

- 4.5.2. Influence of Aspect Ratio: It would seem that the longer the fibre, the more probability there is of it being intercepted by the nasal hairs. However, examination of asbestos particle lengths in the lung has shown them to be of the same order of magnitude as the distances between the nasal hairs. The possibility thus arises that the fibres in airways, in which the airflow is laminar, may align themselves with the streamlines. Hence if the fibres are fine enough, they can be expected to show a capacity for wending their way through fine airways.

There is no direct evidence available on whether fibres do tend to align themselves with the air streamlines. Dr. Timbrell has assumed that the conditions in an aerosol spectrometer prevail in the lung airway. Consequently, he has measured the orientations of fibres in the particle deposits in this instrument. Figure 2 shows histograms in which percentage of fibres is plotted against angle to airstream in the aerosol spectrometer for glass, Amosite and Crocidolite fibres with aspect ratios <5 . A similar histogram for fibres with an aspect ratio >5 is plotted in Figure 3.

It is seen from Figure 2, when the aspect ratios are <5 , there is no preferred orientation for any of the four fibres. However, for fibres with aspect ratio >5 (see Figure 3) there is a definite tendency for the fibres of all four materials to align themselves with the direction of airflow.

Furthermore, it appears from Figure 3 that there is a more marked tendency for alignment of the glass fibres than for the fibres of the three types of asbestos. It is suggested that this is due to the highly symmetrical character of these synthetic fibres, whereas the asbestos fibres, although highly selected groups, exhibit slight asymmetry.

4.6 Standard Samples

At the International Conference on the Biological Effects of Asbestos in November 1964, one of the conclusions was as follows:

"There are large differences both in morbidity and mortality of asbestos in the surveys in different parts of the world. These discrepancies may be explained by the different chemical nature of the minerals, but there is at the same time an urgent need to standardise radiological findings and histology."

The U.I.C.C. working party on asbestos and cancer also realised this problem, and suggested that international samples of the four main commercial types of asbestos be made available.

Dr. Timbrell supervised the production of such samples in Johannesburg at the end of July, 1966. The five samples produced were: Amosite (S.Africa), Crocidolite (S.Africa), Chrysotile (Rhodesia), Chrysotile (Canada) and Anthophyllite (Finland). The Canadian fibre consists of components from eight mines, and the most difficult problem experienced was mixing them so that any portion of the standard sample as small as a match head would be representative.