asbestos—only the bones were left behind, clean and intact—earning for it the title of "magic mineral" and the "funeral dress of kings."

The same qualities that make it weavable, however, also make it deadly. The long tiny fibers are easily wafted into the air, inhaled, and trapped in the lungs, where they can remain for years, causing a slow and steady scarring known as *asbestosis*. The first modern medical description of the disease dates from England at the end of the nineteenth century, though asbestos was also worked in the ancient world and must have caused many deaths and infirmities.[135] Victims suffocate—or drown—from lung constriction and associated complications; the feeling is reportedly something akin to having an iron band slowly tightened around your chest.

Germany was never a major producer of raw asbestos, which may explain why asbestosis fatalities were not identified there until 1914, by which time English and American interest in the topic was already well underway. Germans tended to manufacture finished asbestos products, which is how workers there first began to contract the disease. Asbestos in these early years was commonly referred to as *Bergflachs*—literally "mountain flax"—and asbestosis soon became known as *Bergflachslunge* or "mountain flax lung,"[136] a rather rustic euphemism for such a devastating scourge.

The possibility of a cancer hazard was not suspected until the 1930s, by which time tens of thousands of workers—especially in the shipbuilding industry—were routinely handling the fiber. Naval officials were intrigued by its insulating and fire-resistant properties: asbestos was used, among other things, to insulate steam pipes and to seal and fireproof steam-engine boilers. Asbestos was used for brake shoes and clutch facings; it was also used to strengthen cement, to fireproof paints and textiles, and to render building materials fire-resistant (roofing and floor tiles, for example).

Recognition of a lung cancer danger came in 1938, when three German papers and an Austrian review provided strong evidence of a link.[137] An occasional association of asbestos and lung cancer had earlier been reported in both England and America,[138] but the German reports were the most comprehensive and convincing up

to that time, and the most definite in their conclusions.[139] Franz Koelsch in his contribution noted that the twelve lung cancers thus far tied to asbestosis, while suggestive, did not absolutely prove the link; but others were not so reticent. Ludwig Teleky in Vienna reasoned that it was "extremely likely" that asbestosis was a predisposing factor for lung cancer.[140] The Hanover pathologist Martin Nordmann made the strongest case of the lot: lung cancer for him was an established hazard of asbestos workers, afflicting roughly 12 percent of those who suffer from asbestosis. Nordmann concluded that "a new occupational cancer" had arrived in Germany.[141]

By this time, German labor authorities had already taken steps to reduce the risk posed to workers handling the fiber—based on longer-standing knowledge of the scarring hazard. Asbestos was a major target of an "antidust campaign" launched in 1936.[142] New kinds of ventilators were introduced, and the dirtiest jobs were moved under hoods whence dust could be drawn away from the workplace. In 1937, a Subcommittee for Asbestosis was founded by the Labor Ministry in collaboration with the German Society for Labor Protection; headed by Ernst Baader, with members expert in mineralogy, dust technology, insurance engineering, clinical medicine, pathology, and physiology, the committee explored how the disease arose and how it might be prevented. Manufacturing sites were inspected, whereupon it was found that the highest exposures were in the early stages of production, when the mineral was pounded, shredded, and carded. The newly invented *Übermikroskop* (the Siemens company's electron microscope, with a magnifying power in the tens of thousands—see fig. 4.2) was used to address the question of whether asbestosis arose from chemical or mechanical irritation (extremely small fibers were found in lung tissues, suggesting a mechanical irritation).[143] Ventilation technologies were recommended, and workers in many factories were screened for the disease—usually by X-rays but sometimes also blood and urine tests. Gunther Lehmann's bizarre scheme of measuring nasal filtration capacity was evaluated to see whether this could be used to determine who was more or less susceptible to asbestos-related disease (the experts were not enthusiastic).[144]