

OWENS-ILLINOIS GLASS COMPANY

MANUFACTURER OF  GLASS CONTAINERS

GENERAL OFFICES

TOLEDO

March 21, 1935

Dr. L. R. Thompson,
U. S. Public Health Service,
Washington, D. C.

Dear Dr. Thompson:-

Enclosed are the initial and progress reports of the Temporary Organization Committee which was formed at the conclusion of the symposium on dust problems at Pittsburgh, January 15, 1935. You may have read these already, but when I heard from Mr. Hitchins (Mr. Hitchins is President of the American Refractories Institute) that your name was not on the mailing list, I asked that he send me these extra copies which I am now forwarding.

As a bystander, I have watched the progress made by Mr. Hitchins' Committee from its formation, with great interest. This has been possible because Mr. A. W. Sherwood, who is Vice-President of this Company, represents the glass sand, ground sand and glass container associations on the Temporary Organization Committee. Through him I have seen some of the reactions of industry to the project. There has been some misunderstanding, unfortunately, as to the function of the Committee; although the "Narrative" of March 12 has undoubtedly clarified the matter,-- by re-stating that the Temporary Organization Committee has for its purpose the formation of interested trade associations and individual companies into a permanent organization which will have \$25,000 to conduct a preliminary survey of the dust field -- under the guidance of an advisory board chosen from "dusty" experts, and following a detailed program to be worked out by this board.

The future of the project holds many rosy possibilities that the potential benefits to investigators and field workers,--in addition to industry itself, which is, of course, footing the bill -- are tremendous.

Mr. Sherwood is confident of the eventual success of the Committee in collecting fifty pledges. Time is required for them to come in, and there is much to be gained by setting up the permanent advisory board promptly. Consequently, when your dust-interested industrial friends seek your advice, I am wondering if you will give the movement a forward boost by urging that they dig deep for their \$500.00. I mention this because apparently there are certain companies that would join in, if they had a personal talk with someone experienced in the dust field.



*Noted
file*



OWENS-ILLINOIS GLASS COMPANY

Incidentally, Mr. Hitchens has now included all the Konicide Club on his mailing list, so that this group -- whose services will assuredly be relied upon when the permanent organization is formed, -- may follow the idea from its inception.

I would appreciate having your comments on this movement, particularly as to what reception it is getting in Washington and vicinity.

Sincerely,

W. G. Hazard.

WGHazard
HB

P. S. There are now 14 pledges, three more than Mr. Hitchens reported on March 12. Perhaps the snowball is beginning to roll.

W.G.H.

TEMPORARY ORGANIZATION COMMITTEE
INDUSTRIAL DUST PROBLEM

Room 909
1608 WALNUT STREET
PHILADELPHIA, PA.

February 5th, 1935.

REPORT AND RECOMMENDATION OF THE TEMPORARY
ORGANIZATION COMMITTEE WHICH WAS ELECTED
AT THE "SYMPOSIUM ON DUST PROBLEMS" HELD
AT PITTSBURGH, PA., JANUARY 15, 1935.

Dear Sir:

All individuals who attended the Symposium on Dust Problems held at Pittsburgh, Pa., January 15, 1935 and all Trade Associations which were addressed by Dr. Weidlein of Mellon Institute under date of December 1, 1934, are receiving copies of this letter.

The purpose of this letter is to ask if your Company or your Trade Association (as the case may be) will subscribe an amount not to exceed \$500.00 for the establishment of a Coordinating Agency as the first move toward a study of the many existing phases of the industrial dust problem, together with a recommendation based on that study as to such further concerted action as may be possible and proper for all industry.

At an initial over all cost of \$25,000.00 when pro-rated amongst the subscribers to the movement, the individual contributions required may be very materially less than \$500.00 each, depending on the number of subscribers.

The enclosures will furnish full information to enable you to judge whether the plan proposed has sufficient merit to justify its cost, and whether your Company (or your Trade Association) should properly share in the initial cost on a pro-rata basis.

Page 2.

It is of great importance that whatever is to be done should be started quickly. May I, therefore, ask that you reply to this letter as promptly as is possible?

Yours very truly,

Roger A. Hitchins
Chairman, Temporary Organization Committee
Elected in Pittsburgh, January 15, 1935.

Enclosures:

- (1) A brief outline of the events leading up to and occurring at the "Symposium on Dust Problems" held in Pittsburgh, Pa., January 15, 1935.
- (2) A brief outline of the discussion and action taken by the Temporary Organization Committee on January 15, 1935.
- (3) A brief outline of the discussion and action taken by the Temporary Organization Committee at a special meeting held at the Duquesne Club, Pittsburgh, Pa., on Friday, February 1, 1935.
- (4) Copy of a letter from Dr. E. R. Weidlein, Director of Mellon Institute dated January 21, 1935, together with a copy of the "Plan for Study of Dust Problems" referred to in Dr. Weidlein's letter.
- (5) A tentative "Program of Initial Activities" (for a correlating agency) arranged in somewhat different form but which has the approval of Mellon Institute.
- (6) A Form of Letter for your reply, which is suggested for your guidance, if your Company or Trade Association (as the case may be) is willing to participate in this movement.

Enclosure
(1) A paper on the subject of dust hazards occurring at the Symposium on Dust Problems in Pittsburgh, Pa., January 15, 1934.
Page 1 General Manager

On December 1, 1934, Dr. E. R. Weidlein, Director of Mellon Institute of Industrial Research, at Pittsburgh, wrote to more than eighty industries, in connection with the subject of industrial dust hazards. There are various types of so-called 'dust diseases', known generally as pneumoconiosis, among which are silicosis, asbestosis, anthracosis, siderosis, and numerous others.

Dr. Weidlein's letter was written at the request of a few of the industries, in which the dust hazard exists, in an effort to determine whether sufficient interest existed to warrant having a meeting for a general discussion of this question, and with the basic idea that if such a meeting could be held it might be possible to establish a coordinating agency for the collection of all available data on silicosis and other dust diseases and its dissemination to the interested industries, and with the further thought that such an agency would later develop into a coordinating and planning body.

The response to Dr. Weidlein's letter was immediate and represented a large percentage of the industries to whom the original letter had been sent. In view of the wide-spread interest, Mellon Institute proceeded with arrangements for a "Symposium on Dust Problems". This meeting was held at the University Club, at Pittsburgh, Tuesday, January 15, and addresses were made by the following:

Mr. A. C. Hirth
Williams, Eversman & Morgan
Toledo, Ohio

Dr. R. R. Sayers
Medical Officer in Charge
U. S. Public Health Service
Washington, D. C.

Dr. A. J. Lanza
Assistant Medical Director
Metropolitan Life Insurance Co.
New York, N. Y.

Dr. Eugene P. Pendergrass
X-Ray Laboratory
University Hospital
Philadelphia, Pa.

Prof. Philip Drinker
School of Public Health
Harvard University
Boston, Mass.

Mr. F. Robertson Jones
General Manager, Association of Casualty
and Surety Executives
New York, N. Y.

Donald E. Cummings
Assistant Director, Saranac Laboratory for
Study of Tuberculosis
Edward L. Trudeau Foundation
Ironwood, Michigan

Dr. Samuel R. Haythorn
Director, Singer Memorial Laboratory
Pittsburgh, Pa.

Dr. Weidlein, of Mellon Institute, in opening the meeting explained that the interest of the Institute was simply the desire to assist industry toward a realization of the problem and the development of a possible program of activity. No reporters were present at this meeting and no stenographic notes were kept. Attendance was by registration only and there were present nearly two hundred representatives of many of the important industries who are affected by the dust problem.

At the conclusion of an excellent and extremely informative program, on motion from the floor a nominating committee was appointed to submit names of individuals in industries who would form a Temporary Organization Committee to develop plans and make a definite written recommendation to all of the registered attendance at the meeting, as well as to those industries originally invited, as to the formation of a permanent organization and its purposes.

The industries represented grouped themselves into seven general classes and the Nominating Committee report consisted of the nominations for a Temporary Organization Committee, with one representative for each of the following Groups of Industry:

GROUPS OF INDUSTRY

- I. Asbestos, Cork and Non-metallic.
- II. Chemical, Abrasives, Alloy and Non-ferrous Metals.
- III. Foundries.
- IV. Glass Sand, Ground Sand and Glass Manufacturers.
- V. Iron, Steel and Iron Ore.
- VI. Lime, Limestone, Cement and Gypsum.
- VII. Refractories, Ceramics and Clays.

The report of the nominating committee was accepted by the meeting.

ROGER A. HITCHINS,
Chairman, Temporary
Organization Committee

Enclosure

- (2) A brief outline of the discussion and action taken by the Temporary Organization Committee on January 15, 1935.
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Following the adjournment of the general meeting in the late afternoon of January 15, 1935, a meeting was held of the Temporary Organization Committee at which time the undersigned was elected Chairman of the Committee.

The Committee was of the opinion that Mellon Institute of Industrial Research, Pittsburgh, was better qualified to conduct this work than any other agency. The Chairman was thereupon instructed to request Mellon Institute for a proposal which would outline the work which they would expect to do on Silicosis and other Dust Problems and the cost of doing it, in case industry in general desired the establishment of such a coordinating agency.

ROGER A. HITCHINS,
Chairman, Temporary
Organization Committee.

Enclosure

- (3) A brief outline of the discussion and action taken by the Temporary Organization Committee at a special meeting held at the Duquesne Club, Pittsburgh, Pa., on Friday, February 1, 1935.

Page 1

On call of the Chairman, the Temporary Organization Committee met at Pittsburgh on Friday, February 1st, 1935.

Judging from the keen interest displayed at the "Symposium on Dust Problems" held in Pittsburgh, January 15th, 1935, it was the desire of those in attendance that a coordinating and correlating agency should be established for the purpose of making a complete study of all of the existing facts concerning the many phases of the industrial dust problem as affecting all industry, and a recommendation based thereon as to future action.

The letter from Dr. Weidlein of Mellon Institute dated January 21st, 1935, together with the "Plan for Study of Dust Problems" was read and discussed.

The maximum cost for the first year or for the first period of this work, which is estimated to require from six months to a year's time, will be \$25,000.00.

The plan provides for the possible establishment of a permanent organization to be known as the Industrial Dust Institute (or by whatever other name may be selected) to be associated with Mellon Institute, and the details of whose membership and their contributions may be kept at Mellon Institute and will be entirely confidential.

Such permanent organization when formed to be directed by an Advisory Committee which will be elected by the contributing members, and whose function will be similar to that of a Board of Directors in co-operation with Mellon Institute in carrying out the purposes of the new Association.

A somewhat rearranged "Suggested Program of Initial Activities" for the correlating agency covering medical, preventive, legal, legislative and publicity features of the industrial dust problem was prepared and discussed with representatives of Mellon Institute and was approved by them.

From the fact that a number of interested industries have already expressed their willingness to underwrite this program to the extent of \$500.00 each for the first year it appeared to the Temporary Organization Committee that the cost per individual contributor will be relatively small when considering the benefits which may result. The actual expenses will be pro-rated among those subscribing, thus if fifty members will underwrite proportionately the amount will be exactly \$500.00 each. If eighty participate the amount will be only slightly more than \$300.00 each, and less in the event of a larger number of subscribers. If the entire \$25,000.00 is not required for the first phase of the work any balance will be carried over for future activities

Enclosure (3)

Page 2.

or can be refunded proportionately to the contributors.

The Temporary Organization Committee feels that the importance of this subject to industry can scarcely be over-estimated; - and that this appears to be a most opportune time for all industry at reasonable cost to attempt to gather together in a central agency all of the existing information of all kinds on this subject as a basis for determining what further activities along this line are necessary or practical. The Dust Problem in every industry raises certain problems common to all, such as those concerned with Engineering (respirators, dust elimination and prevention), and the Medical, Legal and Legislative aspects.

The Chairman of the Temporary Organization Committee was thereupon directed to write to each individual who was present at the Symposium on January 16, 1935, as well as to the more than eighty Industrial Trade Associations who were addressed by Mellon Institute under date of December 1, 1934; - and transmit to them (a) the development leading up to and occurring at the Symposium on January 16, 1935, and (b) the developments occurring at the organization meeting of the Temporary Organization Committee on January 15, 1935, and (c) the plans proposed by and approved by Mellon Institute as to initial activities and objectives, and (d) a report of the discussions and recommendations of the Temporary Organization Committee meeting in Pittsburgh on Friday, February 1, 1935, and he was directed to request that those addressed should respond promptly with an indication as to whether or not they will support a permanent organization on the basis outlined.

ROGER A. HITCHINS,
Chairman, Temporary
Organization Committee.

MELLON INSTITUTE OF INDUSTRIAL RESEARCH
UNIVERSITY OF PITTSBURGH

Pittsburgh, Pa.

Enclosure
(4)
Page 1

January 21, 1935.

Mr. Roger A. Hitchins, President,
American Refractories Institute,
No. 1608 Walnut Street,
Philadelphia, Pa.

My dear Mr. Hitchins:

In accordance with your request as Chairman of the Organization Committee which was formed at the conference on dust problems held in Pittsburgh on January 16, we are giving you our ideas regarding the important problems involved and the type of organization that should be established. I am enclosing a plan for the study of dust problems and the organization chart.

If this work were to be centralized in Mellon Institute, it could be carried out as a part of our air hygiene research. The director appointed to handle the investigation would also be the head of the institution or organization which the industries would set up. In this way, the work could be carried out in a most confidential manner as to who was supporting the research and no one would know what industries or individuals were contributing to the fund. This would enable the organization to get soundly established, so that if later on it was desired to come out in the open this could be arranged.

Hoping that this gives you the information which you wish, I
am

Sincerely yours,

(signed) E. R. Weidlein

Director

ERW-W
enclosures

C O P Y

Plan for Study of Dust Problems

I. Organization of the Industries.

It is necessary that there be some organization representing industries for the reason that no program of research investigation could be carried on without assurance of continuity and financial support. Such assurance could be given only by some body that had authority to speak for a sufficient number of industries or companies, and might be called The Industrial Dust Institute. If it seems inadvisable to effect such a separate organization, for reasons that may be sound, it is suggested that a group of individuals be chosen from industries or companies, such a group to be called, for example, Industries Advisory Board for the Study of Dust Problems. Affected industries and/or individual companies could contribute to this Board, which in turn could make contracts and disburse the monies.

The other primary functions of the Institute or Board would be to select the central agency to administer the activities later referred to in some detail (called, for convenience, the research agency), to keep in touch with that central agency, advise with it as to the program of work, and aid it in other obvious legitimate ways. Obviously, such central agency must be independent of any specific industry or group, it must have a broad outlook, a sympathetic understanding of the problem, and wide contacts with all cooperating agencies; and it must have the confidence of the industries, and of the physicians, engineers and all institutions, groups or individuals who might cooperate to advantage.

II. The work of the research agency.

Of primary importance in the initial stage is the collection of available data published and, as far as possible, unpublished.

These data must then be evaluated and correlated, and in this phase of the work it is assumed that it will be possible to secure the advice and cooperation of the recognized specialists in the fields of medicine, law, chemistry, physics and engineering. Evaluation should include the weeding out of data that cannot be considered as authoritative.

It will then be possible to prepare a comprehensive program designed to provide the industries concerned with legitimate protection.

In preparing to work out such a program, it would be necessary to compile a list of specialists in all fields who are engaged in a study of dust problems; to have determined any among them who may not be properly qualified and whose results might, therefore, not be entirely acceptable; to attempt as far as feasible to have investigational work correlated and synchronized; to be in position to make reasonable grants to qualified individuals or agencies to study special problems or phases of problems.

Some of the aspects that occur to mind are:

- (a) The pathological and psychological effects of dusts of various kinds, alone and in combination; for this a classification of dusts is necessary.

Important from both medical and legal standpoints is the preparation of court cases. On the medical side is also plant hygiene, insofar as it is affected by industrial dusts and fumes.

- (b) A study of sampling devices and sampling methods, with the idea of further developing standards, and also to attempt to provide plant officials with simple portable apparatus which, while neither as delicate nor as accurate as the standard equipment, will enable them to keep a regular check on plant conditions and to know when the danger line is approached.
- (c) Study of existing methods and cooperation in the development of improvements designed to minimize dust and fumes in the plant, as well as protective measures for workmen.
- (d) Dissemination, through proper channels, of authoritative information.
- (e) Maintaining contact as closely as possible with independent agencies and cooperating agencies engaged in studies of phases of the problem, and a program of such research experimentation as may be indicated.
- (f) Study and synopsis of existing pertinent legislation (including compensation), and assistance in the preparation of safety codes and fair laws.

The place to start is in the collection and evaluation of available data, which must precede the formulation of the longer-time program.

III. Estimate of cost.

- (a) The cost, if any, of operating the parent organization or Board.
- (b) Cost of research agency. It is estimated that for the initial work of collecting and evaluating available data and preparing authoritative abstracts for dissemination, surveying the field and formulating a long-time program of constructive work, not less than \$25,000 should be appropriated.

The time necessary for this initial phase cannot be predicted with certainty, but it is estimated that at least six months and not more than a year will be required.

After the conclusion of this period, it is certain that an effective program can be developed and would require a substantially larger budget.

IV. Organization chart.

The plan outlined above is shown broadly in the accompanying chart.

CORRELATING AGENCY

SUGGESTED PROGRAM OF INITIAL ACTIVITIES

- MEDICAL.**
- (1) Secure from medical profession and health authorities as complete as possible information covering past and present research on Industrial Dust diseases.
 - (2) Study the assembled data and report and recommend (a) as to what phases have duplication of effort and (b) as to what phases should have further research; with the objective of enlisting the cooperation of American Medical Association in setting up authoritative and approved standards of diagnosis and correction.
- PREVENTIVE.**
- (1) Secure from all possible sources the existing available data on Industrial Dust hazards.
 - (2) Study the assembled data and report and recommend (a) as to present means of eliminating or minimizing those hazards and (b) as to what further should be done in that direction; with the objective of setting up authoritative and approved standards for the control of industrial dusts which, if complied with by industries, or by industrial companies, will act as a defense against personal injury suits.
- LEGAL.**
- (1) Secure from all affected industries their present experience as to personal injury suits and claims growing out of industrial dust hazards and claimed diseases; in complete detail as to name of claimant, amount involved, court of jurisdiction, prosecution and defense counsel, character of suit (or claim) together with a history of closed cases and the status of pending suits or claims.
 - (2) Study the assembled data and report and recommend (a) as to the aggregate amount of money loss which industry has experienced and with which industry is threatened as a whole and by divisions and (b) as to the instances where the situation appears to be a "racket" against industry and (c) what concerted action may be possible to be taken in pending cases and claims; with the objective of enlisting the co-operation of the American Bar Association and local Bar Associations in stopping the "racket."
- LEGISLATIVE.**
- (1) Secure from all States and Territories copies of existing or pending legislative enactments and existing court decisions affecting the dust hazard in industry, whether

LEGISLATIVE.
(Contd)

workmen's compensation or occupational disease or common law.

- (2) Study the assembled data and report and recommend (a) as to existing laws which properly protect both employer and employee and (b) as to such existing laws as do not properly protect both employer and employee; with the objective of securing the enactment of State laws, of a uniform character, which, when compiled with, will fairly and properly protect the interest of industry and of those engaged in industry and of enlisting the co-operation of the Federal Government in that direction.

PUBLICITY.

Consider and recommend (a) the manner in which affected industries may be informed and be kept informed as to all phases of the industrial dust problem and (b) the manner in which governmental agencies and the public may be informed and be kept informed, and the propriety and advisability of doing so, as to the measures which are being and should be taken in the direction of protecting both human life and property.

Enclosure (6)

Mr. Roger A. Hitchins, Chairman
Temporary Organization Committee
Room 909, 1608 Walnut Street
Philadelphia, Penna.

Dear Sir:

We have your letter of February 6, 1935 and accompanying copy of letter from Mellon Institute of Industrial Research, outlining a program for the study of industrial dust hazards.

We are in full agreement with this program and with the method suggested for putting it into effect. We understand that the estimated expense for the first year is \$25,000. In consideration of other similar contributions, we agree to contribute toward the initial expense of such a program the sum of five hundred dollars. (\$500) with the understanding that if the total contributions exceed \$25,000, the amount of our contribution is to be proportionately reduced.

It is our understanding that when sufficient contributions have been received, a meeting of the contributors will be called for the purpose of effecting a permanent organization, and that contributions will be payable at such times as the directors of the proposed organization shall call for payment.

Yours truly,

TEMPORARY ORGANIZATION COMMITTEE
INDUSTRIAL DUST PROBLEM

Room 909
1608 WALNUT STREET
PHILADELPHIA, PA.

March 12, 1935

Dear Sir:

This Progress Report is being sent to all individuals and all organizations who were addressed by me under date of February 6th, 1935 or who have since been sent copies of that letter and enclosures.

As of Saturday, March 9th, responses to a total of approximately 375 letters have been as follows:

- 11 have agreed to co-operate in the movement, and contribute up to \$500.00 on a pro rata basis as outlined.
- 32 Trade Associations or individual companies have indicated an interest and have said that their governing body - or their membership - is being canvassed for authorization.
- 24 Trade Associations or individual companies have said they are not interested.
- 300 (approximately) letters have not been replied to.

The response, indicated above, does not seem at all discouraging. It is realized that the time element has to function in the face of other pressing matters.

There is still, however, a need for the quick formation of a permanent organization, if one is to be formed. The enclosed memorandum outlines the conception of the Chairman and at least some of the members of the Committee as to the reasons for and proper function of the Temporary Organization Committee. It is hoped this will clear up several quite apparent misunderstandings and thus speed the conclusion.

Yours truly,

Roger A. Hitchins
Chairman, Temporary
Organization Committee.

TABLE 6.—SUMMARY OF DETERMINATION OF DUST CONTENT OF ATMOSPHERE OF WORKROOMS AND OTHER PLACES

SAMPLE NO.	PROCESS AND SOURCE OF SAMPLE	LOCAL EXHAUST VENTILATION TO PROCESS OR NOT	OTHER PROCESSES IN SAME ROOM	NO. OF PARTICLES PER C.C.	PERCENTAGE 2m AND UNDER	PERCENTAGE 7.5m AND UNDER
1. 1/2	Carding; passageway between cards	Yes	Yes	2,139	81.3	95.1
2. 1/5	Spinning	No	Yes	1,456	95.9	100.0
3. 1/3	Cloth weaving, dry	No	Yes	1,756	84.1	96.7
4. 1/7	Opening	Yes	Yes	2,384	80.9	93.7
5. 1/6	Sieving; shoveling fiber on to sieve	No	Yes	2,829	83.0	97.6
6. 1/8	Plaiting	No	No	1,687	99.0	99.0
7. 1/1	Office	...	...	901	98.8	100.0
8. 2/11	Office	...	...	1,480	98.7	100.0
9. 2/1	Cloth weaving	No	Yes	1,788	88.9	98.6
10. 2/14	Spinning	No	Yes	1,073	96.2	100.0
11. 2/10	Mattress making; filling	Yes	No	985	92.5	98.1
12. 2/8	Mattress making; beating, damp	Yes	No	970	85.9	95.3
13. 2/7	Mattress making; beating, dry	Yes	No	1,629	86.9	96.6
14. 2/9	Mattress making; after filling 2 mattresses	Yes	No	1,204	96.6	99.4
15. 3/1	Band weaving, wet	No	No	808	96.6	100.0
16. 3/4	Opening	Yes	No	2,313	77.7	96.6
17. 3/3	Carding; between cards	Yes	Yes	1,328	82.5	97.4
18. 3/5	Carding; feeding card	Yes	Yes	1,321	82.9	96.4
19. 3/7	Office	...	...	1,046	96.3	100.0
20. 4/1	Mattress making; filling	No	Yes	1,858	60.1	90.1
21. 4/1	Mattress making; filling basket	No	Yes	1,390	....	....
22. 4/3	Emptying settling chamber	No	Yes	3,401	....	....
23. 4/4	Same	No	Yes	4,711	....	....
24. 4/5	Insulating sections; levelling fiber	No	Yes	1,838	....	....
25. 4/5a	Carding; side of dirty card	Yes	No	1,402	....	....
26. 4/6	Carding; end of clean card	Yes	No	1,092	....	....
27. 4/7	Carding; feeding card	Yes	No	1,689	....	....
28. 4/9	Cloth weaving, very slightly damp	No	Yes	3,033	....	....
29. 4/10	Cloth weaving, damp	No	Yes	758	....	....
30. 4/11	Braiding	No	Yes	506	....	....
31. 4/12	Spinning	No	Yes	954	....	....
32. 4/13	Office	...	...	680	....	....
33. 5/1	Band weaving, dry	No	Yes	2,372	....	....
34. 5/3	Cloth weaving, dry	Yes	No	835	....	....
35. 5/3	Band weaving, dry	Yes	No	701	....	....
36. 5/9	Opening	Yes	Yes	643		
37. 5/6	Carding; feeding card	Yes	Yes	562		

J. L. H.
June, 1930

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TABLE 6.—Continued

SAMPLE NO.	PROCESS AND SOURCE OF SAMPLE	LOCAL EXHAUST VENTILATION TO PROCESS OR NOT	OTHER PROCESSES IN SAME ROOM	NO. OF PARTICLES PER C.C.	PERCENT-AGE 2μ AND UNDER	PERCENT-AGE 7.5μ AND UNDER
33. 6/4	Carding; center of room	Yes	Yes	620	....	....
39. 6/3	Carding; grinding rollers	Yes	Yes	540	....	....
40. 6/7	Spinning	No	Yes	620	....	....
41. 6/8	Office	...	...	666	....	....
42. 7/2	Cloth weaving, dry	Yes	Yes	4,688	....	....
43. 7/1	Opening; shoveling fiber into box	Yes	Yes	4,880	....	....
44. 7/3	Opening	Yes	Yes	6,324	....	....
45. 7/4	Band weaving, wet	No	Yes	5,353	....	....
46. 7/5	Spinning	No	Yes	6,044	....	....
47. 7/6	Carding; between cards	Yes	Yes	4,607	....	....
48. 7/7	Office	...	...	3,413	....	....
49. 8/2	Cloth weaving, dry	No	Yes	1,287	38.6	94.9
50. 8/3	Band weaving, dry	No	Yes	1,233	78.2	93.7
51. 8/5	Carding	Yes	Yes	1,193	67.2	94.9

tent was determined by means of Owens' jet apparatus. Here also the undetermined effect of dust from neighboring processes must be noted. Nevertheless some information of practical value was obtained.

Reference to Table 6 shows that the counts ranged from 506 to 6,324 particles per cubic centimeter in the air of workrooms, and from 666 to 3,413 per cubic centimeter in the air of offices associated with the factories. In some cases there was a smaller count in a workroom than in an office of the same factory; this was due either to there being much fewer smoke particles in the air of the workroom, or to adherence of the smoke particles to the inorganic dust in the workroom.

The character of the dust in the two cases is, however, entirely different. In the air of the office almost all the particles are black, or brownish, and amorphous, evidently smoke; in the

air of the workroom, the majority of the particles are, just as clearly, crystalline particles of asbestos, together with, frequently, some cotton fibers and numbers of black and brownish particles, some adherent to asbestos spicules and some free. Most of the latter are iron containing and are derived from the asbestos, and there are relatively few smoke particles. Isolated golden-brown scales or plaques, also derived from the asbestos, are scattered about the field.

The asbestos fiber first fragments longitudinally, and apparently this process can go on indefinitely, since there is no ultimate fiber comparable to a vegetable fiber such as cotton. The dust collected in the Owens apparatus contains numbers of these very fine fibers—some about 0.5 micron in transverse diameter, many less—which have fragmented transversely. Thus spicules of very diverse length—up to