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ASBESTOS

Medical and Legal Aspects

FOURTH EDITION

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> (I)n the practice of American and Canadian life insurance companies asbestos workers are generally declined on account of the assumed health-injurious conditions of the industry.

That 3 of these asbestos workers' deaths were reportedly caused by tuberculosis and 2 were reportedly caused by pneumonia raised concern over the possible role of asbestos trapped in the lungs in causing these deaths. The data pointed to one or more of the following as possible roles for asbestos: 1) asbestos dust in the lungs might reduce a person's resistance to tuberculosis and/or pneumonia infections, 2) asbestos dust in the lungs might reduce a person's resistance to the progress of such infections, once they are contracted; 3) asbestos pneumoconiosis might be a serious disease in itself and be misdiagnosed as tuberculosis and/or pneumonia. Although these are small numbers, it is highly significant that life insurance companies were already refusing to insure asbestos workers, and that Murray had identified a distinct disease as the cause of death in an asbestos worker. Hoffman repeatedly urged research into the health hazards in the growing asbestos industry, decrying the lack of medical literature on the subject.

Case Reports in Medical Journals

Though the English had so far taken the greatest interest in the problem of asbestosis, they had published practically nothing in the medical literature. Starting in 1924, a number of important papers on asbestosis were published in the *British Medical Journal*. Now that asbestosis was discussed in a prominent medical journal, the word spread quickly and was picked up in journals in the United States and other countries. When reports later started to come in from many countries in the 1930s, the authors usually demonstrated an impressive awareness of previous work, which they cited.

The first detailed case report of asbestosis in an individual worker, published in the general medical literature, was by the British pathologist W.E. Cooke in 1924. Dr. Cooke described his patient as having tuberculosis and also "Fibrosis of the Lungs Due to the Inhalation of Asbestos Dust" (the title of the

paper).[19] Cooke's report was noted by radiologists Pancoast and Pendergrass in Philadelphia, who also commented on 17 asbestos workers with pneumoconiosis they had examined. "This is another very dusty industry," they wrote.[20]

The subject of Cooke's case report was Nellie Kershaw, who had worked for Turner Brothers Asbestos Company from the age of 13, intermittently after age 26, until she was totally disabled at the age of 31. The Newbold Approved Society approached Turner Brothers in 1922 to pay Ms. Kershaw workers' compensation, on the basis of a doctor's certificate diagnosing her as having "asbestos poisoning."[21] The company replied that "we repudiate the term 'Asbestos poisoning'" and noted that no such condition was listed among the diseases that were compensable under the Workmen's Compensation Act.[22] The company meanwhile wrote to its insurer, "we feel that it will be exceedingly dangerous to admit any liability whatever in such a case and before referring the matter to you, we considered that we ought to do all in our power to repudiate the claim."[23]

Thus, unable to obtain sickness compensation from either the National Health Insurance system or her employer, Nellie Kershaw wrote to Turner Brothers, saying "I think it is time there was something from you." She said she was in need of nourishment and had not received a penny during nine weeks off work. Her request, and later that of her husband, unable to pay for her funeral expenses, were rejected, "to avoid creating a precedent."[24]

The case was referred to Dr. Cooke in 1924, after a coroner's enquiry was reported in the press, raising the possibility that asbestos had contributed to Ms Kershaw's death at the age of 33. Her treating physician, Walter Joss, wrote that he had seen 10-12 cases a year of lung conditions in patients working with asbestos.[25] The case of Nellie Kershaw and Turner & Newall's reaction would much later be cited by Selikoff and Greenberg as an early event in "the long-playing tragedy of asbestos, a story of missed opportunities for avoiding a worldwide disaster."[26]

In 1927, Cooke added certain pathologic details about Ms. Kershaw. In this paper, Cooke named the disease "pulmonary

also appeared to be least exposed to asbestos dust among the work force studied. The dust sample analysis counted dust particles in the air in toto, and did not distinguish fibers from other airborne dust particles. (For further information, see Chapter 4.)

Merewether and Price also made recommendations for the control of dust exposures in asbestos plants. These recommendations covered specifically each major manufacturing industry using asbestos, and in addition included general "housekeeping" practices to be followed by all. In addition, periodic medical examinations of the workers were recommended, to exclude people with lung disease and detect cases of fibrosis and tuberculosis "at the earliest possible moment." The importance of worker education was stressed. Respiratory protection was "only recommended as a second line of defense, and not in substitution for other preventive measures specifically directed to the control of dust as near as possible to its point of origin." The hazard of insulation work in shipyards was also noted.

In a magazine article entitled "Workers Who Breathe Death," Merewether's findings were reported. "The only advantage which the less dusty processes have is that it takes longer finally to cripple and disable the worker," the article said.[45] Government regulation of the industry and compensation for asbestosis were strongly urged.

The Merewether and Price survey was noted in numerous other publications in England and the United States.[46-51] The major medical journals in England promptly carried editorials on it.[52-53]

But the "British monopoly" on asbestosis research was now over, and in 1930 new contributions would emerge from a number of countries. For it turned out that virtually everywhere asbestosis was looked for, it was found.

Other Events of 1930

This year the British activities on asbestosis received considerable attention in the United States medical literature, as the first case reports of asbestosis in the U.S. were published. There was also a conference on pneumoconisis held by the Interna-

tional Labor Office in 1930, at which the subject of asbestosis was repeatedly discussed. Medical reviews of the state of knowledge on asbestosis were published in a number of countries. And the British radiologists observed that cessation of exposure to asbestos would not halt the steady progress of the deadly lung disease, once it was established.

Statistical highlights of Merewether's findings were reported in the *Journal of the American Medical Association* on June 28, 1930, at the time when a bill had just been introduced in Parliament to extend the silicosis provisions of the Workmen's Compensation Act to cover asbestosis as well.[54]

> Supporting the bill, Lord Russell for the government said that many processes in silica working could not show a mortality approaching that for the asbestos industry, in which 14 fatal cases had now been reported and in addition 3 deaths from asbestosis associated with tuberculosis.

Later that year, the *Journal of the American Medical Association* noted Mills' report of an asbestosis case.[55,56] This report, just published in *Minnesota Medicine*, described a severe case of asbestosis in a man who had worked in an asbestos mine in South America long before his death. Mills' alert to doctors in the U.S. was amplified.

> Concerning the relation of physicians of the United States to this industry, Mills pointed out that asbestos is mined and manufactured in many parts of this country, and that pulmonary asbestosis surely will be encountered.

The editorial went on to report that the Workmen's Compensation Act in England had been extended to include asbestosis.

The *Journal of the American Medical Association* was the most widely read medical journal in the United States. By 1920, the *J.A.M.A.* was mailed directly to 48 percent of the physicians in the U.S. and was believed to have reached 80 percent of them.[57] Total circulation of the journal in 1930 was 98,000, including institutions and individual subscribers.[58]

Additional medical case reports and reviews of the literature on asbestosis were published in the U.S. by Lynch and Smith

(in *J.A.M.A.*), and by Soper, in 1930.[59,60] Dr. Soper began by expressing disappointment with the medical profession's slowness to appreciate the threat of dust hazards in general and asbestos dust in particular. He concluded,

> When there has been exposure to asbestos dust the presence of pulmonary asbestosis should always be suspected

The International Labor Office held an international conference on silicosis and other dust diseases in Johannesburg, South Africa, in 1930.[61] This was the first of several major conferences held by the I.L.O. bringing together pneumoconiosis experts and knowledge from all over the world. Here, too, it was noted that there was a bill before the British Parliament to provide compensation for workers disabled by asbestosis. Authorities in Great Britain reported that, "Asbestos damaged (the lungs) more rapidly than silica." Incapacitating asbestosis had been observed in South Africa and southern Rhodesia but not in Australia. Engineering dust controls had been installed at an Italian asbestos plant in 1912. An Italian said it was "well known" that blue asbestos (crocidolite from Africa) was more deadly than white (chrysotile, mined in Italy and elsewhere); but no supporting evidence was given.[62] Researchers from the Saranac Laboratory for Research on Tuberculosis (U.S.) contributed a preliminary report on their experiments on guinea pigs inhaling asbestos.

The International Labor Office had stern warnings about asbestos in its encyclopedia, *Occupation and Health*, in 1930:

> All processes from extraction onwards unquestionably involve a considerable hazard, and American and Canadian life insurance companies generally refuse asbestos workers on account of the assumed deleterious conditions in the industry.

The article went on to deplore the lack of more detailed data on the hazard in various branches of the industry, laying stress on the "rapidly increasing development of industries utilizing asbestos."[63] Other treatises on pneumoconiosis and preventive medicine now included sections about asbestosis.[64,65]

some of the features of the disease." The authors closed with a plea for adoption of preventive measures.

Chest physicians in South Carolina reported an additional "pure case" of asbestosis in an asbestos textile worker in 1931. The authors surveyed the literature and counted 172 cases of asbestosis in medical journals.[100]

Radiologists Pancoast and Pendergrass reported that they had seen 58 men employed at various occupations in asbestos mining, of whom 15 "showed definite evidence of pneumoconiosis."[101] They did not regard the hazard at the mine as comparable to that in factories, which were dustier.

Gardner and Cummings had exposed guinea pigs to air-borne asbestos and produced asbestosis in the animals, which they examined and described pathologically. There was little if any enhancement of the virulence of tuberculous infection by asbestosis.[102]

In 1932, medical examinations were conducted for all 1,140 employees of Johns-Manville's factory in Manville, New Jersey. Guidance was obtained from Metropolitan Life doctors Lanza and Fellows in designing the survey. Interpretation of chest X-rays was done by Dr. F. V. Meriwether, chief of the U.S. Bureau of Mines clinic in Picher, Oklahoma; however, Dr. Meriwether was not provided with information on the occupational exposure histories of the workers after their hire by Johns-Manville. The report of this unpublished study shows 327 (29%) of the workers had X-ray evidence of pneumoconiosis, which was called "asbestosis" if the worker had had no prior history of exposure to occupational dust hazards. The company separately tabulated length of service and length of exposure, while noting asbestosis among a number of workers listed as having no exposure. Some of the employees diagnosed by X-ray as having asbestosis, whose "exposure" at Manville was recorded as "none" were a watchman, a mill-wright, packing and shipping department workers, and machinists.[103] Thus, Manville plant workers exposed as "bystanders" were identified as asbestosis victims before any such cases were reported in the published medical literature (See Chapter 7).

The Children's Bureau of the U.S. Department of Labor convened an expert committee in 1932 to formulate guidelines

for the protection of children at work. The committee was unanimous in recommending that minors under 18 be prohibited from working in a number of hazardous occupations. Among those listed were "occupations involving exposure to free silica dust, asbestos dust, or other dusts in injurious quantities."[104] This reference to health hazards in the asbestos industry was reiterated by a labor representative at a 1933 government hearing on the asbestos industry. The hearing was attended by the Presidents of Johns-Manville Corporation and Philip Carey Manufacturing Company, and a representative of Keasbey & Mattison Company.[105]

An I L O. bibliography, *Pneumoconiosis*, published in 1932, listed 70 references on asbestos. With the exception of one article on geological occurrence, these were all medical reports about asbestosis.[106] The point of diminishing returns had already been reached, however. The next 70 publications would have little to add to the framework of their predecessors on the subject of asbestosis. The first reports of another scourge, lung cancer with asbestosis, were yet to be written.

London chest physician Philip Ellman published thorough articles on the features of asbestosis in both the U.S. and Great Britain in 1933-1934.[107,108] He described some of his patients, who included: a 22-year-old woman with "early" asbestosis; a 26-year-old woman whose X-ray showed "definite and progressive spread of fibrosis in both lungs in less than 9 months"; and a man with an early stage of asbestosis who had worked for 10 years as a pipe-coverer (insulation worker). Ellman also mentioned that a terrier dog "kept for ratting purposes in an asbestos factory" was "lethalled in its own interest due to the distressing degree of dyspnea the dog suffered." Ellman warned that "Pulmonary asbestosis, once established, is a progressive disease with a bad prognosis." He also said,

> Inhalation of asbestos dust must be expected sooner or later to produce pulmonary fibrosis, depending upon (a) length of exposure and (b) nature and concentration of the dust.

Ellman's clinical description of the asbestotic was vivid, and was one of the earliest comparisons of asbestosis with its better-known cousin, silicosis.

> [A] case of simple silicosis often looks well, declares that he is well, and is even offended when any reflection is cast upon the soundness of his lungs. In contrast to this, a case of asbestosis is cyanotic, emaciated, anxious, and often obviously going downhill. Such, then, is the clinical picture of *sufferers* from asbestosis.
>
> Only by an extension of meaning could the word 'sufferer' be applied to anyone with simple silicosis (original emphasis)

The publication of Ellman's article in the *British Journal of Radiology* followed another on asbestosis by radiologist W Burton Wood.[109] Dr. Wood reported that he had had patients with asbestosis that did not worsen after cessation of exposure as well as others that did.

The British journal *Tubercle* ran separate, comprehensive, three-part articles on asbestosis by Merewether and Gloyne.[110,111] Gloyne described minutely the pathological aspects of asbestosis, and Merewether described almost everything else then known. Merewether began with a description of the asbestos industry's phenomenal growth. Just between 1922 and 1927 Britain's consumption of asbestos had tripled.

Merewether reviewed earlier work, and described the disease as he had in his 1930 Factory Department report. By 1933, he recommended that chest X-rays were "invaluable" in diagnosing asbestosis, "and should never be neglected."

Again and more clearly, the fundamental concepts of the *requisite lung burden* and the *period of maturation of fibrosis* were explained:

> [T]his is important from the practical point of view of prevention, that a certain minimum fibrosis-producing amount, as it were, of asbestos dust must be trapped in the lungs in order to produce a potentially disabling or serious amount of fibrosis, and also that a certain "maturation" period must elapse before that amount of fibrosis is developed.

Pausing to describe two illustrative fatal cases with under 5 years' duration of exposure, he went on to explain the interplay between exposure and the maturation of disease:

> Particulars of cases seem to show that with high concentrations of dust the minimum period of time which must elapse between the commencement of exposure and the production of a serious degree of asbestosis is approximately seven years—which include not only the trapping period of the fibrosis-producing dose of dust, but also the maturation period of the fibrosis, which periods, of course, overlap.
> The existence of this, which may be referred to as the fibrosis-producing period, i.e., the period which must elapse from the date of commencing work before a serious degree of asbestosis can be produced, accounts for the fact that it is not until the second five years of employment is reached that appreciable numbers of cases of asbestosis are discovered.
> This period of seven years is, of course, the minimum, and few cases mature in this minimum period; in successive years, however, depending on the dustiness of the process in which employed, more cases mature. In the more dusty processes the fibrosis-producing period, as defined above, is commonly eleven years

The workers themselves were commonly oblivious of the inexorable progress of the disease until it became well advanced, he said.

Dr. Merewether then posed the question "Does Asbestosis Shorten Life?" The answer to this question is "emphatically Yes," he wrote. He presented figures showing that of 42 fatal cases of asbestosis in Great Britain, the average age at death was 41. All but two of these cases were examined post-mortem. The extent of the devastation caused by asbestosis was indicated by a comparison with silicosis:

> The average duration of employment sufficient to cause a fatal degree of asbestosis was only 15.2 years, as compared with 40.1 years for all cases of silicosis.

Merewether concluded that asbestosis was "comparable with the more serious silicosis risks" based on these findings.

In light of the irreversible and progressive nature of asbestosis, he held out little hope for the victims of asbestosis

> The ultimate prognosis in those with developed asbestosis or in those who have incarcerated in their lungs a fibrosis-producing amount of asbestos dust, even though no appreciable fibrosis or only a slight amount can be detected, is bad. Death from the disease is inevitable sooner or later, if life is not cut short by accident or by some unconnected disease.

He went on to explain that asbestosis needn't even be advanced to cause death. It proved sufficient in some cases simply by destroying the body's *reserve* capacity to deal with other onslaughts in life:[14]

> It is remarkable to what extent the lungs can be affected and yet life in a fair degree of comfort remain. The reserve is however, so slender that the addition of any burden to the system, in the form of a disturbance of health which would only slightly inconvenience a normal person, may overcome the remaining resistance and precipitate the fatal outcome. It is apparent, therefore, that while the onset of an acute respiratory infection is most ominous, the development of any disease which directly or indirectly throws an added strain on the heart or lungs is of serious import.
>
> For these reasons and from consideration of the features present in recorded fatal cases, *the view is forced upon one that the existence of even a moderate degree of asbestosis is a serious and ever-present potential risk to life.* (emphasis added)

Donnelly, a physician in North Carolina, reported on 15 cases of asbestosis he had seen from the asbestos plants in his area. He emphasized that exposure "for even a comparatively short time is a definite and serious industrial hazard."[111]

No further clarification was given on the meaning of "selected more or less at random."

Only if there was a consensus of the X-ray readers was a worker classified as having radiologic evidence of asbestosis:

> *The (X-ray) films were read conservatively,* taking into account the physical examination and the age of the individual, *and were classed as positive only when there was no major disagreement* (among the examiners of the X-rays).. emphasis added)
> The films classified as negative for asbestosis were further subdivided into doubtful and negative.

The definite cases of asbestosis were broken down into first stage and second stage, the latter being a more extensive development of the disease.

> Of the total of 126 X-ray examinations, 4 were diagnosed as second degree asbestosis, 63 as first degree, 39 as doubtful, and 20 as negative.

In other words, 53 percent of the workers had asbestosis by a conservative reading of the X-rays, and another 31 percent had some X-ray signs of disease ("doubtful"). Only 16 percent had no signs of asbestosis on X-ray. It should be recalled that these were active workers; those who had left due to illness were not examined.

The majority of persons classified by X-ray as "doubtful" and "negative" complained of cough and/or shortness of breath. Referring to those that were classified as "negative" by X-ray who complained of symptoms, the authors said, "too much emphasis should not be placed on statements of subjective symptoms."

The authors minimized their finding of widespread asbestosis, commenting that, in the cases selected for examination, none had "marked disability." The threat of progressive maturation of fibrosis previously noted by many authorities was not discussed; one of those authorities, Dr. Pancoast at the University of Pennsylvania, had even been consulted by the Metropolitan Life investigators in the interpretation of the X-ray films.

14. Merewether, E.R.A. A Memorandum on Asbestosis. *Tubercle 15:* 69-81, 109-118, 152-159 (1933-1934).

15. Effects of Asbestos Dust on Workers' Health in Asbestos Mines and Factories. *Labour Gazette 12:* 761 (1912). Printed in Ottawa, Canada.

16. Fahr, T. Demonstrationen: Präparate und Microphotogrammes von einen Falle von Pneumokoniose. *Muenchener Med. Wochr. 11:* 625 (1914).

17. Pancoast, H.K., T.G. Miller, and H.M. Landis. A Roentgenologic Study of the Effects of Dust Inhalation upon the Lungs. *Trans. Assoc. Amer. Phys. 32:* 97-108 (1917).

18. Pancoast, H.K., T.G. Miller, and H.M. Landis. A Roentgenologic Study of the Effects of Dust Inhalation upon the Lungs. Republished. *Amer. J. Roent 5:* 124-138 (1918).

19. Cooke, W.E. Fibrosis of the Lungs Due to the Inhalation of Asbestos Dust. *Brit. Med. J. 2:* 147 (1924).

20. Pancoast, H.K. and E.P. Pendergrass. A Review of Our Present Knowledge of Pneumoconiosis, Based Upon Roentgenologic Studies, with Notes on the Pathology of the Condition. *Amer. J. Roent 14.* 381-423 (1925).

21. Blomley, J. (Newbold Approved Society) Letter to Turner Bros. Asbestos Co. (Sept. 1, 1922).

22. Turner Bros. Asbestos Co. Letter to Newbold Approved Society (Sept. 15, 1922).

23. Turner Bros Asbestos Co. Letter to London & Lancashire Insurance Co. (Sept. 21, 1922).

24. Kershaw, N. Letter to Turner Bros. Asbestos Co. (Sept 1922). And Turner & Newall document 0068-1766 (July 25, 1924).

25. Joss, W.S. Note explaining basis for his previous diagnosis of "Asbestos poisoning." Turner & Newall files, No. 0068-1752.

26. Selikoff, I.J., and M. Greenberg, "A Landmark Case in Asbestosis," *J.A M.A. 265:* 898-901 (1991).

27. Cooke, W.E. Pulmonary Asbestosis. *Brit. Med. J. 2:* 1024-1025 (1927).

28. McDonald, S. Histology of Pulmonary Asbestosis. *Brit. Med. J. 2:* 1025-1026 (1927).

29. Oliver, T. Clinical Aspects of Pulmonary Asbestosis. *Brit. Med. J. 2:* 1026-1027 (1927).

The editorial cited epidemiological and experimental evidence suggesting that asbestos workers were at an increased risk of lung cancer. It characterized this cancer risk as "probable," and stated that workers in asbestos-consuming industries should be considered at risk along with manufacturing plant workers.[135] This unsigned *J.A.M.A.* editorial was also written by Wilhelm Hueper at the request of the editor.[29] Members of the Industrial Hygiene Foundation, a group of more than 300 industrial and insurance companies, received a summary of this editorial in the *Industrial Hygiene Digest*.[136] Dr. L.W. Smith echoed these concerns, writing later that year, and further publicizing the British data.[137]

The Scientific American Article

The same month the Chief Inspector of Factories published his annual report for the year 1947, an article called "Cancer and Environment" was published in *Scientific American*.[138] This report by Groff Conklin listed asbestos in a table of "carcinogens known to be present in human environment," and in another graphic display showed that the target organ for asbestos cancer was the lung. Excerpts from Conklin's article were read at the April 7, 1949 general meeting of the Asbestos Textile Institute (ATI). One of those present, George Marshall, wrote for "clarification" to Dr. A.J. Lanza at the Metropolitan Life Insurance Company. Lanza's associate, Dr. W.J. McConnell, replied that, "During the last few years, quite a number of articles claim that carcinoma of the lungs was found due to asbestos." McConnell said he had seen no evidence in his own work to support the asbestos-cancer relationship and closed, "However, time will prove whether they are right or wrong."[139]

Dr. Wyers' Report from Cape Asbestos

Wyers' report on 115 fatal cases involving asbestosis in England offered statistics on the incidence of accompanying lung and pleural cancer.[140] There were 17 such cancers in all, and they were referred to as one entity: "The proportion of pulmonary cancers in the series was therefore 14.8%." Seven others died

yet been obtained. In the case of some such studies which were initiated by the American industry support was withdrawn at the interim stage because of the way the results seemed to be going.

More Reports and Reviews Linking Asbestos and Cancer

Merewether's statistics associating asbestosis with cancer of the lung and pleura were cited by Doig (also with the Factory Department), who wrote: "evidence is accumulating that cancer of the lung is unduly frequent in asbestos workers."[155] Similar comments and reviews were published by others, including Fischer, Frost, Fickhoff, Middleton, G.C. Smith, Silson, and Gloyne in the years 1949-1951.[156-166]

Hueper, who had become Chief of the Environmental Cancer Section of the U.S. National Cancer Institute, noted in 1951 that most of those who had written on the subject had concluded that there was a causal relationship between asbestosis and lung cancer.[167]

Owen in England reported another case of asbestosis with lung cancer in 1951. The victim died at age 39, and his only exposure to asbestos had been a 12-month job in a London asbestos factory 20 years before.[168]

Another fatal case of asbestosis with lung cancer was reported in New York that year in a 40-year-old man. He had worked as a pipecoverer starting in 1940 and had been a plumber before that. The authors (one of whom had reported 2 earlier deaths from these causes in insulators) introduced their report with a review of earlier literature. They concluded:[169]

> (The association of carcinoma in cases of asbestosis) emphasizes the hazards of industrial exposure, the compensability of the cancerous process as well as asbestosis and the need of careful preventive measures.

A tabular presentation of the literature on cases of lung cancer with asbestosis was published in 1952 by Behrens. He reviewed the cumulative world literature and his own experience for the

frequency of lung cancer with asbestosis and compared that with the reported rate of lung cancer with silicosis. He counted a total of 509 autopsied cases of asbestosis in which 44 (14.2%) had lung cancer. For silicosis, there were only 35 cases with lung cancer out of 2,475 autopsy reports (1.4%).[170]

Hardy of the Massachusetts Institute of Technology referred to prior case reports of asbestosis with lung cancer in an insulation worker and in a man who "worked for seven years sorting and carding asbestos fibers intended for insulation manufacturing." She concluded,

> These cases have particular significance since there are nearly 10,000 workers exposed to varying amounts of asbestos in American industry, many of them in some operations not properly safeguarded against a potential carcinogen.

Hardy used the term "potential carcinogen" though she seemed convinced by Merewether's 1947 statistics.[171] The use of such an expression does raise the point that, whether one was inclined to accept the carcinogenicity of asbestos as proven or await further data before drawing a conclusion, one had to acknowledge the immediate responsibility for taking preventive measures.

Werber added another report of asbestosis and lung cancer, which the author believed was the first case in the literature to be operated upon with success. The cancer was presumed to be occupationally caused.[172] Others to comment positively on the relation between asbestosis and lung cancer were Mayers, Sroka, and Grosse.[173-176]

Dr. W.E. Smith, at New York University, still felt that there had been inconclusively few reports of lung cancer with asbestosis in Germany, the United States, and Canada. However, he seemed persuaded that a cancer hazard with asbestosis had been demonstrated in England, where dust control regulations had been in force since 1933. Smith had recently been informed by Dr. Merewether that although lung cancer had been found predominantly among people who started work in the asbestos industry before the industrial hygiene rules took effect, some cases had also been diagnosed in individuals first

exposed afterwards. While the latter could have been unrelated to occupation in the regulated era, Smith acknowledged that people starting their employment in the 1930s "are only now reaching the mean age at which tumors might be expected to appear."[177,178]

In the published discussion of one of Smith's papers, Dr. A.J. Lanza offered this incredible critique of Merewether's data:[175]

> I think it is important to distinguish between cases of clinically recognizable and fatal lung cancer, on one hand, and cases in which the diagnosis of lung cancer has been made as more or less of an incidental finding at autopsy, on the other. The English claim for an association between lung cancer and asbestosis has been based, it seems to me, on data obtained from lungs that a pathologist has searched with a microscope. I wonder how many cases of lung cancer would be found if lungs from any sort of population were subjected to the same minute scrutiny?

Smith responded that the British Pneumoconiosis Board handled silicosis cases the same way as asbestosis cases, and so the silicotics could serve as a control group. In fact, the silicotics had an almost identical incidence of lung cancer as the general population, one tenth the incidence of lung cancer in asbestotics. In addition, many of the pathologists reporting excess lung cancer in asbestotics had done thousands of autopsies of the general population, and cited them as a comparison or "control" group. Further, no autopsy series of asbestotics was reported as having a "normal" rate of lung cancer.

Another person who commented after Dr. William Smith's report on European research on occupational cancer was Dr. Paul Cartier, of the Thetford Industrial Clinic in Quebec.[179] Cartier reported that his clinic had detected "eight cases of primary cancer of the lung" among an asbestos mine and mill working population of 4000. Other cases were suspected, but only those cases confirmed by an autopsy (or biopsy) were included. Of the eight cases described, two were called "pleural mesothelioma." The degree of concomitant asbestosis of the

Workers' compensation was becoming more than just an insurance problem for asbestos manufacturers by the 1950s. By then, a medical consensus had formed that asbestos caused lung cancer, which had risen to become the most common form of cancer in U.S. males. Moreover, major asbestos manufacturers learned first-hand about the afflictions of asbestosis and lung cancer in users of their insulation products, whom they had employed in their contracting divisions. The compensation claims filed by these workers in the 1950s presaged the deluge of product liability suits that would come in the 1970s, 1980s, and 1990s.

In the absence of direct preventive measures, society's provisions for the compensation of occupational disease bore the brunt of the burden of prevention. In the United States, this situation prevailed at least until the passage of the Occupational Safety and Health Act of 1970. Compensation is thus a major theme of the history of the asbestos problem of today.

Asbestos Compensation in the Early Years: Damage Suits

The year W.E. Cooke named the disease asbestosis, 1927, a foreman in the weaving department of a U.S. asbestos factory filed a claim for workers' compensation. The Massachusetts Industrial Accident Board awarded the man compensation for disability from occupational lung disease.[27] Three years later, another claimant with asbestosis in Connecticut was awarded compensation.[28]

In many states, the workers' compensation laws either did not cover occupational diseases or applied only to designated industrial diseases, and workers seeking compensation for "unlisted" ailments had to sue their employers in civil court. Dr. Anthony J. Lanza, Assistant Medical Director of the Metropolitan Life Insurance Company, remarked that "the damage suit situation" prompted employers to deal with asbestosis.[29]

> Silicosis and asbestosis burst upon the amazed consciousness of American industry during the period 1929-1930. Arising out of the period of economic depression, the situation with respect to silicosis and asbestosis became

> manifest as a medico-legal phenomenon of a scope and intensity that was at once preposterous and almost unbelievable. Damage suits, under the common law, were instituted against employers by employees, alleging pulmonary dust diseases, in industrial centers all over the United States, to an amount in excess of 100 million dollars.

Beginning in 1929, attorney Samuel Greenstone brought suits against the Johns-Manville Corporation on behalf of 11 employees and former employees alleging disability from lung damage.[30] The negligence suits typically demanded $50,000 for total disability and specifically charged that the Manville, N.J. plant management had failed to provide.

1. a safe place to work
2. masks and other safety appliances, and
3. a proper ventilating system at the plant.

At least 3 of these complaints were served on A.R Fisher, who rose to be the President of Johns-Manville in the early 1950s. Perhaps due to questionable practices Mr. Greenstone used in soliciting these cases, Johns-Manville lawyers were able to negotiate a settlement of $30,000 for all the cases and obtain Greenstone's written assurance that he "would not directly or indirectly participate in the bringing of new actions against the Corporation." Settlement by the company President was thus authorized at a meeting of the J-M Board of Directors on April 24, 1933.[31]

Later that year, A.R. Fisher, manager of the Manville plant, received a confidential note from corporate Vice President S.A. Williams, referring to advice received by a plant doctor at another location (Waukegan, Illinois). Dr. A.J. Lanza's "verbatim" responses to questions were enclosed. Asked whether employees should "definitely be made aware that asbestos is hazardous to their health" by means of posters, Lanza had reportedly said he doubted the hazard justified that: "This is especially true in view of the extraordinary legal situation."[32]

In 1935, Johns-Manville was hit with another volley of lawsuits (about 20) from former employees at its Waukegan,

part of Saranac's budget with annual contributions of $5000. The 1933 annual report of Saranac referred to Met as the "mainstay of the experimental work during the past five years."[54] As Lanza himself put it, "Both Dr. Sayers and I were instrumental in establishing Saranac Laboratory in the industrial consultation field."[55]

Correspondence remaining from 1934 suggests that the compensation issue may have been crucial in the decision to finally publish Dr. Lanza's research on asbestos factory workers. By 1935, compensation had become a pressing concern of industry executives. Lanza sent a galley proof of his article to Johns-Manville lawyer Vandiver Brown, who passed it along to Newark attorney George Hobart (who had earlier negotiated the settlement of asbestosis lawsuits brought by Samuel Greenstone). Hobart explained that the New Jersey Legislative Commission was considering the addition of silicosis to the list of occupational diseases under the New Jersey compensation law. Hobart worried that asbestosis might also be recognized as a compensable disease.[56]

> (W)e have consistently urged that there is a substantial difference between silicosis and asbestosis and we have urged that asbestosis should not at the present time be included in the list of compensation diseases, for the reason that it is only within a comparatively recent time that asbestosis has been recognized by the medical scientific professions as a disease—in fact one of our principal defenses in actions against the company on the common law theory of negligence has been that the scientific and medical knowledge have been insufficient until a very recent period to place upon the owners of plants or factories the burden or duty of taking special precautions against the possible onset of the disease to their employees.

Brown and Hobart were well aware of the fact that if asbestosis became a compensable disease under the workers' compensation code, workers would not have to prove that the employer was at fault as required in negligence suits.

Before even receiving Hobart's reply, Vandiver Brown focused on a sentence Dr. Lanza had deleted from his initial report, to

the effect that, "Clinically, it (asbestosis) is of a type (of disease) milder than silicosis."[57,58] Brown had suggested to Lanza, and Hobart agreed, that the sentence must be re-inserted but could be reworded to "Clinically, *from this study* it appeared to be of a type milder than silicosis" (emphasis added).[56] The exact wording didn't matter, Hobart said, but that sentence must be included in some form:

> Here again I have in mind the probability that the New Jersey Commission will introduce a bill in the Legislature which opens in January of 1935; and if it is the policy of Johns-Manville to oppose any bill that attempted to include asbestosis, as compensable, it would be very helpful to have an official report to show that there is a substantial difference between asbestosis and silicosis; and by the same token it would be troublesome if an official report should appear from which the conclusion might be drawn that there is very little if any difference between the two disease.[56]

Vandiver Brown sent a copy of Hobart's 3-page letter to Dr. Lanza, asking that the contents be given "your most serious consideration."[59] Two weeks later, on January 4, 1935, Lanza's paper appeared in *Public Health Reports* with the sentence from Hobart's letter in conclusion number one, word for word.[46] Other changes requested by the lawyers were also made by Lanza.

It certainly appears plausible, from this record, that Lanza was asked to get his work into print so that the asbestos companies would have a tool to lobby against compensating asbestosis in New Jersey (and perhaps elsewhere). However, in the years since Lanza had originally written his findings, Merewether in England had published statistics (1933) showing that asbestotics were dying far younger than silicotics and after careers less than half as long.[60] Lanza was almost certainly aware of Merewether's work at this time, as he was a leading authority on asbestosis and referred to this article of Merewether's in his lengthy text, published in 1938.[29] These statistics were also published in the Annual Report of the Chief Inspector of Factories for the Years 1931-1933, and reprinted in the U.S. in

Monthly Labor Review.[61-63] Ellman also described asbestosis as a cause of more pronounced suffering than silicosis in papers published in the U.S. in 1933 and in the U.K. in 1934.[64,65] Attorney Brown immediately noticed that the crucial sentence was deleted and quite possibly perceived that the publication of Lanza's report could backfire and hasten legislative recognition of asbestosis. By this time, the report had already been submitted for publication and was in the galley proof stage, and could hardly be withdrawn. So, as Brown realized and Hobart stressed, the report would have to be edited—and it was.

In the state of New Jersey, where Johns-Manville had its largest manufacturing plant, asbestosis and silicosis were not listed as compensable diseases until 1945.[66] By this time, Vandiver Brown had changed his mind on the comparative costs of civil suits and workers' compensation for asbestosis (see opening quote of this chapter).

The Asbestos Magazine Letters

The English radiologist W. Burton Wood published an article on the chest X-rays of asbestos workers in the May, 1929 issue of *Tubercle*.[67] An abstract of this paper appeared in *Bulletin of Hygiene*, also printed in England.[68] This in turn was summarized and discussed in *Monthly Labor Review*, a publication of the U.S. Bureau of Labor Statistics.[69] Finally, this last item was picked up by the trade magazine of the asbestos industry in the United States, *Asbestos*.[70] The magazine not only informed its readers that much had been written in England about asbestosis, but went on to say, "The Bureau urges the establishment of efficient exhaust systems and the introduction of other safety methods."

This article appeared among advertisements of asbestos companies from all over the world, including Ehret Magnesia Manufacturing Company, Philip Carey Manufacturing Company, Johns-Manville, Keasbey & Mattison Company, Asbestos Corporation Limited, Ruberoid Company, and Cape Asbestos.[70] That very month, the Merewether and Price report was laid before Parliament by the Chief Inspector of Factories. Merewether's monumental contribution to the literature on asbestosis was not, however, cited in *Asbestos*. In fact, the subject of

A.S. Rossiter, editor of *Asbestos*, about publishing a review of a book on pneumoconiosis.[76]

> (I) told her in substance that...I felt there was considerable likelihood that a number of her subscribers would dislike an article on this subject in the trade magazine of the Asbestos Industry. I had in mind the ostrich-like attitude which has been evidenced from time to time by some members of the Industry. While I did not over-emphasize this point with Miss Rossiter, but merely suggested she give it consideration, I am inclined to believe she will omit any review of the book in question.

Nothing more about the health hazards of asbestos appeared in the trade magazine until 1969.

> [The 1935 *Asbestos* magazine letters are reproduced in full in Appendix 1.]

RISING TIDE OF COMPENSATION IN THE 1930s

Insurance carriers' concern about asbestos was evident by 1932.[77] Asbestos manufacturing was listed along with industries with silicosis, lead, and serious chemical hazards as receiving special attention "for some time" in insurance underwriting. But the closing paragraph of a 1932 occupational disease report in *The National Underwriter* was reserved for asbestos:

> Any processes involving asbestos are considered especially hazardous, for the asbestos fibers appear to be difficult to expel from the lungs.

Britain's industry leader, Turner & Newall, found it "impossible" to insure the risk of asbestosis by the early 1930s. Commercial Union was hired only to carry out the administrative aspects of claims processing, according to T&N instructions.[78]

The Supreme Court of North Carolina (*McNeely v. Carolina Asbestos Co.*, May 23, 1934) determined that the occupational disease, asbestosis, contracted unexpectedly and gradually over a long time, if due to the employer's failure to provide means of prevention, was an injury "by accident" and was compensable

under the state Workmen's Compensation Act.[79] There had been many civil suits filed against employers by workers with asbestosis in North Carolina, according to Dr. J. Donnelly.[80]

Insurance executive F.R. Jones wrote that the *McNeely* case and others like it injected elements of uncertainty that rendered the hazards of asbestosis and silicosis "often uninsurable at practicable rates." Jones went on to discuss the workers' compensation insurance rates in New York, following that state's recognition of asbestosis and other diseases under the Workers' Compensation law in 1935. He wrote that even though the rates were high, "their adequacy...is generally doubted." Jones said the State Fund charged even higher rates to companies rejected by the private insurance carriers. This, in turn, was driving operations with dust hazards out of New York, and at the same time fueling (successful) efforts to weaken the New York compensation law.[79]

Jones was the General Manager of the Association of Casualty and Surety Executives, and in 1935-1936 he issued urgent warnings to the effect that dust diseases were a mortal menace to industry. He called for the development of minimum engineering standards, "to impress backward industrialists, to guide and support insurers in granting or refusing coverage, and to furnish a scientific basis for regulations kept open to continual revision .. "[81,82] In this way, Jones hoped occupational diseases could be reduced to exceptional misfortunes instead of routine ones.[83]

He was much alarmed about the perils to business posed by occupational disease compensation, which had risen from insignificance to a major expense, along with taxes and unemployment insurance, in three years' time. All-inclusive occupational disease laws, Jones said, "should be avoided like sin" because they would leave open the possibility that courts and industrial commissions would then hold industries and their insurance carriers liable for all forms of ill health in any way contributed to by work.[83,84]

To confront the dust disease threat, a meeting of about 250 people representing over 50 industries with industrial disease problems was held on January 15, 1935. According to Vandiver Brown's memorandum of the meeting, speakers included Vice

President F.W. Sherwood and attorney A.C. Hirth of Owens-Illinois, Dr. A.J. Lanza of Metropolitan Life, Dr R.R. Sayers from the U.S. Public Health Service, Dr Philip Drinker of Harvard, and insurance lobbyist F.R. Jones.[85]

Reviewing the discussions, Brown wrote,

> Only two forms of dust, namely, free silica and asbestos, are definitely known to produce disabling fibrosis of the lung.

Turning to problems common to all, the meeting then focused on what Brown called "the menace of ambulance chasing lawyers in combination with unscrupulous doctors." This menace to employers was seen to be greatest where juries decided the facts in each case. Brown then quoted a speaker who urged that "the strongest bulwark against future disaster for industry is the enactment of properly drawn (workers' compensation laws)." Such legislation would.

1. "eliminate the jury" and replace it by an appointed medical board within the workers' compensation system;
2. "eliminate the shyster lawyer and the quack doctor" by strictly limiting their fees under the law; and
3. "permit the correcting of initial mistakes in the making of awards" by establishing hearing procedures where new evidence could be offered to contest awards of compensation

By March 21, 1935, Willis Hazard of Owens-Illinois reported that 14 companies had pledged funds to establish an organization on industrial dust issues, "representing industries." The Suggested Program of Initial Activities outlined a number of offensive strategies for bringing down the costs to business.[86]

One objective was to set up "authoritative and approved standards for the control of industrial dusts, which, if complied with by industries or by industrial companies, will act as a defense against personal injury suits." The profession of industrial hygiene appears to have enjoyed industry's blessing after that, and within a short time professional organizations were formed (American Conference of Governmental Industrial Hygienists in 1938, American Industrial Hygiene Association in

knew, or by the exercise of ordinary care would have known that, "asbestos fumes and particles were likely to be breathed into (Dugan's) lungs and to injure him ... yet failed to warn plaintiff of the dangers ... carelessly and negligently failed to furnish any instrument, or device for the mixing of said ingredients with safety to plaintiff and other employees, or any mask, or device or other protection to be used over his nostrils and mouth ..."[152] It appears that Mr. Dugan died in 1934, and the lawsuit was dismissed.[153]

There were also two damage suits filed by insulation workers in 1957 and 1961 against Johns-Manville.

The first of these cases was brought by Frederick LeGrande, who had been an insulation worker for about 30 years.[154,155] A complaint was filed in U.S. District Court in New Jersey, stating that LeGrande had not been warned of the danger of breathing dust from the asbestos products he handled. Mr. LeGrande asked for a jury trial and $500,000 in damages. At this time, Mr. LeGrande asserted that he was disabled by asbestosis and had ceased work involving the handling of insulation. He had worked for J-M distributor H.W. Porter & Company, against whom a workers' compensation claim was filed.

When Johns-Manville failed to respond to LeGrande's lawyer's interrogatories, a Court Order was obtained directing the company to do so. The Answers to Interrogatories in this early damage suit, made under oath, set the tone for future proceedings (and contained factual errors)

> This deponent has no knowledge of any case of asbestosis ever being contracted by an applicator. Asbestosis was first contracted by an employee of this defendant at one of its plants in 1946 ...
>
> Since *this defendant never received notice of any claim of asbestosis resulting to any persons other than our employees who were engaged in the manufacture of the products*, we had no reason to issue any warnings, instructions, or preventions to any other persons. (emphasis added)

As the jury was about to be selected for trial, Johns-Manville offered $35,000 to settle the case out of court, and this was accepted in March of 1959.

Fred C. Wenham was an insulation worker who developed asbestosis and lung cancer. A workers' compensation claim was filed against Mr. Wenham's employer, and a wrongful death case was filed against Johns-Manville in U.S. District Court in New Jersey.[156,157] This case was also settled out of court, for about $10,000, and most of that was remitted back to the workers' compensation carrier that had insured Mr. Wenham's employer.

Eagle-Picher Company was sued in 1960 by Gladys Faciane, widow of insulator Clarence A. Faciane. Mr. Faciane had died from lung cancer. An amended petition filed with the court in Louisiana on March 15, 1961 named as additional defendants Armstrong Contracting and Supply, Johns-Manville, Owens-Corning Fiberglas, Ruberoid, U.S. Rubber, Philip Carey, Mundet Cork, Nicolet Industries, Keasbey & Mattison, Baldwin-Ehret-Hill, Pittsburgh-Corning, and tobacco manufacturers R.J. Reynolds and P.F.Lorillard.[158] The product liability case was dismissed because the widow could not prove whose products her husband had used.

Corporate Compensation Meetings at Manville

The compensation claim files and court documents are valuable, but offer little direct insight into the company's internal reaction to the compensation toll among both its employees and its customers.

By the late 1950s, there were regular meetings of the compensation committee at Johns-Manville's main (Manville, New Jersey) plant. At these meetings were Medical Director Ken Smith, plant engineer Cliff Sheckler, nurse Hahn, and a couple of others. Some excerpts of their notes:[159]

Sigmund Skirzenski, age 52, advanced pneumoconiosis
Sheckler: Should we change him?
Smith: Won't make any difference. Do not transfer, retire if necessary.

In the other case reported by Stewart, *et al.* the asbestosis was severe. This individual had worked in an asbestos factory for only 9 months in 1921, and had taken no precautions against the inhalation of dust. Commenting on the second case, the authors illustrated the connection between short-term, heavy exposure and longterm, brief exposure. They concluded that respiratory protection should be very widely used in work with asbestos:

> This demonstrates that the symptoms of a pneumoconiosis may come on years after a short exposure *and emphasizes again the absolute necessity for wearing masks in even the less dusty atmospheres.* (emphasis added)

At the other extreme, Aetna Life Insurance Company physician Roscoe Gray, in his *Attorneys' Textbook of Medicine,* threw caution to the wind in interpreting the literature:

> Since asbestosis practically does not occur with spinning, unless there has been previous exposure to more dusty processes, it is considered that the dust concentration of the spinning room is *safe* Merewether found the dust count in this department to be as low as 506 to the cubic centimeter, equal to about 13,500,000 to the cubic foot. (emphasis added)*[52]

Such reasoning may have been useful in contesting asbestosis compensation claims; but it is doubtful that it was used by Aetna to justify the sale of life insurance to asbestos workers.

In 1935, the state of Pennsylvania published the results of a medical and engineering survey of four asbestos plants.[53] Table 1 shows the distribution of 14 cases of asbestosis among the 56 people examined.

The data show an increasing prevalence and severity of the disease at 4.64, 16.9, and 44.3 million particles per cubic foot.**

*The correct equivalent of 506 particles per cubic centimeter is 14 3 MPPCF, as previously noted.

**Here again, all types of particles captured by the sampling instrument were counted, not just asbestos fibers.

Table 1[53] Incidence and Degree of Asbestosis with Relation to Occupation, Dust Concentration, and Years of Exposure

Occupation	Average Concentration Millions of particles per cubic foot	Years of Exposure	Total Number Examined	Asbestosis				
				Negative	Slight	Moderate	Advanced	Doubtful
Preparers and Carders	44.26	0-5	3	2	—	—	—	1
		6-10	3	—	—	3	—	—
		11-15	5	1	1	3	—	—
		16-20	2	1	1	—	—	—
		over 20	1	1	—	—	—	—
		Total	14	5	2	6	—	1
Weavers and Spinners	10.87	0-5	3	2	—	—	—	—
		6-10	4	3	1	—	—	—
		11-15	4	3	—	1	—	—
		16-20	5	3	2	—	—	—
		over 20	2	2	—	—	—	—
		Total	18	14	3	1	—	—
Winders, Twisters, Warpers, etc.	4.64	0-5	4	4	—	—	—	—
		6-10	7	7	1	—	—	—
		11-15	8	8	1	—	—	1
		16-20	1	1	—	—	—	—
		over 20	4	4	—	—	—	—
		Total	24	21	2	—	—	1
Totals			56	40	7	7	—	2

A-218.b

The data indicate that the "safe" level is less than any in the range reported. An abstract of this study in *Journal of Industrial Hygiene and Toxicology* concluded that, "The study was too limited to permit the formulation of permissible standards of dustiness, but a reduction in the asbestos dust concentration in the operations studied is shown to be necessary."[54]

Lanza and coworkers at the Metropolitan Life Insurance Company conducted the first industry-sponsored study of asbestosis published in the United States.[55] X-ray evidence of asbestosis was found in over half the workers examined (and in 87 percent of those with over 15 years in the plants). A total of 121 dust counts for various processes in five plants were tabulated. Most of the values were below 5 MPPCF, and only a few were as high as 40-82 MPPCF. The authors declined to recommend any level of asbestos exposure as a guideline, saying, "It is not practicable as yet to establish standards for the asbestos dust content of air."

Meanwhile, other events were setting the stage for a dust limit for asbestos. At a National Silicosis Conference in April, 1936, Alfred Hirth, Chairman of the Air Hygiene Foundation's Legal Committee, urged the establishment of "safe" levels of dust high in free silica content. The Foundation's Medical Committee, chaired by A.J. Lanza, then suggested a limit of 5 MPPCF, though they separately doubted the adequacy of scientific knowledge for setting a threshold to prevent silicosis. Vandiver Brown, whose desire that asbestosis be presented by Lanza as a "milder" disease than silicosis, would later remark that the 5 MPPCF limit for asbestos-containing dust was selected with it well in the mind that this limit "had already been prescribed for silicosis."[56,57] Dr. Leroy Gardner, in a plant survey at an asbestos plant owned by U.S. Gypsum in 1936, advised keeping dust counts less than 5 MPPCF, noting that this limit had been "tentatively suggested" by various authorities for free silica. He also said, "It is quite possible that the safe limit might be even lower for asbestos than for silica."[58]

Plant Surveys by the U.S. Public Health Service

The Public Health Service employed engineers, doctors, and chemists who performed studies on hazardous industries. While

the P.H.S. had no enforcement authority, its *Public Health Bulletins* and reports in scientific periodicals advanced the state of knowledge in many industries. These studies were widely cited and commented upon; they also were directed toward determining what degree of exposure was acceptable and what was not.

In the years 1935-1937 two separate investigations were conducted. The smaller one was published first, and consisted of an industrial hygiene engineering survey of an asbestos textile plant. This facility was not described as having the best available control technology; but it was believed to be "representative of the best practice in this country at this time."[59]

A table of dust counts taken with and without the exhaust ventilation in operation showed that exposures were reduced 90 percent and more by the controls in most operations. Most impressive was the rise from 1.7 MPPCF to 62.4 MPPCF in the carding process after one hour's operation without exhaust. An abstract of this paper by Dr. Philip Drinker at Harvard concluded, "A final table shows clearly that the industry can keep dustiness well below 10 MPPCF."[60]

Dreessen and others from the U.S. Public Health Service were meanwhile conducting a medical and engineering survey of three North Carolina asbestos textile plants. However, prior to the arrival of the Service, the mills discharged more than one fourth of their employees.[61] Public Health Service researchers later noted,

> The incidence of frank disease was so great that prior to the beginning of the study out of a total of less than 600 employees the plants discharged 150 workers suspected of having asbestosis.[62]

The reports of the Public Health Service and local chest physicians leave no doubt that most of the people discharged had asbestosis.[61-65] Shull, for example, wrote:

> During the latter part of 1934 it was my privilege to examine the chests of 71 of 100 workers who had been dismissed from local asbestos plants. All had undergone physical

District Court for Western District of Pennsylvania, taken in Baltimore, Dec. 1-2, 1983).

The equipment in the Tyler plant was dismantled and buried following the plant closing. A book was written by *New Yorker* journalist Paul Brodeur about the hazardous conditions in this plant (*Expendable Americans*, Viking Press, 1974). The class action brought by 445 Tyler plant employees was settled out of court for $20 million in 1977. Pittsburgh-Corning paid $8.1 million, Union Asbestos and Rubber Co. paid $1.0 million, Cape Industries paid $5.2 million, and the U.S. government paid $5.7 million. Pittsburgh-Corning had previously made non-asbestos insulations, and was a member of the National Insulation Manufacturers Association during the years 1960–1964.

EAGLE-PICHER INDUSTRIES

Eagle-Picher began producing "Super 66" asbestos-containing insulating cement in 1938. Another product line, "One-Cote Cement," was added in 1950. The company also manufactured asbestos-free, mineral wool insulation products.

As early as 1932, the hazards of asbestos were pointedly noted in a report to the company by the U.S. Bureau of Mines. In a report of lung fibrosis among employees at the company's plant in Joplin, Missouri, where rock wool and asbestos were used, the mixing room was described as "a particularly dusty place." The report continued, "It is now known that asbestos dust is one of the most dangerous dusts to which man is exposed." Dust control was recommended throughout the plant by the author of the report, Dr. F.V. Meriwether (F.V. Meriwether report and letter of transmittal to Dr. R. R. Sayers, March 11, 1932; Bureau Director Scott Turner letter to Erbon Mahon, Safety Engineer, Eagle-Picher Co., Picher, OK, March 21, 1932. U.S. National Archives documents). Glen Christner, who began work for Eagle Picher in 1931 and retired as Vice President of the insulation division in 1963, recalls having heard about the early Bureau of Mines report at the plant when it arrived (testimony in *Kitsap Co. Cases of Shroeter, Goldmark, and Bender*, No. 81-2-00669-0, Port Orchard, WA, Nov. 1, 1984).

In 1942, a salesman reported from Texas that health officials

had made unfavorable comments about "Supertemp" to a customer, Humble Oil and Refining Company. The salesman, H.M. Aber, also reported that a 1938 article, "Asbestos" (written by Gloyne and Merewether and published in the 1938 *Supplement* to the encyclopedia, *Occupation and Health*, by the International Labor Office) showed asbestos to be more dangerous than mineral wool. (See also Table 8 in Chapter 5) Aber communicated a state health official's offer to "make any reasonable test on Supertemp relative to its being injurious to workmen." (H.M. Aber. "Texas State Board of Health." Eagle-Picher Sales Co. Industrial Contact Report, April 8, 1942)

Eagle-Picher advertised its "Super 66" in the same issue of *Southern Power and Industry* that carried the article "Industrial Hygiene Importance of Dust" (Nov. 1946). The article, by N.V. Hendricks of the Georgia Dept. of Public Health, repeatedly referred to asbestos as a threat to health warranting engineering controls and exposure monitoring.

The Research Library of the Eagle-Picher firm accumulated the following documents relating to asbestosis:

Document	Year Received	Comments
Drinker, P. and T. Hatch. *Industrial Dust* New York: McGraw-Hill Book Co., (1936).	1938	section on asbestosis pp. 32-34
Johnstone, R.T. *Occupational Medicine and Industrial Hygiene* St. Louis: C.V. Mosby Co., (1948)	1953	Chapter 30 on asbestosis notes that occupational exposure occurs in the insulation trade
Sax, N.I. *Handbook of Dangerous Materials* New York: Reinhold Publ. Co., (1951).	1951	notes that occupational exposure occurs in insulation work, p. 34

Eagle-Picher was the primary defendant in the product liability case filed by the widow of insulator C. Faciane in 1960. (See "Lawsuits by Product Users Against Asbestos Manufacturers," in Chapter 3).

Correspondence of officials of the company also dealt with the subject of health hazards of Eagle-Picher insulations.

July 8, 1960. R. Beaudry letter to Eagle Picher Sales Co., and July 21, 1960 reply from Glen Christner (V.P. Insulation Div.).

> Insurance claims adjuster writes that E-P mineral wool products used in 1946–1948 are suspected of contributing to asbestosis in an insulator. Christner reply says products sold in those years contained no asbestos.

April 6, 1965 P.L. Losse letter to R. Alexander (Sun Shipbuilding and Drydock Co. Chester, PA).

> Notes that "minor amounts" of asbestos and other materials were used in the products. "(W)hile each of these added ingredients could be a health hazard if exposure were to a high concentration, such is not the case." After mentioning occasional dermatitis problems, Losse concluded: "In view of the above relative minor hazard potential for the materials we manufacture, we do not have any medical reports relative to this matter."

May 22, 1968. P.K. Maitre letter to F.J Hess (Shell Oil Co. Wood River, Illinois.)

> The above Eagle-Picher products (Super 66 and One-Cote cements) do not contain any toxic ingredients. Therefore, no antidotes are needed.

Subsequent to the filing of a civil claim against Eagle-Picher in 1963, attorneys employed by and representing the company met with Johns-Manville Medical Director K.W. Smith. A memorandum of these discussions observed that:

> Dr. Smith gave us an example of samples taken of a man who was exposed approximately 5 minutes an hour who sustained a serious asbestosis in a working period of only a few months.

The use of warning labeling was also discussed. This memorandum was withheld for years under the claim of attorney-client privilege ("Conference Feb. 19, 1964, Eagle-Picher Insulation Plant, Joplin, Missouri"; and Affidavit of E-P Vice President James Ralston in *Heathman*, Case No. 87-C-1934, Brazoria Co.,

TX, March 25, 1988; and videotaped deposition of E-P corporate representative, R. Bochstaller, by former insulation worker, attorney Lawrence Madeksho, of Houston, TX, in *Heathman* case, Mar. 2, 1989). The document's existence was revealed after it was inadvertently produced by E-P in discovery, in a lawsuit E-P had filed against the U.S. government.

An internal memorandum about the size of printing to use in labeling product hazards reflects the dominance of commercial considerations over concern for the consumer's awareness of health risks Placement and design of health warnings predictably prevented their notice by many workers handling labeled insulation products

> This is large and clear enough type face to be completely legible, yet does not 'shout CAUTION from the roof tops'
>
> (W F. McCarthy, E-P Advertising Dept. memorandum to Alton L. Jones, Joplin Insulation Plant, "Type Face for 'Caution' Notice, June 19, 1964.")

In a letter July 20, 1970, Dr. Irving Selikoff urged Eagle-Picher President W. Atteberry to market asbestos cement products in plastic bags to facilitate lower worker exposures by enclosed mixing (as opposed to mixing in open troughs).

Retired Eagle-Picher engineer Herman Lee Huelster has testified that, although asbestos was used in the company's insulating cements from 1942 to 1971, it was never needed. He attributed the use of asbestos to pressures from the company sales department, and characterized this as a "sales gimmick." Huelster had always objected to spending "big money for an ingredient that we did not manufacture ourselves and (which) did nothing to improve the insulating qualities of the product." He attributed the requirement for asbestos in some Naval specifications for insulating cements not to technical purposes, but rather to "clout" of firms with major interests in asbestos (deposition taken Aug. 28, 1980 in *Zsamba v. State Insulation Corp. et al.* Superior Court of New Jersey, Middlesex County, No. L-32392-770).

Eagle-Picher was a member of the Industrial Hygiene Foundation during the years 1936–1961, and thus received the *Industrial Hygiene Digest* abstracts on industrial medicine and hygiene. The company was also a member of the National Insulation Manufacturers Association in 1960, when NIMA considered the possibility of a health program and rejected it.

UNITED STATES GYPSUM COMPANY

U.S. Gypsum has manufactured a wide range of building products in which asbestos is used. These include trowel-applied and sprayed acoustical plasters, sprayed insulation, block insulation, ceiling tiles, and paints.

The company was associated with the Saranac Laboratory from the early 1930s, when tissue samples from employees were examined for pathological effects of gypsum dust. After purchasing the National Asbestos Co. plant (in Jersey City, NJ), USG had the Saranac Laboratory conduct a survey. Loading and packing asbestos cement were among the most hazardous jobs, with exposures of 261 MPPCF. Asbestosis was diagnosed in 5 workers and suspected in the cases of 5 others. The findings were transmitted to USG Vice President W.L. Keady ("Report of Dust Survey at National Asbestos Co. Plant of United States Gypsum Co. at Jersey City, NJ," by L.U. Gardner, Saranac Laboratory, May 25-June 2, 1936; and "Dust Survey—Jersey City," 3-pp. memorandum to W.L. Keady from General Service Manager, Aug. 13, 1936). The memorandum characterized the asbestos dust hazard as "serious."

USG was one of the contributors to the series of asbestos experiments started at Saranac in 1937 (See "Raybestos-Manhattan, Inc.," this chapter.) The company received progress reports on Saranac asbestos experiments from Vandiver Brown at Johns-Manville. USG was also a party to the censorship of all references to cancer in the report of industry-sponsored asbestos research at Saranac, published by Vorwald in 1951 (See "Early Saranac Laboratory Cancer Tests with Asbestos" in Chapter 2).

COMPANIES MINING ASBESTOS IN QUEBEC, CANADA

There is a body of knowledge that may be ascribed to Canadian asbestos mining companies, generally. The largest asbestos mining operation in Quebec was that of Johns-Manville (sold by Manville Corporation to former employees in 1983), in the town of Asbestos. Others are located not far away, most near the town of Thetford Mines. These others include, or in the past years have included:

Company	Relevant History
[illegible] Asbestos Mines	Subsidiary of Cassiar & Yukon Corporation [illegible] Newell, B.C. (U.K.) in 1965. Sold in 19[illegible] the Quebec government corporation SO[illegible] Nouveau est Limitée
[illegible] Corporation Ltée	Formed by consolidation of [illegible] and Canadian [illegible] Corp. (U.S.) obtained a 54% interest in 1969 and sold it to Société Nouvelle d'Amiante in 1981.
[illegible]'s Company	Operated as Asbestos Corp. Ltd. until [illegible]
Nicolet Asbestos Mines, Ltd	Operated by Nicolet Industries, Ltd. from 1958-1968.
National Asbestos Mine	Operated by National Gypsum Company from 1955-1973 and sold to Lake Asbestos
Lake Asbestos (Lac d'Amiante du Quebec, Ltee)	Subsidiary of Asbeco, Inc. (U.S.), in operation since 1958.
Flintkote Mines, Ltd	Subsidiary of Flintkote Company (U.S.), in operation from 1946 until about 1973.
Quebec Asbestos Corp.; Carey Canadian Mines	Subsidiaries of Philip Carey Manufacturing Company (U.S.), which in turn has become succeeded by Glen Alden, Rapid-American Corporation, Paragon, and Celotex, part of Jim Walter Corp. (U.S.) The first of these operations closed and the second began in the late 1950s.

Cooperation among asbestos mining companies in Quebec dates from 1930 or before, on the subject of asbestosis. In that year, an article on asbestosis appeared in *Asbestos* magazine amidst advertisements by Philip Carey Manufacturing Company, Johns-Manville, Keasbey & Mattison, Asbestos Corporation Ltd., and others. Other material on asbestos hazards known to mining firms in Quebec includes the following items:

1. Health surveys were undertaken under the auspices of the Metropolitan Life Insurance Company in 1930 by Drs. Frank Pedley and A.J. Lanza. Their findings were contained in a report by Dr. George Wheatley, medical director of Metropolitan Life. This obscure 1944 report, *Tuberculosis and Asbestosis*, included data from a 1930 survey of 395 asbestos miners in Asbestos and Thetford Mines. Of this number, 42 had asbestosis. The Wheatley report also noted that asbestosis was a compensable disease in the Province. According to a memorandum by Quebec Asbestos Mining Association lawyer J. Sabourin (attached to the back of the report), the report had been sent to compensation officials and pulmonary experts in Quebec at the time it was prepared. (See also "Asbestosis in Canada" in Chapter 1).

   An unpublished report to Metropolitan Life Insurance Company identifies the companies surveyed in Thetford Mines as Asbestos Corporation, Keasbey & Mattison, and Johnson's Mine (Frank Pedley, *Report of the Physical Examinations and X-ray Examinations of Asbestos Workers in Asbestos and Thetford Mines, Quebec*, 15 pages, Nov. 1930).

2. Burton LeDoux report, "Asbestosis" and the asbestos strike of 1949

   Pierre Elliott Trudeau's book, *The Asbestos Strike* (Toronto: James Lorimer & Co., 1974, originally published in 1956) says that LeDoux had previously written exposés of silicosis in Quebec, creating a scandal in 1948 (pp. 241-242, 274). His investigation of the asbestos mines was written entirely about Quebec Asbestos Corp., Ltd. a subsidiary of Philip Carey. LeDoux' account was printed in the newspaper *Le Devoir*, an indictment that filled several full pages of the newspaper. It was entitled, "Asbestosis at East Broughton—A Village of 3,000 Suffocated by Dust," and appeared in print on January 12, 1949.

   LeDoux' account was also printed in English. It describes case histories of workers disabled by asbestosis, local doctors who were afraid to tell them so, estimates of how much profit Carey

mined out of the town, descriptions of asbestos air pollution in town, commentary on the "ample and authentative medical literature.. that the disease is incurable and fatal"; and culminates with what LeDeux called "proof of company and government responsibility" starting in 1944. This was a thorough, piercing, investigative report.

Le Devoir let hardly a day pass for the next month without adding reports and editorials on asbestosis. One of the reporters of this scene, Gerard Pelletier of *Le Devoir*, is the protagonist of the chapter of Trudeau's book about press coverage of the strike. He described the workers of Carey's East Broughton mining operation as "preeminently the victims of asbestosis," and yet the only unionists who did not join the five-month strike in the asbestos mines that began in February, 1949

3. F. Lathe, "Associate Committee on Asbestos" (Aug. 11, 1938) and D. Wolochow, "Asbestos" (June 3, 1938)

Canadian government officials were the "advisers" to the Quebec Asbestos Producers Association in the 1930s to defend against claims of asbestosis by the industry trade association (renamed Quebec Asbestos Mining Association in 1943

4. O.C. Smith (Bell Asbestos Mines, subsidiary of Turner & Newall, U.K.), "Report to Quebec Asbestos Mining Association on Pulmonary Cancer and Supplementary Memorandum on Cancer Research" (Dec. 19, 1950)

Memorandum enclosing review by Dr. John Knowelden of the U.K. Factory Inspectorate's statistics linking asbestosis and pulmonary cancer. Addressed to representatives of the following companies: Asbestos Corporation Ltd., Flintkote Mines, Canadian Johns-Manville, Nicolet Asbestos Mines, and Quebec Asbestos Corp.

5. A.J. Vorwald, *First Interim Report Asbestosis and Pulmonary Cancer*, Saranac Laboratory, report to Q.A.M.A. (May 7, 1952)

The Saranac Lab was commissioned by the Quebec Asbestos Mining Association to test Canadian chrysotile asbestos in mice by inhalation. By May 1952, this preliminary report of 14 months' testing appeared, showing a trend toward positive findings, and shortly thereafter funding of the study was apparently halted (See "The Saranac Lab's Cancer Studies for the Quebec Asbestos Mining Association," in Chapter 2)

6. P. Cartier, Reports of Cancer among Asbestos Miners at Thetford Mines, 1952-1955.

Pathology reviews of tissues were done at the Saranac Laboratory for the mining companies starting in 1942, and a number of pulmonary cancer cases were already recorded by 1949 (See "Dr. Schepers' Visit to America," in Chapter 2). Dr. Cartier, of the Thetford Industrial Clinic, periodically reported on these cancer cases (See "More Reports and Reviews" and "The Seventh Saranac Symposium," in Chapter 2).

7. D.C. Braun, *An Epidemiological Study of Lung Cancer in Asbestos Miners* prepared by Industrial Hygiene Foundation for Quebec Asbestos Mining Association (Sept. 1957); D.C. Braun and T. Truan, "An Epidemiological Study of Lung Cancer in Asbestos Miners," *Amer. Indust. Health* 17: 634-652 (1958).

These and other documents describe research sponsored by Q.A.M.A. on lung cancer in asbestos miners (See "The Industrial Hygiene Foundation Cancer Study," in Chapter 2).

8. "Minutes of the 89th Meeting of the Quebec Asbestos Mining Association," held Oct. 14, 1964 at the St. George's Club, Sherbrooke, Quebec.

Q.A.M.A. decided to contribute toward the expenses for the international conference on asbestos sponsored by the New York Academy of Sciences.

9. "Minutes of the Special Meeting of the Quebec Asbestos Mining Association Held on March 28 and 29, 1968, at the Grand Bahama Hotel and Country Club, G.B." And "Special Meeting Grand Bahama Hotel and Country Club, G.B."

The first of these mentions a proposed health warning label for bags of asbestos "to release the producers from possible legal responsibility." The text was to be checked by "member company counsels" for review at the next Q.A.M.A. meeting.

The second refers to the TLV Committee of the American Conference of Governmental Industrial Hygienists.

> The Committee has potent legal standing in theory, but not in practice. It was emphasized that adequate information is not always available to this Committee; for instance, standards for the asbestos industry are not up-to-date.

10. *Montreal Star* (March 20, 1975).
    Contains two front-page stories about the Thetford clinic's failure to inform asbestos miners that they had asbestosis, over a period of decades.

The minutes of the Quebec Asbestos Mining Association (founded in 1931) have never been made available for inspection in discovery proceedings.

PHILIP CAREY MANUFACTURING COMPANY
(aka: Gem Metal, Panacon, Celotex, J-M Wallboard Corp.)

The Philip Carey Company of Cincinnati, Ohio, boasted that it had been supplying asbestos and asbestos products for over 50 years in an ad appearing in *Asbestos*, in March, 1930 (this issue also carried an article about asbestosis). Carey was in the insulation contracting business as well.

Publicity over asbestosis among Carey's Quebec mine employees led to a historic asbestos strike in the Province (See "Compensation at the Asbestos Mines in Canada," in Chapter 3, and "Companies Mining Asbestos in Quebec, Canada," this chapter). Carey's ownership of the Quebec Asbestos Corporation was recorded in *Moody's Manual of Investments* (1953). Q.A.M.A. lawyer Ivan Sabourin communicated the initial report and findings of the industry-sponsored cancer epidemiology study to Ed Broadway of Quebec Asbestos Corp. on Nov. 11, 1957 (See "The Industrial Hygiene Foundation Cancer Study," in Chapter 2).

The following documentation relates directly to Carey:

1 National Industrial Recovery Administration Hearing on Code of Fair Practices and Competition, Presented by Asbestos Industry, Oct. 19, 1933.
    Carey President George Crabbs and Johns-Manville President Lewis Brown, accompanied by representatives of 3 other asbestos companies, testified at hearings on a proposed code that would have excluded minors under age 18 from employment in occupations with exposure to "asbestos dust .. in injurious quantities." Brown presented a list of companies that had signed the proposed code (including American Brakeblok, Carey, Ehret, Garlock, J-M, Keasbey & Mattison, Ruberoid, Southern Asbestos,

ASBESTOS CORPORATION LIMITED (ACL)

This company was set up in 1925 and nationalized in the 1980's (incorporated into the Quebec government company, Société Nationale de l'Amiante).

A dust survey of the firm's King mine and mill was conducted in 1944 by Metropolitan Life Insurance Company, and the brief report of the findings was on file (Document No. 1178) at the Institute of Occupational and Environmental Health, in Montreal (I.O.E.H. was a part of the Quebec Asbestos Mining Association until its library was merged into the Canadian Asbestos Information Centre in 1982, now the Asbestos Institute). The report notes that a similar survey had been conducted in 1930. Dust concentrations ranged from 11.2 to 26.6 MPPCF in the five operations evaluated. The plant was running at full production, and the workers were typical of areas at the time samples were taken. Improved housekeeping and the covering of conveyors, in addition to the above factors were given as reasons for the "much lower" dust concentrations measured in 1944 than in 1930. In terms of plant design, very little had changed.

> No changes have been made in the machinery since the first survey. The only effort at dust suppression is the water covering some conveyors.

The Metropolitan Life report recommended that efforts be made to lower exposures to a maximum concentration of 5 MPPCF. In this connection, the report of the U.S. Public Health Service (Dreessen *et al*, 1938) was cited. Reprints of two papers by Dr. Lanza and his co-workers at Met Life (1935, 1938) were attached to the King Mine survey report.

Starting in 1943, numerous cases in which asbestosis was suspected among ACL employees were referred to the Saranac Laboratory. Many of these people had been seen by Dr. Cartier's Thetford Industrial Clinic, and compensation claims had been filed in at least 17 of the cases reviewed by Dr. Gardner and Dr. Vorwald between 1943 and 1957. In a 1946 case where a death claim had been filed, the asbestosis was extensive and was accompanied by lung cancer (Vorwald Patient

File P-46-372). The Treasurer of ACL, whose exposure consisted only of office work starting in 1920, died from pleural mesothelioma in 1949 (Vorwald Patient File IM-573). Details of these cases beyond those in the Vorwald files are unavailable from the Quebec government and the mining companies in Quebec, due to the Quebec Records Concerns Act, which bars the transfer of certain types of records out of the Province, even as photocopies.

ACL was a member of the Industrial Hygiene Foundation from Dec. 1, 1958 until Dec. 31, 1960. ACL was an "associate member of the Asbestos Textile Institute from June, 1952 until ATI was dissolved in the 1970's

On January 5, 1970, ACL Vice President J.C. Cowan wrote to representatives of other asbestos mining companies that caution labels would be placed on future ACL asbestos shipments. These labels were being placed on shipments "to Canadian and American customers only" (original emphasis):

> This bag contains chrysotile asbestos fibre. Persons exposed to this material should use adequate protective devices as inhalation of this material over long periods may be harmful.

JOHNS-MANVILLE CORPORATION
(Became Manville in 1981)

This company was the asbestos industry leader in the United States, with mines in Canada. Its founder was Henry Ward Johns, who patented inventions for roofing and insulation products. Johns started his own company at the age of 21, and died 40 years later of a chronic lung condition, in 1898. (His death certificate lists the cause of death as "phthisis pulmonalis.")

The company's continuous concern about the problem of asbestosis apparently dates from the late 1920s. Lanza, in his 1935 publication, acknowledged that "officials representing the asbestos industry in the United States" had approached him to conduct a health survey in 1929.

J-M also presumably knew that Company doctors and Public examined workers at their mine in Asbestos, Quebec, and identified 18 cases of asbestosis there in 1930 (See "Asbestosis in Canada," in Chapter 1).

A 1930 report by J-M Sales Promotion Department (Market Analysis Section) contained factual summaries of British medical reports published in 1929. This is one of the first documents of interest produced in discovery by Johns-Manville to plaintiffs in civil litigation (from files of the J-M Waukegan, Illinois plant). Discovery conducted by the U.S. Department of Justice in the mid-1980s, in connection with a suit brought by J-M against the government, unearthed files of Vandiver Brown and others that had been preserved on microfilm.

Lawsuits were filed against Johns-Manville by employees claiming disability from lung diseases at least as early as 1929. The corporation's board of Directors approved of a settlement of asbestosis lawsuits in New Jersey in 1933 (See "Asbestosis Compensation in the Early Years," in Chapter 3).

Advised by Dr. A.J. Lanza of Metropolitan Life Insurance Company, J-M found that 29 percent of its Manville, NJ plant employees, including 2 watchmen and 2 shipping clerks, had pneumoconiosis (See "1931-1935 Taking Account of Asbestosis," in Chapter 1). Lanza advised against publishing early warning signs in J-M's Waukegan, IL plant in 1933, because of concern over lawsuits (See "Asbestos Compensation in the Early Years: Damage Suits," in Chapter 3).

Johns-Manville's early involvement in matters relating to the health hazards of asbestos seems to have been handled primarily by corporate attorney Vandiver Brown in the years 1930-1950. Shortly after 1950, Brown was summarily retired, and until his death in 1983 he resided alternatively in Scotland and Waco, Texas. Plaintiffs' attorneys were surprised to discover that he was still living, having been told in Johns-Manville's Answers to Interrogatories that Vandiver Brown was dead. Brown's doctor and banker (financial guardian) then testified that he was completely senile and in such poor health that he could not safely undergo a deposition. Brown never was prevailed upon to add to the documentary record of his years at Johns-Manville.

Brown's activities in the 1930s are known largely through the Sumner Simpson Papers (See "Raybestos-Manhattan," this chapter; and Chapter 3). These activities included making editorial suggestions to Dr. Lanza on galley proofs of his paper published in 1935; discouraging the trade magazine *Asbestos* from running stories on asbestosis and dust control; and representing asbestos companies sponsoring research at the Saranac Laboratory. In this last capacity, Brown vigilantly watched for any violation of the laboratory director's contract forbidding publication without approval of the industry sponsors. He also received in 1943 an annotated outline of a monograph that Dr. Gardner intended to write. This contained evaluations of human and unpublished Saranac animal test data, to the effect that in both cases the evidence was suggestive but not conclusive that asbestos was a carcinogen. Brown and representatives of other companies pressed Saranac to omit all mention of cancer in the published report of Gardner's research (See "Early Saranac Laboratory Cancer Tests with Asbestos," in Chapter 2).

Vandiver Brown was the asbestos industry representative who joined with representatives of other industries to launch the Air Hygiene Foundation, soon after renamed Industrial Hygiene Foundation.

Brown and the Johns-Manville president (Lewis Brown) met with Charles Roemer and officials from the Union Asbestos and Rubber Company in 1942 or 1943. According to Mr. Roemer, Brown explained that it was company policy to not tell employees their medical examinations showed they had asbestosis. Brown went on to explain the financial reasoning behind this policy (See "A Lobster Lunch with Vandiver Brown," in Chapter 3, and opening quote to this chapter).

In 1947, Brown criticized the lacking of scientific basis of the tentative threshold limit first proposed for dust in asbestos plants by the U.S. Public Health Service (See "Unsteady Movement Toward Numerical Exposure Limits," in Chapter 4).

In 1950, Brown demanded that Dr. Gerrit Schepers suppress a report Schepers had prepared for the South African government about the asbestos problem in the U.S. and Canada. Brown objected particularly to Schepers' reference to cancer at

the Canadian mines and the extreme dustiness of two Johns-Manville asbestos plants (See "Dr. Schepers' Visit to America," in Chapter 2).

In late 1950, Page Woodard, another J-M executive, met with Dr. Vorwald, Dr. A.J. Lanza, and Quebec Asbestos Mining Association attorney Ivan Sabourin to negotiate terms for an animal inhalation test on the carcinogenicity of asbestos. The funding for the test was apparently interrupted before completion, and none of the findings were published (See "The Saranac Lab's Cancer Studies for the Quebec Asbestos Mining Association," in Chapter 2).

Another key figure in the Johns-Manville response to the health threat of asbestos was Dr. Kenneth W. Smith. At the company's large mine and mill complex at Asbestos, Quebec, he conducted a survey of 708 employees in the late 1940s and considered 59 "probable compensation claims." None of the employees were informed that they had asbestosis (See "Compensation at the Asbestos Mines in Canada," in Chapter 3). Even before 1949, Smith recalled that Johns-Manville's top medical official at Asbestos, Quebec was concerned that the town was downwind of J-M's mining activities (See "Asbestos Air Pollution in the Community," in Chapter 7).

In 1950, Dr. Gerrit Schepers met Dr. Smith and discussed with him the pathological records of cancer on file at the Saranac Laboratory from eleven Canadian asbestos mine and mill workers (See "Dr. Schepers' Visit to America," in Chapter 2). But even before 1950, Dr. Harriet Hardy recalls, Dr. Smith was discreetly trying to interest doctors at the Massachusetts General Hospital in the issue of asbestos carcinogenesis. Even though this suggestion was well received, Smith later told Hardy he was not allowed to follow up because of J-M executives' objections.

Smith recommended warning labels for asbestos as early as 1952, the year he became corporate medical director. He testified as follows shortly before his death about the fate of that recommendation:

> The reason why the caution labels were not implemented immediately, it was a business decision as far as I could

understand. Here was a recommendation, the corporation is in business to make, to provide jobs for people and make money for stockholders and they had to take into consideration the effects of everything they did and if the application of a caution label identifying a product as hazardous would cut into sales, there would be serious financial implications. And the powers of be (sic) had to make some effort to judge the necessity of the label versus the consequences of placing the label on the product.

(K.W. Smith deposition in *Louisville Trust Co. v. Johns-Manville Corp.* Jefferson Circuit Court, Common Pleas Br. 7th Div. of Kentucky, Case No. 174-922, April 21, 1976.)

Labels warning that breathing asbestos was dangerous were not placed on J-M asbestos (insulation) products until 1964, not on sacks of J-M asbestos fiber from Canada until 1969 (See also "The Charges: Failure to Test, Failure to Warn," in Chapter 5). Apparently, most if not all others in the industry did not begin to label their products as hazardous until Johns-Manville did so; and some lagged years behind.

The company policy of not informing J-M employees when their medical examinations revealed asbestosis has also been described by Wilbur Ruff, former manager of the company's Pittsburgh, California manufacturing plant. Ruff testified that this "hush-hush condition" persisted as company policy at the plant he managed until 1971 or 1972. Ruff himself had been told asbestos caused lung disease in the late 1940s from C.B. Burnett, who went on to become the company's president in 1960 (Sworn Statement of Wilbur L. Ruff, Jan. 11, 1978, at law offices of Marrs A. Craddick, Walnut Creek, California)

At the corporate level, safety engineer Hugh Jackson worked closely with medical director Dr. Kenneth Smith. Even before Smith arrived at the corporate offices in New York, Jackson dealt with health problems at the plants, even arranging for lung tissue slides to be sent to Saranac Laboratory. In 1948, he verified that a plant foreman had died of asbestosis from breathing the general atmosphere in the plant, and expressed concern to Dr. Vorwald at Saranac that such exposure could

produce such severe lung disease (See "Sarance Compensation Reviews for Manufacturers," and "Cancer," Chapter 5).

In 1954, Jackson wrote to an official at the Waukegan plant that compliance with threshold limit values for employee exposure to asbestos did not assure protection for all the workers: "... no guarantee of full protection can be assumed at any level of exposure." (See "The American Conference of Governmental Industrial Hygienists TLVs," Chapter 4)

A management "compensation committee" held regular meetings at the large Manville, New Jersey, manufacturing plant in 1957-1958. Kenneth Smith, Clifford Sheckler, and others decided whether to inform workers whose medical examinations had turned up lung disease, whether to transfer affected workers to less dusty areas of the plant, and how to help affected individuals so that they would not file workers' compensation claims. Similar practices were followed by J-M management elsewhere, in the 1960s (See "Corporate Compensation Meetings at Manville," in Chapter 3).

A construction contracting firm owned by J-M was sued in 1933 by a workman, Bernard Dugan, who said he was totally disabled with lung disease from inhaling asbestos-containing materials used in construction. In 1957 and 1961, Johns-Manville was named in damage suits in New Jersey by insulators Frederick McGrande and Fred Wenham. Both plaintiffs received out-of-court settlements. Johns-Manville was also named in the product liability suit filed by G. Padano in 1961 (See "Lawsuits by Product Users Against Asbestos Manufacturers" in Chapter 3).

Workers' compensation claims were also filed against Johns-Manville by insulation workers employed in J-M construction contracting divisions in the 1950s. Based mainly on a list of claims involving Armstrong Cork, it was possible to ascertain that J-M was joined as a co-defendant in the following cases:

Harry Kish (1953)
Edward Campbell (1954)
James Riley (1957)
Harry Haake (1957)
John Swartout (1958)

Ervey McCarrell (1959)
Lewis Munger (1959)
Harvey Curtis (1961)
Anthony Onofrio (1962)
Robert Goans (1963)

(See "Workers' Compensation Claims by Insulators against Contracting Divisions of Asbestos Product Manufacturers," Chapter 3.) J-M was also a defendant in the claim of Dean Templeton in Michigan in 1960 (See "Owens Corning Fiberglas," this chapter).

Johns-Manville also referred a number of asbestosis cases to the Saranac Laboratory for review. In the case of one worker who had asbestosis and died from lung cancer, Safety Engineer Hugh Jackson at corporate headquarters arranged to have the plant documents and chest X-rays sent to Saranac. He wrote to Dr. Vorwald on July 28, 1950, "As you know Johns-Manville is considerably interested in the relationship of asbestosis and lung carcinoma" (Vorwald Patient File P-49-455). Two other cases of lung cancer and asbestosis were reviewed by Saranac for Johns-Manville in 1950 and 1951; one of these men had worked at the Waukegan, Illinois plant, and the other had worked at the company's Quebec asbestos mine (Vorwald Patient Files P-50-495, P-51-542).

By 1954, Johns-Manville operated a clinic in Asbestos, Quebec, with the capability to perform microscopic analyses of airborne dust samples. In addition, an annual survey was conducted with dust samples shipped to the Travelers Insurance Company for analysis (H. Rozovsky, "Air Handling and Dust Control at the Jeffrey Mine of Canadian Johns-Manville Company," *Canad. Mining J.* 75:59-65, 1954).

Johns-Manville was a member of the Asbestos Textile Institute, the National Insulation Manufacturers Association, Industrial Hygiene Foundation, Quebec Asbestos Mining Association, and the Asbestosis Research Council, among others. Through special studies, meetings, and publications of these organizations Johns-Manville was continually dealing with the problem of asbestos disease (See "Industry Research and Trade Associations," in Chapter 10).

In 1968-1970, J-M was among the members of the Asbestos Cement Products Association willing to warn the public that sawing asbestos-cement products would create a health risk. (See "National Gypsum Company," next in this chapter)—but others in the industry would also do so.

NATIONAL GYPSUM COMPANY

National Gypsum owned interests in asbestos mining (National Asbestos Mine in Quebec) and manufacturing (plants in Louisiana and New Jersey). This company made [illegible] drywall joint compounds and asbestos-cement panels.

Another product under development at the firm's research labs in 1949 was a sprayed acoustical treatment. Several different compositions were tested using various combinations of mineral wool, asbestos fibers and "floats," etc. The test materials were applied to the ceiling of a school auditorium in Ohio and evaluated. The first recommendation in the report was:

> The floats should be removed from the formula despite the increase in dust and the possibility of Asbestosis outweighs the slight increase in surface smoothness.

It was also recommended that the amosite asbestos content be raised to offset the effect of removing the short fibers ("floats") (F.M. Stumpf and B.O. Stewart, "On the Job Application of Spraying Wool for Acoustical Treatments," File No. 6a-6004, Rept. No. 391, June 28, 1949).

On March 11, 1953, National Gypsum Director of Safety M. Pollard wrote to Dr. L.W. Spolyar, Director of the Indiana Division of Industrial Hygiene. He listed amosite asbestos as a constituent of "Thermacoustic" spray-applied insulation, and recommended that operators mixing it for use wear a respirator approved for pneumoconiosis-producing dusts "because of the asbestos used in the product." Pollard suggested that respirators might be necessary for applicators, too, "if there is dust present." The same day, Pollard also sent an internal memorandum to others in the company, saying that asbestosis was a respira-