FIGURE 12. Electronmicrograph of dust from a vacuum cleaner bag after sweeping a carpet of synthetic fiber.

FIGURE 14. Electronmicrograph of cosmetic grade talcum powder.

FIGURE 13. Electronmicrograph of sweepings from a lawn after mowing.

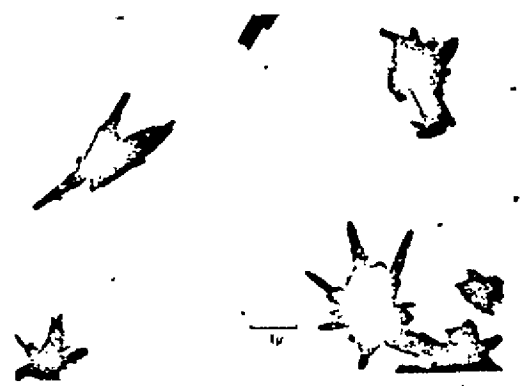

FIGURE 15. Electronmicrograph of a toothpaste.

incorporated into the cellulose structure of the fiber.

Animal fibrous materials include animal hair and scale, insect hair, and fragments of insect appendages.

Synthetic fibers include the newer ceramic fibers, metal whiskers, glass fibers, slag fibers, etc., as well as a wide range of established and emerging organic types used in textiles, fillers, containers, filaments, structural materials, etc.

The accompanying figures present data from a limited survey of respirable fibrous materials associated with industrial, commercial, and domestic products to which persons in industrial, urban, and residential environments may be exposed.

The illustrations were taken from electron micrographs of samples collected during the current study on membrane filters or bulk material samples prepared by viscous shear. The specimens were transferred to formvar films on copper grids and were left uncoated. The illustrations are typical of the fibers seen throughout the samples.

Figures 1-5 show submicron fibers of a number of basic fibrous materials often encountered in industry and in some types of commercial and domestic products: chrysotile, attapulgite, diatomaceous earth, sillimanite, and glass fiber. The morphologic differences distinguishable in the electron photomicro-

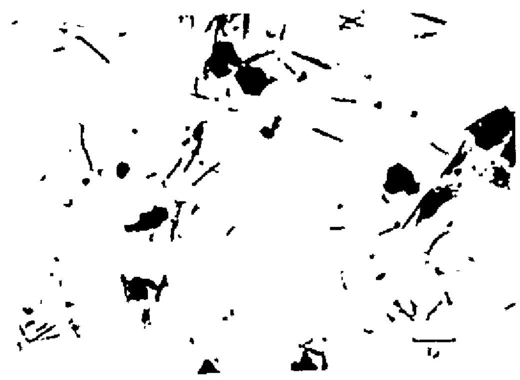

FIGURE 16. Electronmicrograph of an anti-diarrheal compound available without prescription through retail drug outlets

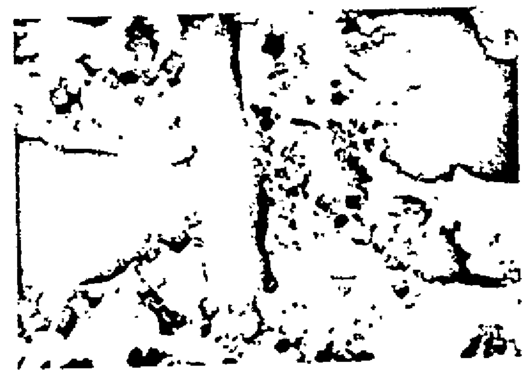

FIGURE 17 Electronmicrograph showing fibers found in rainwater collected at Cincinnati, Ohio several days after a severe dust storm in Texas

graphs would not be apparent in the lower magnification of the optical microscope.

Figures 6-11 show fibrous materials contained in products commonly encountered in the home environment: scouring cleaners, animal and plant insecticide dusts, yard fertilizers, vermiculite, and plaster of Paris.

Figure 12-16 show fibrous materials in a variety of common sources including vacuum sweepings from a synthetic carpet, lawn sweepings after mowing, cosmetic talcum powder, toothpaste, and an anti-diarrheal compound available through retail outlets and without prescription.

Figure 17 shows fibrous materials from Cincinnati rainwater following a dust storm originating in the Texas panhandle-Oklahoma area. Wind velocities up to 60 miles per hour prevailed during the storm.

Summary

Recent investigations have shown the presence of fibers, coated with an iron-containing material, in the lungs of persons coming to autopsy in a number of urban hospitals. The number of fibrous bodies observed on the slide smears from individual lungs varied greatly with around 4.0% to 6.0% showing numerous bodies. It is not known how many of the latter group have had appreciable exposure to fibrous materials through their work or by living in residences adjacent to manufacturing plants processing fibrous materials. The nature of the fibers from which the coated bodies were derived, has not been established. It is probable, with the application of improved research techniques that fibrous bodies, as well as uncoated fibers, will be found in varying amounts in the lungs of a vast percentage of all persons.

Environmental investigations have shown that respirable fibers are ubiquitous. Although they have probably always been present in man's environment, our modern technology and way of life have undoubtedly increased considerably their nature and extent. They arise from industrial processing, community and personal activities, and the action of natural forces. These fibers may be mineral, vegetable, or animal in origin and may come from natural and synthetic sources. Little is known on the pulmonary response to these different fibers or to the pattern of their distribution among urban, rural, and industrial population groups. Definitive information must be obtained on their identification, source, and biological response before a respective assessment can be made of the meaning of their presence in the lung.

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