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Mr. A. L. Penhale	-	Asbestos Corporation Limited
Mr. W. J. Johnson	-	Johnson's Company Ltd.
Mr. G. E. Gibbs	-	Flintkote Mines Limited
Mr. G. K. Foster	-	Canadian Johns-Manville Co. Ltd.
Mr. [illegible] V. [illegible]	-	Canadian Johns-Manville Co. Ltd.
Mr. A. E. Lo[illegible]	-	Quebec Asbestos Corporation Ltd.
Mr. L. Montpetit	-	Nicolet Asbestos Mines Ltd.

Gentlemen:

Report to
Quebec Asbestos Mining Association
re Pulmonary Cancer
and Supplementary Memorandum
re Cancer Research

At the Skytop meeting, Mr. Shepherd promised to look into the above subject on his return to England.

We are now pleased to send you herewith a copy of the report he recently forwarded us.

Yours very truly,

BELL ASBESTOS MINES LTD.

O. C. Smith

Encl.
OCS/AS

CC. Mr. W. M. [illegible]ontar
Dr. F. Cartier
Mr. [illegible] [illegible]ith
Mr. Ivan Sabourin

REPORT TO
QUEBEC ASBESTOS MINING ASSOCIATION
RE PULMONARY CANCER
AND SUPPLEMENTARY MEMORANDUM
RE CANCER RESEARCH

Comments by Dr. J. F. Knox.
Factory Medical Officer for
Turner Brothers Asbestos Co. Ltd.

In the Annual Report of the Chief Inspector of Factories for the year 1947, published by H.M. Stationery Office in January 1949, there is a section (P. 79) entitled "Asbestosis and Carcinoma of the Lung". Tables XXXII to XXXVI also refer to this subject. Although the first group of figures on page 2 of the Supplementary Memorandum of the Quebec Asbestos Mining Association bears some resemblance to them, they are not exactly similar and much qualifying information has been omitted. The important statement made in the Chief Inspector's Report is "During the 23 years 1924 - 1946 inclusive, 235 deaths, either caused by asbestosis or in which asbestosis has been proved at autopsy, have come to our notice. Cancer of the lungs or pleura was found to be present either as a cause of death or as a concomitant in 31 (13.2%) of these 235 cases". For comparison I can offer three groups of figures:-

(1) Numbers of post-mortem examinations of which I have records from 1930 - 1950

TABLE I

Number of Post Mortem examinations	Number of cases in which carcinoma was associated with asbestosis	Duration of exposure to dust	Percentage rate of cancer	Average age at death	Period of exposure prior to completion of full programme of protection (1932)
		years			years
109	18	22.4	16%	56.4	13.3

• TABLE 2

Case	Death	Exposure in years	Age	Suspension to death in years	Started work	Period of exposure prior to completion of full programme of protection (1932)
1	1935	13	62	3	1922	10
2	1935	16	56	3	1919	13
3	1936	23	65	0	1913	19
4	1938	19	66	1	1919	13
5	1939	24	69	0	1915	17
6	1941	28	52	3	1921	21
7	1942	28	59	1	1914	10
8	1948	22	53	13	1929	7
9	1948	32	60	13	1916	16
10	1948	27	51	0	1923	9
Average	-	22.4	56.4	-	-	13.3

(*) Details concerning the 10 cases in column 2, Table 1.

Comment

No case has arisen yet of the association of carcinoma of the lung and asbestosis in this area in anyone starting work later than 1923. There was only one woman in the series. She was aged 51 and was suspended for eight years. Men and women are employed in about equal numbers in the scheduled areas of the Rochdale Works.

It is noted that according to Table 2, these cases of carcinoma have occurred in two groups - one of six cases with established asbestosis and suspended for three years or more, and another group of four cases. In the latter group, two were suspended one year before death and two not suspended at all. It is reasonable to assume that the suspension - disability from which those who died within one year following suspension were suffering was in fact the early symptoms of carcinoma of the lung.

Although this is an account of 100 autopsies it does not represent all the people who have died following employment in the [illegible] industry in this area. There is an unknown number of both men and women who, after working in scheduled areas for years, have drifted away to other industries or who have remained at home and whose subsequent deaths have not been reported to the Coroner and therefore made the subject of post-mortem study. There are no precise pathological criteria of asbestosis and the Coroner has linked the term asbestosis with many deaths where the degree of fibrosis was slight and the association between this and the major cause of death not apparent. On the other hand, the large of people without obvious disability and who have died suddenly of coronary thrombosis or cerebral haemorrhage have been found to contain the usual asbestos bodies, some patchy fibrosis and such changes as would undoubtedly have been associated in the Coroner's verdict with their employment if the death had occurred more slowly. It is considerations such as these which make one view all statistical material on asbestosis with reserve. As an indication of the difficulty of diagnosis during life, only 47 of these 100 cases were suspended during their lifetime.

(3) Cancer mortality figures extracted from the Registrar General's Statistical Review. 1940 - 1945. Vol. I. Medical:

On the subject of Carcinoma of the Lung on page 176, it is stated that "The rise in mortality from cancer of this site alone accounts for most of the recent increase in male cancer death rates from cancer of all sites at ages 35 - 55 which have been noticed above. Whereas in 1938 lung cancer contributed 23% of all cance deaths of males, at this age period in 1945 it contributed 30%".

From Table LXXVII the following figures are obtained:

Males 45 - 65 years. Cancer deaths per 1,000 deaths from all non-violent causes 1943 - 1945 : 213

From Table LXXIX:

The proportion of deaths from cancer of lung to total cancers at ages 45 - 55 : 1.5%

Recent suggestions to account for this increased incidence of lung cancer include cigarette smoking, and inhalation of petrol and oil fumes.

It seems difficult to understand the comparative figure of 1.32 given as the incidence of carcinoma of the lung in silicosis autopsies on page 2 of the Memorandum and in the Chief Inspector's Report of 1947. If this is so, it would appear that this silicotic group has a lower incidence of lung cancer than the general population.

(3) Figures derived from death certifications
in private practice

In the last 100 death certificates issued by me, 3 in all of which concerned asbestos workers, there were seven lung cancer deaths with an average age of 62.7 years.

General observations

On page 3 of the Memorandum of the Quebec Asbestos Mining Association the incidence of lung cancer in the general population is given as 1.36% and in asbestos workers as 1.4%. This seems to me a more reliable method of estimating the incidence of the two groups than the autopsy material. In the section on page 9 of the Memorandum on the incidence of lung cancer in various types of pneumoconiosis, the data is attributed to Dr. Readhead Gloyne. This observer wrote the section on Pathology in Silicosis and Asbestosis (Lanza) Oxford Medical Press. 1938. On page 245, he writes "carcinoma has been found in six cases by the writer at autopsy". If this figure refers to a series of 100 cases mentioned in the preceding paragraphs, his percentage rate would be 6%. He further states that until more statistics are available it is impossible to draw definite conclusions as to the relation of the two diseases. In giving the figure of 21 under asbestosis in Total cases of Pneumoconiosis, with 17 cases of lung cancer, he would seem to be singularly unfortunate in finding 11 cases in his next 20 autopsies. The total number of asbestos deaths up to the end of 1948 is given by the Chief Inspector of Factories as 247. Dr. Gloyne could hardly claim to have first-hand knowledge of a second series of 100 cases.

Without further qualification the statement in the memorandum that lungs of 165 individuals without pneumoconiosis, but employed in the same set of industries as above, revealed 14 cases of cancer of the lung or 8.5% means little. At today's carcinoma of the lung rates per man in the 55-65 age groups it would not represent more than 1% above the average for the country as a whole.

On the question of asbestosis as a carcinogenic agent, I would agree that the approach suggested by the Quebec Asbestos Mining Association is an excellent one. In the short-term programme, provided the statistical boys have access to figures which are relevant, this should be an interesting report. As regards the long-term programme of experimental work, much of the preliminary study has been done and the criteria available for the work, as well as the size and concentration of fibre which will produce experimental asbestosis, are well known now. As far as I am aware, there is no record of carcinoma of the lung occurring in an animal which was the subject of experimental asbestosis.

The third phase of the programme is one which will meet general approval. All concerned will benefit from the widest publication of accurate statistics and informed articles containing clinical studies on the asbestosis problem.

In considering the possibility of carcinogenic action of asbestos fibre, the emphasis so far has been on the lung. No question has been raised of carcinogenesis [illegible] through contact with skin as is the case with certain mineral oils. I can state that neither my former partner, Dr. [illegible] H. [illegible], whose practice in this area covered 45 years, nor myself in the last [illegible] years has seen a skin cancer in association with an asbestos skin wart. These warts are common and are due to the penetration of the skin by minute fragments of fibre. A fibrous tissue reaction of the foreign body type occurs around them.

J. F. Knox

SUPPLEMENTARY MEMORANDUM

re:

CANCER RESEARCH

Further to C.A.M.A. meetings, Sherbrooke . . . . . and Montebello . . . . . the writer has, through the medium of the best available sources, particularly on this Continent, evolved a plan which, prepared in conjunction with Mr. Foster, is at this date ready for distribution for the Skytop Lodge Meeting.

As the following data do not in any way deter from the substance of the above joint report, such data rather adding to and completing said report, they are presented as a supplementary memorandum.

The more this cancer research problem is being approached, the more anyone is convinced, whether he be specialized or not in any field of science or study, that very little is known, at least officially, of "cancer and its causes". And this is still more true in the case of occupational cancer which, just like a tree is growing in divisions and subdivisions every day, new names being added to the list of branches or leaves of the tree without very little more being known of the sap that keeps the generic tree growing. And one may safely state that much more was known some twenty years ago, of the respective incidences of Asbestosis and Tuberculosis (that is, taken separately) or of the influence of Asbestosis-Tuberculosis (that is, present at the same time) than of Asbestosis-Cancer today (therefore the two being present at the same time) or as regards Cancer alone.

Yet, the "Asbestosis-Cancer" problem looms up today with as threatening a potential of responsibility with industry as that of "Asbestosis" alone at any time.

Such possible widening of responsibility in industry is [illegible] to 18 in[illegible]

[illegible] (that is, the 'carcinogenic' agent and [illegible]

see page 6 of the "green" pamphlet.

Whilst statistics constitute a powerful weapon of demonstration in the hands of the one who proposes the existence of a cancer caused by a specific occupation, a severe and very thorough breakdown of said statistics is needed before it should be accepted, we all know. England has acquired the reputation of having in application a most detailed system of compiling statistics, particularly as regards Health or any branch thereof, including Industrial Hygiene and Hazards.

Now, it happens that the following figures are circulated around the world, coming from England, said statistical data dealing, amongst other things, in Cancer in terms of asbestosis. These figures emanate from two very widely known persons in the field of industrial Health. One is Lanchester (Chief Inspector of Factories in England) and the other is Gloyne (an eminent scientist who died just a few days ago). These figures speak for themselves.

DATA FROM [illegible] OF CHIEF INSPECTOR OF FACTORIES

	asbestosis	millionaire
LUNG CANCER INCIDENCE	13.2%	1.32%
AVERAGE AGE AT DEATH	48.5 years	68.2 years
AVERAGE DURATION OF EMPLOYMENT	14.8 years	34.3 years

[illegible] causing Cancer (that is, the "carcinogenic" agent has escaped)
see page 8 of the "green" pamphlet.

Whilst statistics constitute a powerful weapon of demonstration in the hands of the one who proposes the existence of a disease caused by a specific occupation, a severe and very thorough breakdown of said statistics is needed before it should be accepted, we all know. England has acquired the reputation of having in application a most detailed system of compiling statistics, particularly as regards Health or any branch thereof, including Industrial Hygiene and Research.

Now, it happens that the following figures are circulated around the world, coming from England, said statistical data dealing, amongst other things, in Cancer in terms of Asbestosis. These figures emanate from two very widely known persons in the field of industrial Health. One is Merewether (Chief Inspector of Factories in England) and the other is Gloyne (an eminent scientist who died just a few days ago). These figures speak for themselves:

DATA FROM 1948 REPORT OF CHIEF INSPECTOR OF FACTORIES

	Asbestosis	Silicosis
LUNG CANCER INCIDENCE	13.8%	1.33%
AVERAGE AGE AT DEATH	46.8 years	58.2 years
AVERAGE DURATION OF EMPLOYMENT	14.8 years	34.3 years

the "green" Occupational Cancer pamphlet now being distributed by the New York State Occupational Cancer Committee (names of members of the Committee appear on page 5). Note is made here that the literature quoted in "Bibliography" page 19 under the heading "Respiratory System: Asbestosis" page 20, is indeed not up to date (two articles written in 1957 and 1958 respectively).

Stress might be made also of the fact that Cancer, it is stated, may appear as late as 20 or 30 years after exposure to the body causing Cancer (that is, the "carcinogenic" agent has ceased) see page 8 of the "green" pamphlet.

Whilst statistics constitute a powerful weapon of demonstration in the hands of the one who proposes the existence of a cancer caused by a specific occupation, a severe and very thorough breakdown of said statistics is needed before it should be accepted, we all know. England has acquired the reputation of having in application a most detailed system of occupational statistics, particularly as regards Health

INCIDENCE OF LUNG CANCER

GENERAL POPULATION	1.38%
ASBESTOS WORKERS (2300)	1.41%
ASBESTOSIS (238 cases)	13.2%

INCIDENCE OF PRIMARY LUNG CANCER IN VARIOUS TYPES OF PNEUMOCONIOSIS. (Data of Dr. Readhouse Gloyne)

OCCUPATION	TOTAL CASES OF PNEUMOCONIOSIS	No. OF CASES WITH PRIMARY LUNG CANCER	PERCENTAGE OF PRIMARY LUNG CANCER
IRON AND STEEL	78	4	5.1
POTTERY	340	19	5.6
COAL MINERS	293	19	6.5
STONEMASONS	90	8	8.8
ASBESTOS	121	17	14.0

Lungs of 160 individuals without pneumoconiosis but employed in the same set of industries as above yielded 14 cases of lung cancer (8.8%)