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Research and Engineering Center
December 17, 1968

File 259

A. C. Smith

Asbestos in Beer Filtration Applications

Enclosed are copies of the following items which relate to the use of asbestos in the filtration of beer:

1. The article "Examination of Fibres in Beer" by Biles and Emerson which appeared in the July 1968 issue of the English publication NATURE.

2. A letter of October 17, 1968 from W. P. Howard , Turner & Newall Limited, to C. B. Burnett concerning the article in NATURE.

3. A summary of the work to date in our laboratory on the fibrous content of various samples of beer.

I attended a seminar Friday December 13 held at the Food and Drug Administration Headquarters in Washington, for the purpose of discussing health hazards which might arise from talc, asbestos, and other fibrotic substances. Drs. Lewis Cralley and Irving Selikoff were the speakers at the seminar. During the question and answer period one of the FDA people asked Dr. Selikoff if the use of asbestos to filter beer, wine, soft drinks, vegetable oils, and pharmaceuticals constituted a hazard to the general population. Dr. Selikoff replied that he felt the very small quantities of fiber involved and the lack of any positive evidence of danger to health indicated there was little or no hazard. He cited animal feeding experiments in which chrysotile asbestos was fed to hamsters as part of their regular diet for over a year with no evidence of any increase in gastro-intestinal tumors or cancer, as one reason for believing there was little or no hazard. He did make the point that he felt the use of asbestos filters for pharmaceutical preparations which were to be injected into the tissue was unsafe.

F. L. Pundsack

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Enc.

cc: F. J. Solon -GH

ASBESTOS FIBER - ANALYSIS

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of differentiation suggests that observations in this situation are relevant to spontaneous development.

I thank Miss R. Spurway for technical help. This work was supported by the British Heart Foundation and by the Central Research Fund of the University of London.

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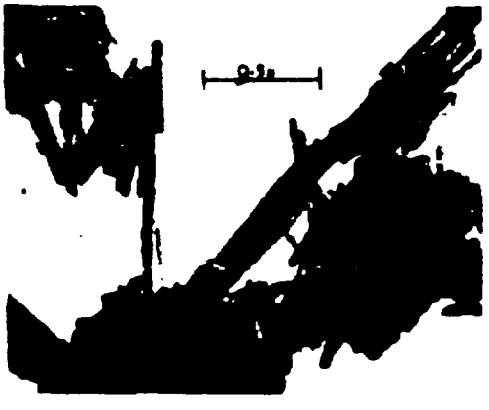
APPLIED SCIENCE

Examination of Fibres in Beer

[illegible]



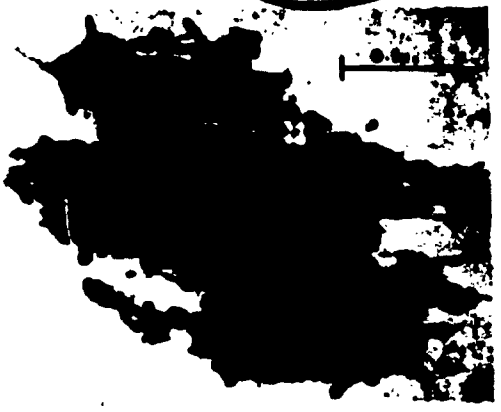


Fig. 2. Electron micrograph of fibres found in beer (× c. 36,000).

The following method was finally adopted: one pint of beer, divided into four parts, was centrifuged for 1 h and the supernatants were filtered through a Sartorius *MF* 15 membrane filter (for retention of particles > 0·05μ). The residues were combined in 200 ml. of water, respun for 1 h and filtered through the same filter as was used for the supernatants. After washing with water, the moist filter and the residue were ashed in a covered platinum crucible at 400° for 1 h; the lid was then removed and heating continued for 2·5 h at 500°. This temperature was not exceeded as changes in the appearance of chrysotile fibres in the electron microscope are often observed when higher temperatures are used. Finally, the residue, after moistening with water, was powdered, reheated at 500° and washed into about 3 ml. of water. The suspension was agitated for 10 min in an ultrasonic vibrator to disperse the fibres and particles and an [illegible] of the suspension was transferred to a [illegible] at the bottom of which was a carbon-coated electron microscope grid. The tube and contents were centrifuged and the precipitate was collected over the [illegible] of the grid, thus enabling all the precipitate to be examined. The examination was carried out using a 66 electron microscope at 100 kV on unshadowed specimens at magnifications of × 30,000 × 80,000. Fibres were clearly seen to be present on the grid among much other material. Most were short single fibres, but a few small groups and large clumps of small fibres (see Fig. 2) [illegible]. These fibres bore a close resemblance both in size and appearance to those of a standard sample of chrysotile asbestos (Fig. 3). An electron diffraction examination of the fibres obtained from beer confirmed that some were definitely chrysotile, the measured repeat distance along the fibre axis being 5·34 Å, the same value as quoted in the literature[1,2]. Most fibres did not give electron diffraction patterns consistent with their being single crystals, probably because some leaching of the fibres had occurred in the beer. By counting the fibres in aliquots taken from an ashed pint of beer, a rough estimate of the number of fibres in a whole pint could be made; this procedure gave a figure of 5,000 [illegible] fibres per pint must be subject [illegible] because of the variability in commercial [illegible]

[illegible] taken to avoid contamina[illegible] the specimens for the [illegible] all water was filtered [illegible] and only carbon-[illegible] examination in the [illegible] of contaminating fibres [illegible]

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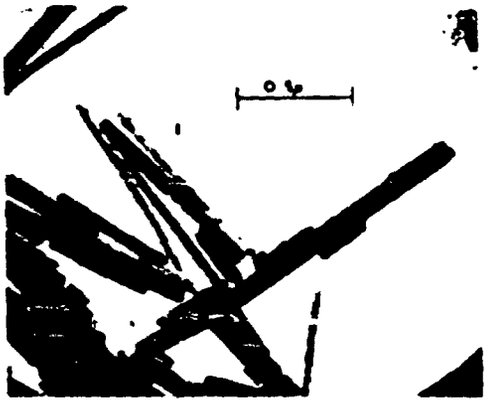

[illegible]

The purpose of this communication is to report factual observations, the chemical importance of these findings [illegible] assessed.

We thank the Science Research Council for financial assistance.

R. Bates
I. R. Edmeades

[illegible]

[illegible]

[illegible]

Factors in the Design of Electrochemical Reactors

The purpose of this communication is to consider those [illegible] important in the design of reactors for [illegible]. Less familiar is the necessity [illegible] the problem. We shall [illegible]

[illegible]

[illegible]

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