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INTRODUCTION TO DISCUSSION ON DEFINITIONS AND CLARIFICATION OF TERMS CONCERNING PNEUMOCONIOSIS.

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SEVENTH SARANAC LAKE CONFERENCE.

22nd September, 1952.

I am very glad the conveners of this Conference included definitions in the subjects for discussion. In dealing with industrial diseases, and particularly the pneumoconioses, unambiguous, clear and precise definitions are of special and very practical importance. On the definitions may depend the grave issue of compensation, and thus the economic future of the claimant and, on the other hand, the prosperity or failure of an industry.

Definition of an industrial disease presents problems beyond those of defining a disease from the clinical-pathological point of view. There is necessarily an inter-relation between the two problems, and it lies principally in the concept of what is "disease".

Thus, to take as an example the definition adopted by the Sydney Silicosis Conference, 1950, which is also the one recently adopted by the South African Bureau of Standards:-

> "Whilst in a wide sense the term 'pneumoconiosis' connoted any condition of the lungs resulting from the inhalation of dust, that might or might not, be of clinical significance, for the purpose of the International Labour Organisation the Conference accepted the following definition:-

RECEIVED F.H.H&S
DATE: JUL 3 1979
M.E.M

4975

> Pneumoconiosis is a diagnosable disease of the lungs produced by the inhalation of dust, the term 'dust' being understood to refer to particulate matter in the solid phase, but excluding living organisms."

Immediately the question is posed: "What does 'disease' really mean?" This word may be defined, and has been defined, variously, depending very much on the context in which it is used. The pathologist would say it means deviation from normal of the cells of the tissue. But about a century ago Virchow pointed out that cellular abnormalities do not necessarily connote functional abnormality. In fact, normal function may be continued in an organ the cells of which show abnormality, and function may be impaired in an organ in which cellular abnormality is not detectable. There are gradations, of course, in the inter-relations between observable cellular states and function.

The clinician might define disease as impairment of bodily functions.

In considering industrial diseases the problem of compensation must be borne in mind. The concept of disease is, therefore, usually related to functional impairment. The terms commonly employed are "incapacity" or "disability". I think in industrial disease legislation there is only one exception to this usage, and that is in the South African Silicosis Act, in which compensation is provided for a condition in which no functional impairment need be demonstrated, or even be claimed by the applicant.

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DATE: JUL 3 1978
M.E.M

Having regard to the course of the majority of pneumoconioses, it is hardly surprising that the definitions so far adopted have all, so far as I can ascertain, caused difficulties to those concerned with the diagnosis, certification and assessment of compensation, the latter being generally based on the degree of disability/incapacity certified by the examiners.

South African experience, where medical examinations and assessment of degrees of silicosis have been centralised in one establishment for over 35 years, provides probably more promising information than any other experience, for reviewing the effect of definitions on the problems of assessing the existence and stages of the disease, and the consequent compensation.

The first Act, that of 1912, had a very simple definition. This Act was entitled "The Miners' Phthisis Act, 1912". The definitions were:-

> "Miners' Phthisis shall mean silicosis of the lungs", and
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> "... the benefits to be awarded under this Act shall be -
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> (a) to a miner who shows definite physical signs of miners' phthisis and whose capacity for underground work is thereby not seriously or permanently impaired, the sum of eight pounds per month for a period not exceeding one year;
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> (b) to a miner who has contracted miners' phthisis in a marked degree and whose physical capacity for underground work is thereby seriously and permanently impaired, the sum of eight pounds per month, but not exceeding four hundred pounds in all: Provided that where a monthly payment has been awarded to a miner under this sub-section the Board may, if it is satisfied that the special circumstances of the case warrant it, extend the period of such payment so that the payments made to such miner will exceed four hundred pounds. All such cases shall be specially reported on by the Board under section twelve of this Act."

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There was no mention of tuberculosis in this Act.

The next phase in making definitions was in the 1916 Act. In this Act the definitions were:-

"(2) For the purposes of this Act the expression 'miners' phthisis' means silicosis of the lungs; and tuberculosis means tuberculosis of the lungs or of the respiratory organs. A person shall, for the purposes of this Act, be deemed to be suffering or to have suffered from miners' phthisis in the primary stage if, though he shows or has shown definite physical signs of that disease, his capacity for work is not, or has not been seriously and permanently impaired.

A person shall for the purpose of this Act be deemed to be suffering or to have suffered from miners' phthisis in a secondary stage, if the miners' phthisis shows or has shown itself in a marked degree and thereby his physical capacity for work is or has been seriously and permanently impaired."

Now tuberculosis is included and is compensable, whether this disease is or is not associated with silicosis. The importance of this amendment of the previous Act lies in the onus thrown on the examiners to decide whether the pulmonary tuberculosis is or is not associated with silicosis, inasmuch as the compensation payable was very much higher when silicosis was also present - nearly 2½ times higher.

It will be noted that only two stages of silicosis were defined.

In the 1919 Consolidating Act radical changes were made in the definitions. The definitions now were:-

"(2) For the purposes of this Act the expression 'silicosis' means silicosis of the lungs. A person shall, for the purposes of this Act, be deemed to have or to have had silicosis -

(a) in the ante-primary stage when it is found by the Bureau that physical signs of damage to the lungs short of definite physical signs of silicosis have become evident and that such damage has supervened during and in consequence of employment in a scheduled mine;

(b) in the primary stage when it is found by the Bureau that definite and specific physical signs of silicosis are or have been present and that capacity for work is or has been impaired by that disease though not seriously and permanently;

(c) in the secondary stage when it is found by the Bureau that definite and specific physical signs of silicosis are or have been present and that capacity for work is or has been seriously and permanently impaired by that disease."

Attention is invited to the following important changes:-

(a) The introduction of the ante-primary stage. (Later it was renamed 1st stage).

(b) The use of the expression "definite and specific signs of silicosis" in the definitions of the "primary" and "secondary" stages, but "short of definite physical signs of silicosis" in the ante-primary stage. The word "specific" is here omitted.

The examiners were now required to make up their minds as to what are "definite physical signs of silicosis" and what is meant by "specific signs", which the law did not require to be present in

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DATE: JUL 3 1979
M.E.M

ante-primary stage. To a medically trained audience there is no need to labour the point that the almost impossible was asked. Later, I will allude to the unsatisfactory - to use the mildest term - consequences of these ill-thought out definitions.

At this stage I think it well to say a word about why the ante-primary stage was introduced. The reasons given were:-

(a) That by eliminating from hazard men in the earliest detectable stage of silicosis, progression would be arrested and the victims with still practically undiminished functions would rehabilitate themselves in some other employment;

(b) That the liability in respect of compensation would in the long run be much diminished.

Of course, in the event neither of these expectations was realised to any notable extent.

My views on the 1919 definition of ante-primary silicosis were stated before a parliamentary committee in 1920:-

> " I should like the Committee to pause and consider exactly what these sentences mean. If they mean anything at all they mean this: The Law directs the medical examiners of the Bureau to say that a man has silicosis before there are any facts capable of being established by any method of diagnosis with which we are acquainted to-day or which are likely or may even reasonably be expected to be discovered in the future, to indicate that there is any silicosis whatever. It is difficult and to me impossible to understand how such a law can be laid down, except on the supposition that people are still labouring under the mediaeval belief that medical men possess occult and supernatural powers which are beyond the ken of ordinary man."

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DATE: JUL 3 1979
M.E.M

Then came the 1925 Act. Here the definitions read:-

> "A person shall for the purposes of this Act be deemed to have or to have had silicosis -
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> (a) in the ante-primary stage, when it is found by the Bureau that the earliest detectable specific physical signs of silicosis are or have been present; whether or not capacity for work is or has been impaired by such silicosis;
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> (b) in the primary stage, when it is found by the Bureau that definite and specific physical signs of silicosis are or have been present, and that capacity for work is or has been impaired by that disease, though not seriously and permanently;
>
> (c) in the secondary stage, when it is found by the Bureau that definite and specific physical signs of silicosis are or have been present, and that capacity for work is or has been seriously and permanently impaired by that disease or when it is found by the Bureau that tuberculosis with silicosis is or has been present."

Particularly to be noted are the words "... the earliest detectable specific physical signs..." in the ante-primary stage, and also the addition of the words "... whether or not capacity for work is or has been impaired by such silicosis". The word "specific" is now added to the definition of this stage.

Here an attempt was made to clarify the ambiguity of the previous definitions. But, has it been done? In the light of subsequent experience, I do not think so. At a recent inquiry into the working of the Silicosis Medical Bureau, the Chairman of the Bureau categorically stated that the certification of the first stage of silicosis is a "fifty-fifty matter". The import of this statement need not be underlined to an audience such as this.

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DATE: JUL 3 1 1979

M.E.M

The next and last changes in the South African legal definitions are in the Silicosis Act, 1946:-

> " 'silicosis' means any form of pneumoconiosis due to the inhalation of mineral dust; and for the purposes of this Act a person shall be deemed to be or to have been suffering -
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> (a) from silicosis in the first stage (which corresponds with the ante-primary stage under the 1925 Act) when the Bureau has found that the earliest specific signs of silicosis, detected by any means whatsoever, are or were present in the lungs of the person in question, irrespective of whether his capacity for work has or has not been impaired by the said disease; or
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> (b) from silicosis in the second stage (which corresponds with the primary stage under the 1925 Act) when the Bureau has found that moderately marked specific signs of silicosis are or were present in the lungs of the person in question and that the said disease has not incapacitated him from performing moderate manual work; or
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> (c) from silicosis in the third stage (which corresponds with the secondary stage under the 1925 Act) when the Bureau has found that marked specific signs of silicosis are or were present in the lungs of the person in question and that the said disease has incapacitated him from performing moderate manual work."

Here we have some important changes:-

(a) Silicosis means any form of pneumoconiosis.

This means that for legal purposes - compensation, etc. - any pneumoconiosis is to be dealt with as if it were silicosis, and the definitions of the three stages of silicosis apply to the other pneumoconioses. Previously only silicosis - _sensu stricto_ - was compensable.

(b) The definition of the first stage (the old ante-primary) is -elaborated -

RECEIVED F.H.H&S
DATE: JUL 31 1979
M.E.M

elaborated in the words "detectable by any means whatsoever", in place of the previous "earliest detectable", and the word "physical" is omitted.

(c) "Capacity for work is or has been impaired by that disease" is replaced by "... the said disease has not incapacitated him from performing moderate manual labour" in the definition of the second stage.

(d) In the third stage "capacity for work is or has been seriously and permanently impaired by that disease" is replaced by "... the said disease has incapacitated him from performing moderate manual labour". The last sentence of the 1925 definition relating to the presence of tuberculosis is deleted. Tuberculosis is dealt with separately in the 1946 Act as follows:-

> " 'tuberculosis' means tuberculosis of the respiratory organs and a person shall, for the purposes of this Act, be deemed to be suffering from tuberculosis -
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> (a) if the Bureau has found the said person's sputum to contain tubercle bacilli; or
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> (b) if the Bureau has found the said person to be suffering from 'closed' tuberculosis which seriously impaired his working capacity."

One of the effects of these definitions on certification is that the words "specific signs" are taken to mean radiological

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RECEIVED F.H.H&S
DATE: JUL 3 1 1979
M.E.M

signs only, and assessment of stages has been made virtually solely on the radiological appearances. The contention appears to be that the radiograph provides the only "specific signs" of silicosis: That in the absence of certain radiographic appearances, any cardio-pulmonary disability present must be due to some other cause; and that it is not the function of the examiners to seek for the "other cause".

One consequence is that the miners assert that they "lost confidence in the Silicosis Medical Bureau" and have threatened to boycott it if the personnel and methods are not radically changed forthwith.

Because of the attitude of the miners, the Government recently appointed a Commission of Enquiry. This Commission in its report submitted to Government the following definitions of silicosis. ("Silicosis" means any pneumoconiosis in this context).

"A person shall be deemed to be or to have been suffering -

(a) from silicosis in the first stage when the Bureau has found during life the earliest signs of silicosis demonstrable by radiological or any other appropriate examination, or when the Bureau has found demonstrable permanent impairment of respiratory or cardio-respiratory function; or when the Bureau has found post-mortem early lesions of silicosis or chronic bronchitis and/or its sequelae. Provided that the impairment of the respiratory or cardio-respiratory function or the chronic bronchitis and its sequelae shall, in the opinion of the Bureau, be permanent and have resulted from the performance of work in a dusty occupation and shall have been found within a period of twelve months since the person last worked in a dusty occupation.

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DATE: JUL 2 1 1979
M.E.M

(b) from silicosis in the second stage when the Bureau has found by radiological and other appropriate examination that silicosis has given rise to impairment of respiratory or cardio-respiratory function causing reduction in capacity for exertion to the extent of unfitting the person for more than moderate exertion, or the Bureau has found post-mortem such lesions of the cardio-respiratory organs due to silicosis as would have incapacitated the deceased for more than moderate exertion during life;

(c) from silicosis in the third stage when the Bureau has found by radiological and other appropriate examination that silicosis has given rise to impairment of respiratory or cardio-respiratory function causing reduction in capacity for exertion to the extent of unfitting the person for more than light exertion, or the Bureau has found post-mortem such lesions of the cardio-respiratory organs due to silicosis as would have incapacitated the deceased for more than light exertion during life."

The Commission remarked:-

"This definition has been drafted with the view to removing as much ambiguity as is possible and at the same time leaving the Bureau the same amount of latitude in exercising the science and art of diagnosis as must be left to those called upon to deal with a subject which is by no means either static or easy.

The words 'specific', 'moderately marked' and 'marked' have been deliberately omitted from the proposed definition as being vague and too much the subject of a variety of personal interpretation, and because their use tends to over-emphasize the radiological findings and to obscure the overwhelming importance of incapacity for work.

Furthermore, the words 'cardio-respiratory' are brought into the definition in order to indicate as clearly as may be that such affections of the lungs as are usually present in at least the later stages of silicosis cannot be dissociated from cardiac disfunction.

The word 'exertion' has been substituted for the words 'manual work' in order to indicate that what is to be assessed is loss of power for sustained muscular effort."

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DATE: JUL 31 1979
M.E.M

Turning to definitions adopted or proposed elsewhere than in South Africa -

The 1930 International Conference, convened by the International Labour Office, in Johannesburg, adopted the following definitions:-

"Silicosis is a pathological condition of the lungs due to inhalation of silicon dioxide. It can be produced experimentally in animals."

As to stages of the disease -

"In the 'first stage' symptoms referable to the respiratory system may be either slight or even absent. Capacity for work may be slightly impaired. There may be a departure from the normal in percussion and in auscultatory signs, and the radiograph must show an increased density of linear shadows, and the presence of discrete shadows, indicative of nodulation.

In the 'second stage', there is an increase of the physical signs observable in the 'first stage', and the radiograph shows an increase in the number and size of the discrete shadows indicative of nodulation with a tendency to their confluence. There must be some degree of definite impairment of working capacity.

In the 'third stage' all the above conditions are grossly accentuated and indications of areas of massive fibrosis are usual. There is serious or total incapacitation.

Pulmonary tuberculosis may be present in any of the above described 'stages' of silicosis, altering the symptoms, physical signs and radiographic appearances, and the degree of working capacity. Its presence must therefore influence the 'stage' classification of the individual, which classification must in these circumstances be based more on the degree of loss of working capacity than on physical signs and radiographic appearances."

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DATE: JUL 3 1979
M.E.M

The concept that "silicosis" is due to silicon dioxide, accepted by this Conference, has, of course, been modified. It is now accepted that comparable lesions and damage can be produced by certain silicates. However, purists may contest this.

In 1934 the Committee on pneumoconioses of the Industrial Hygiene Section, American Public Health Association, defined silicosis as:-

> "a disease due to breathing air containing silica (SiO_2), characterized anatomically by generalised fibrotic changes and the development of miliary nodulation in both lungs, and clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis (some or all of which symptoms may be present), and by characteristic X-ray findings."

Sayers states that pneumoconiosis produced by other dusts were purposely omitted (U.S.Public Health Reports, 49, 1934).

I have already quoted the definition adopted at the Sydney Conference.

This Conference also considered a scheme for the classification of radiographs of pneumoconiosis.

The scheme is largely the work of Dr. Fletcher and he is so much more competent to deal with this subject, that I merely mention it, in the hope that he will present it for discussion. But I should like to suggest that in discussing this matter we should be quite clear that radiological findings do not provide a criterion for assessing disability. The impression

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RECEIVED F.H.H&S
DATE: JUL 3 1979
M.E.M

that the radiograph is the criterion has bedevilled the subject.

There remains only to remind you of the terminology attached to the various pneumoconioses. The Sydney Conference deprecated the extension of terms, and suggested that the terminology should in future take the form of naming the dust to which the worker is exposed in the industry or process concerned.

27th August, 1952.
AJO/EAC.