ASBESTOSIS RESEARCH COUNCIL.

22nd September, 1960.

H.M Chief Inspector of Factories,
Factory Department,
Ministry of Labour & National Service,
19 St. James's Square,
LONDON. S.W.1.

Dear Sir,

A publication prepared by the Ministry of Labour in collaboration with other Government Departments and expert bodies - and with it is stated, the advice and assistance of representatives of industry - has come to our notice. This is a booklet entitled "Toxic Substances in Factory Atmospheres". Safety, Health and Welfare. New Series No. 8. H.M.S.O. In the introduction acknowledgement is made to the American Medical Association Archives of Industrial Health for permission to reproduce the information regarding maximum permissible concentrations of gases, vapours and mineral dusts. Our special interest in this publication is the maximum permissible value for asbestos dust which is given as 5 million p.p.c.c. and this letter is addressed to you in order to draw your attention to this figure which, stated baldly in this way would appear to us to have little meaning or significance.

The figure of 177 p.p.c.c. (or 5 million particles per cubic foot, as it is more usually quoted in American literature) as the maximum permissible concentration figure for asbestos dust has been so quoted for many years in the lists issued annually by the American Conference of Government Industrial Hygienists. As this is the first occasion on which the figure has been published in an official British publication, it would seem that there is a new policy regarding dust concentrations to be permitted in the asbestos industry in this country. We are unaware of any discussion on this matter which has taken place with representatives of our industry and therefore regard the statement quoted above in the first sentence of this letter as misleading. In the U.S.A. the method of dust counting by which the dust concentration in industry generally is assessed is the method of the jet-impinger associated with the names of Greenburg and Smith. This method is relatively insensitive and is not now in general use in this country. There are no known correlations between the results of the different dust counting methods and in fact the results obtained by the thermal precipitator are invariably substantially higher than those of the impinger method.

As the precipitator method is that most likely to be used here, it is hard to see the usefulness of the figure 177 p.p.c.c in these circumstances. As normally practised in the U.S.A., a count is made of the total dust collected by the instrument on a counting slide in a fluid suspension. In this country, it has been the custom of many technicians to incinerate the counting slide and clear away the organic fraction of the dust before beginning the count on the dry slide. As magnifications of 1000 are used in counting with this method, dust particles of 0.5 microns in size are the smallest to be identified with certainty. In the U.S.A and Canada, a magnification of only 100 is used when counting impinger samples and particles of approximately 7 microns across are the smallest which can be distinguished. It would seem, therefore, that any figure indicated to the industry as a maximum safe concentration should be accompanied by a recommendation of the method to be employed in sample obtaining and collection.

On a recent visit to the U.S.A., one of the writers (J.J.K.) interviewed Professor Hatch of Pittsburgh, a leading authority on Industrial Hygiene and the joint author of a standard work on Industrial Dusts. In discussing the figure of 5 million p.p.c.c.f., Professor Hatch said he was unaware of any basic research work by which that figure had been established and he viewed with some concern its wide adoption in the asbestos industry without further qualification as regards method and without further research on the whole subject.

If, therefore, a guide is now to be given to the asbestos industry in this country by authorities representing the views of the Ministry concerned, it would seem that this should be the subject of discussion with all parties and if, as seems likely, the figure of 5 million p.p.c.c.f. is a carry-over from regulations made in other countries with regard to silica dust, much further research work ought to be done before any figure is given official sanction by reason of its inclusion in documents issued by the Ministry of Labour.

The Asbestosis Research Council was formed in 1957 by three of the major manufacturing companies in the asbestos industry in this country, viz:- British Belting and Asbestos Ltd, the Cape Asbestos

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. Ltd. and Turner Brothers Asbestos Co. Ltd. This Council
s made dust sampling and counting one of its principal
bjects of study. It is aware of the difficulty in the
tablishment of uniform methods by which this may be done and
is not yet prepared to give a firm opinion on this subject.
recognises, however, that the evaluation of methods of dust
traction as applied to individual machines is necessary and
so that only methods of dust counting which reveal all dust
rticles in the atmosphere in the respirable range which are
own to cause fibrosis of the lungs are of real value.

Yours faithfully,

J.F Knox,
Chairman of the Asbestosis
Research Committee.

G. Holmes,
Secretary of the Asbestosis
Research Committee.

SUMMARY ON ASBESTOSIS RESEARCH, 1957-61

Introductory

The aim of research into the problem of asbestosis is to attempt to understand as fully as possible the reaction of the tissues of the lung to inhaled asbestos dust. The clinical entity has been well described previously and many observers have described the lung changes present after death. Animal experiments had been performed which were not conclusive in their results or necessarily valid in there application to the human condition. The reason for the variability of the response in those exposed was obscure also, and what were the lower limits, if any, of the dust concentrations which would fail to excite a pathological response even after many years exposure. It would seem that observations on a works population exposed to known concentrations would provide a simple answer, but such was not forthcoming. No simple relationship between exposure in years and the development of asbestosis was demonstrable and it was even recorded that an exposure of as brief a period as 6 months had resulted in the development of the condition some 26 years later. On the other hand exposure of 30 years and upwards had failed to cause the condition. The methods of recording dust concentrations have varied greatly over the years and finality has not been reached yet in this matter. A full knowledge of the composition of dust clouds incorporating asbestos and their physical properties still awaits elucidation although some progress has been made. It is a fact that cases of asbestosis still occur with exposure to dust in work places though, where great reduction of its concentration has been achieved, these are fewer in number. The need for further study is therefore evident.

Human Autopsy Studies

Starting from the supposition that the lung condition found at death was caused by the mineral dust inhaled it was decided to study all lung specimens obtainable to learn if there was any relationship between their mineral contents and the pathological change. Over a period of 9 years some 50 specimens were examined by Dr. J. Beattie and his collaborators from this and other points of view. The results of the studies has been published in "Inhaled particles and vapours" (Pergamon Press 1961) and are summarised only here. No direct relationship was revealed between the amount of mineral (asbestos) present and the severity of the reaction. There was evidence that with lengthened exposure the amount of mineral present increased, while the length of exposure added to the survival period suggested that after 25 years there was an increased likelihood of the disease supervening. This event coincided with a breakdown of large fibrous particles which had been rendered inactive for a long period by a protein coating derived from the tissues. The development of pulmonary infections or a reduced cardiac efficiency appear to accelerate such changes. It appeared also that the changes occuring in the asbestos fibres and their coverings were relevant in themselves to these events but the nature of these changes is incompletely known and more study is required to elucidate the process. Differences were observed in the severity and nature of the reaction where the results of implantation of asbestos fibres and fragmented bodies were comparable