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A STUDY OF DUST CONDITIONS

in the

BRIDGEPORT AND STRATFORD, CONN. PLANTS

of the

RAYBESTOS DIVISION OF THE RAYBESTOS-MANHATTAN, INC.

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The following report is a study of dust conditions in the Bridgeport and Stratford, Connecticut plants of the Raybestos Division of the Raybestos-Manhattan, Inc. This study was carried on during February and March of 1930, by the Industrial Health Service of the Metropolitan Life Insurance Company.

It is the fourth unit in a series of studies of the asbestos industry of the United States and Canada for the purpose of determining the extent and nature of atmospheric pollution to which asbestos workers are exposed and whether there can be demonstrated any harmful effects to such workers.

This study includes a limited number of physical examinations, the nature of the evidence derived from which is similar to that obtained from the third unit study (United States Asbestos Division at Manheim, Pennsylvania.)

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The operations of this company are conducted in two plants, one at Bridgeport which engages in the weaving of brake-band lining and the treating and processing of the same, and the other plant at Stratford, Connecticut which manufactures molded brake-band lining, clutch disks, and asbestos packing.

The yarn used for brake-band lining in the Bridgeport plant is supplied by the General Asbestos plant at Charleston, S. C.

THE BRIDGEPORT PLANT

This plant consists principally of one three-story building with looms on three floors. Another two-story building is used for treating of brake-band material and for the laboratories.

Dust counts were taken at representative points throughout the weaving department.

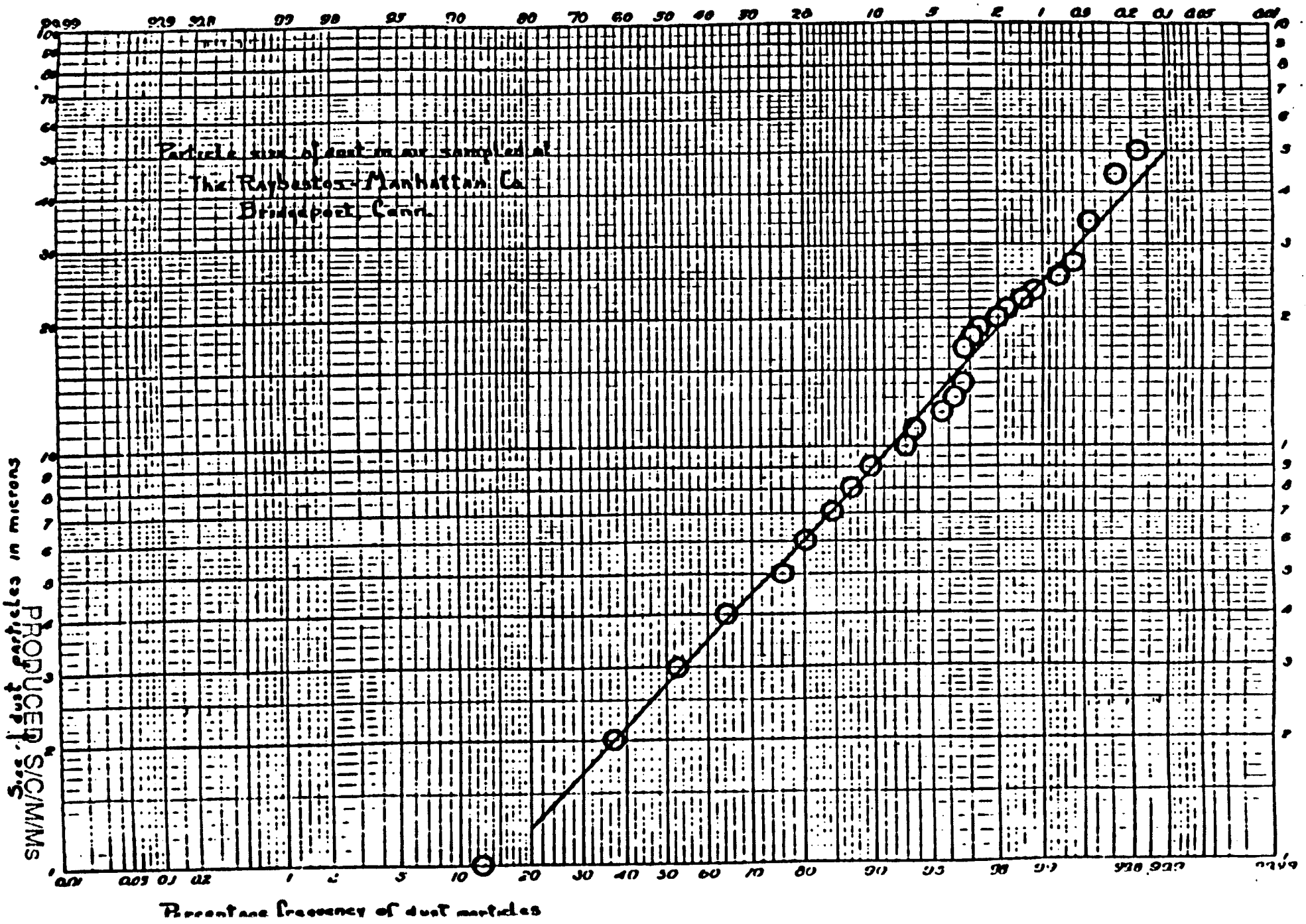
Although the yarn received at the Bridgeport plant has received an oil treatment, the yarn used for warp is usually again run through oil.

The methods used in the collecting of dust samples and counting are identical with those given in reports of other plants of this company and as outlined in the United States Public Health Service Bulletin No. 144, Treasury Department, Washington, D.C.

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Particle size measurements of the dust were made and the results are recorded in the attached graph from which the percentage of the various sizes can be determined. It will be noted from the curve that 95% of the particles are less than 10 microns in their greatest diameter.

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Particle size of dust in air sampled at
The Raybestos-Manhattan Co.
Bridgeport, Conn.
Size of dust particles in microns
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Percentage frequency of dust particles

No method of humidification is used in this plant although different units for humidifying the air in certain departments were installed for tests. Due to the large size of the rooms sufficient equipment had not be installed to accurately accomplish humidification.

The dust counts with locations indicated are listed in the following table.

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TABLE #1.

WEAVE ROOMS
2nd and 3rd Floors

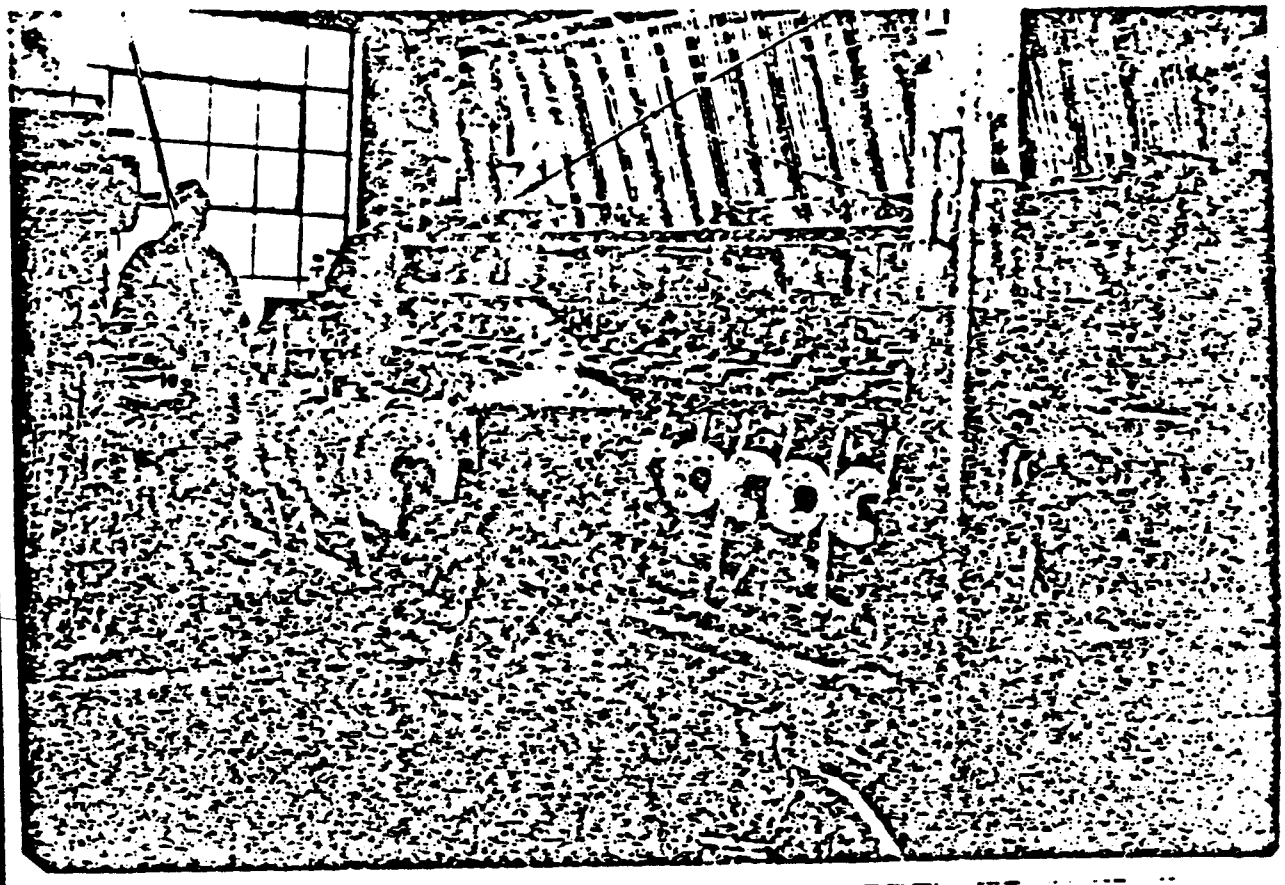
Against F'ds

Sample No.	Building No.	Floor No.	Location of Sample	Total Counts of Dust Particles per Cubic Foot	Weights of Dust in Milligrams per cubic Foot
1	1	3rd	Loom at northeast corner of weave room	936,170	.23
3	1	3rd	Between looms #54 and #55	2,315,725	.25
4	1	3rd	Between looms #74 and #75	3,010,150	.26
5	1	3rd	Between looms #60 and #61	1,382,978	.12
6	1	3rd	Between looms #70 and #71	1,000,000	.30
7	1	3rd	At loom #53	3,036,876	.19
9	1	2nd	At loom #44	2,000,000	.55
10	1	2nd	Between looms #39 and #40	2,297,870	.22
11	1	2nd	Between looms #37 and #38	6,304,348	.28
13	1	2nd	Between looms #34 and #35	1,764,708	.27
14	1	2nd	Between looms #28 and #27	997,850	.30
15	1	2nd	Between looms #9 and #10	4,468,085	.18
17	1	1st	Weave room for broad cloth	2,127,659	.26
18	1	1st	Warp machines #264 and #265	6,904,762	.36
19	1	1st	Machine at left hand corner of room	2,466,666	.55

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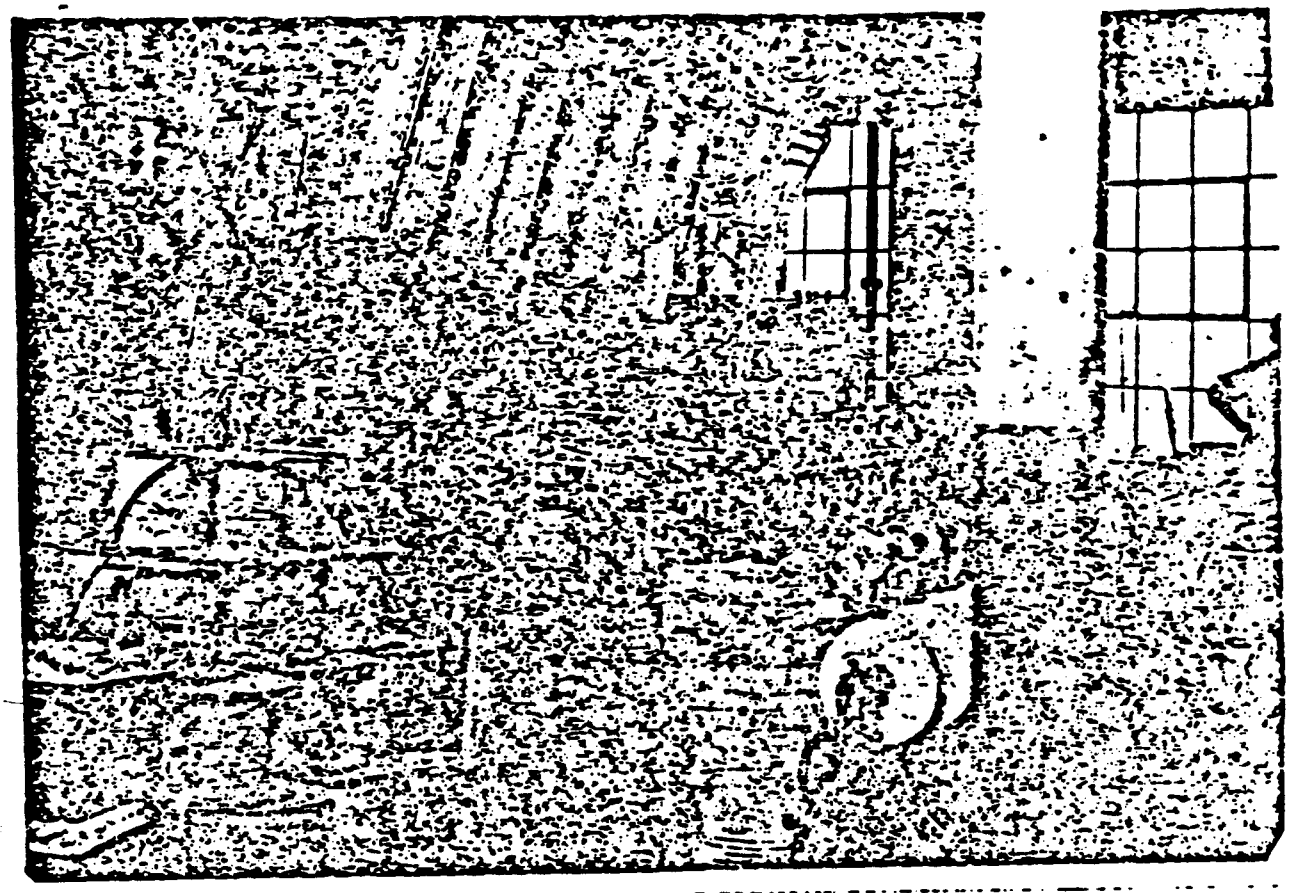
These counts are not excessive, but it must be remembered that the preparation and manufacturing of the yarn involving the handling of the raw material is not performed in this plant. As the material approaches the finished processes, as it does in this plant, the dustiness becomes less.

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Brake-band weaving in the
Bridgeport plant.

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Another view of the
weaving room in the Bridgeport plant.

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THE STRATFORD PLANT

This plant consists of two one-story brick buildings; one housing the molded brake-band lining and clutch disk manufacturing, and the other the manufacturing of asbestos packing material. This latter operation is isolated due to the use of inflammable solvents. Paper pulp combined with asbestos fibre and various binding materials, such as starch, are used in the manufacturing of the molded brake-band lining.

In the manufacture of the asbestos packing material the asbestos fibres are combined with rubber and other binders dissolved in gasoline. On account of the vapors which are quite evident in this department, it was considered inadvisable to operate the motor used on the pump for collecting air samples because of the possibility of explosion. Dust samples were taken therefore only at the two other apparent dusty processes; namely the mixing of the pulp and the grinding of the clutch face disks. These counts are given in the following table.

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TABLE #2.

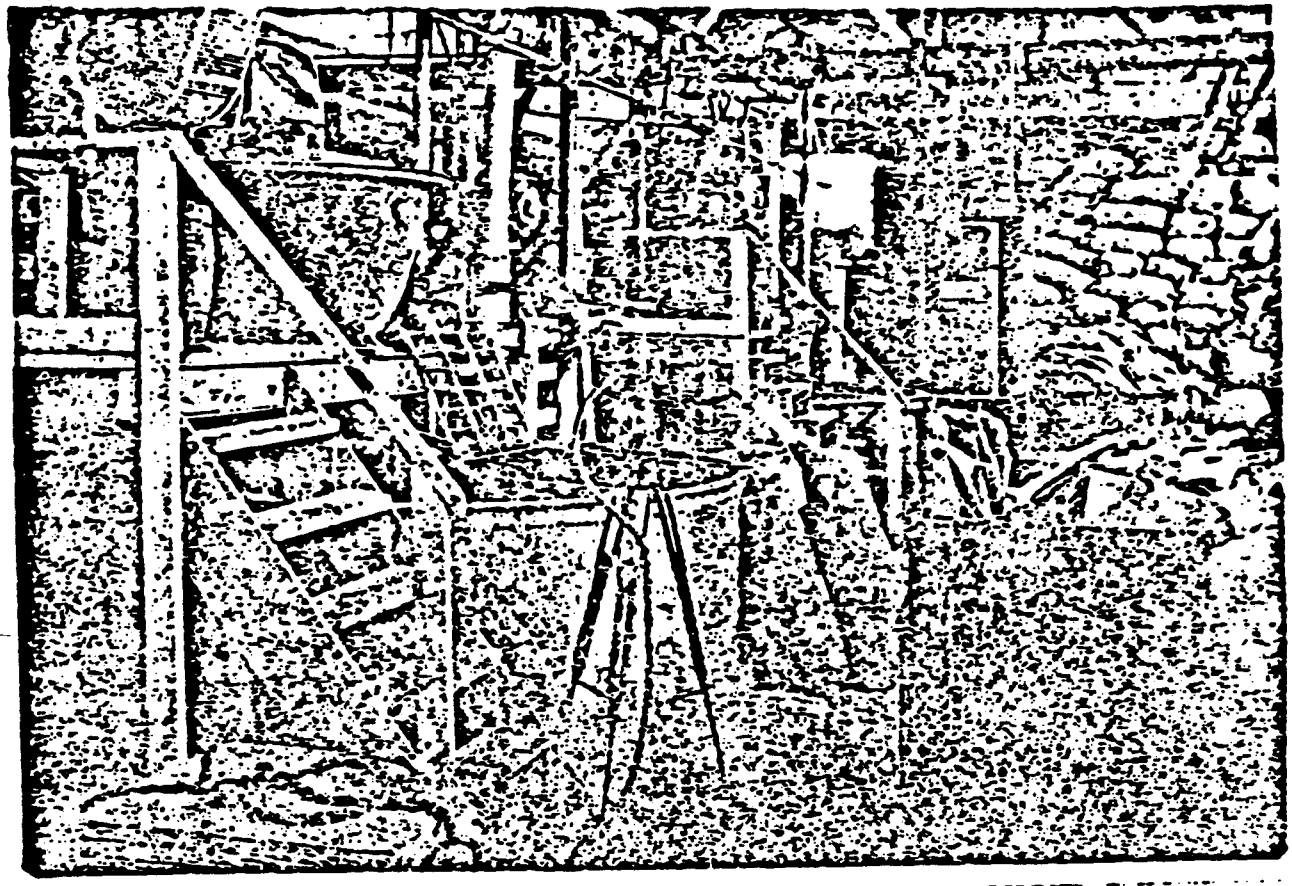
STRATFORD, CONN. PLANT

Sample No.	Building No.	Location of Sample	Total Counts of Dust Particles per Cubic Foot	Weight of Dust in Milligrams per Cubic Foot
21	Main	Grinding operation on the Cincinnati machine	654,598	
22	Main	Paper mixing. Center machine #2	529,915	.10

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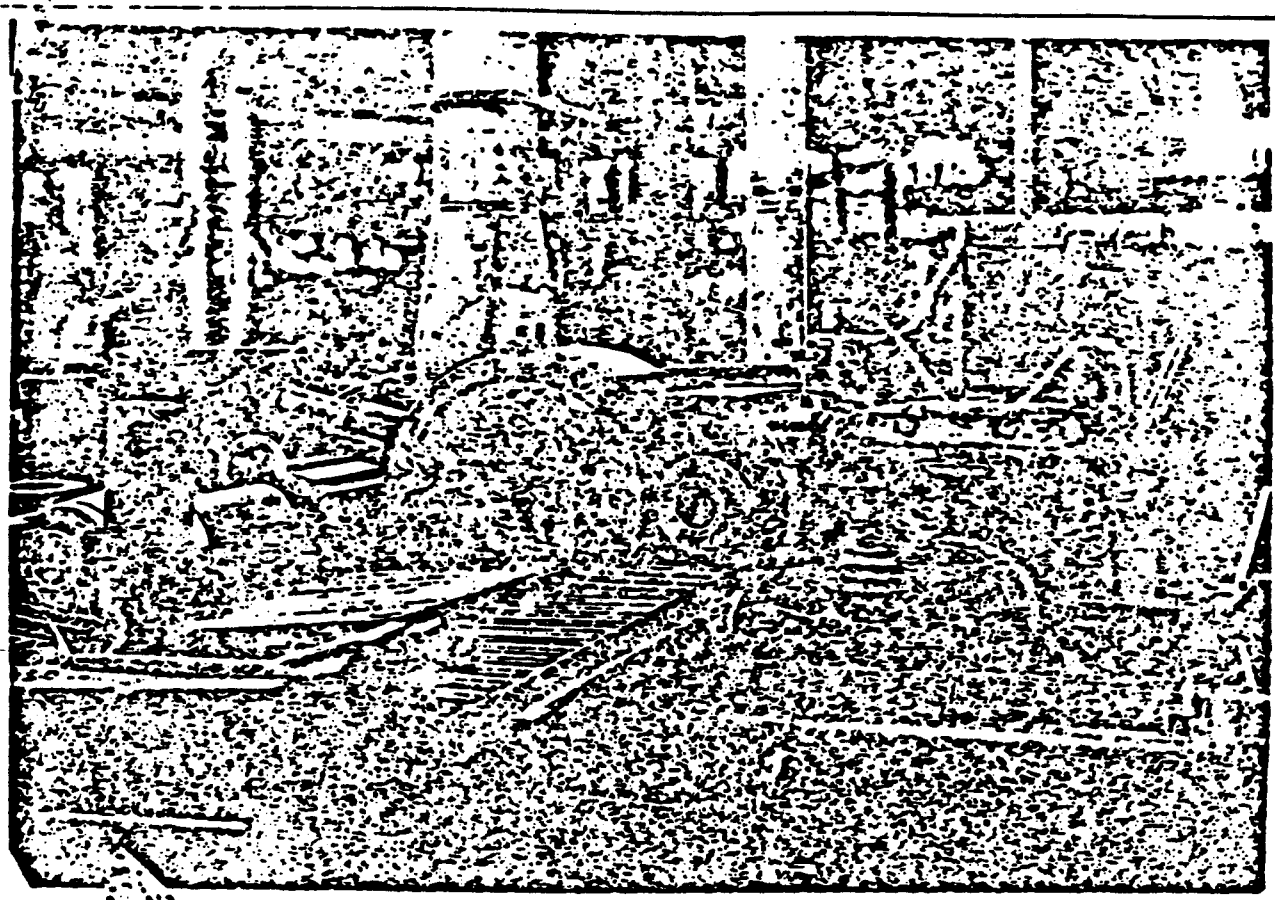
It is noted that these are very low and should not present a hazard.

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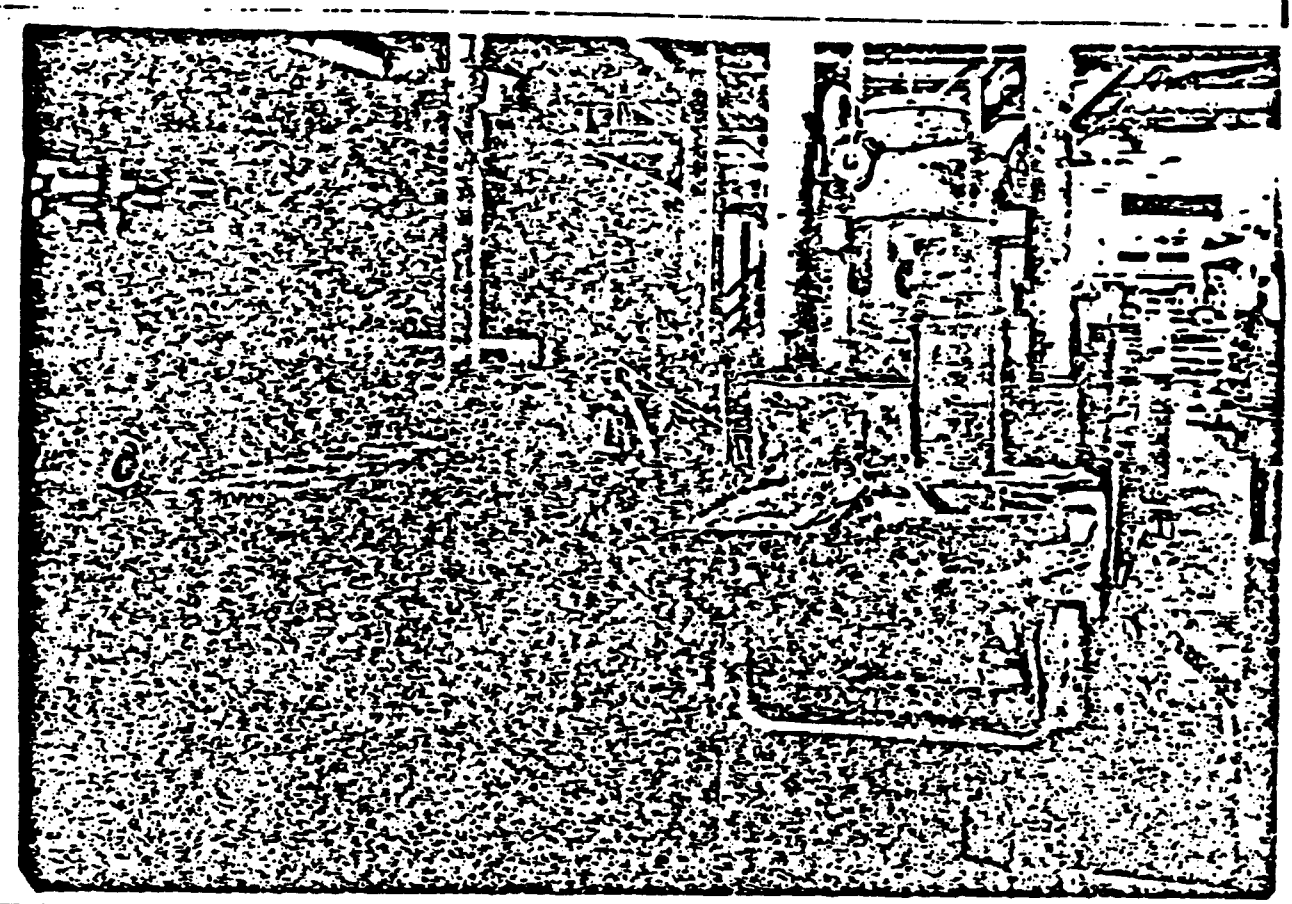
Pulp making in the Stratford plant.

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Grinding clutch facing at the Stratford plant.

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Another view of the clutch face finishing department at the Stratford plant.

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PHYSICAL EXAMINATIONS

Physical examinations were made on ninety-one employees. This group included all those who had been engaged in the asbestos industry for a period of three years or longer, and included employees from both the Bridgeport and Stratford plants.

All signs and symptoms, usually associated with what English authorities term "asbestosis", were listed when found. These include anorexia, leaden-hued complexion, emaciation, dyspnoea, cyanosis, cough, expectoration, "asbestos corns", decrease in chest expansion, clubbing of fingers, swelling of skin at the nails, and history of chest troubles. The chests of these employees were then examined for friction rubs, râles, dullness, diminished breath sounds, and increased voice sounds.

The action of inorganic dust upon the lung tissue is to cause the development of fibrous tissue - fibrosis. Such dust fibroses are classified under the general term pneumoconiosis. The various types of pneumoconioses are differentiated by more specific titles which define themselves, such as silicosis, anthracosis, and asbestosis. These conditions can be satisfactorily demonstrated only by X-ray.

Twelve employees were selected for X-ray examination. The films of three of these were unsatisfactory. The following table analyzes the occupational history and X-ray diagnosis of the remaining nine.

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TABLE #5.

No.	Sex	Age	Occupational History	Diagnosis
1	M	58	Weaver - 9 years	Early first degree asbestosis
2	M	27	Weaver - 6 years	Negative
3	M	41	Weaver - 8 years	Early asbestosis
4	M	45	Weaver - 9 years	Negative -recent pleurisy
5	M	44	Foreman - 16 years	First degree asbestosis with aneurism of the arch of the aorta.
6	M	45	Weaver - 10 years	Negative
7	M	30	Weaver - 8 years	Negative
8	M	55	Weaver - 12 years	Well advanced first degree asbestosis.
9	M	68	Elevator operator - 9 years	First degree asbestosis

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A study of this table reveals that the X-ray films of five men showed the characteristic appearance of dust fibrosis. Four were rated negative and it should be noted here that in these studies, where X-ray films were secured, all doubtful cases were classed as negative, the diagnosis being given as positive for dust fibrosis only where the evidence was unmistakable.

None of these five cases of asbestosis presented evidence of tuberculosis which lends support to the contention that the inhalation of asbestos dust does not tend to activate tuberculosis. The number of cases in this study is too small to draw any sweeping or definite conclusions.

SUMMARY

The dust counts in this study are relatively low.

X-ray films of five out of nine men selected from those physically examined revealed typical dust fibrosis. The number of years exposure together with the X-ray appearances tends to confirm the impression that the action of asbestos dust upon the lungs is to cause a mild fibrosis. What the end results of this type of fibrosis are we are not yet in a position to state.

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RECOMMENDATIONS:

1. That the weave rooms be humidified. This procedure will not only decrease the number of breakages in the yarn, but will assist in allaying the dust.

2. That cleaning be done by means of a vacuum system instead of the present method of blowing with compressed air. Portable vacuum units are sold on the market.

3. That the dust be exhausted at the source of origin, where possible, and drawn away from the breathing level of the operator.

4. That all employees be given an initial physical examination and periodically thereafter. X-ray examinations should be made when indicated.

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