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REPORT OF THE PHYSICAL EXAMINATIONS  
EXAMINATIONS OF ASBESTOS WORKERS IN Asbestos  
AND THETFORD MINES, QUEBEC

~~the~~ The report herewith presented deals with the examination of 141 employees of the Canadian Johns-Manville Co., Asbestos, Que. and 54 employees of the Asbestos Corporation of Canada, the Keasby-Mattison Co. and Johnson's Mine, all of Thetford Mines, Que. 40 of the men of the Canadian Johns-Manville Co. were examined by Dr. D. M. Stevenson and Dr. Joseph Wyatt, who performed the physical examinations and X-ray examinations respectively. The other examinations were all performed by me, except the X-ray examinations. Actually, Drs. Stevenson and Wyatt examined 57 men; but since 17 of these men were re-examined by me I am including them in my list. Drs. Stevenson and Wyatt carried on their work in November 1929. My examinations were done in July 1930 in Asbestos, and in September 1930 in Thetford Mines.

The Asbestos and Thetford groups are very dissimilar with respect to age distribution and length of service in the asbestos industry, but racially and economically the two groups are much alike.

Table I gives the age distribution of the men and Table II the distribution according to length of service in the asbestos industry.

REPORT OF THE PHYSICAL EXAMINATIONS OF ASBESTOS EXPOSURE IN THE  
ASBESTOS INDUSTRY, 1929.

The report herewith presented deals with the examination of 141 employees of the Canadian Johns-Manville Co., Johnston, Que. and 54 employees of the Asbestos Corporation of Canada, the Thorby-Mattison Co. and the Asbestos Mine, all of Thetford Mines, Que. 40 of the men of the Canadian Johns-Manville Co. were examined by Dr. H. L. Stevenson and Dr. Joseph Byatt, who performed the physical examinations and X-ray examinations respectively. The other examinations were all performed by me, except the X-ray examinations. Actually, Drs. Stevenson and Byatt examined 57 men; but since 17 of these men were re-examined by me I am including them in my list. Drs. Stevenson and Byatt carried on their work in November 1929. The examinations were done in July 1930 in Johnston, and in September 1930 in Thetford Mines.

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Table I gives the age distribution of the men, and Table II the distribution according to length of service in the asbestos industry.

TABLE 1.

AGE DISTRIBUTION OF ASBESTOS MONITORS

| <u>AGE GROUP</u> | <u>Asbestos</u> |                   | <u>Thorium Monitors</u> |                   |
|------------------|-----------------|-------------------|-------------------------|-------------------|
|                  | <u>Number</u>   | <u>Percentage</u> | <u>Number</u>           | <u>Percentage</u> |
| 15 - 19          | 3               | 2.1               |                         |                   |
| 20 - 24          | 24              | 17.0              | 2                       | 5.7               |
| 25 - 29          | 24              | 17.0              | 5                       | 9.5               |
| 30 - 34          | 26              | 18.5              | 6                       | 11.1              |
| 35 - 39          | 25              | 17.7              | 4                       | 7.4               |
| 40 - 44          | 18              | 12.8              | 15                      | 27.8              |
| 45 - 49          | 14              | 10.0              | 7                       | 12.9              |
| 50 - 54          | 5               | 3.5               | 6                       | 11.1              |
| 55 - 59          | 1               | 0.7               | 4                       | 7.4               |
| 60 - 64          | 1               | 0.7               | 6                       | 11.1              |
| 65 - 69          | 1               | 0.7               | 1                       | 1.9               |
| 70 - 74          | 1               | 0.7               |                         |                   |
| <u>TOTAL</u>     | <u>141</u>      | <u>100.00</u>     | <u>54</u>               | <u>100.00</u>     |

# T A B L E II

## LENGTH OF SERVICE IN ASBESTOS INDUSTRY

| Years of Service. | Asbestos |            | Thetford Mines |            |
|-------------------|----------|------------|----------------|------------|
|                   | Number   | Percentage | Number         | Percentage |
| 0 - 4             | 44       | 31.2       | 1              | 1.85       |
| 5 - 9             | 65       | 46.1       | 6              | 14.8       |
| 10 - 14           | 11       | 7.8        | 6              | 14.8       |
| 15 - 19           | 10       | 7.1        | 16             | 29.6       |
| 20 - 24           | 6        | 4.3        | 9              | 16.7       |
| 25 - 29           | 2        | 1.4        | 9              | 16.7       |
| 30 - 34           | 2        | 1.4        | 1              | 1.85       |
| 35 - 39           | 1        | .7         |                |            |
| 40 - 44           |          |            | 2              | 3.7        |
| T O T A L         | 141      | 100.0      | 54             | 100.0      |

It will be noted that while 68 percent of the men in Thetford Mines were over 40 years of age only 28 percent of the men in Asbestos were over 40. And further with respect to length of service 83.4 percent of the men examined in Thetford Mines had worked in the asbestos industry for 10 years or more, but in Asbestos only 22 percent had worked for more than ten years.

Table III shows the disposition of the men in various parts of the industry. Since the numbers are

small broad occupational groupings are used. In Asbestos the occupations are divided into 3 groups - mill, pit and factory; in Thetford Mines only the first two occupational groups are used, since no asbestos manufacturing is carried on there. All the men of the Thetford Mines group could be so circumscribed, but 5 men were excluded from the Asbestos group since they did not appear to be exposed to an unusual amount of dust.

T A B L E III

LENGTH OF SERVICE IN DIFFERENT OCCUPATIONS IN ASBESTOS INDUSTRY

| Years of service | ASBESTOS |              |         | THETFORD MINES |              |
|------------------|----------|--------------|---------|----------------|--------------|
|                  | Mill     | Drilling pit | Factory | Mill           | Drilling pit |
| 0-4              | 14       | 7            | 24      | 1              |              |
| 5-9              | 36       | 8            | 16      | 3              | 5            |
| 10-14            | 6        | 6            |         | 7              | 1            |
| 15-19            | 7        | 3            |         | 12             | 4            |
| 20-24            | 3        | 1            |         | 6              | 1            |
| 25-29            | 1        | 1            |         | 6              | 1            |
| 30-34            | 1        | 1            |         | 1              |              |
| 35-39            | 1        |              |         |                |              |
| 40-44            |          |              |         |                | 2            |
| TOTAL            | 69       | 27           | 40      | 40             | 14           |

The past occupational history in industries other than the asbestos industry was significant only in 5 cases. Of these one had been a grain inspector

for 6 years and so exposed to very dusty conditions, one had been an underground copper miner for 18 years, one a copper miner for 2 years, a fourth had worked in a cement plant for 9 years, and the fifth had operated a drill in an iron mine. This last individual showed X-ray evidence of pneumoconiosis, the others did not have pneumoconiosis.

In Table IV are given observations of weight in relation to height by age. The average weights are taken from the figures compiled by the Association of Life Insurance Medical Directors and the Actuarial Society of America.

T A B L E IV.

WEIGHTS AND HEIGHTS ACCORDING TO AGE

|               | Pounds Under average |       |      |          | Pounds over average |       |       |     |  |
|---------------|----------------------|-------|------|----------|---------------------|-------|-------|-----|--|
|               | 20-29                | 10-19 | 5-9  | -4 to +4 | 5-9                 | 10-19 | 20-29 |     |  |
| HEIGHT 5' 10" | 20. 21               | 23    | 19   | 24       | 16                  | 19    | 9     | 4   |  |
|               | 15.6                 | 20.0  | 15.6 | 17.1     | 11.4                | 15.6  | 6.4   | 3.0 |  |
| HEIGHT 5' 8"  | 9                    | 11    | 8    | 9        | 8                   | 6     | 7     | 1   |  |
|               | 16.7                 | 20.4  | 14.6 | 16.7     | 5.6                 | 11.1  | 12.9  | 1.9 |  |
| HEIGHT 5' 6"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 5' 4"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 5' 2"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 5' 0"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 4' 10" |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 4' 8"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 4' 6"  |                      |       |      |          |                     |       |       |     |  |
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| HEIGHT 0' 10" |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 8"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 6"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 4"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 2"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 0"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 10" |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 8"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 6"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 4"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 2"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 0"  |                      |       |      |          |                     |       |       |     |  |
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| HEIGHT 0' 6"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 4"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 2"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 0"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 10" |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 8"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 6"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 4"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 2"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 0"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 10" |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 8"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 6"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 4"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 2"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 0"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 10" |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 8"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 6"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 4"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 2"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 0"  |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 10" |                      |       |      |          |                     |       |       |     |  |
| HEIGHT 0' 8"  |                      |       |      |          |                     |       |       |     |  |

No. 162). It will be noted that there is very little distinction between this large group and the group of asbestos workers so far as degrees of overweight or underweight are concerned.

In the consideration of individual defects some interesting facts have been found. In this study only the 101 men at Asbestos and the 54 men at Thetford Mines are considered, since the records of the men examined by Dr. Stevenson are not strictly comparable with mine.

#### TEETH:-

Dividing the men into two groups according to whether the teeth did or did not need attention, of the Asbestos group 49.5% required attention, and of the Thetford Mines group 51.8 %.

#### HEARING:-

Acuity of hearing was tested by means of a watch. (My own hearing, which has been tested by an audiometer, was considered normal, and used as a standard) The watch test is admittedly very rough. In noisy occupations impaired hearing is frequently found in the older employees. Of the 101 men at Asbestos 10 showed definite hearing loss. This is not an excess proportion since an

group of adults will show a similar picture. In Thetford Mines 28 of the 54 men suffered from well marked hearing loss. This is a very high percentage, and comparable to what may be found in wiring sheds and boiler shops. All these men, except two, had been exposed to loud noise in their work for 10 years or more, and it is reasonable to suppose that noise played a part in their hearing disability.

The number of men with infected TONSILS was 27 in Asbestos and 13 in Thetford Mines, and almost identical ratio to the total in both groups.

Defects of the THYROID were rare. 4 men in Asbestos and 1 in Thetford Mines had enlarged thyroids.

#### BLOOD PRESSURE:-

Readings were recorded in all men over 40 years of age. Except in exceptional circumstances the blood pressure was not taken in the younger men. Consequently although the groups examined in Thetford Mines was smaller than that in Asbestos more blood pressure readings were taken there. 2 men in Asbestos had blood pressures of over 150 and 2 blood pressures under 100 mm. of mercury. 8 men in Thetford Mines had blood pressures of over 150 and 2 blood pressures under 100.

The incidence of HERNIA is of interest from the compensation standpoint. In Asbestos all new employees must pass a physical examination before employment. There were 4 cases of inguinal hernia discovered among the 101 men examined there. In addition to these 5 men had been operated upon for this condition

In Thetford Mines physical examination is not required before employment. There were 5 cases of inguinal hernia among the 54 men examined and 2 cases which had been operated upon.

Some interest has arisen in connection with the occurrence of the so-called ASBESTOS CORNS. These are usually pin head sized elevations of the skin, somewhat like minute warts. None of these were detected in the Asbestos men probably due to my ignorance of their appearance. 8 of the Thetford Mines men had these growths on their hands and several others reported having had them at one time or another.

L U N G S

Of the 101 men examined by me at Asbestos only 4 suffered from definite first stage pneumoconiosis. These will not be considered on account of the doubtful diagnosis.

Of the 40 men examined by Drs. Stevenson and Wyatt 14 were diagnosed as first stage pneumoconiosis (asbestosis 1) (I am including the 17 men examined by Drs. Stevenson and Wyatt and subsequently re-examined by me in my group of 101). The much lesser incidence of pneumoconiosis in my group of men may seem surprising, but it must be remembered that the X-ray negatives were not read by the same men. In my group the X-ray diagnoses were made by Dr. Kerinother of Pitcher, Oklahoma, and in the other group the interpretations were by Drs. Wyatt and ~~James~~ <sup>Marinelli</sup>. Further the ~~group~~ <sup>group</sup> examined by Drs. Stevenson and Wyatt were, in general, older than those in my group.

Of the 54 men examined at Thetford Mine 24 were diagnosed by X-ray as suffering from pneumoconiosis (asbestosis), of these 4 were diagnosed as probably first stage asbestosis, 8 as early stage, 9 as definite first stage and 3 as second stage.

The pertinent facts regarding the definite cases of asbestosis are given in tables V and VI.

Table V

| Case No.               | Sex | Age | Occupational history                          | Symptoms                            | Signs                                                                                                     |
|------------------------|-----|-----|-----------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <u>Asbestos Group.</u> |     |     |                                               |                                     |                                                                                                           |
| 66                     | A.1 | 39  | Screener cyclone<br>10 years                  | cough, dyspnea,<br>loss of strength | deficient expansion<br>occ. crepitations<br>left apex.                                                    |
| 71                     | A.1 | 47  | General operator<br>blast furnace<br>24 years | cough, dyspnea<br>frequent colds    | poor expansion, pers-<br>piration at inner left<br>chest, crepitations<br>all over both lungs.            |
| 72                     | A.1 | 42  | loading cars in<br>mill 2 foreman<br>27 years | no symptoms                         | no abnormal signs.                                                                                        |
| 73                     | A.1 | 39  | driller 7 years                               | no symptoms                         | no abnormal signs.                                                                                        |
| 74                     | A.1 | 41  | Millwright 31 years                           | dyspnea, cough                      | no abnormal signs                                                                                         |
| 75                     | A.1 | 7   | water attendant<br>for 11 years               | no symptoms                         | faint moist rales<br>left rib to front.                                                                   |
| 76                     | A.1 | 37  | millwright 16 years                           | no symptoms                         | no abnormal signs                                                                                         |
| 77                     | A.1 | 35  | labourer watch-<br>man in mill 7 years        | no symptoms                         | slight dullness right<br>lung, left chest ex-<br>posed more than right.<br>breath sounds at apex<br>harsh |
| 78                     | A.1 | 33  | labourer top floor<br>mill, 7 years           | no symptoms                         | no abnormal signs                                                                                         |
| 79                     | A.1 | 47  | in mill 16 years                              | no symptoms                         | expansion slightly<br>limited                                                                             |
| 80                     | A.1 | 37  | millwright 31 years                           | no symptoms                         | expansion limited                                                                                         |
| 81                     | A.1 | 61  | iron in mill 27 years                         | no symptoms                         | no abnormal signs                                                                                         |
| 82                     | A.1 | 41  | mine (work not stated)<br>11 years            | no symptoms                         | no abnormal signs                                                                                         |
| 83                     | A.1 | 41  | driller 4 years                               | no symptoms                         | no abnormal signs                                                                                         |
| 84                     | A.1 | 41  | driller 27 years                              | no symptoms                         | no abnormal signs                                                                                         |
| 85                     | A.1 | 60  | driller 4 years<br>foreman 23 years           | no symptoms                         | about even fraction                                                                                       |
| 86                     | A.1 | 37  | driller 7 years<br>trackman 4 years           | no symptoms                         | bronchial rales<br>left side                                                                              |
| 87                     | A.1 | 33  | pipe coverer<br>(factory) 4 years             | no symptoms                         | no abnormal signs.                                                                                        |

Table VI

| Case No.            | Initials   | Age | Occupational History                                                        | Symptoms                                                                                    | Signs                                                                                               |
|---------------------|------------|-----|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Thorford Mine Group |            |     |                                                                             |                                                                                             |                                                                                                     |
| 1                   | A.1        | 33  | filling bags 6 years<br>oilier 12 years<br>foreman 1 year                   | no symptoms                                                                                 | coarse crackles above heart<br>& at both bases behind.                                              |
| 2                   | A.1        | 43  | driller 23 years                                                            | no symptoms                                                                                 | no abnormal signs                                                                                   |
| 3                   | A.1        | 33  | oilier in mill 3 yrs.                                                       | no symptoms                                                                                 | no abnormal signs                                                                                   |
| 4                   | (probably) | 33  | filling bags 4 yrs.                                                         |                                                                                             |                                                                                                     |
| 5                   | A.1        | 33  | millwright 27 years                                                         | no symptoms                                                                                 | no abnormal signs                                                                                   |
| 6                   | A.2        | 43  | sweeper 1 year                                                              | cough, ex-<br>pansion,<br>coloration,<br>Dec, blood in<br>sputum, dyspnea<br>loss of weight | coarse crackles<br>left ax. behind                                                                  |
| 7                   | A.1        | 33  | millwright 21 years                                                         | cough, ex-<br>pansion,<br>coloration,<br>dryness, loss<br>of weight, .<br>strength          | dry rales over rt. chest<br>behind, expansion deficient                                             |
| 8                   | A.1        | 37  | millwright 21 years                                                         | cough                                                                                       | occasional dry rales at<br>left base                                                                |
| 9                   | (probably) | 37  |                                                                             |                                                                                             |                                                                                                     |
| 10                  | A.1        | 37  | driller 11 years                                                            | no symptoms                                                                                 | no abnormal signs                                                                                   |
| 11                  | A.1        | 43  | driller 17 years                                                            | history of<br>pleurisy,<br>sister died<br>of t.b.c.,<br>dyspnea                             | no abnormal signs                                                                                   |
| 12                  | (early)    | 37  | millwright 14 years                                                         |                                                                                             |                                                                                                     |
| 13                  | A.1        | 37  | driller 43 years                                                            | no symptoms                                                                                 | no abnormal signs                                                                                   |
| 14                  | (early)    | 37  |                                                                             |                                                                                             |                                                                                                     |
| 15                  | A.1        | 37  | driller 6 years                                                             | no symptoms                                                                                 | many crackles right<br>base.                                                                        |
| 16                  | (early)    | 37  | general work in pit<br>1 year                                               | no symptoms                                                                                 | no abnormal signs                                                                                   |
| 17                  | A.1        | 44  | filling bags 1 year<br>last coal 3 years                                    | history of<br>hemoptysis                                                                    | no abnormal signs                                                                                   |
| 18                  | A.1        | 33  | in mill 3 years<br>in tunnel feeling<br>crusher 1 year                      | cough, dyspnea,<br>suspected t.b.c.<br>in 1 yr.                                             | no abnormal signs                                                                                   |
| 19                  | (early)    | 33  | crusher 1 year                                                              |                                                                                             |                                                                                                     |
| 20                  | A.1        | 33  | sweeper in mill 4 yrs.                                                      | no symptoms                                                                                 | no abnormal signs                                                                                   |
| 21                  | (early)    | 33  | oilier in mill 3 years                                                      |                                                                                             |                                                                                                     |
| 22                  | A.1        | 33  | loading boxes in pit<br>33 years, feeling<br>the mill 3 years               | sister died of<br>of t.b.c. 1 yr.                                                           | showing of fine crackles<br>both lungs behind from<br>vertebra down; crepitation<br>note diminished |
| 23                  | A.1        | 33  | millwright 2 years                                                          | dyspnea                                                                                     | no abnormal signs                                                                                   |
| 24                  | (early)    | 33  | foreman 1 year                                                              |                                                                                             |                                                                                                     |
| 25                  | A.1        | 33  | feeling crusher 10 yr                                                       | dyspnea                                                                                     | crepitations in rt. axilla<br>& l. base behind,                                                     |
| 26                  | (probably) | 33  | feeling crusher in mill 15 yrs.                                             |                                                                                             |                                                                                                     |
| 27                  | A.1        | 33  | feeling crusher in mill 6 years, drivers 1 year,<br>foreman in mill 3 years | no symptoms                                                                                 | no abnormal signs                                                                                   |

Table VI (continued)

| No.                           | Diagnosis       | Age | Occupational history                         | Symptoms                                    | Signs                                                                                                                                       |
|-------------------------------|-----------------|-----|----------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Thetford Mill, Gro., (cont'd) |                 |     |                                              |                                             |                                                                                                                                             |
| 63                            | A.I. (early)    | 34  | loading boxes in pit 7 yrs., driller 7 yrs.  | no symptoms                                 | no abnormal signs.                                                                                                                          |
| 64                            | A.I. (probably) | 31  | operator in mill 7 yrs., millwright 11 years | no symptoms                                 | percussion dull & resonant over right lung, normal over left lung, normal over right side of chest, dull over left upper lobe front & back. |
| 65                            | A.I.            | 38  | otter in mill 10 yrs. foreman mill 7 yrs.    | non-diat. t.b.c. daughter has tuberculosis. | expectoration poor, cough, crepitation in r. apex, crepitation in l. upper lobe anterior & at both bases.                                   |
| 66                            | A.I.            | 41  | mill repairs 11 yrs. mill foreman 11 yrs.    | cough, dyspnea                              | expectoration poor, percussion poor at 2 bases, no rales.                                                                                   |
| 67                            | A.I. (late)     | 44  | Foreman mill 17 yrs. millwright 7 yrs.       | no symptoms                                 | no abnormal signs.                                                                                                                          |

It will be noted that of the 111 men examined at Anderton 7 were diagnosed as first stage asbestosis, while of the 51 examined at Thetford 13 were diagnosed as first stage asbestosis and 7 as second stage asbestosis. This is not to be interpreted as indicating an excess hazard in Thetford Mines. The increased incidence of pneumoconiosis in Thetford is simply a reflection of the different distribution with respect to age and length of service. Reference to tables 1 and 2 will recall the great differences in these two things.

In the great majority of cases the length of service in dusty work was more than 5 years an indicator in the following table:

| length of service | number of cases | number of men aged 40 and over |
|-------------------|-----------------|--------------------------------|
| 0 - 4 yrs.        | 2               | 22                             |
| 5 - 9             | 2               | 27                             |
| 10 - 14           | 7               | 31                             |
| 15 & over         | 7               | 31                             |
| Total             | 18              | 111                            |

From this table one would conclude that asbestosis is not likely to develop with an exposure of less than 5 years, but that with an exposure of more than 15 years there is a great possibility of it developing. It is, however, of interest to remember that many men with long periods of exposure do not develop any signs of asbestosis.

As to occupations of 41 drillers 11 were cases of asbestosis, of 1 mill workers 27 were cases of asbestosis and of 40 workers in the factory, only 1 case showed x-ray evidence of the disease. Evidently there is little difference in the hazard in mill workers and drillers. The mill workers appear to be exposed to far greater dust concentrations than the drillers and it is rather difficult to understand why the high incidence of asbestosis among the drillers. However, it may & may not be of interest to note the

that the drillers are occasionally exposed to granite dust.

4. None of the cases of arteriosclerosis appeared to suffer from disabling symptoms. Perhaps the most common defect was shortness of length, but less than half the cases combined with a number (11 of the 41 cases).

As to clinical signs I was unable to find any, other, no. one sign which would enable one to make a diagnosis in the absence of the x-ray picture. Inspiration of the lungs was of little value since it was difficult to evaluate the degree of pleuritic excursion and no other excursion was found to be deficient when actually it was not. If a respiration test was available some quantitative idea of vital capacity might have been attained; the measurement of chest expansion by a tape measure was given up after the first 2 or 3 trials.

Since there is not a single, little of information here and no other  
intensity of tactile freedom of vocal resonance one can be seen, the chest is  
of the chest with the other is dated, abnormality. But abnormality is  
essentially a cylindrical lesion and in this disease the expansion of the  
the side of the chest is a little higher. The same observation apply to  
the quality of the breath sounds.

The most frequently found abnormality was the presence of rales, particularly crepitations. In two of the more severe cases a change of these rales occurred throughout both sides of the chest, particularly on coughing, but in two of the three cases of record at the beginning these rales were not heard, so that crepitations <sup>that</sup> were not a constant sign of pulmonary disease. In one case two or three of the cases with large amounts of sputum were not heard, but were then, it is believed, but the more examination did not confirm this impression.

Tuberculosis did not play an important part in the study. Even of the cases of asbestosis appeared to be complicated with this disease. Indeed the incidence of definite tuberculosis in the two groups of individuals was very low. There were several suspected cases on clinical examination which were not confirmed by x-ray and several suspected cases by x-ray which showed no real evidence in the way of signs and symptoms. Only one case in the group can be considered as actively tuberculous.

It was difficult to obtain sputum from most of the men since very few of them were coughing. About 12 sputa were examined for tubercle bacilli and asbestos bodies. No tubercle bacilli were found but one case '14' gave several asbestos bodies. This case was diagnosed by x-ray as pneumoconiosis (first stage) but is not included in the number of asbestosis cases since the x-ray film was not satisfactory.

Conversation with physicians and mine managers in the asbestos region indicated that no hazard to health was suggested in connection with work in the asbestos mining and milling industry.

In general it may be said that the <sup>hazard</sup> of <sup>pneumoconiosis</sup> ~~asbestosis~~ in the asbestos mining and milling industry has been <sup>demonstrated</sup> ~~not demonstrated~~, but evidently the disease does not incapacitate to any great degree and, therefore it is not particularly associated with tuberculosis.

Paul E. Paddy  
1930