

PUBLIC HEALTH

Traces of Aluminum Powder Prevent Dread Silicosis

Rabbits Dusted With Quartz To Which Less Than One Per Cent Aluminum Dust Was Added Show No Fibrosis

TINY traces of aluminum dust added to the already dusty, silica-filled air breathed by certain classes of miners may some day stay the rages of dread silicosis.

This is the suggestion implied in the medical report of scientists and physicians at the University of Toronto (*Canadian Medical Association Journal*, July).

Technical and financial guidance of the promising research are shared by a Canadian Nobel Prize winner and a Canadian mine owner; Sir Frederick Banting, discoverer of insulin, and J. P. Bickell, president of the McIntyre Porcupine Mines, Ltd., of Schumacher, Ont.

J. J. Denny, metallurgical engineer, and Dr. W. D. Robson, chief surgeon of the McIntyre Mine, and associate professor Dudley A. Irwin, of the department of medical research at the University of Toronto, form the three-man discovery team which has reported the following:

1. The addition of small quantities of metallic aluminum dust almost completely inhibits the solubility of silicious materials in a laboratory beaker.

2. Rabbits dusted with quartz to which less than one per cent. of metallic aluminum dust had been added showed practically no fibrosis, while control rabbits, dusted with quartz alone, showed well developed silicosis.

Reduces Solubility

Discovery 1 suggests that the addition of the aluminum reduces the ability of the silica to go easily into solution. Soluble silica has previously been recognized as a factor in the dangerous pre-silicosis phase.

Discovery 2 bears out the first finding but uses the more decisive animal experimentation criterion as a test. Results in test tubes and those on living animals sometimes fail to show comparable results as they did in this case.

Behind these two simple but striking and significant results lies a trail of

theory and research that goes back to 1930 and to a report by the noted British scientist, Sir William Bragg, published in a little-known and highly-specialized German technical journal devoted to the structure of crystals.

Sir William described the probable molecular arrangement of freshly fractured quartz and a fellow Englishman, P. Heffernan, suggested that the possible cause of acute silicosis arose from the unsaturated oxygen atoms present in such freshly broken quartz. These dissatisfied oxygen atoms, as it were, might join to the lung tissues and hence bring the start of silicosis.

After crediting Bragg and Heffernan for prior work the Canadian scientists state:

"This (Heffernan's hypothesis) suggested to us that if the unsaturated

oxygen atoms could be satisfied with nascent hydrogen it might diminish the toxicity of silica in tissue and change a fibrosis response into a simple foreign body reaction."

Laboratory, test tube experiments came first, but just about a year ago animal experiment was started with 13 rabbits which, for six months, lived in a world of silica dust. Seven rabbits breathed the silica with a tiny trace of powdered aluminum dust added. The other six breathed the silica dust alone.

Examine Lungs

At intervals up to six months the lungs and other organs of these animals were sent to Dr. Irwin for pathological examination in his laboratories at the University of Toronto. In the control animals, breathing the quartz dust alone, the gradual onset of silicosis with its characteristic and spreading fibrous growths in the lungs could be traced. In no case did a similar reaction show in the animals breathing the quartz dust plus the aluminum powder. Both groups of animals had large quantities of dust in their lungs, of course, but in the group breathing the quartz-aluminum mixture the lungs had reacted in simple fashion as they do when any dust is breathed. Scientists call this well-known



ONE IN FIVE MILLION

An albino bison is not merely one in a million, it is one in five million. As nearly as scientists of the U. S. Biological Survey can figure out, that is the ratio of albino to brown calves born to bison cows. Records from the days of the "Thundering Herd" tell of not more than a dozen or so ever seen by white men. The four-year-old albino bull shown in this picture lives on the National Bison Range at Moiese, Mont. The other animals in the herd guard it jealously; it is very risky to enter the corral to attempt a photograph.