PLAINTIFF'S EXHIBIT 4342.0

CORNING GLASS WORKS
CORNING, NEW YORK

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FIBRE PRODUCTS DIVISION

March 9th, 1937.

PLAINTIFF'S EXHIBIT WV-01082

Mr. Lester W. W. Morrow,
Corning Glass Works,
Corning, New York.

Dear Mr. Morrow:

In answer to your inquiry, concerning any possible health hazard of fiber glass or its products, I would like to relate what work on that subject has been done and the conclusion arrived at:

Very early in the manufacture of glass wool we considered the possibility of its having deleterious effects upon those working with it or using it. An investigation was made and it soon developed that there was a scarcity of pertinent experimental work published in the literature. It therefore appeared wise to conduct our own experiments, which procedure had the advantage that the results would apply specifically to our own commercial grades of glass wool made from our own batch.

Several groups of experiments were undertaken to determine what, if any, untoward physiological effect glass wool might have when it comes in contact with the human body. The reasoning behind this work, which dictated the choice of experiments, was briefly as follows:

It was assumed that glass wool might enter the body by three routes, by inhalation, by swallowing and by penetration of the skin.

If glass wool dust is breathed, assuming the particles are small enough to enter the small air spaces of the lungs, answers to these questions were sought: Will inhaled glass wool dust cause a reaction in the lung tissue similar to that produced by silica dust in silicosis? Will the reaction be at all harmful? If not, what will become of the glass wool dust?

If glass wool fibers are swallowed - will they produce any serious or permanent injury to the digestive tract?

If glass wool fibers penetrate the skin - will the glass act as a tissue poison? What will become of the particles of glass wool that might be injected in the skin?

Dr. Leroy U. Gardner of Saranac Laboratory, Saranac Lake, New York, undertook two groups of animal experiments, and Mr. Philip Drinker of the Harvard School of Public Health, together with Dr. C. Titus, undertook a third group of experiments.

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Animal Injection Experiments

In determining whether inhaled glass wool dust would act in any way comparable to free silica dust, it is essential that the exposure be prolonged over a period of many years in order to show up chronic effects. No group of workmen in this country have used glass wool long enough to show positively whether or not chronic injury to the lungs might result. X-ray and clinical examinations on our workmen with the longest periods of service, however, revealed no unhealthy lung condition at all. The effects of inhaled dust can be accelerated in the case of animal experiments, and it was for this reason - to check our inconclusive X-ray findings - that Dr. Gardner's help was solicited.

Animal experiments to determine the effect of inhaled dust can be performed in two ways. First, the animals can be place in dust-laden atmospheres and made to breathe dusty air for long periods of time. Second, the dust in question can be injected into the animals' bodies, and it is generally recognized that the type of inflammation or reaction that results indicates to a trained pathologist whether the harmful effects are at all comparable to those produced by free silica dust. Because the "dusting" method requires two or more years to get results, the injection or second type of experiment was selected.

Animals were injected with glass wool dust, both "plain" and "oiled". (Oil is applied to some commercial grades of glass wool to reduce fracturing of the fibers and to prevent dust being given off during handling). Animals were examined at intervals of several days or weeks for a total period of 285 days.

Dr. Gardner states:

> "Experience in this laboratory and elsewhere has shown that these methods are adequate to demonstrate the capacity of a mineral dust to produce fibrosis. Injection of over 20 different types of dust has indicated that if no reaction occurs in organs other than the lungs, none will occur in the respiratory tract, and that conversely, dusts like silica and asbestos that are known to produce fibrosis of the lungs, also cause fibrosis in other tissues when injected in sufficient quantities."

Dr. Gardner summarizes this series of experiments as follows:

> "Neither plain nor oiled glass wools have caused fibrosis or any chronic progressive reaction by injection, and therefore, it is a reasonable assumption that their inhalation would likewise fail to produce such effects."

Eating Glass Wool

A considerable number of references exist in the literature to cases where circus performers and individuals with ulterior motives, have either eaten glass or caused others to eat it. Usually in these reports the glass was in chunks or pieces large enough to see with the naked eye. In no instance that has come to our attention did the reports show that any serious injury was done to the individual by the glass.

There remained the possibility, however, that long-continued swallowing of small amounts of extremely fine particles of glass might

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produce some chronic damage to the body. Dr. Gardner therefore undertook the second series of experiments in which fasting guinea pigs were injected with finely ground glass wool by stomach tube. None showed any ill effects even after the injections were repeated.

Guinea pigs were then fed glass wool dust, mixed with a portion of grain, before they received their morning rations. After these meals were administered daily for periods varying up to a total of 119 days, examination "failed to disclose evidence of the glass fragments or any injury inflicted by them."

Dr. Gardner concludes:

"One may therefore conclude that the ingestion of as much as 51 grams of finely powdered glass wool, administered in divided doses, will not cause injury in 4 months' time. In the absence of any reaction at all, it would hardly seem essential to continue the investigation further."

His concluding statement we think is extremely pertinent. It is as follows:

"Trusting these findings may allay any skepticism as to a theoretical hazard involved from the handling of glass wool, I am

Very truly yours,

Leroy U. Gardner, M. D.,
Director"

Solubility of Glass Wool

No information was found which gave the solubility of glass in body fluids. A knowledge of how soluble glass is in body fluids was felt to be essential in answering the question, "What becomes of glass after it enters the body?"

Dr. Titus therefore, under the direction of Dr. Drinker, ran chemical experiments on solubility of glass wool in blood serum. By the same method he also obtained the solubility of quartz (free silica) in blood serum. Compared to quartz, glass was found to be extremely soluble. As a matter of fact, the blood serum had a certain residual silica content, and Dr. Titus was unable to ascertain whether any of the quartz went into solution during a two-months period.

In the case of glass wool (same types used by Dr. Gardner), however, the quartz content of the serum increased more than fifteen fold during the same period.

Conclusions

Referring to the original questions, we believe that Dr. Gardner showed that glass wool dust, if breathed, will produce no harmful effect on the lung tissue comparable in any way to that caused by silica dust. As a matter of fact, in view of Dr. Gardner's conclusions, we may assume there is no harmful effect of any sort.

It is believed that glass wool dust which enters the lungs

would be removed by the normal action of the "scavenger" cells of the lymphatic system, and in view of Mr. Drinker's work, that the particles will eventually pass off in solution.

The evidence revealed by a search of the literature, supplemented by Dr. Gardner's experiments, shows that no permanent damage is done to the digestive tract if glass wool is swallowed, either in single large doses or in small doses taken regularly over a long period of time. While it is likely that large pieces of glass would cut the digestive tract, animal experiments reported in the literature show that this injury heals completely in three or four days, and produces practically no discomfort.

From Dr. Gardner's work, it is evident that the actual process of going into solution that is the process of solid glass being carried off by liquid, does not give rise to any tissue poison. This indicates that glass in the body will be dissolved and eliminated slowly and continuously without any injurious or poisonous effects on the individual.

Of course, the fine particles of glass wool do produce a form of skin irritation in some people. This is of a minor nature and in man-hours worked, under observation, there has been no lost time or serious reaction due to such mechanical irritation.

Dr. H. H. Sayers of the United States Public Health Service in discussing the health hazard of this product, states "that he does not think there is any chance of any untoward effects." However, at the present time, he is doing experimental work for us, which will, I believe, confirm the work done by Dr. Gardner. This work will probably be over a period of six to twelve months and on the completion of it, I will forward his results to you.

Theoretically there may be a hazard due to oil on the glass, as there are certain people, who are susceptible to dermatitis, when exposed to any product, which has even a small percentage of oil in it. These people, we will have to ignore as the reaction is so unusual that patch tests to determine the degree of susceptibility would be more trouble than the value received. A bath, preferably in a shower, with plenty of force and plenty of soap suds, seems to relieve all cases of the skin irritation. It is essential, however, that the workers wear loose clothing, particularly at the wrists and neck. Female workers can be protected by the use of rubber aprons or other devices, as they seem necessary.

Trusting this satisfactorily answers your inquiry, I am

Yours truly,

W. C. Templer, M. D.,
Medical Director.

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