

Aluminum Company of America

ALUMINUM RESEARCH LABORATORIES

POST OFFICE BOX 772

FRANCIS C. FRARY
DIRECTOR

New Kensington, Pa.

December 30, 1948

CONFIDENTIAL

Dr. William F. Ashe
Kettering Laboratory
University of Cincinnati
Cincinnati 19, Ohio

Dear Dr. Ashe:

We have just completed some analytical work which has been discussed with Dr. Dudley A. Irwin, Medical Director of Aluminum Company of America. Dr. Irwin has suggested that I transmit the results of our analysis to you. For your information, the results of our analysis are being transmitted only to you and to Dr. Irwin who is receiving a copy of this letter.

Shortly after the Donora episode, Dr. G. W. Ramsey, Pathologist at the Washington Hospital, Washington, Pennsylvania, sent to me lung tissue and blood from the body of Mike Dorance who died during the period of the trouble at Donora. We made a general examination of the lung tissue in order to determine what elements were present, and the results were more or less of a general nature. The sample showed the presence of a great many elements, including some cadmium in low concentration.

In the course of our examination of the tissue, we made our usual spectrographic test for fluorine which will reveal extremely small amounts, and we were unable to detect any fluorine at all in the lung tissue. It may be of some interest to you to know that when the sample was sent to us, it was immersed in a liquid which may or may not have been excess body fluid. Before ashing the lung, it was removed from this liquid and squeezed several times. This removed as much liquid as possible, but all of the liquid squeezed out, as well as that remaining in the bottle, was carefully ashed and tested. However, the ash of this liquid was so extremely low that we did not have enough sample to make the second spectrographic shot necessary to test for fluorine.

At that particular time, we did not do anything with the sample of blood, because we learned that the body of the man had been embalmed before excision of the tissue.

At some time later than this, Dr. Ramsey made arrangements with the coroner of Washington County who delivered to me a sample of the embalming fluid which we examined carefully on a qualitative basis. We found no fluorine whatsoever present.

A few days ago, Dr. Irwin suggested that we analyze the sample of blood for fluorine content, and we have just completed that analysis. The sample was received by us and contains 20.3 p.p.m. fluorine.

This figure was obtained by our usual method of analysis which involves ashing the sample at 600°C. in the presence of lime. The ash was subjected to distillation by the Willard-Winter technique, using sulfuric acid, and distilling at a temperature of 165°C. The distillate was concentrated and redistilled from perchloric acid at a temperature of 135°C. Mr. E. J. Largent of Kettering Laboratory is well acquainted with our methods and procedures and, as a matter of fact, he can show you an exact copy of our method. We ran a blank parallel with the blood sample completely through the whole procedure and obtained a blank which amounted to about 10% of the total fluorine found, and the 20.3 p.p.m. fluorine which I am reporting herewith is after the subtraction of the blank.

I trust you will find this information of some use to you.

Very truly yours,

H. V. Churchill

H. V. CHURCHILL, Chief
Analytical Division
ALUMINUM COMPANY OF AMERICA
Aluminum Research Laboratories

HVC/jw

Copy: Dr. Dudley A. Irwin, Pittsburgh

January 27, 1949

Mr. H. V. Churchill, Chief
Analytical Division
Aluminum Company of America
P.O. Box 772
New Kensington, Pennsylvania

CONFIDENTIAL

Dear Mr. Churchill:

Thank you very much for your letter of December 30, 1948 and also if you see him, thank Dr. Irwin for including us.

The information which you sent is of very real interest. It does, however, present a serious problem; i.e., how could so much be in the blood and none found in lung or tissue juice when the latter organ contains so much blood?

It seems to me that the fly in the ointment must reside in Dr. Ramsey's laboratory somewhere. He is a man well along in years and may have continued to use the now obsolete fluoride anticoagulants. What other sources of contamination that large there might be in his pathology laboratory, I am sure I don't know.

If you are in a position to inquire into the source and previous uses of the bottle in which he transmitted the blood to you, it might be extremely useful information. As I am sure you are well aware, some bone dust in the blood sample might affect the picture, but I feel sure you people would have noticed something odd about the sample, had that been the case.

Please be assured that we are grateful to you for this data and know that it is completely reliable information. The only problem is: "where did the fluorine come from?"

Very truly yours,

WFA:r s

Wm. F. Ashe, M.D.

1. Mr. Neutron ✓
2. Cholester ✓
3. Return to W.F.R.

Mike Dorance

Autopsy 11:30 PM October 30, 1948 at Rudolph R. Schwerha Funeral Home
Assistant: Dr. Robert Gray Donora, Pennsylvania

The body is that of a rather poorly developed white male aged 70 years. Examination of the right lung shows dense adhesions of the pleural membranes over the thoracic cage to the diaphragm throughout mediastinal space. Grossly this lung is intensely congested and edematous. Grossly emphysema is present. There are numerous small hard black nodules scattered throughout both lungs. The pleural membrane is densely thickened. Sections of the right lung show congestion, edema, and thickening of the stroma. The alveoli are filled with pink staining fluid, red blood cells, small round cells and fibrin. The supporting stroma is edematous. Numerous small anthrasic nodules are seen in the sections. The bronchi, large and small are filled with fluid material.

The left lung is collapsed. This lung is extremely edematous. Otherwise, it is similar to the right lung.

The heart is markedly hypertrophied. Both auricles are dilated. The coronary arteries are patent and show very little evidence of atherosclerosis. The mitral valve is incompetent due to shortening and adhesions of the chordae tendinae. The valve leaflets are thickened, and the left leaflet is markedly shortened. The left ventricle is 3 cm in thickness and the right .5 cm. The aortic and tricuspid valves are essentially normal. There is only a moderate atherosclerosis of the aorta.

The liver is pale and of approximately normal size. Sections of the liver show thickening of the capsule and cirrhosis extending down 1 cm in depth. The triads contain a marked increase of small round cells and also an increased amount of fibrous tissue. The hepatic cells show a moderate fatty degenerative change. The capillary vessels are congested.

Sections from the kidneys show a moderate nephrosclerosis of the arterial type. The convoluted tubules show marked degenerative changes.

Examination of the blood sample shows it to be dark in color. The specimen has a strong acid reaction, but this is probably largely due to the formaldehyde used in the embalming fluid. If sulphur dioxide were present it would cause an increased acidity, but since formaldehyde was present this test is discounted.

Sections of the lungs show a marked congestion and extensive edema. In some areas there is extravasated blood in the alveolar spaces. There is extensive emphysema, and many alveolar walls are ruptured. The lining cells of the bronchioles are detached. The basement membranes of the bronchioles are thickened and hyalinized. There are focal points of exudation of small round and plasma cells in the alveoli.

Sections of the pleural membrane show a marked thickening together with small round and plasma cells. There are large areas of subpleural vascularized fibrous tissue containing deposits of dust cells.

Sections of the nodules in the lungs show some filled with black pigment contained in spindle and round cells. These nodules are irregular in shape and size. There are dust cells around larger vessels and within their walls.

A second type of nodule is pale and composed of spindle and round cells containing only a moderate number of dust particles. The cells are surrounded with pink staining hyalin material. Many of the nodules are highly vascularized. Some of these nodules are more typical and surround a single blood vessel.

Sections of the liver show congestion and parenchymatous degeneration. There is an increased amount of fibrous tissue in the triads and also an increased number of small round cells in the triads.

Sections of the kidneys show congestion, edema and granular degeneration of the convoluted tubules.