

FILE NAME: General Motors (GM)

DATE: 1986 May 15

DOC#: GM046

DOCUMENT DESCRIPTION: Published Article Presented at GM Cancer Research Foundation - Mesothelioma and Mineral Fibers

INSTITUT DE L'AMIANTE
1130 OUEST, RUE SHERBROOKE — BUREAU 410
MONTREAL, (QUEBEC), CANADA H3A 2M8

★ IA 6794
Code 36
38
46
47
52
53
54
90
82

CHARLES S. MOTT PRIZE

Mesothelioma and Mineral Fibers

J. CHRISTOPHER WAGNER

In 1952, the Chief Mining Engineer of the South African Government wrote a memorandum to the Minister of Mines enquiring if all types of asbestos caused the same diseases. Rather by chance, I was appointed Asbestos Research Fellow at the South Africa Pneumoconiosis Research Unit in 1954, and asked to answer the question. This investigation is still continuing.

I have had several significant "lucky breaks." The first of these was in 1956, when I undertook a necropsy examination on a black adult male who had been the shower attendant on one of the Witwatersrand Gold Mines. He was thought to have died from tuberculosis, terminating with pleural infection which did not respond to chemotherapy. Much to my surprise I found a huge gelatinous tumor completely filling the right chest cavity, with the collapsed lung in the center. Extensive histologic and histochemical studies confirmed that the tumor was a mesothelioma of the pleura, while in the lung tissue we observed a few asbestos bodies, but no evidence of pulmonary fibrosis.

I presented the case, with the full radiologic and clinical findings, at the next meeting of the local chest group. A week later, our Chief Thoracic Surgeon, Libero Fatti, was called down to the town of Kimberley, the center of the diamond mining industry, to see a patient. While he was there, he was approached by Dr. Kit Sleggs, Chief Medical Officer of the local Tuberculosis Hospital, who stated that when he had first arrived in Kimberley in 1946, tuberculosis was endemic, with a high mortality rate, particularly when the infection had spread to the pleura. In 1952, the antituberculosis drugs became available which led to a rapid increase in survival from the whole region, with the exception of the cases of pleurisy from the west of Kimberley, some of whom seemed to have a secondary tumor. It was recognized by people of this area that anyone who developed fluid in his chest would die within the year. Dr. Sleggs took Dr. Fatti to the hospital where, to his amazement, he saw the radiographs of 14 cases that

were identical to those of the patient that I had demonstrated. It was agreed that Paul Marchand, Dr. Fatti's assistant, would biopsy the pleura of these people. Within a month, I had a further 12 specimens of what had previously been considered a very rare tumor. Fortunately, at this stage, Professor Paul Steiner from Chicago was visiting us and he confirmed my diagnosis of mesothelioma.

We were puzzled as to why we were seeing so many of these tumors. I then recalled that we had seen asbestos bodies in the first case and that 90 miles west of Kimberley were the large mines which had been developed along the so-called blue asbestos mountains, a range of hills stretching for more than 400 miles from the Orange River in the south to the Botswana border in the north. We then meticulously examined every scrap of lung tissue that had accompanied the biopsy specimens, and in three more cases we found occasional asbestos bodies. I therefore suggested that we should consider an association between the blue (crocidolite) asbestos mines and development of the mesotheliomas. The next case which was submitted was of a woman aged 55 years who gave a history of having been born in Kimberley where her father was a dentist. When she was 1 year old, the family had moved to Prieska, one of the asbestos mining villages, where she lived for 5 years before returning to Kimberley. All she remembered of it was that there was a mill in the middle of the village which produced clouds of blue dust.

From further cases referred by Dr. Sleggs, we obtained histories showing that few of the patients had been employed by industry working as insulators with blue asbestos on steam locomotives.^{1,2} The majority, however, had only lived in the vicinity of the asbestos mills, some for very short periods, and, on average, their tumors developed 44 years after exposure.

The next question was, were the tumors confined to exposure to blue asbestos or were other types of fiber involved? South Africa was the ideal country for this study: First, it is the only region in the world in which the three major types of asbestos—crocidolite, amosite, and chrysotile—are mined, the latter accounting for more than 96% of the world's production. Secondly, these deposits had been exploited for more than 40 years by large labor

Presented at the 1985 General Motors Cancer Research Foundation Prize-winners Laureates Lectures, Jack Masur Auditorium, National Institutes of Health, Bethesda, Maryland, June 12, 1985.

(first pg. only)