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Re: Aluminum Treatment of Diatomaceous Earth Pneumoconiosis.

Dear Tony:

Thanks for your letter of January 25 in reply to my letter of January 22 and which further amplified your memorandum of January 19, 1951.

I have had opportunity to discuss the matter of utilizing aluminum powder (which as you know consists of a mixture of metallic aluminum and its oxide alumina) in the prophylaxis of diatomaceous earth pneumoconiosis with Dr. Anderson of Lompoc, Mr. Eisenbast of Johns-Manville, Mr. Tellefsen of Great Lakes Carbon Corporation, Mr. Bolleart, manager of Dicalite Division, Great Lakes Carbon Corporation, and Dr. Dudley Irwin who recently spent a few days in Los Angeles.

I believe everyone conversant with the subject is agreed that there has been no clinical or experimental evidence to show that the inhalation of aluminum powder in and by itself has proven harmful to either experimental animals or human beings.

A perusal of the literature would indicate that insofar as animals are concerned, the use of aluminum does seem to alter favorably the course of quartz silicosis under the conditions of the experiments. However, there appears to be considerable disagreement among qualified investigators as to how much effect aluminum has in preventing or altering the course of quartz silicosis in human beings. Some feel that such effect if any is due to the associated dust control and/or to psychological factors. It is possible that not enough time has elapsed to accurately and properly evaluate the effect of aluminum inhalation in the treatment or prevention of silicosis in human beings.

I personally am opposed to using aluminum inhalations among diatomaceous earth workers <u>at the present time</u>. It is my belief that <u>before</u> we undertake its use in human beings we should at least complete enough animal experiments

to be able to state that the use of aluminum dust along with flux-calcined diatomaceous earth does not enhance or aggravate the disease as produced experimentally in control animals dusted with the flux-calcined material alone. I make this suggestion for the following reasons: 1. It is an established principal in the practice of medicine that before any medicinal agent or combination of agents is used in the treatment of human beings we shall have tried the agent on animals for the purpose of demonstrating, (1) its harmlessness, and (2) its potential therapeutic properties. It is one thing to say that aluminum inhalation given concomitantly with the inhalation of quartz dust is harmless to human beings, and quite another thing to say that the use of aluminum dust along with the inhalation of diatomaceous earth products will be harmless to workers in the D.E. industry.

For years everyone connected with the D.E. industry (executives, chemists, clinicians, lawyers, pathologists like Drs. Gardner, Vorwald and Carnes, consultants like you, Chick Sander and myself) have stoutly maintained that diatomaceous earth pneumoconiosis was quite different from silicosis. Aren't we being somewhat inconsistent by inferring that because aluminum may prevent quartz silicosis it will also have the same effect when used with D.E.? Surely we would be on safer ground after having some animal experiments justifying clinical trial of this treatment.

We must recognize that every so often a diatomaceous earth worker develops a disabling and rapidly progressive and occasionally fatal case of massive conglomerate fibrosis from the inhalation of diatomaceous earth dust after a comparatively short exposure. I have had the duty of appearing on the witness stand in connection with a number of cases which were adjudicated by the California Industrial Accident Commission. Many of the attorneys who represent the applicants in these cases are capable of asking rather pertinent and penetrating questions. If such an attorney were to ask me on the witness stand - do you know of any experimental animal work which indicates that the simultaneous inhalation of aluminum dust and flux-calcined diatomaceous earth will give rise to no more serious pulmonary condition than the inhalation of the D.E. dust alone? - I should have to say, "No." In other words, I would have to admit that we have not gone to the trouble of trying out the combination of dusts on animals. This could be a very embarrassing situation and an unscrupulous attorney might easily maintain that the combination of the two dusts is capable of giving rise to a more serious type of pulmonary disability than would be expected if the D.E. dust were inhaled alone. If the Industrial Accident Commission was inclined to believe this, it would put the employer in a very bad position medico-legally. He would have acquired a two-fold liability - both industrial injury and malpractice.

Please be reminded that there are a number of qualified workers including Drs. Irwin, Vorwald, Schepers, and myself who believe that Shaver's disease and the massive conglomerate fibrosis sometimes seen in D.E. pneumoconiosis are essentially the same condition. It is very possible that Shaver's disease is due to the inhalation of ultra-microscopic particles of crystobalite and/or tridymite. We know that the fumes given off by the corundum furnaces contain

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ultra-microscopic particles of silica and alumina. Inasmuch as the raw bauxite contains both alumina and quarts it is reasonable to assume that much of the quarts has been converted into crystobalite and/or tridymite by the high temperature (2000° centigrade). You will remember that at the A.M.A. meeting in Chicago in 1948 Dr. Jephcott reported that studies with the electron microscope showed ultra-microscopic particles of alumina in the fumes. He did not mention silica but it was reported at the Saranac Conference on bauxite in 1947. It has been asked more than once - why if alumina is capable of preventing pneumoconiosis due to any form of SiO_2 - amorphous, quarts, crystobalite and tridymite, why does it not prevent Shaver's disease?

The work of Drs. Shaver and Riddel would indicate that Shaver's disease can be more acute and rapidly progressive than our worst cases of diatomaceous earth pneumoconiosis. A sharp attorney could easily emphasize the point that we should have known from the experience with Shaver's disease that alumina or aluminum oxide could not prevent diatomaceous earth pneumoconiosis but might actually enhance or aggravate it. Now I am familiar with the explanation given by Dr. Irwin as to why the alumina present in the fumes of the bauxite furnaces does not prevent Shaver's disease but so far as I know, Dr. Irwin's explanation is entirely a theoretical one and has not been corroborated by scientific experiments with animals.

I am very enthusiastic about some qualified laboratory undertaking experiments with aluminum in combination with flux-calcined D.E. It should be possible to get an answer from such a study in the matter of six months. In view of the above considerations I think that we should withhold the use of aluminum in humans until the conclusion of such animal experiments. Please let me know your views.

Sincerely yours,

Reginald H. Smart, M.D.

RHS:fe
C.C. Mr. Tellefsen - Great Lakes Carbon
Mr. Bollaert - Great Lakes Carbon
Mr. Eisenbast - Johns-Manville
Dr. Anderson - Johns-Manville
Mr. Woodard - Johns-Manville
Mr. Westmont - Johns-Manville

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