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September 11, 1958

Memorandum to: Dr. Kenneth W. Smith, Medical Director
Johns-Manville Corporation
22 East 40th Street
New York 16, New York

Re: Case of Harold Browner
Pittsburg, California Plant

From: Paul Gross, M.D., Research Pathologist

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## INTRODUCTION

Received three slides of lung tissue bearing the following identification: 58-665. Browner Harold, Crenshaw, 3-14-58. These were received via mail from Herrick Memorial Hospital, Berkeley, California.

### Microscopic Description

Sections exhibit portions of thick-walled cystic structures adjacent to atelectatic lung tissue. The cysts are lined in part by flattened cells, in part by cuboidal epithelium, and in some regions by ciliated, columnar bronchial epithelium. There are also regions in which no lining cells are demonstrable. The cyst walls are of variable thickness and, in general, they are composed of a moderately dense,

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relatively acellular collagenous tissue. This collagenous tissue is arranged in coarse bundles. In some regions, a noteworthy admixture by numerous prominent smooth muscle bundles is present which strongly indicates a bronchial relationship of the cysts. This impression is further strengthened by the presence of numerous large, thick-walled vessels peripheral to the walls. There are scattered foci of lymphocytes irregularly dispersed within the cyst walls. In one region, instead of lymphocytes, a large accumulation of eosinophiles is found. In one cyst, several papillary structures lined by cuboidal epithelium are present. These contain lymphocytes.

The cyst walls contain little or no exogenous pigment or dust. In contrast, a moderate amount of such pigment is present in the adjacent lung parenchyma.

The alveoli are only moderately enlarged and atelectatic and their walls are mostly of normal thickness and structure. There are, however, scattered foci where septal walls are thickened; but these thickenings are definitely not of collagenous character. They are composed of dust-filled phagocytic cells, widely separated from one another by edema and very delicate fibrils (reticulin?). These cells are clustered about a central vessel.

The dust consists of irregular, black to translucent green granules and occasional rods 0.5 to 2 microns in diameter. Much of this dust is intracellular but some is also found to be extracellular. It is of

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considerable interest that where the dust is extracellular (such as near vessels and within the vessel walls themselves) little or no reaction is noted.

Relatively little of the dust is interstitial in position. Most of it is found within alveolar macrophages. The latter are free in the air spaces.

In a few compressed air spaces, the lumen is filled with proliferated alveolar cells among which many multinucleated giant cells are present. In general, the proliferation of alveolar cells is moderate.

In addition to the small granules of dust, there are also rare, large, dark orange-red, translucent, elongated bodies 5 to 7 microns thick and 20 to 40 microns long. These resemble asbestos bodies superficially. They are, however, considerably larger and instead of having the characteristic segmented or beaded or drumstick appearance, such appearance is only simulated by the presence of numerous granules that form excrescences upon the surface of the body. These bodies must, therefore, be classified as pseudo-asbestos bodies which have been described as occurring with talc and other dusts.

A single small, encapsulated granuloma having the structure of a miliary tubercle is found. The center is composed of a single Langhans giant cell; the midzone of epithelioid cells; and the periphery of lymphocytes and concentric collagen fibers.

Numerous blood vessels are present in the sections. Some are relatively normal, whereas others show varying degrees of sclerosis.

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**Diagnosis**

1. Bronchiectatic cysts of lung. Etiology probably infectious and allergic.

2. Pneumoconiosis, minimal, non-fibrogenic.

3. Miliary granuloma (tuberculous ?)

## COMMENT

The cysts are considered bronchiectatic because:

1. The presence of large amounts of smooth muscle within the wall of some cysts.

2. The presence of ciliated columnar epithelium in some areas of the cyst lining.

The etiology of the cysts is infectious and allergic because:

a. The presence of lymphocytic foci.

b. The presence of eosinophiles.

Pneumoconiosis is ruled out as an etiologic factor because:

1. The cyst walls are remarkably free, or nearly free, of dust granules.

2. There is no collagen production where the dust is most abundant interstitially.

3. The reaction to the dust appears to be no greater than that associated with carbon dust or soot.

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Comment upon Dr. Crenshaw's Report

The mineral analysis of the lung tissue reportedly done by the Pharmacology Department of University of California Hospital is incomprehensible.

Is the silica content based on the wet weight of lung tissue, dry weight of lung tissue, or of the total ash?

Is the silica content the total silica content as silicates?

Was any attempt made to determine the silica content as crystalline $SiO_2$?

There is a strong probability that the analysis performed at the hospital (where facilities for other than routine hospital analyses are limited!) was for total silica only.

If that is the case, all conclusions based on the analysis are worthless.

As they stand now, the figures given are meaningless.

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## Legends of Illustrations

Fig. 1 - Heavily pigmented alveolar macrophages present in variable numbers within the air spaces. The latter are moderately enlarged but the alveolar walls are not significantly thickened. There is but little interstitial pigment.

Fig. 2 - A perivascular focus of interstitial pigmentation composed of widely separated pigmented macrophages between which there are very fine fibrils suggestive of reticulin. No collagen is present. Some of the alveolar walls appear slightly thickened due to distention of the alveolar capillary. A number of alveoli contain heavily pigmented macrophages. There is some recent extravasation of RBC's into the air spaces.

Fig. 3.- A medium-sized artery surrounded by atelectatic alveoli. There is here a very interesting infiltration of the arterial wall, inclusive of intima, by extracellular pigment. There is but little reaction to the presence of the dust particles. In the lower left portion of the artery where the intima is infiltrated by dust, the endothelial surface is normal. There is obvious intimal thickening here as well as above this region.

Fig. 4 - The apposed walls of a collapsed cyst showing fragmentary epithelial surface covering on the right with a small papillary structure. There is infiltration of the superficial stroma by lymphocytes. An occasional eosinophilic leukocyte is also present. On the right a large bundle of smooth muscle is present. The absence of pigment or dust is a noteworthy feature.

Fig. 5 - Adjacent field to that seen in Fig. 4 to show presence of fairly large vessels in cyst wall. These show little sclerosis. No pigment or dust is found.

Fig. 6 - Another cyst wall showing fragmentary epithelial surface covering with slight subjacent lymphocytic infiltration. In the lower left corner there is a large focus of lymphocytes. No pigment or dust is present.

Fig. 7 - Portion of a cyst wall containing a large amount of smooth muscle. The surface has no distinctive cellular covering. Most of the cells infiltrating this portion of the cyst wall are eosinophiles. There is no pigment or dust.

Fig. 8 - In this collapsed cyst some of the surface covering is by tall columnar epithelium, resembling the bronchial type of epithelium. Focal lymphocytic infiltration is present. There is no evidence of dust.

Fig. 9 - Portion of cyst wall containing a single, encapsulated miliary granuloma. A Langhans giant cell is present in the center. There is a peripheral zone of lymphocytes. No pigment or dust is present in the granuloma or in the environs.

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