



May 31, 1944

Mr. U. E. Bowes
Director of Research
Owens-Illinois Glass Company
Toledo, Ohio

RE: Hydrous Calcium Silicate
Animal Experiments

Dear Mr. Bowes:

I am only just now in a position to submit a final report on the results of our animal assay of the physiological effects of your product designated "Hydrous Calcium Silicate".

As received the material was too coarse for animal injection tests. After further reduction in size it proved to be quite toxic when injected into guinea pigs so that it was necessary to repeat many of the tests. However, enough animals survived for a sufficient period so that the general characteristics of the tissue reaction could be evaluated. Such reaction had none of the appearances of a silicosis but did resemble asbestosis.

One would conclude that if the dust of this material were ground sufficiently fine to be inhaled in appreciable quantities it would probably produce a pulmonary disease simulating asbestosis. However, the appended data indicate that in the samples submitted the particle size of the components was such that inhalation of most of the components would be difficult. You are in a better position than we to know whether these samples are representative of the air-borne dust in your plant. In my opinion the dust of this "hydrous calcium silicate" is potentially dangerous if in processing the material the particle size is reduced considerably below that in the samples submitted.

The appended report contains details of the physical and chemical characteristics of the dust samples and of the animal tests made to test its physiological activity.

I enclose a statement for our services.

Very truly yours,

Leroy U. Gardner, M. D.
Director

LUO:RB

P. S. If you could refer me to any literature on the effects of water on asbestos and its subsequent relation it would be appreciated.

EXCERPT FROM THE PROCEEDINGS OF THE RHODE ISLAND INDUSTRIAL HEALTH INSTITUTE

PROVIDENCE, WEDNESDAY, MAY 19, 1943

(AFTERNOON SESSION)

W. C. HAZARD

P. A. Industrial
Hygiene Engineer (R),
U. S. P. H. S.

As Dr. Deery¹ stated in his announcement of this meeting, "The manufacture and processing of Fiberglas is a new industry in Rhode Island. The finished product is handled by multitudes of workers in many plants throughout the state and nation. Its wartime use is of national importance, and it is destined to become a common substance in the lives of all of us."

When any such new material is launched, it falls on the manufacturer, the consumer and the state to ascertain what, if any, are the health hazards associated with its use, and how it can be manufactured and applied in safety. Fortunately, such an investigation of Fiberglas has been underway since the early days of its commercial distribution. The facts are now at hand; what's needed is their widespread dissemination.

Dr. Walter J. Siebert of St. Louis reported in *Industrial Medicine* for January, 1942, that he had looked at the wrists, arms, ankles and other such areas of 200 employees of the plant which was manufacturing Fiberglas. He examined serial microscopic sections. He concluded:

"Contact with glass wool may cause ephemeral discomfort among workers inexperienced in handling the material. The skin irritation, however, cannot be regarded as a progressive dermatitis for it is non-toxic and usually disappears in a few days."

Dr. Louis Schwartz reporting in *Industrial Medicine* for March, 1940, on "Skin Hazards in the Manufacture of Glass Wool and Thread" said:

"Workers handling glass fibre in textile manufacturing may develop dermatitis from the mechanical cutting action of the fibers on the skin. . . . Some new employees experience sensitivity to handling the glass fibers for a few days, but an immunity seems to develop quickly, so that the great majority of experienced workers prefer to work without gloves or special clothing."

This afternoon Dr. Sulzberger² has reported on thematic, controlled experiments—not only on animals, but on men and women, where the exposure,

that is, the opportunity, for acquiring a skin ailment was greater even than among workers in the plant where the product is fabricated. Dr. Sulzberger found:

"All of the reactions observed were of a transitory and superficial nature. . . . The pieces of material which were seen sticking into the skin after rubbing with Fiberglas in its wool-like form appeared to be very superficially imbedded. Ordinary washing with water easily removed a large part of them."

Mr. Durkan³ has reported on animal experiments conducted by him and Dr. Gardner⁴ in which animals lived in a dust room for several hours a day over a period of months exposed to as high a concentration of air-borne glass wool dust as could be obtained. No hazard to the lungs was found. These experiments carry conviction, for the technic was one which has been developed by Dr. Gardner, Mr. Durkan and their associates through recent years to a point of great reliability in predicting lung damage, or absence of it, in humans.

Knowing these facts, the job for the plant physician and personnel director is to satisfy the possible anxieties of workers who handle this material. This is often no small task. Indeed, it is sometimes resisted because today a few people are eager to imagine a health injury which can be used as a prod for getting some gain of a totally unrelated nature.

People have a horror of being injured by glass. It seems deep rooted. When we cut ourselves with a penknife, we think only of the bleeding wound, but when we run afoul of a broken window pane, we think first of the injury and then of the fact that glass caused it. In the last war some of you may recall that enemy spies were said to be sabotaging the home front by mixing peanut butter with ground glass. So serious was this that some able experimenters in Richmond fed animals, and then themselves, ground glass diets to see what would happen. Nothing happened, except in the case of the dogs where there was a slight reddening of the intestinal tract. The men lived—and the speaker heard firsthand their interesting story years later. No authenticated case of poisoning from eating glass among

¹James P. Deery, M.D., Medical Director of Industrial Hygiene, R. I. Department of Health.

²Norman S. Sulzberger, M.D., Comdr. (MC) U.S.N.R., See Sulzberger, Norman S., M.D., and Boer, Rudolf L., M.D., with the technical assistance of Lovenberg, Clara, M.S., and Monast, Mildred, B.S., "The Effects of Fiberglass on Animal and Human Skin—Experimental Investigation" in *Industrial Medicine*, Vol. XI, No. 10 (October, 1942), pp. 482-484.

³Thomas M. Durkan, Chief Chemist, The Sarnes Laboratory.

⁴Leroy U. Gardner, Director, The Sarnes Laboratory.