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Threat of asbestos disease widens

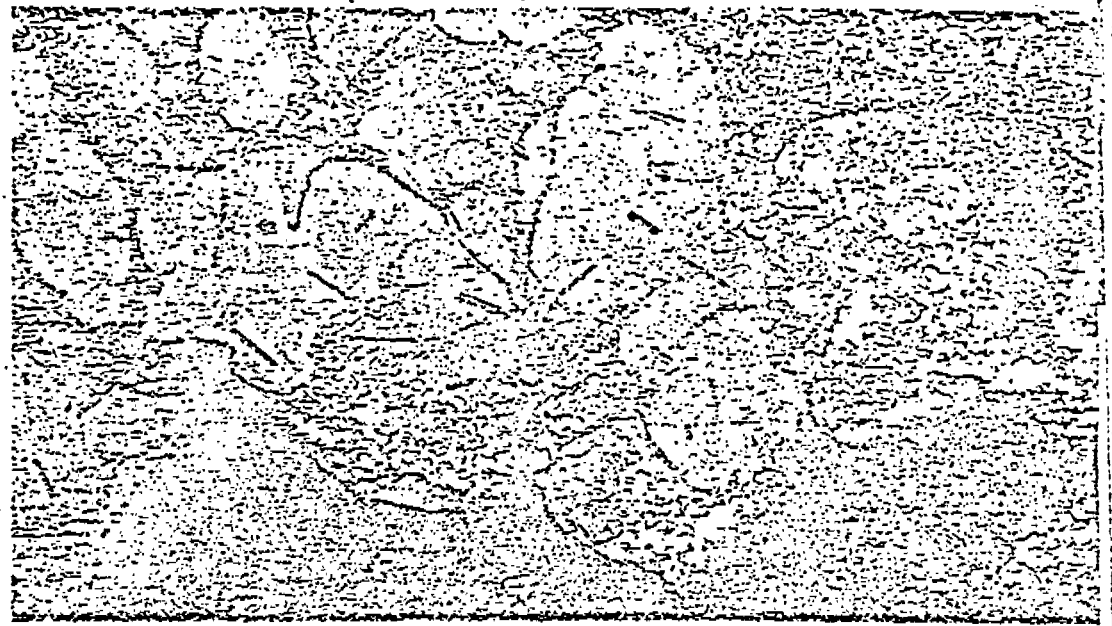
If a patient complains of shortness of breath and shows calcification or pleural thickening on a routine chest x-ray, asbestosis and other asbestos-related diseases can be ruled out with a few simple questions about job history. Right?

Wrong, says Dr. Henry A. Anderson of Mount Sinai School of Medicine's environmental sciences laboratory in New York City. What is needed to prevent possible misdiagnosis is a complete lifetime history of where the patient has lived and worked, plus the job history of family members whom he or she may have lived with for 30 or 40 years.

The once-prevalent notion that asbestos exposure must be intense or prolonged to produce any ill effects is refuted by Mount Sinai studies of workers' families. Dr. Anderson found that even one day's exposure to asbestos fibers is enough to produce pleural fibrosis. "When someone 30 years old who has never been sick a day in his life comes up with these radiographic changes, it is highly significant," he says.

Of the 210 family members examined 25 to 30 years after the time of their household contamination with asbestos, 38.6% had chest x-ray abnormalities, pleural or parenchymal or both, that are characteristic of asbestos exposure. A comparative sample of a "well" population did not turn up any of the observed changes in lung tissue. Nearly 8% of the family members had clinical symptoms compatible with asbestos-related lung disease. And, among the children of one 13-year asbestos worker, four cases of mesothelioma have appeared.

Nowadays, of course, asbestos workers don't breathe nearly as much of the "magic mineral" as they used to (though a planned further 90% reduction of the amount of asbestos fibers permitted in the air at work has been postponed, at least until after the November elections), and they don't track much of it home. But the substance has become far more prevalent in the environment at



Micrograph from Mount Sinai's Dr. Arthur Langer shows asbestos fibrils 300 A to 400 A wide in lung tissue of city dweller whose hobby of refinishing furniture also exposed him to high levels of the mineral.

large. It flakes down from ceilings and hot water pipes, it blows through the ventilating systems of large office buildings, it is squeezed out into the roadside air when we jam on the brakes. We spackle and patch walls with it, we rub it on our skin in talc products, and in many areas we drink it in the tapwater.

Once in the lungs, asbestos fibers stay put. The longer they have been there, the greater their effect. Dr. Anderson predicts that physicians will soon be starting to see the peak effect of the relatively light "by-stander" asbestos exposure of shipyard workers during World War II.

Even in the primary risk group, whose work consists mainly of handling asbestos, the adverse effects are likely to be long delayed. Dr. Irving J. Selikoff, who is head of the Mount Sinai laboratory, and his associates have been following 632 members of the insulation workers' union in the New York metropolitan area who were registered union members on Jan. 1, 1943. For the first nine years, only 73 deaths occurred, with 76.4 expected. "The next two decades, however, saw a worsening of their experi-

ence," says Dr. Selikoff. From 1952 to 1961, 18.3 cancer deaths were expected and 57 occurred, while from 1962 to 1971, 17.6 cancer deaths were expected and 104 occurred. Of all workers who died, 45% died of cancer.

The risk to "asbestos neighbors" (people who have lived within half a mile of an asbestos plant) is especially visible in the incidence of mesotheliomas, which now seem to be almost as directly tied to asbestos exposure as asbestosis itself. These rare tumors of the pleura and peritoneum account for about one in 10,000 deaths in the general population. But Dr. Selikoff found that about 7% of deaths among asbestos workers was due to mesotheliomas. Studies from Britain and South Africa have found traceable asbestos exposure in the backgrounds of 85% to 97% of mesothelioma cases studied. In a London study, neighborhood asbestos exposure actually accounted for slightly more mesothelioma deaths than family contact, indicating to Dr. Selikoff that the family hazard and neighborhood hazard are "equally significant."

After the workers, family members, and neighbors of asbestos mines

Iberet-500

One Filmtab[®] tablet a day supplies:

Controlled-Release Iron

ferrous Sulfate,

(elemental iron)

525 mg. (as iron—105 mg.)

Plus High Potency Vitamin C

Vitamin C

(as Sodium Ascorbate) 500 mg.

Plus the B-Complex

(contains no folic acid)

Niacinamide 30 mg.

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INDICATIONS: For conditions in which

iron deficiency occurs concomitantly

with deficient intake or increased need

for the B-complex vitamins (contains no

folic acid).

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Folic Acid 800 mcg.

INDICATIONS: In non-pregnant adults,

for the treatment of iron deficiency and

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where there is an associated deficient intake or increased need for

B-complex vitamins. Also indicated

for pregnancy for the prevention and

treatment of iron deficiency where there

is a concomitant deficient intake or increased

need for B-complex vitamins (including folic acid).

CONTRAINDICATION: Pernicious

anemia.

WARNINGS: Folic acid alone is im-

proper therapy in the treatment of per-

nicious anemia and other megaloblastic

anemias where vitamin B₁₂ is deficient.

PRECAUTION: Where anemia exists,

cause should be established and

underlying causes determined. Iberet-

Folic-500 contains 800 mcg. of folic acid

per tablet. Folic acid especially in

doses above 1.0 mg. daily may obscure

pernicious anemia, in that hematologic

improvement may occur while neurological

disturbances remain progressive.

ADVERSE REACTIONS: The likelihood

of allergic intolerance is remote. If such

intolerance occurs, the tablet may be taken

after a meal. Allergic sensitization has

not been reported following both oral and

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ASBESTOS continued

and plants, who comes next in risk of asbestos-related disease? Possibly auto mechanics who spend much time repairing brakes, possibly people who live or work in buildings that have been constructed or repaired with products containing asbestos.

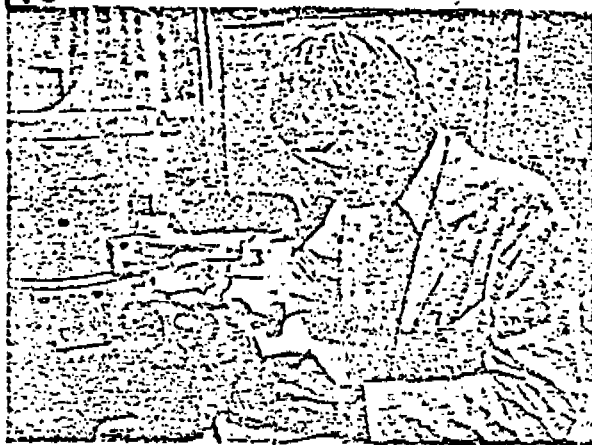
In some high-rise buildings fireproofed with asbestos spray two to five years earlier, the Mount Sinai investigators found airborne asbestos levels "not much different from some of the concentrations we have measured near asbestos factories," reports Dr. William J. Nicholson.

Dr. Nicholson and his colleagues studied 19 buildings in five cities, taking a total of 116 air samples. The now-discontinued fireproofing process used in these buildings is one in which dry asbestos and dry binders are blown with a hose through a water spray in order to bind the asbestos to the steel framework. The process is ineffective—some fibers get wetted and activated and some don't, and if a sealant isn't used, the asbestos is extremely friable. "The asbestos falls off and it's something of a bad show," says Dr. Nicholson.

The fibrous spray has also been used for acoustical and decorative purposes. It can erode with time, releasing fibers into the air in concentrations far above "normal" background occurrence. The method may have been used in as many as half the large multistory buildings built in this country since 1953, but the EPA banned it in 1973 after New York City, Boston, and Illinois had already prohibited it.

Although there is no way of pinpointing which buildings were constructed with this method, it is possible to take air samples—albeit at considerable cost and effort (as Dr. Nicholson points out, to study a single sample requires a day's use of an electron microscope). If the building has a considerable problem, the asbestos dust may be easy to spot and periodic air sampling can be augmented with regular visual checks. The surface can be coated with a sealant or resprayed with another fireproofing material (asbestos can be mixed with cement into a substance that firmly adheres). But even with sealed asbestos, an ac-

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Dr. Anderson found one day's exposure to asbestos produced abnormal changes.

cident (someone banging into the ceiling with a ladder while replacing a light bulb) can damage the surface and loosen the asbestos.

A related problem in many of these buildings is that the sprayed grillwork is in contact with a moving air stream that forms part of the air recirculation system. "If you look in the return air plenum, it is really frightening because asbestos is everywhere and it is just an impossible situation to clean up," says Dr. Nicholson. "The whole air supply system has to be redesigned and made compatible. What we need now is engineering research to see if we could convert to an efficient filtering system," he says.

Better building maintenance procedures are also needed, he emphasizes. For instance, some caution is necessary whenever any workman goes into the plenum space—to fix any supply network of air, water, or electricity that passes through it—in order not to dislodge the asbestos. "The maintenance men need to be aware of the possibility of knocking off the asbestos and sending it through the building," says Dr. Nicholson. Another urgent need is to find techniques for safe demolition of such buildings—if not handled carefully, asbestos escapes into the air.

Airborne asbestos from these buildings affects not only the people inside, Dr. Nicholson emphasizes. Concentrations outside the buildings ranged up to 48 ng/M³ of air, compared with a high of 200 ng inside, suggesting that these buildings make an important

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●otent analgesic for relief of mild to moderate pain

DARVOCET-N[®]100

propoxyphene napsylate with acetaminophen

Indications: For the relief of mild to moderate pain, either alone or accompanied by fever.

Contraindications: Hypersensitivity to propoxyphene or to acetaminophen.

Warnings: *Drug Dependence*—Propoxyphene can produce drug dependence characterized by psychic dependence and, less frequently, physical dependence and tolerance. Propoxyphene will only partially suppress the withdrawal syndrome in individual's physically dependent on morphine or other narcotics. The abuse liability of propoxyphene is qualitatively similar to that of codeine although quantitatively less, and propoxyphene should be prescribed with the same degree of caution appropriate to the use of codeine.

Usage in Ambulatory Patients—Propoxyphene may impair the mental and/or physical abilities required for the performance of potentially hazardous tasks, such as driving a car or operating machinery. The patient should be cautioned accordingly.

Usage in Pregnancy—Safe use in pregnancy has not been established relative to possible adverse effects on fetal development. Therefore, propoxyphene should not be used in pregnant women unless, in the judgment of the physician, the potential benefits outweigh the possible hazards.

Usage in Children—Propoxyphene is not recommended for use in children, because documented clinical experience has been insufficient to establish safety and a suitable dosage regimen in the pediatric age group.

Precautions: Confusion, anxiety, and tremors have been reported in a few patients receiving propoxyphene concomitantly with epinephrine. The central-nervous-system depressant effect of propoxyphene may be additive with that of other C.N.S. depressants, including alcohol.

Adverse Reactions: The most frequent adverse reactions are dizziness, sedation, nausea, and vomiting. These effects seem to be more prominent in ambulatory than in nonambulatory patients, and some of these adverse reactions may be alleviated if the patient lies down.

Other adverse reactions include constipation, abdominal pain, skin rashes, light-headedness, headache, weakness, euphoria, dysphonia, and minor visual disturbances.

The chronic ingestion of propoxyphene in doses exceeding 800 mg. per day has caused toxic psychoses and convulsions. (101754)

ASBESTOS *continued*

contribution to the asbestos load in urban air generally. (Prolonged exposure to concentrations of over 100 ng/M³ is a significant risk.)

Small buildings as well as large ones can contain asbestos hazards, even if no asbestos was used in the original construction. Late last year, a report from the Mount Sinai laboratory linked the use of commercial spackling, patching, and jointing materials to a possible risk. The investigators based their warning on an analysis of 15 samples of consumer spackling and patching compounds that were purchased at hardware stores between 1972 and 1974. Five of the products contained "appreciable amounts" of asbestos minerals.

Spackling and drywall taping compounds consist of extremely fine grained white powders or premixed pastes. These are composed primarily of plaster of Paris but often other materials that naturally contain asbestos are included in the commercial product. The asbestos fibers spread as dust when the spackling is mixed or sanded or the debris is cleaned up. The Mount Sinai investigators found "detectable fiber concentrations in adjacent rooms during mixing and fibers were still suspended in the room air for a least 15 minutes after mixing had ceased." They also found that significant concentrations of asbestos remained suspended and could pervade living quarters after the rooms had been swept.

The Mount Sinai researchers suggested that the labels on these products should clearly state their content and provide instructions on how to minimize the hazard (such as protecting people in the working area with appropriate respirators). Most of the companies, however, have since taken steps to remove the asbestos from their product.

Commenting on these findings, David P. Rall, director of the National Institute of Environmental Health Sciences, says, "they suggest the possibility of significant exposure during home construction and repair. The results are alarming when considered in relation to other evidence being accumulated indicating that far less

environment is capable of producing asbestos-related disease."

Most environmentalists agree that all U.S. city dwellers run a real risk of asbestos contamination. Last year, during studies that confirmed the contention that asbestos fibers can be found in the lungs of nearly every urban resident, researchers in Chicago noted a significant association between the number of fibers found and the incidence of lung cancer. This was true even in persons with no known exposure to asbestos who had a "far smaller" number of asbestos bodies in their lungs than would be found in the lungs of most occupationally exposed workers, reported Dr. Andrew M. Churg of the University of Chicago's Pritzker School of Medicine.

Drs. Churg and Martha L. Warnock found asbestos fibers in 93% of the cases they studied, suggesting that nearly all city dwellers have at least a slight theoretical risk of asbestos-related neoplastic disease. For the other conditions attributed to asbestos, including the characteristic chest x-ray findings, there appears to be a threshold factor protecting most people who have not had fairly intense asbestos exposure.

Airborne asbestos can be measured today, but it was not the general practice to do so 30 or 40 years ago, so no one can directly correlate the amount found in air today with any past health experience. There is no way of knowing the level of exposure then. However, the world production then was 50,000 tons a year, now it is over 400 million tons. According to Dr. Nicholson, the total U.S. use of asbestos has risen from 156,000 short tons in 1920 to 720,000 short tons in 1965. "To be fair, though," he says, "the largest growth has occurred in those uses unlikely to contribute greatly to atmospheric pollution."

The gaps in epidemiologic correlation of airborne asbestos and asbestos-related disease in the general population are large enough, but in recent years the controversy over asbestos has centered on water pollution, where the gaps are even larger. Lake Superior has been the focus of the biggest scare.

Additional information available to the profession on request.

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ASBESTOS *continued*

tion Agency sued the Reserve Mining Company in Silver Bay, Minn., for polluting the lake by dumping about 67,000 tons of waste into it each day. Reserve (which is owned jointly by Republic Steel Corp. and Armco Steel Corp.) developed a process by which iron ore in the form of pellets is extracted from taconite, a hard gray rock. Three tons of taconite must be mined to produce one ton of pellets; the remainder constitutes the "tailings" that have been dumped into the lake since the plant opened in 1955. After nine months of hearings, a federal District Court injunction closed the Silver Bay facility for a few days, but it was reopened when a U.S. Circuit Court in St. Louis gave the company a "reasonable" time to begin dumping its wastes on land and to reduce its smokestack emissions.

The basis for the decision was that the wastes posed a "potential" danger but not an "imminent" one. On-land sites have been proposed by Reserve and are being considered by Minnesota's Pollution Control Agency and the Department of Natural Resources.

But little scientific evidence is available to show whether ingested fibers can penetrate the stomach or intestines, be picked up by the blood stream, or lodge in other tissues to

cause cancer. At the hearings, Dr. Arnold Brown, a pathologist at the Mayo Clinic in Rochester, Minn., said, "I see no evidence for an increased incidence of cancer in those communities that could be attributed to the presence of asbestos fibers in water."

However, Duluth now has a \$6-million grant from the federal and state governments to build filters at its central water treatment works to strain out the fibers before pumping the water into the main distribution system.

Meanwhile, since Reserve did not appeal the Circuit Court decision that it must find on-land dumpings, it has come up with a \$202-million project to convert its operations to total on-land tailings disposal with no discharge to Lake Superior or any surface waters. In November 1974, Reserve applied to the appropriate State of Minnesota agencies for permits to implement its on-land tailings disposal plan at the so-called Milepost Seven site. Hearings were held on Reserve's proposal but the hearing officer, Wayne Olsen, recommended that the agencies reject "Milepost Seven." They did so, and Reserve is appealing that decision in the Minnesota District Court. The trial should be held this fall. Reserve also has an appeal in the U.S. District Court, to postpone the July

1977 closing date, since the controversy may not be settled by then.

And on May 21, 1975, Reserve signed a stipulation with the state agreeing to install the most sophisticated air quality control facilities to virtually eliminate all visible air emissions from its Silver Bay plant (except water vapor and steam). That program, which will cost \$34 million, is scheduled for completion in two years from the start of construction.

The upshot of this is that the Environmental Protection Agency said it will conduct a nationwide sampling program to determine whether there are significant levels of asbestos in drinking water. It has chosen 32 locations in the U.S. for monitoring asbestos discharge into water from various sources including asbestos mining and manufacturing, mining of other ores such as talc and vermiculite that can be sources of asbestos, and the natural run-off of asbestos from rock formations. The EPA says that asbestos may be quite widely distributed in drinking water supplies throughout the nation since it comes from natural as well as industrial sources. Another source may be the walls of asbestos cement pipe used in water distribution systems.

So far, the EPA has found concentrations of more than a million fibers per liter in Duluth, Seattle, San Francisco, Troy, Vt., and Skidway Island, Ga. The agency said it won't have any conclusions on the public health aspects of the asbestos levels until early next year.

"The asbestos situation follows Agnes Allen's law," says Dr. Selikoff. "She was a corsetiere who used to say there are some things that are much easier to get into than out of. Medical knowledge about the health hazards of asbestos began to be collected in the 1930s and 1940s. But we physicians didn't warn society to take it seriously and today we have a huge asbestos industry, with millions of tons of the mineral in our modern buildings and in consumer products."

Since asbestos is not biodegradable the environmental load is largely cumulative. Even if we stopped all use of asbestos tomorrow, the problem would be with us a long time. ■



Reserve Mining Company, which has been dumping taconite tailings in Lake Superior, is embroiled in legal battles over on-land disposal site.

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