encountered is designated as chrysotile and
ties of the mineral serpentine, in which it

mind that silicosis (and presumably asbes-
ly, taking from 5 to 15 and even 20 or 25
shed. This rate of progress is influenced
silica which the lungs receive, and this dos-
on three variables—the amount of silica in
dust in the air, and the length of exposure.
might be included as a fourth variable;
of the variations in susceptibility in those
ght well be assumed that similar variables
rence of asbestosis.
os is mined or fabricated in North America
o be present the clear-cut clinical picture
in communities with a true silicosis hazard,
communities. It may be that some of the
o recent origin for the typical effects of a
manifest, but this would not apply to the
e fabricating plants.
service of the Metropolitan Life Insurance
wing investigation during the period from
1931, which included:
litions in asbestos mines and mills in Canada
along the Atlantic Seaboard in the United

ns of asbestos workers, including X-ray

aust systems designed to eliminate asbestos

g plants only are included in this study and
ort as plants A, B, C, D, and E. This is a
ore extensive study of the asbestos industry

DUST STUDIES

of sampling.—Both the impinger (1) and
2) were used for the collection of air samples
levels and in close proximity to the workmen.
pparatus are adapted for this work, as they
set up and adjusted for the taking of the
level, and are extremely efficient.
the dust by aspirating the air and then
surface covered by a liquid in a container.
lled water, containing 50 percent alcohol to

prevent the solution of some of the dusts, particularly any silica which might be present. The impinger was actuated by an electrically driven rotary pump and the rate of air sampled was measured by means of a resistance type of flow meter with an inclined manometer for measuring the pressure difference. Each sample represents the dust collected from a volume of 100 cubic feet of air.

The electric precipitator is designed upon the Cottrell precipitator principle used for recovering dusts and fumes commercially. This principle depends on electrifying the dust particles by making them pass through an electrostatic field and thus causing them to settle out upon a sheet of celluloid. The electrostatic field is set up by means of a transformer operating from the lighting lines on 120 volts, alternating current. Air is drawn through the apparatus by a small rotary fan, run by a motor, the quantity being measured by a flow meter.

Samples of dust brushed from beams and pipe lines near the ceiling also were secured for chemical analysis. All samples were shipped to the industrial hygiene laboratory of the Metropolitan Co., and the dust counts were made according to the methods accepted by the United States Bureau of Mines and the United States Public Health Service (1). Particles in size up to 360 microns in the greatest diameter were counted.

Chemical analyses were made for total (free and combined) silica according to the accepted standard method of Hillebrand (3).

In the first plant studied (A) only particles 10 microns and under in size were counted. It has been demonstrated repeatedly that no silica particles exceeding 10 microns (a micron equals one-millionth part of a meter or one-thousandth part of a millimeter) in greatest diameter enter the lung tissu ; for this reason, the larger particles usually are not considered when determining dust counts. Later, as it appeared from some of the published articles (4) (English) that asbestos particles much larger in size were found in lung tissue, it was decided to count all particles and make differential counts of all those 10 microns and under.[1]

Total particles per cubic foot and the corresponding weight of the dust in milligrams were obtained. Since no relationship between the dust counts and the corresponding weights was found, the weights are not included in the tabulations in this report.

Table 1 shows by plants and by departments the maximum and minimum dust counts in million particles per cubic foot of air. Although the counts in plant A are of particles 10 microns and under,

[1] Samples collected by both the impinger and the electric precipitator were counted. In addition, microphotographs of these dust particles were enlarged by being projected upon a screen with a lantern-slide projector, the enlarged particles being measured with a ruler. Knowing the entire enlargement (by actual measurement), it was easy to calculate the original particle size (5). By the use of Hazen's (6) logarithmic probability paper, the logarithms of the function to be measured (in this case microns) are plotted as ordinates against the probability of occurrence as abscissae.