M E M O R A N D U M

Re: ASBESTOSIS -
(Saranac Report
of September 30,1948)

This report is based upon experiments commenced by Dr. Leroy U. Gardner in 1937 and notes and preliminary studies made by him with respect thereto. These experiments were undertaken pursuant to contractual arrangement between Dr. Gardner and a group of Asbestos Textile Manufacturers, which is set forth in an exchange of letters between Vandiver Brown, representing the Textile group, and Dr. Gardner, representing Saranac Laboratory, dated November 20 and November 23, 1936, respectively. The letter addressed to Dr. Gardner contained the following paragraph:

> "It is our further understanding that the results obtained will be considered the property of those who are advancing the required funds, who will determine whether, and to what extent and in what manner, they shall be made public. In the event it is deemed desirable that the results be made public, the manuscript of your study will be submitted to us prior to publication."

Dr. Gardner's letter, accepting the proposal, contains the following paragraph:

> "The Saranac Laboratory agrees that the results of these studies shall become the property of the contributors and that the manuscripts of any reports shall be submitted for the approval of the contributors before publication."

Several interim reports were made by Dr. Gardner prior to his death, including an outline of a monograph he proposed to prepare upon the basis of his experimental findings.

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Page 1 of the Saranac Report of September 30, 1948 contains an "ABSTRACT", in the nature of a summary of what is to follow, which makes the following points:

1. The inhalation of asbestos dust causes asbestosis -- "a peribronchiolar fibrosis which seems to be the result of mechanical, rather than chemical, irritation of the tissue by asbestos fibres".

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2. Only the long fibres produce the fibrosis, short fibres being "relatively inert".

3. Inhalation of asbestos dust apparently does not alter significantly the course of experimental tuberculosis in guinea pigs.

4. The asbestosis body,"a specific concomitant of asbestosis, is believed to prevent further damage to the tissue by the fibre and thus to limit progression of the reaction when exposure ceases".

The qualifying adjectives, which make the foregoing somewhat inconclusive, have been underlined.

On Pages 40 to 42 are listed certain "CONCLUSIONS", as follows:

1. Asbestos fibres produce a peribronchiolar fibrosis of the lungs of guinea pigs, rats, cats and rabbits but not of mice and dogs.

2. The mode of action appears primarily to be of mechanical rather than chemical in nature.

3. Short asbestos fibres do not produce fibrosis.

4. Fibrosis can be produced by exposure to air containing "an extremely small proportion of long fibres".

5. Asbestos dust does not "alter significantly the course of experimental tuberculosis in guinea pigs."

6. Asbestosis bodies seem to represent a coating of the fibres and result in loss of the ability to produce fibrosis.

Although the "CONCLUSIONS" appear to indicate a greater degree of certainty than the "ABSTRACT", they are subject to certain qualifications where favorable, which qualifications are omitted where unfavorable, e.g., 4. above. In any event it is believed the "CONCLUSIONS" and the "ABSTRACT" should be reconciled and,to the extent permitted by the experimental results, couched in more definite terminology.

Paragraph 75 on Page 31, and Paragraph 92 on Page 39, deal with tumors and indicate that 9 out of 11 mice exposed for a year to long-fibre dust showed pulmonary tumors. Paragraph 75 states that the lesions did not contain dust or asbestosis bodies and that they were"usually" adenomatous in type". Paragraph 92

explains that an adenoma is the benign or non-malignant type of neoplasm -- cancer being the term applied to the malignant type. Paragraph 92 also indicates that Dr. Gardner in his notes "referred to these lesions as adenomas" which is at variance with Paragraph 75 which states that they were "usually adenomatous". It is noted that a supplement to the report is intended following a review by Dr. Vorwald of Dr. Gardner's data for the purpose of clarifying the exact nature of the lesions and the pathological material.

The report covers two types of experiments - (a) inhalation and (b) injection. The injection experiments were of three types, namely, intratracheal, intravenous and intraperitoneal.

The inhalation experiments were the following:

1. Experiment in 1928 with "King's Floats asbestos dust (Paragraphs 11 to 24, inclusive). A question arises as to whether a discussion of these experiments is necessary to the present report. Dr. Gardner, prior to his death, repudiated them as "unsatisfactory".

2. Experiments with fibres collected from dust bins and screened to pass 200 mesh, to which was added one part in four of unground material. (Paragraphs 25 to 44, inclusive).

3. Experiment with 100% ball-milled asbestos dust (that is, which contained no admixture of unground material). (Paragraphs 45 to 57, inclusive.)

4. Experiment with long fibre asbestos dust. (Paragraphs 58 to 76, inclusive.)

With respect to tumors, it should be noted that these were not observed in any of the animals subjected to the three types of injection experiments; neither were they found in any of the types of animals which were subjected to three of the inhalation experiments. They were noted in only one type of animal in one of the inhalation experiments. It would appear, therefore, premature to make any reference to "neoplasms" and that this aspect should be made the subject of separate experimentation specifically designed to determine what, if any, relationship might exist between asbestos dust exposure and lung tumors.

On Page 38, Paragraph 91, reference is made to the high incidence of pneumonia amongst animals exposed to the inhalation experiments. It is stated that "this suggests the possibility of an effect of asbestos dust on non-tuberculous infection", and that "since such epidemics are not uncommon [illegible] even in the colony of normal" (that is, unexposed) "animals, it is felt that asbestos dust

does not exert a significant effect on the susceptibility to non-tuberculous pulmonary infection". It is also stated that the experiments were not pointed towards determining this question. For this reason (which is the same as is applicable to the portion dealing with tumors) and even though the conclusion arrived at is generally favorable, it might be desirable to omit this reference pending further experimentation.

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Thomas M. Durkan, Assistant Director of the Saranac Laboratory, in his letter transmitting copies of the Report of September 30, 1948, writes as follows:

> "We now plan to begin preparation of the final portion of the report - that dealing with human asbestosis - and we will have this in your hands as soon as we possibly can."

The experiments underwritten by the Asbestos Textile Industry in accordance with the 1936 contract related only to animal experimentation. It is believed, therefore, that any subsequent Saranac report dealing with human asbestosis should be considered a separate report, rather than a second part of the present report, and not subject to the proviso relating to approval prior to publication.

Vandiver Brown.

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