Time Europe*, special report, 21 February 2000, Vol. 155, no. 7).
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28. Selikoff, *et al.*, 'Mortality experience of insulation workers in the United States and Canada 1943–1976', *Annals New York Academy of Sciences*, 330, 91–116.
29. Detailed sources for this episode can be found in Edith Efron, *The Apocalyptics: How Environmental Politics Controls What We Know About Cancer* (Simon and Schuster, 1984), pp. 437–49.
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37. Two main sources for this section are Roger Parloff, 'The $200 Billion Miscarriage of Justice', *Fortune*, 4 March 2002; Brickman, 'Asbestos litigation' (2002).
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40. Corrosion Proof Fittings v. EPA, 947 F2d 1201 (5th Circuit) 1991.
41. For figures in this passage, see Fumento, 'The Asbestos Rip-Off'.
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44. *Ibid.*

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63. *Sunday Express*, 2 April 2006.
64. *Sunday Telegraph*, 9 April 2006.
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