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The Rochdale Asbestos Cancer Studies and the Politics of Epidemiology:

What You See Depends on Where You Sit

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The history of the exploitation of epidemiology by the U.K. asbestos industry and the subsequent obscuring of the disastrous results of exposures is presented, exploring in particular the roles of Sir Richard Doll and his colleagues. Epidemiology, often regarded as a neutral science, is susceptible to socio-political influences. *Key words:* epidemiology; asbestos; industry influence; Sir Richard Doll; Julian Peto; Rochdale.

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Even during his lifetime, Sir Richard Doll (1912–2005) was regarded as the leading epidemiologist of his era—a man whose medical contribution was of “Harveian proportions.”¹ When Doll died, aged 92, obituarists vied with themselves to laud him. His authorized biographer portrayed a man who had saved millions of lives, with a legacy that was “imperishable,” “iconic,” and central to the social history of post-war Britain.²

Certainly Doll’s career was important in establishing the link between smoking and cancer. Even so, it is surprising that no obituarists saw any contradiction between the youthful Communist sympathizer and the older Establishment figure. Not everyone has been so admiring. In his own lifetime, carefully-worded accounts portrayed the Oxford don less flatteringly, as an academic who was quite capable of sidelining colleagues he did not like.³ Doll was also attacked for having a pro-industry track record on disease prevention and for underestimating the prevalence of environmental and occupational cancers.⁴ Doll was particularly criticized for his role in the asbestos tragedy.⁵ This article further explores this aspect of his work and focuses on the stance that he and his colleagues took when dealing with this hazard. It shows how epidemiology—which is often regarded as a neutral and purely scientific discipline—was always intertwined with the socio-political aspects of asbestos production. This gave the science a slant that hindered a fuller appreciation of the risks of asbestos.

EARLY ASBESTOS CANCER STUDIES

Since the early 1940s, when cancer in the industry became prominent, asbestos companies have sup-

ported (and hindered) research into asbestos-related diseases (ARDs). In 1953, Doll was asked to assess the incidence of lung cancer at Turner Brothers Asbestos (TBA) in Rochdale, England. This factory was the headquarters of the Turner & Newall (T&N) group—the largest company in the U.K. asbestos industry. In 1955, Doll’s published results demonstrated an increased lung cancer risk for workers in this asbestos textile factory.⁶ This study demonstrated Doll’s statistical talents and the potential of an emerging branch of medicine—epidemiology. Other aspects of this paper also reflected credit on Doll, because he published it against the wishes of T&N.

Doll could never have imagined that the paper would have become so significant and so scrutinized. After all, his conclusions were hardly surprising: Germany had introduced compensation for asbestos-related lung cancer in 1943; and in the United States and the United Kingdom this disease was recognized before 1955.⁷ But the paper was a landmark because it seemed to offer statistical certitude—something that was important then and in later litigation (which also brought the T&N archive into the public domain). The archive showed not only T&N’s attempt to derail the paper and Doll’s fortitude in publishing, but also his amendments to preliminary drafts. It has been suggested that those revisions—which suggested that the lung cancer hazard was eliminated at TBA (due to the implementation of government dust regulations after 1931)—were a response to company pressure.⁸ A “quid pro quo” may explain why, after this paper had appeared (and the bad publicity had not materialized), T&N invited Doll to resume his studies.

In 1964, Doll and T&N updated the Rochdale cohort. Again, it was potentially controversial. Mesothelioma had now been publicized as a hazard; while research conducted by the American physician Dr. Irving Selikoff had shown very high rates of asbestos-related disease (ARD) in the insulation industry. Selikoff had relied not, as Doll did, on company data, but on trade union records—thus giving his epidemiology a different perspective.⁹ Selikoff’s work triggered a wave of bad publicity for the industry, especially after it was presented at a key asbestos conference in New York in 1964. Doll did not attend the conference, but TBA’s physicians (such as Dr. John Knox) and its tech-

nologists used the analysis of asbestos textile workers to portray an industry that was shedding its hazardous past. Doll and T&N had concluded that, "it is possible that the specific occupational hazards to life have been completely eliminated, but it is not now possible to assert this with confidence and further detailed observations are needed."¹⁰ Not surprisingly, it was the first part of this quotation (repeated in 1968¹¹) that appealed most to the company. However, T&N physician Dr. Hilton Lewinsohn visited Selikoff in New York in 1971 and told him about several mesotheliomas at Rochdale that had not been included in the published studies. Lewinsohn noted: "Selikoff still remains very critical of the work of Doll and feels that the low incidence of malignancy in the men exposed for 20 years is because they should have been followed for at least 30 years in order to demonstrate the increasing incidence of malignancy due to asbestos exposure."¹² Also, the cohort was small—only 198 men had 20 or more years' experience in the factory by 1961—and not everyone had been traced. Lewinsohn, though, expected Selikoff to be proved wrong.

Perhaps the biggest problem, however, with Doll's early Rochdale studies is reconciling the published picture with other evidence. U.K. government data presented in New York showed a worrying general increase in lung cancer among asbestos workers (much of it in activities, such as insulation, upon which Doll and the industrialists were silent). Moreover, in the year that the Rochdale study was published (1965), Dr Bill Kerns—Knox's successor as medical officer at T&N—resigned because he had been "appalled" at dust in the company's factories (including Rochdale) and because he had been refused permission to publish mesothelioma cases.¹³ Moreover, the dust levels recorded in the 1968 paper (never above 8 f/cc) bear little relation to much higher levels that are recorded in company papers released later in litigation.* The early published Rochdale studies can look like an exercise in public relations.

CHRYSOTILE CONUNDRUMS

In 1972 (soon after Doll was knighted), the company asked him to resume his investigation. The context for this approach was provided by new government regulations for asbestos (introduced in 1969); media stories about dead and dying workers at a factory at Hebden Bridge owned by Cape Asbestos Company; and the growing mesothelioma problem.

Doll now had the help of Julian Peto, a statistician who joined Doll's Oxford University unit in 1974. Peto, who was to emerge as a prominent epidemiologist in his own right, increasingly took over the work. (It

should be noted that Julian Peto's brother was Richard Peto, another epidemiologist associated with Doll and another figure destined to gain international recognition and a knighthood for his work on the health effects of smoking.) With the triad of ARDs (asbestosis, asbestos-related lung cancer, and mesothelioma) now known, the emphasis was on tightening the so-called "safe" dust level for working with asbestos. Julian Peto ambitiously enlarged the scope of the original study by attempting to relate ARDs at the factory to dust levels. Unfortunately, no reliable dust data were available until the 1960s; the cohort remained small; and the extent to which previous employees had smoked (an important consideration because of the dangerous synergy between tobacco and asbestos) was unknown. The biggest conundrum was that asbestos-related cancers take so long to appear—for example, between 30 and 60 years for mesothelioma. Even so, Doll and Peto soon found an excess of lung cancers and respiratory disease in TBA workers exposed after 1933 (thus vindicating Selikoff's view that the "elimination" of asbestos-related lung cancer at Rochdale was illusory).

This was a sensitive finding for TBA, because, as one manager wrote, "published figures have an emotive impact . . . [which] is aggravated by the media."¹⁴ To avoid such problems, the company got Doll and Peto to agree that publication required company approval—an undertaking that did not survive Peto's conference trip to America in 1976. The preliminary research he presented there on excess lung cancer deaths was headlined by the *Sunday Times* in early 1977.¹⁵ Doll, who at first suspected Peto had been briefing the newspapers, issued a press statement the next day in Oxford denying the obvious: that his department had thrown British safety standards into doubt.¹⁶ The statement was promptly circulated to the Rochdale managers to quell anxiety on the factory floor. Such a swift denial reflected complaints that Doll had received from TBA. The company made noises about scrapping the survey and pointed the finger at "certain of your staff," who had created a "brittleness."¹⁷ Doll made a fulsome apology, confirmed that "no use will be made of [data] publicly without approval,"¹⁸ and blamed the Americans for giving conference papers to journalists.

Meanwhile, in 1976 the scandal at Hebden Bridge had forced the government to launch a public inquiry. This was the government's Advisory Committee on Asbestos (or Simpson Committee), which began its hearings in the summer of 1977. The hearings were significant, because it was a public forum in which both the industry and its opponents could state their cases. T&N intended deploying Doll's Rochdale papers (1955, 1965, and 1968) to show that cancer was a thing of the past, but became apprehensive when Peto agreed to update the Committee.

Peto's mathematical skills—insofar as lay people and the committee could understand them—could not be

*Asbestos fibers in this era were counted under an optical microscope and the results expressed as fibers per cubic centimeter (f/cc, or its equivalent f/mL). In lay terms, this was fibers per thimbleful of air.

gainsaid. His contribution was likely to be regarded as authoritative. He was also (unlike the avuncular Doll) self-assertive and sometimes blunt—a man unlikely to be overawed by rumbustious public hearings. When Peto presented his paper to the Simpson Committee, TBA mostly liked what they heard and praised his “more reasonable attitude.”¹⁹ He began by saying that T&N had been unfairly attacked; argued that much of the reaction to mesothelioma had been hysterical; and that “a lot of people are certified as having asbestosis when they obviously don’t deserve it”—an unsupported claim that was greeted from the floor with cries of “nonsense.” After presenting his complex models, Peto concluded that the problem was essentially one of relative risk: “I think it’s sensible to take the risk of killing a few people—it’s not an entirely safe world, and it shouldn’t be.”²⁰ Peto had made his mark and joked to TBA that he had been “attacked from the floor as a capitalist lackey!”²¹

Scrutiny of the fine print, however, revealed less palatable facts for TBA. First, the data showed an excess of lung cancer deaths. Second, Peto was forming the idea—against the prevailing industry wisdom—that chrysotile (white asbestos) could cause mesothelioma. This was for the simple reason that mesotheliomas had occurred in the Rochdale factory, which was basically a chrysotile producer. TBA’s reaction to this commercially-damaging revelation was singular: when mesothelioma was first publicized in the early 1960s, the company had blamed crocidolite (blue asbestos) and denied its use in TBA products. As the Doll/Peto research progressed, however, TBA suddenly began to find evidence that the company had used crocidolite—albeit in small quantities—up to the 1960s. Third, Peto was attempting to assemble data on dust levels at TBA before the 1960s, so that conclusions could be drawn from the morbidity/mortality figures. The company believed that these dust levels had been very high, with mean values in some jobs as high as 26 f/cc even as late as 1972 (thus explaining current deaths and subtly presenting current working conditions and the statutory 2 f/cc threshold in a good light). However, Peto argued that average dust counts after 1931 had never exceeded 15 f/cc.

After the hearings, Peto told TBA that he wanted to publish a version of the Simpson presentation. A preliminary copy was forwarded to TBA in September 1977. The directors and managers were unhappy. One complained: “there appear to be no end to the assumptions and extrapolations he is prepared to make.”²² Another added: “I think more harm than good would result if we were to show our displeasure by refusing to give approval for publication.”²³ An exchange of letters began. There was never any explicit threat to veto publication, but TBA suggested changes in the text. Peto sent another draft to Richard Wells, the managing director, with a covering note asking whether the com-

pany was satisfied and, if not, what further amendments would be desirable.²⁴ But this was not acceptable either. TBA managers noted that Peto had “slipped in” a new section which highlighted how chrysotile migrated to the pleura, where mesothelioma usually occurs. They wanted this section deleted or, if not, for Peto to imply that such ideas were “speculations.” They continued to object to the 15 f/cc ceiling; they regarded some statements about lung cancer as “emotive” (and suggested a judicious use of emphases); and wanted a statement that the risk of mesothelioma was dose-related and that only very high dust levels produced an appreciable risk after a brief exposure.²⁵ While TBA managers tried to edit the text, they simultaneously attempted to distance themselves from it by insisting that Peto make it clear in his endnote that “the views expressed in your paper are those of the author and not necessarily those of T&N and TBA.”²⁶

Peto evidently would not budge on the mesothelioma paragraph or his dust estimates, but accepted some of TBA’s suggestions. Eventually the company let it go and the final version appeared in the *Lancet* in 1978.²⁷ TBA still had misgivings and wrote to the *Lancet* that Peto had underestimated historic dust levels. The letter was scrubbed by TBA shortly before publication, leaving the dust issue unresolved. However, the company by nibbling at the paper had apparently got some of its ideas across: that mesothelioma was dose-related, that some of the science was speculative, that crocidolite had been a factor at TBA, and so on. It is a conceit of epidemiology that it offers scientific precision: yet this episode shows that science can look like diplomacy, in which vested interests try to defend their corner and the epidemiologist attempts (while dependent upon company data) to publicize unwelcome facts.

Subtle pressures came from other directions. Peto’s paper, above all, discredited the British Occupational Hygiene Society (BOHS) 2 f/cc standard,[†] which had been based on TBA data and had stood for nearly a decade as a “safe” threshold for asbestos workers in Britain.²⁸ If there is a criticism of the paper to be made—providing one accepts its models and suppositions—it is that it did not make its points forcefully enough. Peto believed that the BOHS standard was “wildly wrong.” However, this comment was not published in the *Lancet*, but in a private letter to a trade unionist that was shown to a government committee in 1983. Peto later lamented that he had made his criticisms in the *Lancet* “far too obliquely,” presumably because of his position as a relatively junior academic

[†]The BOHS was an unofficial and self-appointed body of (mostly) industry physicians and scientists. The two-fiber limit (which nevertheless meant that workers would still inhale many millions of fibers per day) was supposed to cut the risk of asbestosis to about 1% over a working life. The threshold’s protection against cancer was not estimated.

within a complex web of professional, political, and commercial interests.²⁹ He was briefly a member of the BOHS asbestos standards subcommittee, where his trenchant criticisms disrupted plans to set another industry-friendly threshold. Overall, Peto could claim that he had succeeded (like Doll in 1955) in putting contentious findings into the public domain: the chief of which was that there was still a significant lung cancer risk at TBA. This was duly noted by the industry's critics.

POLITICS AND EPIDEMIOLOGY

Doll was often seen to epitomize the altruistic, humane, and curiosity-driven scientist. It was a role that Doll fostered, with a view of science as somehow being neutral and above the fray. Epidemiology, which elided scandal, anonymized workers and factories, and rarely described the suffering of diseases, lent itself to this approach. But this apolitical exterior hid important social and political values.

Central to the Rochdale method was an emphasis on the factory: a belief that exposures in such environments were essentially low and controllable; and that by scientific calculation dust thresholds could be set so that asbestos use could continue. This emphasis on the factory was a hangover from government regulations, which between 1931 and 1969 had institutionalized the fiction that the only asbestos dust that was hazardous was within the factories (and even then, only in the dustiest processes in so-called "scheduled areas"). This was despite growing evidence to the contrary.

This was combined with the concept of acceptable risk, in which the adverse health effects of hazardous materials were traded against socioeconomic benefits. When Peto told TBA in 1979 that, "I have always thought the risks of the order of 1% or 2% are quite acceptable,"³⁰ he was articulating a common post-war value judgement that deaths must be balanced against jobs. The preferred method for quantifying such a risk was the average loss of life expectancy spread over the whole population exposed to the risk (for chrysotile produced under stringent control this was estimated at a few months). This concept found predictable favor with the asbestos companies and the government, but however it was expressed it could still be contentious. As Peto made clear, he was expressing a personal judgement and not all doctors accepted 1% (or indeed any percentage) risk as acceptable. The biggest problem was calculating the risk accurately, when a mistake in the measurements or modeling could cost lives. Those sensitive to class issues will observe that calculating risk was largely the preserve of scientists, industry, and the government, who then made a social (and often unspoken) judgement—for which their training provided no special qualification—on what risks *others* should bear. The trades unions naturally complained that it was

simply a rationalization of industry's presumption that it was reasonable to contaminate workers. Certainly, acceptable risk was politically and socially constructed, which is why it changed over time. Regulatory agencies now strive for one death per thousands of workers.

To Doll and the Petos, the real cancer problem lay elsewhere—in lifestyle factors, such as diet, but especially smoking (which could shorten life on average by five years or more). For the labor force—whether in the asbestos industry or not—the overwhelming majority of lung cancers would be caused by tobacco, not by industrial hazards, such as asbestos. This was a characteristic shift among cancer researchers in the post-war era, which diminished the earlier emphasis on workplace conditions—skewing the scientific agenda in what some have seen as a "victim-blaming" direction. The classic statement of this view was made by Doll and Richard Peto in 1981, when the U.S. Congress asked them to review risk factors in the causation of cancers. That Doll was asked to conduct such a review gives an insight into the American government's suspicion of its own scientists and the extent of Doll's influence. The published report relegated occupation to a minor role in causing cancers, with only about 4% of cancers estimated as due to this cause, compared with about 65% for tobacco and diet.³¹ These low estimates of occupational cancers, though not universally accepted, chimed with the anti-regulatory ideology of the Reagan era and had an enduring influence on health and safety policies in the United Kingdom.

Julian Peto was quoted as saying that it was "absurd" for smokers in the West to worry about anything except stopping smoking.³² Doll, of course, had a particular reason for focusing on smoking, but he was also a tireless, long-lived, and sanguine man from a generation that had endured the Second World War. He saw no major problem with asbestos and was critical of the "emotional attitudes of the public." The "very small risks" meant that there was "no reason to single out asbestos for public obloquy."³³ Doll's defence of the carcinogenic mineral is intriguing in the context of his own work, especially when one considers the mineral's synergy with tobacco (which dramatically increases the risk of lung cancer).

Doll's scientific and social conservatism was reflected in other ways. He would never countenance anything that smacked of campaigning, and one of his favourite dictums was: "I never told people they shouldn't smoke, just that if they do they will kill themselves."³⁴ According to Julian Peto, the unwritten message in Oxford was that publication of unwelcome findings should be surreptitious. This may have reflected the fact that Doll's unit was funded by the government's Department of Health and Social Security (a linchpin in the invidious compensation system). Interestingly, Doll had chaired DHSS enquiries into asbestos (1968, 1971) that concluded that there was a cancer

risk to the public and that "no amount of exposure is completely free from risk."³⁵ Neither report was made public, and presumably their findings would have remained secret had not public pressure forced their release in 1975. More significantly, Doll was first Warden (or head) of Green College at Oxford University, which had been founded in 1979 with an endowment from the wealthy American businessman, Cecil Green. The college embodied Doll's vision of a working relationship between industry and the medical community.

When the wave of asbestos litigation hit, Doll mostly kept clear of it; Peto shunned it. But Doll did accept some legal requests and these were invariably from the leading asbestos companies, such as Johns-Manville and T&N. In affidavits, Doll offered tepid accounts of the development of knowledge about the cancer risk and never testified about T&N's attempt to suppress his work in 1955—indeed one affidavit stated less than candidly that he always received cooperation and assistance from T&N.³⁶ The 1955 debacle became public only when environmental consultant Dr. Barry Castleman began slowly to piece together the evidence some 30 years after the event (and not until the mid-1990s did litigation reveal a fuller picture). Such tact won appreciation. In June 1985, Doll agreed to meet T&N's lawyers "about your problems in the United States."³⁷ Two months later, Doll was writing to T&N's managing-director, Colin Hope, to thank him for a donation to Green College.³⁸

OUTSIDE THE FACTORY WALLS

Outside factories and Oxford colleges, asbestos had been used widely. By 1964, the disastrous effects of asbestos insulation were public knowledge. Selikoff (and fellow scientists, such as Wilhelm Hueper) warned that:

The floating fibers [of asbestos] do not respect job classifications. Thus, for example, insulation workers undoubtedly share their exposure with . . . electricians, plumbers, sheet-metal workers, steamfitters, laborers, carpenters, boiler makers, and foremen; perhaps even the supervising architect should be included.³⁹

As the problems of asbestos spread, new discourses began highlighting political, social, and ethical issues. Activists and victims' groups argued not for the controlled use of asbestos, but its ban. Something of the difference in tone between the scientific discourses and those by activists can be sampled by reading *Asbestos Killer Dust*, written by the socialist Alan Dalton in 1979.⁴⁰ He dedicated it to the many workers "murdered" by the asbestos industry. Dalton deprecated the scientific work supported by the industry and criticized the fact that so few doctors helped workers in court

cases. Dalton was immediately sued for libel by one such physician, Dr Robert Murray, and bankrupted. Murray continued the work for which Dalton had criticized him—as an asbestos industry consultant.

Less easily stifled was a television documentary, *Alice—A Fight for Life*, which had been screened in July 1982. It featured the slow and agonising mesothelioma death of Alice Jefferson, a 47-year-old Yorkshire mother, who had worked for a few months at Cape's notorious factory in Hebden Bridge. The documentary was a major attempt to wrest the agenda from the asbestos industry and established science. The second part of the program targeted T&N and had enormous repercussions in Rochdale. Faced with this onslaught, T&N reacted predictably by deploying the patrician Doll in defense of the commercial order. He hated the film's appeal to the emotions and its campaigning style (with its criticisms of TBA's factory) and agreed to travel to Rochdale to speak to the workers.

Doll made no attempt to engage with *Alice's* documented allegations (indeed he never mentioned the film). Instead, he focused on the current risk of working at TBA, with the emphasis upon reassurance. At the core of his talk was the Oxford risk assessment: a 2½% risk for anyone who had spent their working life at TBA. Doll told the workers that asbestos might, in certain individuals, reduce life expectancy by about three months (a calculation made by dividing by 40 the ten years lost to the individual worker because of ARD, to give an *average* loss to all the workers exposed to the risk). "Well I think that's a pretty outside chance," Doll told everyone, "If there are any of you who go to the races he would call a 40-1 chance an outsider. . . ."⁴¹ Doll finished by telling the workers not to stop using asbestos, but to give up smoking, since "individuals working here can do more to diminish that risk than the management could by eliminating asbestos altogether."

Dalton and activist groups (such as Hazards) were particularly concerned about deteriorating asbestos within public buildings and exposures in the construction industry. This was dismissed as scaremongering by officialdom and the industry, but they soon had to contend with another critic—asbestos victims' champion Mrs. Nancy Tait. She had lost her husband through mesothelioma, due to asbestos exposure as a telephone engineer. Not surprisingly, during the 1970s she showed great sensitivity to the dangers of transient exposure and to mesotheliomas among building workers.⁴² In 1981, doctors at an East London hospital had helped her profile 27 mesothelioma patients. The results were striking. Most patients had identifiable asbestos exposures, but more worryingly, "No patient . . . reported employment with an asbestos manufacturing company."⁴³ Instead, mesothelioma appeared to be a particular risk for plumbers, joiners, carpenters, and dockers. This finding questioned the government's mantra that ARD was a problem only in the

asbestos factories and it also had profound implications for the future. In 1982, Richard Peto had projected 50,000 ARD deaths over the next 30 years,⁴⁴ but Tait countered that this was too low, because it was based on industry-generated data. She forecast a figure nearer 75,000 and again emphasized the number of cases with no link to the asbestos industry—many with slight exposures.⁴⁵ David Gee, a prominent trade unionist, also warned that Richard Peto's projections could be seriously awry. Drawing upon the insights of Selikoff and his New York group, Gee predicted that over the next 30 years the dead would number nearer 70,000 and that the "bulk of the deaths will occur in the shipyard and construction workers. . . ."⁴⁶

Publicizing that such broad sectors of the workforce were at risk was the last thing the industry wanted; it also questioned the relevance of the Rochdale studies. In October 1982, T&N complained to Doll and Julian Peto about Tait's "uncompromising and extremist stance," expressing "worry about [her] 'political' supporters, who are often anti-industry pressure groups. . . ."⁴⁷ The Oxford academics were sympathetic. They replied that they were sceptical of a future asbestos epidemic and downplayed the 50,000 projection. Julian Peto described Tait's information as "so biased and selected" that it was "worthless for the purpose of assessing the magnitude of the risk in particular occupations or at particular exposure levels." He felt that Tait and her victims' group had their uses, but that they exaggerated the risks, were political, and were "bound to be criticised by independent scientists."⁴⁸ Within days, T&N circulated these private comments verbatim to the government under the imprimatur of the industry's lobby group.⁴⁹ Tait felt that there was an industry campaign to discredit her.

The government, too, reacted. Within days of *Alice*, it implemented the Simpson recommendations (which had been quietly sidelined) to lower the dust threshold to 1 f/cc for chrysotile. In September 1982, the government asked Doll and Julian Peto to write another asbestos report. The rationale for this—so soon after the multi-volume Simpson investigation—was not immediately obvious (with even Doll and Peto expressing doubts about whether they had anything new to say), but was perfectly explicable in the political context. The request was opportune. Public hostility had not disturbed T&N's support for the Rochdale studies: indeed, it had increased it. An apotheosis was reached in 1984, when Doll—responding to a request from T&N—organized a mini-summit on asbestos and health (and litigation) for T&N directors at Green College. Doll and Peto, who were in close touch with the government's Health and Safety Executive (HSE), had more work ready for publication. As usual, T&N directors felt "nervous" and emphasized that nothing could be passed to the government without approval.⁵⁰ But eventually agreement was reached. One part of the work would appear in a medical article; another as an

HSE report—thus satisfying the government's request for something new.

The HSE report was published in 1985.⁵¹ It was a sober evaluation of the epidemiology conducted to date (most of which derived from industry studies) and contained no disturbing projections. Mrs. Tait had pleaded for some consideration of the risks outside the factory setting,⁵² but these were specifically excluded, because Doll and Julian Peto regarded them as either negligible or unquantifiable. For example, it was suggested that the risk from indirect asbestos exposure in buildings amounted to no more than a death a year for the whole country. Nothing was said about building and maintenance workers; and only three paragraphs in the 64-page report discussed "other sectors of the asbestos industry," such as insulation. At a press launch, the HSE presented the report as something that would help everyone "continue to live with asbestos."⁵³ As its own contribution to that end, the HSE withdrew a safety poster that had been intended for every building site in the country. The poster was headed (ironically, in view of its fate) "Goodbye Dusty" and included the blunt warning: "Asbestos Dust Can Kill!" The poster's withdrawal was interpreted by the unions as a sop to the construction industry, which had complained that the poster was "misleading."⁵⁴ But it was also in line with the conservative Doll-Peto findings. The one-death-per-year statistic was soon quoted in the press, under reassuring headlines that the "Asbestos Panic Can Stop."⁵⁵ Doll was invited to lecture to the industry's leading lobby group, the Asbestos International Association (AIA), where he stressed the minimal risks of asbestos and argued that the public needed educating to be more rational. An advance copy of the text was sent to T&N.⁵⁶

The article on ARD at Rochdale also appeared in 1985.⁵⁷ It was a mass of interesting data, proudly presented by Doll, which assessed the risks as being very low. If a prudent worker had read this article, he or she might have been reassured once again. But the same worker might have paused over internal company documents. Dr. Peter Elmes, an experienced respiratory physician (and T&N consultant), was recruited in 1983 to review T&N's multinational factories. Emphasizing that safety thresholds were informed guesswork rather than scientific fact, he told the company (confidentially) that TBA was a dirty factory, with antiquated technology, and several hazardous asbestos processes.⁵⁸ Elmes' reports suggest that, as the industry rapidly contracted, TBA was no longer able to achieve the low dust levels upon which the published studies had depended. Workers' deaths underlined the message. We can take one example: that of Donald Robinson, who died in 1984 from mesothelioma.⁵⁹ A foreman of a chrysotile process, he was only 41 and had four children. His horrifying illness and death were well publicized in Rochdale and Manchester, giving the public and T&N

the opportunity to calculate for themselves what was an acceptable risk. Within a decade T&N had ceased manufacturing asbestos in Rochdale.

THE BUILDING WORKERS' PLAGUE

Doll and Julian Peto may have downplayed the significance of cases of ARD outside primary asbestos manufacture, but these had been documented in increasing numbers since the 1930s—a direct result of industry and government negligence in areas such as the shipyards.⁶⁰ In the late 1960s, T&N's own managers warned of asbestosis and mesothelioma in a "diverse character of occupations," such as porters, plumbers, joiners, and housewives.⁶¹ In 1971, carpenters were shown to have even more pleural plaques than ladders (besides a worrying incidence of lung cancers and mesothelioma).⁶² Yet leading physicians argued that ARD deaths would soon decline. Robert Murray scoffed at the idea of a mesothelioma epidemic; while Doll believed in 1985 (as he had with lung cancer 30 years earlier) that mesothelioma would soon be under control.⁶³ These scientific views sat uncomfortably against the known facts about mesothelioma: deaths were rising; the disease had at least a 20-year incubation; peak asbestos usage had occurred only in the 1970s; and exposures had been widespread.

In 1990, Selikoff's group organized a conference in New York to raise concerns about environmental ARD.⁶⁴ Julian Peto (now at the Institute of Cancer Research, near London) also began re-investigating the issue with the help of the HSE. They got a shock. Not only was U.K. mesothelioma mortality rising (and projected to do so until at least 2020, when a peak was expected of about 3,000 men a year), but a striking percentage of workers were plumbers, electricians, and construction workers. In fact, a fourth of the deaths in the study were from building and maintenance work. Whereas Peto had once thought estimates of an epidemic of 50,000 deaths overdrawn, his latest projections (published in 1995) were at least three or four times higher.⁶⁵ He and Doll had once forecast one death per year for the whole country because of asbestos in buildings, but the new projections (admittedly looking at exposures in a much wider context) were for mesothelioma to account for 1% of *all* deaths for men born in the 1940s.

Peto was in the headlines again. Not surprisingly, the study created widespread anxiety and resurrected the problem of asbestos in buildings. Mesothelioma was now dubbed the "building workers' plague" by the trade unions,⁶⁶ who resented the way in which the report had been showcased as a great revelation. They found it bitterly ironic that the study should call for a "public information campaign" to alert workers to potential danger, after the government had quashed "Goodbye Dusty" in 1984. Peto—whose prediction of

mesothelioma mortality in the United States was also proving to be on the low side⁶⁷—was criticized for persistently underestimating the hazards. It was, after all, 30 years since Selikoff's and Hueper's warnings; and nearly 20 years since Tait and the trade unions had tried to alert scientists. Peto agreed that focusing on asbestos factories had been a mistake, but argued that this was only apparent with hindsight.

"Bystander" mesothelioma cases were now reported almost weekly in the press. This was when the scandal of T&N's Roberts' subsidiary made national news. This small factory in Leeds had bequeathed a legacy of mesotheliomas among former workers, their families (contaminated by dust brought home on clothes), and those who simply lived nearby.⁶⁸ In France, asbestos in the environment, especially in buildings (such as Jussieu University in Paris), was also attracting national attention. Peto's *Lancet* publication and his appearance at a Paris conference in 1995 were helpful to campaigners in destroying the French industry's doctrine of "usage contrôlé" and in paving the way for an asbestos ban within two years.⁶⁹ Britain banned chrysotile in 1999—the year that Peto and his colleagues published an even grimmer calculation that European ARD deaths might total half a million between 1995 and 2030.⁷⁰

THREE DISEASES, TWO DISCOURSES

In the mid-1990s, T&N's archive was released unexpectedly in American litigation. The contents shocked many people (including this author), because of the callousness T&N had often shown towards victims. The records demonstrated a long history of negligence in industrial hygiene, particularly in the group's factories *outside* Rochdale and overseas, and led to renewed interest in Doll's work.

In a deposition in 2000 (shortly before T&N's bankruptcy virtually obliterated its compensation payments), Doll revealed that the company had donated £50,000 to Green College. Under questioning, Doll testified:

It was nothing to do with me, and it was something Turner & Newall sent to the college quite out of the blue in recognition of all the work I had done for them, and they made that donation and said they wanted to have some memorial of me in the college.⁷¹

In 2001, Doll penned a tribute to his late friend Robert Murray in a set of Canadian conference proceedings that extolled the virtues of chrysotile. There was a hint of personal apologia in the brief notice, in which Doll praised Murray for his "appreciation of the contribution that industry had made to the welfare of the population as a whole and the need for basing preventive action on a genuinely scientific assessment of the available facts."⁷² In interviews in 2004, Doll argued that society had gone "too far in eliminating asbestos,"

because (according to Doll) chrysotile when carefully handled “does more good than harm.”⁷³ And he deplored “the public criticism that poor old Turner & Newall undeservedly got.”⁷⁴ But he never, as far as this writer is aware, expressed any regret about the “poor” victims of asbestos—a surprising lacuna in a physician.

Professor Peto continues to generate publicity. In 2004, he controversially recommended the Atkins’ diet for obese children and clashed with the government over access to medical records (he is undertaking a new study of mesothelioma).⁷⁵ His asbestos projections have been widely publicized, especially in battles over the banning of asbestos. In those battles, opponents of asbestos have sometimes tried to claim him as one of their own. Peto has appeared on platforms advocating a ban on asbestos and opposing the use of asbestos in the developing world (where he has stated that it is unlikely to be used safely).⁷⁶ Yet he remains provocative and difficult to categorise. He is doubtful about asbestos removal from buildings—a policy favoured by the unions, but which he feels is motivated more by fear than actual risk. Moreover, his attitude to the social and political movement that aims to rid the world of asbestos appears to be ambiguous.

In 2005, during a lecture to mark the award of an honorary degree by Manchester University for his life-saving work in epidemiology, Peto ridiculed the so-called anti-asbestos lobby for what he believed was its hysterical over-reaction to asbestos—especially to chrysotile. Labelling critics of the industry as “scientifically . . . very dubious indeed” (the present author) and “their” journals as “scurrilous” (*International Journal of Occupational and Environmental Health*), he stated that he found the “public fuss about [asbestos] . . . absolutely extraordinary.”⁷⁷ Regarding the relative risks of chrysotile and other asbestos fibers, he informed his listeners: “You are actually told that even to discuss this scientific issue makes you a complete bastard! [audience laughter].” According to Peto, because substantial exposure to chrysotile in industry has “really little risk,” the mineral’s impact in the developing world is very much an open question.

In his lecture, Peto offered an alternative discourse of a once well-regulated industry that had benefited from an “enormous clean-up campaign” after 1931, where “we were sort of collaborating with the industry to see what was an acceptable level,” and then suddenly campaigners had hijacked the agenda and closed factories. He emphasized that the present problem was because asbestos had been uncontrolled outside the factories, but did not explain how this had happened. Peto made no connection between the rising death rate from mesothelioma (and industry and government unscrupulousness) and the depth of the public reaction. He stated that the resolution of asbestos problems in the developing world was no concern of the West, yet did not inform his audience that the latter is

an important exporter of chrysotile. He did, though, concede that the “peculiar” and “completely unscientific” opposition to asbestos had saved lives.

This view of asbestos history is partial. By concentrating on TBA, Peto ignores an overwhelming mass of documents that shows that the “enormous clean-up” of the industry after 1931 mostly never happened. This is not to denigrate the Rochdale studies that have been reviewed in this article. The time and effort that Doll and Peto expended, often in situations of stress and difficulty, are striking. Their work had tangible benefits in helping to reduce dust exposures and so lower the risk at TBA—whatever one thinks about the “acceptability” of the remaining risk. In the 1970s, Peto’s intervention in helping to neuter the BOHS was important, at least as regards dust in the factories. Equally, one can see that Rochdale epidemiology was refracted through an industrial and political prism so that it illuminated only specific areas. The more stringent dust targets that were devised after the 1960s were hardly applied outside the factories—an environment which was mostly ignored (wilfully so by the industry), even though the workforce at risk was far larger. It was a classic example of the dictum: what you see depends on where you sit.⁷⁸ In this respect, the contrast between Doll and Selikoff is revealing. While Doll became a trusted adviser to T&N, looking only at factory conditions, Selikoff—who with trade union assistance strayed into the disaster area of the insulation industry—was smeared and harassed by the asbestos companies (including T&N).

It is also partial for scientists to bemoan the intrusion of politics, while seeming oblivious to their own role as political players (like everyone else). As this article has shown, the Rochdale studies were positioned at a certain point along a political spectrum, where science sat more comfortably with industry and government than with the industry’s critics (who cared less for mathematical models and the vaunted merits of asbestos than for the physical, emotional, and economic trauma inflicted by the fiber, wherever it had been inhaled). It is a very familiar scenario in the history of occupational health.⁷⁹ Arguably, this led to a failure to listen to the experiences of victims, an over-reliance on statistics from one factory and a single group of “big-name” experts, too little emphasis on the precautionary principle,⁸⁰ and—eventually—to a severe underestimation of the toll. Others, too, underestimated that grievous toll: but Gee, Dalton, Tait, and leading trade unionists made forecasts that, far from being either hysterical or exaggerated, proved far more reliable and prescient than those of epidemiologists—though it gave the former little comfort. As Gee remarked in 1982: “Whatever the figure, it represents a public health disaster which was predictable and preventable.”⁸¹

The Rochdale studies therefore beg the inevitable question: would less emphasis on the utility and the supposedly trivial risks of asbestos—combined with a

greater engagement with the ethics of an industry that allowed so many of its workers to die so painfully and often in poverty—have slammed the brakes on asbestos use much sooner and saved *more* lives? When I raised this issue with Sir Richard Doll in 1998, he replied:

The point is . . . a difficult one—much easier to make retrospectively than at the time. In the 1950s and 1960s, no one thought that the cancer risk from asbestos was likely to be proportional to dose down to trivial levels. . . . The warnings given at the time may be considered to have been insufficiently strong in retrospect, but they were not considered so at the time.⁸²

On the other hand, it was during the 1960s and 1970s—precisely when the Rochdale studies were in full swing—that asbestos usage in the United Kingdom and worldwide not only continued, but actually expanded. Dangerous working practices, such as sawing up asbestos boards and pipes and spraying asbestos, continued unabated in the construction industry. In these circumstances, this writer finds it lamentable that the medical establishment did not take a tougher stance against asbestos and instead regarded the industry's critics as part of the problem.

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