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MEDICAL RESEARCH
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Investigations on Respiratory Dust Disease
in Operatives in the Cotton Industry

by

C. PRAUSNITZ



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PREFACE

This report is issued by the Medical Research Council on the recommendation of their Committee on Industrial Pulmonary Disease. It deals with an investigation which was promoted by the Council, at the request of the Home Office, into the particular question of respiratory dust disease in operatives in the cotton industry. For this purpose the Council were fortunate in securing the services of a distinguished investigator in industrial medicine, Professor Carl Prausnitz, who had had to relinquish his former appointment in the University of Breslau. The work was done in Professor H. B. Maitland's department in the University of Manchester, with the co-operation of the employers' organisations and trade unions concerned, and of many other persons to whom the author makes acknowledgement in the following pages. The expenses of the investigation were borne by the Medical Research Council, but the remuneration of Professor Prausnitz was mainly provided in the form of a personal grant from the Rockefeller Foundation of New York.

The handling of cotton in its early stages, especially in the process known as carding, is inevitably a dusty occupation. When the compressed bales of raw cotton arrive in this country from the plantations, much dust still remains mixed with it and has to be removed in a series of processes, preparatory to spinning the material into yarn. Important among these are the processes carried out in the blowing or scutching room, in which partially loose masses of cotton are thoroughly separated; and in the carding room, where the cotton is subjected to an intensive teasing action, by which its hairs are combed into a parallel arrangement and removed in the form of a filmy rope.

The Departmental Committee on Dust in Card Rooms in the Cotton Industry, appointed by the Home Office, concluded in their report (H.M. Stationery Office, 1932) that the dust in card rooms is still a cause of some discomfort and ill-health due to respiratory disease among operatives. They found that the main effects can be considered in three stages, which gradually merge as the malady progresses. The first evidence of the condition, when it occurs, consists of symptoms of irritation, particularly cough and a feeling of constriction in the chest, but these pass off on removal from the dusty atmosphere. After ten or more years' work the effects may become more persistent, with periods of incapacity, at first short and infrequent but tending to become more prolonged and to occur at shorter intervals. Cessation from work in the dusty atmosphere at this stage is generally followed by recovery, or at least by sufficient improvement to permit of work in another atmosphere. Finally, a stage may be reached in which there is total incapacity for work, with signs of chronic bronchitis and emphysema, and a strain on the heart which is apt to lead to cardiac failure. The very nature of the condition made it difficult to investigate: the absence of special clinical features which would serve to distinguish the disease of card-room workers from other non-specific forms of chronic

pulmonary disorder, indicated the importance of studying the underlying causes rather than the character of the condition.

While the inquiry of the Departmental Committee was in progress, the Council assisted the work by arranging for various relevant investigations. In the first place, Dr. A. Bradford Hill made a statistical inquiry on their behalf into sickness among operatives in card rooms in Lancashire cotton mills, and the results of this were published by the Council as a report of their Industrial Health Research Board. Secondly, Dr. J. C. Bramwell and Dr. R. Ellis, at Manchester, clinically examined for the Council many cotton operatives suffering from cardio-respiratory symptoms believed to be due to the inhalation of cotton dust: the results suggested that some form of sensitisation played an important part. Subsequent work by Professor H. B. Maitland, assisted by Dr. A. Brown, showed the discovery of the hitherto unsuspected presence of histamine in the cotton dust. The obvious desirability of following up this clue led to the investigation of which an account is now given.

In the present report Professor Prausnitz shows how he studied the problem of "strippers' asthma" from many angles, so that he was led ultimately to the view that there is a specific agent in cotton dust capable of producing the observed symptoms and ultimately the pathological changes in the lungs which cause complete disablement in a number of workers exposed to cotton dust for a long time. As a result of an able and laborious research, he has shown the strong probability that this substance, or group of substances, is contained in the protein fraction of the dust and is responsible for the changes which may occur in the lung after prolonged inhalation. He does not think that histamine, although present in cotton dust, is the toxic agent at fault. Professor Prausnitz has also established the existence of super-sensitiveness (allergic sensitiveness) in all patients suffering from this respiratory dust disease, and concludes that in this respect it is related to ordinary asthma.

It seems clear from the results obtained that there is only one method of overcoming this disability of the cotton industry, and that is by preventing access of the finest dust to the respiratory tract. It would appear that the ventilating and exhaust appliances which are now generally in use, although they remove the coarser particles of cotton dust from the atmosphere, do not in fact prevent access to the worker of the finer particles which are particularly liable to produce intense irritation of the respiratory system in those susceptible to the dust. Now that this essential fact is established by Professor Prausnitz, the practical problem seems to rest on the need of discovering a method of removing these finer particles. The ingenuity of the engineer which is shewn in the modern machinery of the cotton industry ought to have relatively little difficulty in solving this mechanical problem and so eliminating an important cause of ill-health among industrial workers.

MEDICAL RESEARCH COUNCIL,
38 Old Queen Street,
Westminster, S.W.1.

25th June, 1936.

INVESTIGATIONS ON RESPIRATORY DUST DISEASE IN OPERATIVES IN THE COTTON INDUSTRY

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