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October 4, 1966

AIR MAIL

Robert A. Kehoe, M.D.
The Kettering Laboratory
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"SKAUTROLL"
Our file 102-4769

Dear Dr. Kehoe:

We have a problem relating to the possible contamination of flour with alumina, as to which we thought that you or Mrs. I. R. Campbell, Mr. Cass or Mr. Cholak might be able to help us in view of the article "Aluminum in the Environment of Man" from A.M.A. Archives of Industrial Health which was issued in 1957.

Our problem is this:-

148,958 balers, containing 7,447,900 pounds of flour were shipped on board a Norwegian ship called the SKAUTROLL, at New Orleans and two other ports in the U.S. Gulf by CARL, Inc. (Cooperative for American Relief Everywhere). This flour was packed in "balers," each baler containing 5 packages of flour, and was to be delivered at Colombo, Ceylon, to be used by the Ceylonese Government in a lunch program for school children.

After loading the flour, the SKAUTROLL called at Port Esquivel in Jamaica and loaded 2953 long tons

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of alumina in bags. This alumina was stowed in four of the five holds of the SKAUTROLL but none was stowed in No. 3. The flour was stowed in all five holds.

In July of 1962, the SKAUTROLL reached Colombo after an uneventful voyage. The alumina had been discharged at a prior port about three days' sail from Colombo.

When discharging one of the holds at Colombo, a whitish powder consisting of alumina covering some of the balers was noticed.

The flour was packed in 10-lb., 4-ply paper bags, five bags in each baler which was made of burlap.

The Ceylonese Government claimed to be alarmed because of the possibility that the alumina had gotten into the flour bags and poisoned them, so that the children would be injured. Ultimately the Ceylonese Government refused to allow any of the flour to be used for human consumption, and it was accordingly sold for animal fodder at a price much below that at which ordinary flour would have been sold.

An analysis of samples of the flour was made by the Ceylon Institute for Scientific & Industrial Research. The result of this analysis was as follows:-

	<u>Ash Content</u>	<u>Aluminium Content</u> <u>(as Al)</u>
A. Flour sample 1	0.462%	70 parts per million
Flour sample 2	0.455%	252 p.p.m.
Flour sample 3	0.506%	224 p.p.m.
Flour sample H ₂	0.480%	96 p.p.m.
Flour sample H ₄	0.574%	287 p.p.m.

You will note that in sample No. 1 the aluminum content was only 70 parts per million, whereas in flour sample H₄ the analysis showed 287 parts per million. We do not know what method of analysis was used, and we understand that if one of the older methods was used the aluminum content might run to an abnormally high figure.

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Flour sample No. 1 came from the hold in which no alumina had been stowed, whereas flour sample H4 came from a hold in which alumina had been stowed above the flour. Flour sample H2 shows only 26 parts per million and this sample also came from a hold in which alumina had been stowed over the flour.

The analysis also shows the ash content, but we do not know if this has any significance.

This analysis was submitted to Dr. S. S. Sibile of the University of Ceylon, Department of Pharmacology, and in a letter dated September 13, 1962, he estimated that sample H4, with the highest content, would contain 15 mg. aluminium trioxide per ounce of flour. He further assumed that if the amount consumed daily in the form of buns or bread by each person is 2 to 4 ounces, the amount of aluminium trioxide consumed in this amount of flour would be 30 to 60 mg. a day. In the same letter he pointed out that aluminium trioxide is used as an antacid in the treatment of peptic ulcers and that an adult with an acute peptic ulcer would receive, initially, up to 3000 mg. daily. He further stated that if 5000 mg. were administered daily for prolonged periods phosphate absorption might result, interfering with bone formation.

Our clients, the owners of the SKAUTROLL, are being sued for \$32,000, which is the loss sustained because the flour was sold as animal fodder.

In view of the article referred to in the preceding part of this letter, we thought that you or one of those engaged in the preparation of the article might be able to give us valuable advice as to this claim. It is impossible for us to see how any significant amount of alumina could penetrate the 4-ply bags in which the flour was contained; also, we do not believe that flour containing 237 parts per million would be harmful. We understand from the article above mentioned that alumina would be present to some extent in flour even if there had been no contamination, but we do not have any authoritative analysis of the flour prior to the shipment.

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The specific question which we would like to have answered is whether wheat flour containing 257 parts per million of aluminum is so dangerous to health as to be unfit for human consumption, including consumption by children.

If you can recommend anyone, including yourself, of course, who could give us authoritative advice on this subject, we should be much obliged. We should, of course, expect to compensate whoever would be willing and able to devote some time to the subject.

Yours very truly,

HAIGHT, GARDNER, POOR & HAVENS

By Charlton Poor

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