

## PUBLIC HEALTH

# More Than 1,000,000 in U.S. Are Exposed to Silicosis

## Not Often Fatal in Itself, Malady Opens Road for Tuberculosis and Other Very Serious Diseases

**M**ORE than one million Americans are exposed to silica dust, the condition which may cause silicosis, sometimes called "miners' phthisis" or "miners' consumption," according to estimates of the U. S. Public Health Service.

Silicosis may affect not only workers engaged in rock cutting, as in the cases reported from Gauley Bridge, W. Va., which are attracting Congressional notice, but also those in the pottery, foundry, sand-blasting, abrasive, granite, tool and ax grinding, glass, slate, silica grinding and mining industries.

Not all those exposed to the dust get the disease, however. Probably one-fourth of any large group exposed to the dust at any one time have silicosis, and most of those have it in the early stage.

Very few people die of silicosis. Silicosis patients usually die of some infection, particularly tuberculosis, to which they are especially susceptible.

Men having silicosis in the first stage of the disease have slight or no disability, and may never have any disability, if placed in suitable surroundings. This does not mean that they must necessarily change their occupation. The surroundings in which they work can be made "suitable" by eliminating the silica dust from the air in which they work, or by reducing it to a safe limit. Men suffering from the disease in its second stage can improve materially, and even those suffering with the third stage of the disease can improve somewhat in "suitable" surroundings. The federal health service knows of no industry at the present time where the conditions causing silicosis cannot be controlled.

In silicosis the lungs, instead of being spongy tissues with plenty of space for the air to circulate, become mottled with patches of fibrous tissue which is dense and prevents the passage of air. As the disease progresses, the patient has less and less normal lung tissue for breathing.

Shortness of breath on exertion and sometimes a cough are the first symp-

oms of silicosis. In the early stages, however, the patients often do not know that they have the disease. They feel all right and are able to go on working and living normally. They even may and frequently do gain weight. It is when tuberculosis or some other infection sets in that the patients begin to lose weight and feel badly.

To prevent silicosis the U. S. Public Health Service recommends a combination of measures, no one alone being successful. These preventive measures are: methods of control of the dust at its source; good ventilation to dilute the amount of silica dust in the air; and physical examinations of the workers at the beginning of employment and periodically thereafter, to detect the presence of silicosis, and, even more important, of tuberculosis.

Conditions in practically all the silicosis-producing industries are definitely improving, according to the U. S. Public Health Service, but the surface has only been scratched and there is much dust yet to be controlled.

*Science News Letter, February 1, 1936*

## PHYSICS

## New X-Ray Technique Aids Against Silicosis

**A** NEW tool of science to combat industrial dust diseases like silicosis has been developed by Prof. George L. Clark and Dexter H. Reynolds of the University of Illinois.

Silicosis is the occupational disease caused by breathing rock dust containing fine silica, especially in the form of quartz, and is claimed to have been responsible for the numerous deaths at the Gauley Bridge, West Virginia, power tunnel now under Congressional investigation.

The new Illinois method is based on obtaining what amount to X-ray "fingerprints" of the quartz dust in a given sample of air from mine or factory. Not only is the kind of mineral present determined but the amount also is measured.

The dust from mine air is pulverized to a fine powder whose particles are smaller than one two-hundredths of an inch in diameter.

The dust powder is molded into a small wedge-shaped mass and placed in the X-ray analyzer. X-rays are then passed through the dust wedge and strike a sensitive photographic film which records an X-ray spectrum characteristic of the minerals composing the dust. This fingerprint spectrum tells what is present but without further research says nothing about the amount of each material present.

To determine how much quartz is in the sample of mine dust, a pure crystalline powder known not to be present is added to the sample in a given amount, say ten per cent.

The X-ray spectrum of this mixture is then recorded. The ratio of relative blackness of the X-ray lines of the known material to the blackness of the X-ray lines due to quartz in the dust samples is then determined. The ratio of line blackness is proportional to the amount of the quartz present in the dust, and can be converted into percentage amounts. The method is accurate to five per cent.

*Science News Letter, February 1, 1936*

## MUSIC-PHYSICS

## Photographs of the Voice Take Mystery From Singing

**S**OME of the mysticism is disappearing from the methods of voice training that yield the opera and concert singer through years of exacting study.

New facts about the mental imagery of singing by "getting it up"—"forward"—"against the teeth"—and "all through the head" are coming to light in studies being conducted at the Peabody Conservatory of Music at Baltimore.

When the voice teacher tells the aspiring voice student to "get the tone up" or "place the tone forward" or any one of a large number of similar figures of speech, he is attempting (often without realizing it) to secure relaxation of the swallowing muscles, says Wilmer T. Bartholomew of the Conservatory. These muscles often spoil good tone-quality by constricting the throat.

For six years the research department of the Conservatory has been studying voice production. Instruments like the oscillograph, which turn sounds of the singing voice into electrical impulses and make possible voice "photographs," have given definite facts regarding the