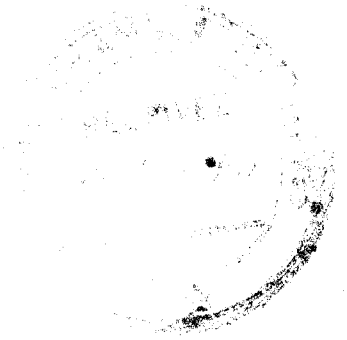
Transvaal and Orange Free State Chamber of Mines

Pneumoconiosis



Report of Chamber Mission to Europe and the United Kingdom

November 1962

A. Appointment of Mission and Terms of Reference

1. After the enactment of the Pneumoconiosis Compensation Act of 1962 the Gold Producers' Committee decided to send a mission overseas to ascertain the bases upon which miners who contract pneumoconiosis or silicosis in the course of their employment are certified in the various European countries in which mining and similar occupations are carried on, and the bases upon which compensation is awarded to such persons; and to indicate whether and to what extent these differ from the provisions contained in the Act.

2. The Committee further decided that the mission should consist of—

(i) **Dr. J. H. G. van Blommestein,** D.S.O., M.B., Ch.B., D.P.H., D.T.M. & H.

Member of the Permanent Commission and International Association for Occupational Medicine.

Member of the Miners' Certification Committee established under the Pneumoconiosis Compensation Act, 1962.

Medical Consultant to the Anglo American Corporation of South Africa, Limited.

(ii) **Professor C. H. Wyndham,** M.B., Ch.B. (Wits.), M.R.C.P., (London). Member of Physiological Society (Great Britain).

Member of Medical Research Society (Great Britain).

Member of Ergonomics Society (Great Britain).

Member of Climatic Efficiency Sub-Committee of Medical Research Council (Great Britain).

Member of U.N.E.S.C.O.'s panel of experts on "Hot, Humid Climatology".

Area representative of International Bioclimatology Society.

Member of Bioclimatology panel of National Research Council—National Academy of Sciences (U.S.A.).

Member of Programme drafting Committee of "Human Adaptability" panel of International Council of Scientific Union (I.S.C.U.).

Professor of Physiology, Witwatersrand University, and Director of Applied Physiology Laboratory of the Chamber of Mines.

(iii) **B. T. Tindall, Esq.,** M.A. (Cantab). Barrister-at-Law, Inner Temple.

Advocate of the Supreme Court of South Africa (Transvaal Provincial Division).

Legal Adviser to the Chamber of Mines.

B. Historical Review

3. The South African Statute law regarding the definition of pneumoconiosis and the basis upon which miners, i.e. workmen employed in a dusty atmosphere, are to be certified, has undergone a considerable change in the last decade.

The Silicosis Act, 1946, defined silicosis as follows:

" '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—

(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

(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

*Term "Bureau" refers to the Silicosis Medical Bureau which carried out the medical examinations required by the Act.

(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."

4. The Allan Commission, which reported in 1950, was appointed to enquire into the occurrence of certain diseases other than silicosis and tuberculosis, attributable to the nature of employment in and about mines. The Commission came to the conclusion that there was strong presumptive evidence that there was a disabling respiratory condition occurring among miners, which was not recognisable by the usually accepted means of detecting the earliest specific signs of silicosis and which might become permanent. The Commission referred to this condition as "pulmonary disability" and recommended that provision be made in the Silicosis Act for the compensation of miners showing serious pulmonary disability in the absence of signs of silicosis.

5. To give effect to this recommendation a Bill was drafted in which pulmonary disability was defined as follows:—

" 'Pulmonary disability' means an impairment of the cardio-respiratory functions of a person which in the opinion of the Bureau—

(a) has substantially and permanently diminished the capacity for work of the person in question, and

(b) resulted from the performance, by the person in question, of work in a dusty occupation, but does not include silicosis or tuberculosis."

The definition went on to provide for two stages of the condition; the first stage being when the miner was fit for moderate manual work only and the second when he was fit for light work only.

6. While the pulmonary disability Bill was under consideration the appointment was announced of the Beyers Commission to enquire into the functioning of the Silicosis Medical Bureau and the Silicosis Medical Board of Appeal. Among its terms of reference was an instruction to enquire whether, having regard to the purposes of the Silicosis Act, 1946, the definitions of "silicosis" and "tuberculosis" were satisfactory and, if not, what alterations were desirable or necessary in those definitions.

7. After studying the proposed definition of "pulmonary disability" in the draft legislation the Commission reported that an unnecessary complication would arise as a result of the introduction of a definition which defined pulmonary disability as something apart from silicosis. It was generally accepted, the Commission said, that pulmonary disability, which had resulted from the performance of work in a dusty occupation, was part and parcel of the advanced stages of the silicotic process. The Commission felt that the position would be greatly simplified if pulmonary disability were to be recognised in law for what it really was, namely, one of the manifestations of dust damage, i.e. a very early stage of silicosis and later, in greater or lesser degree, a manifestation of the advanced stages of silicosis.

8. Notwithstanding the recommendations of this Commission the "Pulmonary Disability Bill" became law in 1952. The consequences of this Act are still fresh in memory. Certifications reached a total hitherto undreamed of and early in 1954 the Ministry of Mines appointed a Departmental Committee, under the Chairmanship of Professor S. F. Oosthuizen, to enquire into the relationship between silicosis and pulmonary disability. Later the terms of reference of the Committee were extended to include the relationship between pneumoconiosis and tuberculosis.

9. On the subject of this relationship between silicosis and pulmonary disability the Committee, whose members made extensive visits overseas, reported that pulmonary disability relating from the inhalation of mineral dust did not exist as a separate entity but that it was an inseparable part of the pneumoconiotic process and that it should be recognised and diagnosed as such. The Committee expressed the view that the existing separate definitions of silicosis and pulmonary disability should be replaced by a single comprehensive definition, and it recommended for insertion in the Act a definition of pneumoconiosis which was intended to include pulmonary disability as part and parcel of the same process.

10. The definition of silicosis under the 1946 Act was concerned with the impairment of the lungs only, without reference to the effect of the disease on other thoracic organs. The definition of pulmonary disability in the 1952 legislation embraced the cardiac as well as the respiratory organs. The Oosthuizen Committee aimed to combine silicosis and pulmonary disability under the generic term of pneumoconiosis, and so to provide for the compensation of all incapacity resulting from damage to the cardio-respiratory organs caused by the inhalation of mineral dust.

11. Following upon the recommendations of that Committee pneumoconiosis was defined in the Pneumoconiosis Act of 1956, as follows:

> " 'pneumoconiosis' means disease of the cardio-respiratory organs (by whatever means discovered) which has been caused by exposure to dust in the course of work in a dusty atmosphere; and a person shall be deemed to be or to have been suffering from pneumoconiosis—
>
> (a) in the first stage, if his cardio-respiratory organs have been found to be or to have been permanently affected by pneumoconiosis, whether or not his capacity for manual work is or was permanently impaired thereby;
>
> (b) in the second stage, if his cardio-respiratory organs have been found to be or to have been permanently affected by pneumoconiosis as a result of which he is or was permanently incapacitated from performing work more strenuous than moderate manual work;
>
> (c) in the third stage, if his cardio-respiratory organs have been found to be or to have been permanently affected by pneumoconiosis as a result of which he is or was permanently incapacitated from performing work more strenuous than light manual work;
>
> (d) in the fourth stage, if his cardio-respiratory organs have been found to be or to have been permanently affected by pneumoconiosis as a result of which he is or was permanently incapacitated from performing any manual work."

The Committee recommended that the definition be applied on the basis of:—

First stage—loss of working capacity up to 20 per cent.

Second stage—loss of working capacity up to 50 per cent.

Third stage—loss of working capacity up to 70 per cent.

Fourth stage—loss of working capacity of more than 70 per cent.

12. The development of the definition of pneumoconiosis over the decade prior to 1956 has been described in some detail to indicate the effort made to evolve a definition of this disease acceptable to all concerned. No less than three Government appointed bodies were engaged from time to time in this task. Expert opinion was canvassed both in this country and overseas in an endeavour to arrive at a satisfactory definition.

13. Throughout this period the main enquiry centred round the disease itself and no report suggested the abandonment of the principle which related the amount of the

award to the degree of incapacity for work. The Oosthuizen Committee said "the specific purpose of the Silicosis Act is to compensate for incapacity resulting from damage to the respiratory organs", and this accorded and still accords with the practice in most other countries.

14. The description of the disease in the 1962 Act is substantially the same as that contained in the previous Act. Pneumoconiosis means "permanent disease of the cardio-respiratory organs (by whatever means diagnosed) which has been caused by the inhalation of mineral dust". A fundamental change has, however, been brought about by the omission from the Act of reference to capacity for work for the purpose of the award of benefits. In lieu thereof the amount of the benefit is now made to depend solely upon the percentage of permanent impairment of the cardio-respiratory functions, and the Miners' Certification Committee is specifically required, when a person is found to be suffering from pneumoconiosis, to determine the degree to which his cardio-respiratory functions have been impaired by that disease (Section 9).

C. Basis for Certification of Pneumoconiosis under 1962 Act

15. When the new Act was in draft form the Honourable the Minister of Mines agreed, at a meeting on 23rd November, 1961, with representatives of the Gold Producers' Committee, that the Chamber of Mines should be provided with a statement setting out the medical authority on which was based the proposal that benefits should be related to the impairment of cardio-respiratory functions. On 19th January, 1962, the Department of Mines forwarded a memorandum setting out the reasons for the introduction of the new basis for the assessment of benefits.

16. The Departmental Memorandum, after stating that the basis on which compensation is to be awarded is not a medical matter, goes on to mention the various bases which could be adopted, and then says—

> "Since the introduction of compensation for pneumoconiosis in 1911 until this day, the object of compensation has been two-fold. The first object is to compensate for the disease whether or not it has caused disablement. The second object is to compensate for the disablement caused by the disease.
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> The first object assumes that damage has been caused to the pneumoconiosis sufferer, even though the damage cannot be measured in physical disablement and that he is entitled to compensation for that damage.
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> The second object recognises the right of compensation for damage caused in the form of disablement.
>
> The soundness of the first object can be questioned in view of present day scientific knowledge of pneumoconiosis. The second object, however, really forms the basis of compensation at present and is the only one that need be considered.
>
> Disablement is not at present, and has never in the past been, related to loss of earnings. Damage for the purpose of pneumoconiosis compensation is therefore not assessed in terms of monetary loss but in terms of physical disablement. In other words, it has never been the object to compensate the monetary effects of pneumoconiosis but to compensate, purely and simply, for the physical damage caused by the disease.
>
> This principle has governed every piece of pneumoconiosis compensation legislation that has been introduced in this country and it is not now intended to change or interfere with this old principle which is as sound a basis for compensation as any that can be evolved."

17. At the outset the writer establishes that the object is to compensate for the physical disablement, or physical damage caused by the disease. These two expressions are used inter-changeably in the memorandum and it is accepted that physical damage caused by the disease means physical disablement.

18. The memorandum then goes on to question the method used at present to assess disablement caused by pneumoconiosis and whether the assessment of the physical damage caused by pneumoconiosis by reference to capacity to perform manual work is the most practical and scientifically correct method to achieve the accepted object of compensation. It is stated that "normal manual work in one occupation may require severe and continuous physical exertion while normal manual work in another occupation may require very little exertion. Therefore if it is assumed that capacity for manual work is related to capacity for physical exertion, then the damage which a person suffered as a result of pneumoconiosis must be measured in terms of his capacity for physical exertion *in relation to his own particular job or occupation*". (The italics are ours).

19. It has been stated by officials of the Mines Department that the consulting physicians to the Bureau have experienced considerable difficulty in assessing capacity for work, owing to lack of knowledge regarding the requirements of each particular job, and that this difficulty was one of the main reasons for the change effected by the new Act. The report of the Oosthuizen Committee did not discuss this question, but Chapter III of Part I clearly contemplated that disability would be assessed in relation to a man's general working capacity and not in relation to his capacity to perform a particular job, and this was certainly the sense of the discussions which preceded the passing of the 1956 Act.

20. If it had been intended to assess a worker's incapacity by reference to his ability to perform his own particular job, no difficulty would have been experienced in wording the Act to make this clear. It is obvious too, that without a survey of the various tasks which are performed by miners working in dusty occupations, and the compilation of a table of values, any attempt at assessment on this basis is unrealistic. Furthermore, assessment on the basis of such tables would in any case give rise to considerable difficulties owing to the frequent change of occupation by many miners and would also result in inequities.

21. If, therefore, the consulting physicians were applying the definition in the fashion stated it was due to a wrong interpretation of what was required and it is a matter of regret that no steps were taken by those responsible to correct this mistaken conception of the requirements of the 1956 Act.

22. The Departmental Memorandum concludes with the following propositions—

(i) "Unless working capacity is related to earning capacity and unless loss of working capacity is related to loss of earnings, 'working capacity' as a basis for compensation has no value."

(ii) "Loss of working capacity is only a consequence or secondary effect of the disease which flows from the impairment of the cardio-respiratory functions. This secondary or indirect effect of the disease can, however, be minimised by numerous extraneous factors such as adaptation, personal habits, psychological approach, etc., which have nothing whatever to do with the basic and irreparable damage or harm caused to the person concerned and which cannot, therefore, be allowed to determine the amount of the compensation to which a person is entitled."

(iii) "In this matter the doctor is only required to indicate to what extent medical science can assess the damage caused to a person in the form of impairment of his cardio-respiratory functions within the prescribed margins or categories."

(iv) "On this question a large number of experts from many countries has been consulted and they are all agreed that it is not only possible but that it is a more correct and scientifically accurate method of assessing the physical damage caused by pneumoconiosis

than the subjective assessment of impairment of working capacity. The general view is that lung function tests have made such big progress during the last five or six years that very accurate assessments can now be made of cardio-respiratory impairment."

Before proceeding to deal with the above statements we propose to give an account of our visit overseas and the position regarding the assessment of pneumoconiosis for compensation purposes, as we found it in the various countries visited.

D. Investigation in Europe

Itinerary

23. The mission left South Africa on 1st September, 1962, and returned on 5th October. During that time, Belgium, France, Holland, Italy, Switzerland, West Germany and the United Kingdom were visited.

24. A list of the places visited and the persons interviewed is attached hereto as Annexure A.

Scope of Enquiry

25. In order to appreciate the medical procedures adopted for the certification of silicosis, or pneumoconiosis, as the case may be, it was necessary to ascertain how these diseases were defined in the law and what conditions were required to be fulfilled before certification could take place. In each country attention was therefore directed in the first instance to the law on the subject and thereafter to the medical procedures to give effect thereto. It is proposed to follow the same pattern in this report.

By reason of this it would be convenient to deal separately with the Continental countries other than West Germany, with West Germany, and with the United Kingdom.

Continental Countries other than West Germany

(i) The Requirements of the Law

26. These countries follow a similar pattern. Silicosis, or pneumoconiosis, is treated as an occupational disease to which the normal principles of "workmen's compensation" apply. The law requires, therefore, the fulfilment of two conditions as a prerequisite to certification, viz. the diagnosis of the disease and the loss of capacity for work.

27. In some countries the term silicosis is defined in the law; in others it is left to medical judgment. But, whether defined or not, diagnosis of the disease is invariably effected by means of X-ray. In some countries absolute certainty in diagnosis is not required. The law is satisfied with a "probability"; mere "possibility" is, however, not sufficient. Medically the criterion for certification can be either nodulation, or excessive reticulation with enlarged hilar glands which can be attributed to dust exposure, or the massive fibrotic conditions as seen in coal miners in the United Kingdom.

28. In all these countries silicosis, or pneumoconiosis, as the case may be, to become compensable, must be accompanied by a diminution or loss of working capacity to a certain degree. Incapacity of less than 20 per cent or in some instances 30 per cent, is not compensable. Classification is in broad grades such as 30 per cent, 60 per cent and 100 per cent, or 30 per cent, 50 per cent, 70 per cent and 100 per cent, etc. It is considered not possible to assess accurately in percentages of 10, as is done in the United Kingdom.

(ii) Measurement of Capacity for Work

29. Working capacity is nowhere assessed in relation to the type of work done by the workman but everywhere in relation to the normal physical capacity of a man of his age. Capacity is capacity for unskilled work.

30. Thus in Holland, for example, capacity has been fixed in men up to the age of 55 as ability to perform heavy work, in men between 55 and 60 years of age as ability to perform moderate work and in those between 60 and 65 as ability to perform light work.

31. In Belgium, however, capacity is capacity for work underground. Normal underground work has been fixed as the work of a coal cutter (hewer). If a miner is unable to perform that work he is entitled to a full pension irrespective of the degree of his disability. He is not assessed in relation to his own particular work.

32. The physiological procedures generally adopted by medical assessors in the continental countries provide for two classes of test, viz. pulmonary function tests and exercise tolerance tests.

33. For the first class of test the spirometer is used. The F.E.V. 1 sec. and V.C. are measured and the Tiffeneau index is calculated. For an explanation of these and other tests, see Annexure B. In some countries additional measurements such as the M.B.C. and the R.V. are made and in some instances the Wright peak flow meter is used.

34. The F.E.V. 1 sec., the V.C. and the Tiffeneau index are common to all systems. The values so obtained are compared against a table of normal values which takes account of age and height. This table was compiled from a survey carried out among the non-mining population of the European coal and steel community.

35. It is generally agreed that the validity of lung function tests depends on the co-operation of the patient and, therefore, reliance cannot be placed solely on these tests for the assessment of disability. A good technician can tell immediately when the patient is not co-operating and when this occurs no cognisance is taken of these tests. There is, moreover, considerable difference of opinion regarding the repeatability of these tests. The repeatability of F.E.V. 1 sec. test is variously quoted at between 5 per cent and 15 per cent. All agree that an accuracy of 1 per cent is not attainable at the present time.

36. For the exercise tolerance tests either the ergometer (bicycle) or the treadmill is used. In some instances both are employed. The main function of these tests is the measurement of the rate of oxygen consumption, though readings are taken at the same time of heart rate and ventilation and estimation is made of the pH, pO_2 and pCO_2 in the blood. It is the rate of oxygen consumption, however, which forms the most important index to the patient's capacity for work. The rate at which there is a departure from normality in these measurements determines the patient's disability. Unlike the lung function tests, its validity does not depend upon the co-operation of the patient and great reliance is placed upon it everywhere.

(iii) Validity of Tests employed for Assessment

37. Although the pattern of tests for the measurement of disability is much the same throughout the continental countries, there are, as may be expected, differences of opinion as to the usefulness of the various lung function tests and the weight to be ascribed to each particular test in the final assessment of disability or capacity for work.

38. Thus in Belgium, where it is only necessary to ascertain whether or not there is disability, the F.E.V. 1 sec. is regarded as a good test. If a miner with micro-nodular silicosis and bronchitis has an F.E.V. of less than half that of a normal person, i.e. below 1.5 litres, then, on the F.E.V. test only, it is considered that he has disability. When the F.E.V. is above 2.5 litres it is assumed that the patient has normal working capacity. Between 1.5 and 2.5 litres there is no correlation between the F.E.V. and capacity for work and ergometric tests are used to establish the percentage disability for work. In other countries, where it is necessary to make an assessment of the percentage disability, the F.E.V. 1 sec. is not given the same importance. So too, while results obtained from the bicycle

are still accepted without qualification in some countries, in others the validity of these results is said to depend upon the physical fitness of the patient and opinion in these countries is veering in favour of the treadmill.

(iv) **Assessment of Disability**

39. The methods used for the assessment of capacity for work are matters of medical procedure which are left by the law to the judgment of the medical practitioner. Although there are differences of opinion between the various medical authorities—even on occasion between authorities of the same country—which result in differences in techniques, tests and criteria, on one aspect opinion is unanimous. There is no one test which is infallible and can be relied upon at all times as a basis for the assessment of disability. Nor is it possible to look only at these physiological tests for the answer. The practice everywhere is to consider all available data, the industrial and medical history of the patient, his clinical examination, his X-ray examination and previous plates, the results of the lung function tests and the exercise tests and finally his age. On a consideration of all these factors an assessment is made and this is, in the final analysis, a matter of clinical judgment.

West Germany

40. Silicosis is listed as an occupational disease and is dealt with under the law relating to "Workmen's Compensation". Under this law benefits are not payable in accident cases unless there has been a loss of working capacity of at least 20 per cent. In the case of silicosis this has been interpreted to mean an impairment of at least 20 per cent in lung and cardiac function, and the directives issued by the Ministry of Labour require the lung and cardiac function to be used as the measure of the loss of working capacity.

41. In the absence of pulmonary impairment, therefore, the award of benefits is not permitted whatever the degree of silicosis shown on the X-ray. In certain special cases this directive has caused difficulty and in some cases where the X-ray shows advanced silicosis and clinically there are signs of early *cor pulmonale* the clinician will use his judgment and assess a loss of capacity although there is no impairment of lung function. This is in accordance with the generally accepted view that there is no correlation between impairment of lung function and loss of working capacity.

42. The medical procedures used to arrive at loss of lung function accord with the practice obtaining in other European countries. A miner is X-rayed and put through a series of tests on the spirometer and the ergometer. As a preliminary to these tests he is first examined for cardiac condition, which on occasion may involve some additional tests of a special nature. Then follows the spirometer on which the F.E.V. 1 sec. and the V.C. are taken. These measurements are not considered sufficient as they depend upon the co-operation of the patient. Finally the patient is placed on the ergometer. Blood saturation, pO_2, pCO_2 and pH are assessed from blood taken from the lobe of the ear. The changes in CO_2 during the various phases of respiration during exercise are regarded as extremely valuable as they give a measure of the evenness of ventilation and perfusion of the lung.

43. After the tests have been completed, the case is considered by a clinician who has to decide whether the loss of pulmonary function is due to the silicosis. The final assessment is a clinical evaluation depending upon all the factors in the case, and the clinician is not bound to follow the report of the physiologist who made the lung function tests.

44. It is clear from a study of actual cases which we were able to make that the tests used in West Germany are the same as those

applied elsewhere to ascertain loss of working capacity and that in the end the assessment made accords with what we found to be the practice everywhere.

United Kingdom

45. Pneumoconiosis is defined by the National Insurance (Industrial Injuries) Act, 1946, as "fibrosis of the lungs due to silica dust, asbestos dust or other dust, and includes the condition of the lungs known as dust-reticulation".

46. The law differs from that pertaining on the Continent in that a person is entitled to a benefit for the disablement which he has suffered as a result of the loss of physical and mental faculty. This is a wider concept than the Continental criterion of "diminution or loss of working capacity". Halsbury (Laws of England, 3rd Edition, Vol. 27, p. 825) explains it as follows—

> "The extent of disablement must be assessed by reference to the disabilities incurred by the claimant as a result of the relevant loss of faculty. These must be ascertained by taking into account all disabilities (whether or not involving loss of earning power or additional expense) to which the claimant may be expected to be subject during the period of the assessment as compared with a person of the same age and sex as the claimant whose physical and mental condition is normal. Every such disability must be treated as having been incurred as the result of the relevant loss of faculty except in so far as the claimant either would, in any case, have been subject thereto as the result of a congenital defect or of an injury or disease received or contracted before the relevant accident, or would not have been subject thereto but for some injury or disease received or contracted after that accident; but no account may be taken in an assessment of the particular circumstances of the claimant other than age, sex and physical and mental condition."

47. Loss of faculty has been interpreted by one eminent authority as follows—

> "The criterion in the assessment of disablement is not simply the intrinsic handicap arising from the injury or disease but the loss of physical and mental faculty—loss of health, strength or the power to enjoy life—as measured by comparison with a person of similar age and status. In addition, due regard, by suitable weighting of the award, is given to the interaction of the injury with concomitant but extraneous disease. For example, in pneumoconiosis the injury to the lungs may lead to loss of faculty through shortness of breath, and other symptoms. This imposes disabilities at work or play, as, for example, restriction of capacity for and speed of work, inability to climb stairs or to walk quickly. The sum of these disabilities makes up the disablement resulting from the disease, and this may be aggravated in individual cases by concomitant though unrelated disease of the heart or other organs and systems."

48. It seems, therefore, that the disablement, for which a person is entitled to a benefit, is the sum of the disabilities flowing from the loss of faculty and thus includes such things as loss of health, strength and power to enjoy life. Consequently what has to be assessed is the total of the disabilities which have resulted from the loss of faculty. In the case of pneumoconiosis, therefore, loss of faculty should include an element of loss of working capacity, and, in some cases, loss of working capacity should form the principal portion of the disablement.

49. A visit was paid to the Pneumoconiosis Panel at Cardiff. This is the leading panel in the United Kingdom and forms the pattern upon which practice at the other panels is generally based.

50. There is no general system of periodical examinations, and when a claim for benefits is made the claimant is X-rayed by the panel and the X-ray submitted to another panel for diagnosis and acceptance for a benefit examination. The 1958 I.L.O. classification is used and the minimum standard is Category 2.

51. If pneumoconiosis is diagnosed the claimant is then examined by the original

panel to assess the degree of disablement. In parenthesis it may be remarked here that when pneumoconiosis is first diagnosed it is assumed, by reason of the doctrine of loss of faculty, that there must be some degree of disablement and a minimum of 10 per cent is automatically given, although in point of fact persons with evidence of early pneumoconiosis have no physical disability or disablement for work. For the purpose of the assessment of disablement the claimant is put through a clinical examination by two doctors and simple lung function tests on the spirometer, i.e. F.E.V. 1 sec. and vital capacity. Effort tests are not done. A stepping test for dyspnoea was used at one time but was abandoned because in the opinion of the panel it depends upon the co-operation of the patient.

52. The results of the lung function tests are compared with tables compiled from a survey of the general population carried out by the Pneumoconiosis Research Unit. These tables are divided into age groups and represent average figures within those groups. Ratings are given in the tables for normal and for slight, moderate and marked disability and the miner is assessed accordingly. "Disability" in this sense refers, therefore, to the percentage impairment of one element of lung function and not to loss of physical working capacity. From this assessment, a percentage disablement is given.

53. The lung function tests are considered to be reliable and miners are classified in percentages of 10. In judging between the various brackets account is taken of clinical history, the clinical examination, the pulmonary function tests, the X-ray, previous X-rays, age and industrial history. The final assessment is a clinical judgment after consideration of all these factors. Thus where a man has a massive pneumoconiosis according to the X-ray but his lung function tests are nearly normal, the initial 10 per cent assessment would be increased.

54. The assessment required from the panel is: "The extent of the claimant's disablement resulting from the loss of faculty due to pneumoconiosis or pneumoconiosis accompanied by tuberculosis" and where more than one "relevant condition" is present the panel is further required to allocate the degree of disablement attributable to each condition. The panels do not regard it as their function to estimate the effect of the disease on a miner's capacity for work, as is done on the Continent. They assess a "disablement", which is based upon the percentage impairment of one element of lung function. It is a matter of some doubt whether this measurement correctly reflects loss of faculty, which includes disabilities at work. (Para. 47 supra.) Lung function tests are merely ancillary and should not be allowed to dominate judgment. On the Continent the F.E.V. 1 sec. and V.C. are only relied on in extreme cases, viz. when the results compared with normal values are so low as to justify the conclusion that there is severe impairment of lung function and loss of work capacity. Final conclusions are not generally made on these results alone.

Basis for the Assessment of Damage

55. The basis upon which silicosis or pneumoconiosis is certified and compensated in Europe and the United Kingdom has been summarised in the foregoing paragraphs. Broadly speaking, the award of benefits depends upon the existence of a disablement which has resulted from the disease. Disablement means a loss of working capacity, except in the United Kingdom where in practice in the panels it appears to have been given a narrower connotation, and where disability is equated with an F.E.V. 1 sec. test value and not, as on the Continent, with loss of working capacity. The mission devoted much time to this subject and the following views emerged from the various discussions which took place with Continental and English authorities:—

(i) In laying down a basis for compensation it is important not to confuse disease with disability. It is the considered opinion of experts that it is logical to compensate the disability and not the disease, as it is not possible to evaluate the disease. It is only possible to evaluate the disability, which generally speaking can be done with a reasonable degree of accuracy.

As one authority said: "Lung function tests alone are not reliable criteria on which to assess the degree of impairment of cardio-respiratory function. The tests themselves are not inaccurate—the difficulty is the wide inter-individual variability which occurs in normal subjects. Furthermore, there are different tests for different functions of the lung. Tests may indicate a good function of some components and a poor function of others. It is not possible to evolve a formula embracing all these tests which would give an accurate indication of the degree of impairment of cardio-respiratory function as a single index. Furthermore, the type of disturbance of lung function produced by pneumoconiosis is not unique to this disease and thus it is impossible, by the use of lung function tests alone, to assess the amount of damage to the lung caused by dust exposure underground. Damage to the lung by smoking, infections, and general atmospheric pollution produces functional alterations which overlap in type and severity to a marked degree with those produced by dust exposure."

Another authority said: "Physiological tests have not yet reached the stage where impairment of lung function can be accurately measured. All that can be done is to assess the degree of loss of capacity for work or capacity for physical exertion as a result of the disease. This in itself can only be estimated in broad percentages, upon which it is possible on occasion for there to be divergencies of opinion among experts."

As yet another authority puts it: "The tests of the mechanical function of the lungs are not so advanced that reliance can be placed on them for the payment of compensation."

(ii) Opinion is emphatic that there is no very close correlation between impairment of lung function and the degree of silicosis estimated from the X-ray—the only practical method of assessment in life. In the case of a miner it is not possible to be sure that impairment of lung function is due to pneumoconiosis, unless there is a severe degree of silicosis present. Also in the case of a man with early pneumoconiosis there is little justification for saying that any impairment which is found to exist in lung function is due to pneumoconiosis because on the average those with early pneumoconiosis are not appreciably more disabled than those without the disease who have worked underground in the mines. An analysis of a large number of cases would show wide individual divergencies. There would be those with little impairment of lung function who had relatively advanced pneumoconiosis, and the reverse would also be true. Thus, lung function tests by themselves are no criterion of the degree of silicosis to which the person is suffering.

It is this lack of correlation that has given rise to the difficulties experienced by the certifying authorities in West Germany.

If an assessment of the damage caused by pneumoconiosis has to be made this should be attempted by asking medical men with appropriate experience to assess all the evidence in each case, derived from industrial and clinical history, signs and symptoms, X-ray appearances, age and the results of a few simple tests of lung function.

(iii) There is, further, no correlation between lung function and disability. Cases are constantly seen of persons with considerable pulmonary dysfunction whose ability to work is not affected.

As one authority said: "Work capacity cannot be assessed on lung function tests only. In surveys carried

out it has been possible to establish the percentage reduction in lung function at which reduction in capacity for work commences and also to establish the percentage of impairment to lung function at which there is 100 per cent incapacity for work. Between these points, however, there is no correlation and on the graph the cases form an elipse. It is possible to find a patient with a large degree of incapacity for work and no impairment of lung function, and *vice versa*. It is, therefore, dangerous and fallacious to rely on lung function tests only or to endeavour to assess a patient only in relation to the impairment of his lung and cardiac condition.

For the purposes of assessment, therefore, all facts are taken into consideration, viz. a patient's industrial history and the period he has been exposed to dust (including whether he has contracted silicosis early or late in his working career) his clinical history, his clinical examination, his X-ray picture and the results of the lung function and ergometric tests. The final decision is a clinical judgment."

E. Conclusions

56. The mission has had the advantage of consultation with leading authorities in Europe and the United Kingdom on the subject of pneumoconiosis. Although there are differences of opinion amongst these experts, these divergencies emerge, not as differences of principle but as variations of approach and methods of solution of the problem. They do not affect the broad conclusions in principle which can be drawn. The mission's conclusions entirely negative the propositions of the Departmental Memorandum (para. 22, supra) which seeks to justify the adoption of impairment of cardio-respiratory function as the complete basis for the award of compensation.

57. These conclusions may be summed up as follows:—

(i) Compensation based on the degree of impairment of cardio-respiratory function amounts in reality to the payment of compensation for the disease itself.

(ii) However, it is not logical to compensate the disease. What must be compensated is the effect of the disease on the physical capacity of the individual.

(iii) It is not possible, in any case, to evaluate the disease. The physiological or mechanical tests have not yet reached the stage where the extent of the impairment of lung function can be accurately measured. For this reason the possibility of evaluating the extent of such impairment within 1 per cent was rejected by all with whom it was discussed.

(iv) Even if such impairment could be accurately measured, such measurement is no criterion either of the extent of the disease or of the degree of physical disablement. It provides no basis, therefore, for the compensation of disablement, which is stated to be the object of the Act. (para. 14 supra.)

(v) The basis in the European countries for compensation for industrial accident and occupational disease is loss of working capacity. Loss of faculty, in its application to pneumoconiosis, differs not in principle but only in degree. In relation to pneumoconiosis both bases fall within the broad concept of impairment of capacity for physical exertion due to the disease.

(vi) Unlike impairment of cardio-respiratory function, loss of physical capacity can be assessed, and can be assessed within a reasonable degree of accuracy for the purposes of compensation.

(vii) The statement in the Departmental Memorandum that the loss of working capacity is only a consequence or secondary effect of the disease which flows from the impairment of the cardio-respiratory functions and that the effect can be minimised by numerous extraneous factors such as adaptation, is a misconception. Opinion is unanimous that there is generally no correlation between

lung function and disability, i.e. between impairment of cardio-respiratory function and loss of working capacity. Compensation is based on disability and such factors as "adaptation, personal habits, psychological approach, etc." have no influence on the medical assessment of disability.

(viii) While we agree with the statement in the Departmental Memorandum that "it is neither the function nor the prerogative of the doctor to determine the basis upon which compensation should be paid" we consider that the doctor should not be called upon to administer a system which medically has no foundation. We are satisfied that the basis for assessment now laid down in the Act is medically unsound and does not have the support of any of the authorities whom we consulted in Europe.

58. Since our return from Europe our attention has been drawn to the fact that the Honourable the Minister of Mines has exercised his powers under Section 7 (7) of the Act and determined the standards to be applied in the certification of pneumoconiosis. We consider that the standards to be applied in certification are a matter of medical opinion and practice. In Europe the final decision is left to the judgment of the clinician who takes into account, for the purposes of his assessment, all the available information, that is to say, clinical history, the results of the clinical examination, industrial history, X-rays, results of lung function and exercise tests and finally the age and sex of the patient.

59. We consider that it would be of greater value to South African practice, and prestige, if the ministerial determination were withdrawn and the members of the Miners' Certification Committee left to apply their professional knowledge and skill. At the same time, members of the Committee should be sent from time to time to Europe to acquaint themselves with the latest opinions and developments there. Within the European community much research work is being done on the subject of pneumoconiosis and there is a continuous exchange of views and discussion. It is important that members of the Committee should keep abreast of the latest thought, particularly as this country is no longer regarded as having the lead which it once had on this subject.

F. Recommendations

60. In the light of the foregoing we submit the following recommendations:—

(a) That the award of benefits under the Pneumoconiosis Act should be based upon the degree to which working capacity has been impaired.

(b) That the Minister be requested to withdraw his instruction to the Miners' Certification Committee and that the decisions of that Committee be left to the medical judgment of the members thereof.

(c) That arrangements should be made for regular visits overseas by members of the Certification Committee to enable them to keep in touch with up-to-date medical developments in the field of pneumoconiosis.

J. H. G. van Blommestein

C. H. Wyndham

B. T. Tindall

Johannesburg.
16th November, 1962.

ANNEXURE A

1. United Kingdom

(a) **London**

Ministry of Pensions and National Insurance

Dr. J. Watkins-Pitchford.
Dr. McVittie.

London School of Tropical Medicine and Hygiene

Dr. M. L. Thompson, Dept. of Physiology.

London Hospital: Department for Research in Industrial Medicine

Dr. A. I. G. McLaughlin.
Dr. G. Kazantzis.

National Coal Board

Dr. J. W. J. Fay, Director of Field Studies in Pneumoconiosis.

(b) **Cardiff**

Pneumoconiosis Panel

Dr. R. W. Thomas, Senior Medical Officer.
Dr. A. Caplan.

Pneumoconiosis Research Unit, Llandough Hospital

Dr. J. C. Gilson, Director.
Dr. J. C. Wagner.

(c) **Glasgow**

Department of Industrial Medicine and Hygiene, University of Glasgow

Dr. A. Meiklejohn.
Dr. J. Black, Senior Medical Officer, Ministry of Pensions and National Insurance.

2. Italy

Milan

Clinica del Lavoro "Luigi Devoto"

Professor E. C. Vigliani, Director.
Dr. Sartorelli.

3. Switzerland

Zurich

Der Mediz Universitats-Klinik

Professor Paul H. Rossier, Director.
Dr. A. Buhlmann.

4. Holland

Heerlen

Geneeskundige Dienst Der Nederl. Steenkolenmijnen

Dr. A. V. M. Mey, Directeur.
Dr. van Elk, Physiologist.
Dr. Chaillet
Dr. C. A. M. Hendriks.
Dr. Rutgers, Clinical Research.
Dr. Servaas, Doctor from Chemical Industry.

5. West Germany

(a) **Bochum**

"Bergmannsheil" Klinik

Professor Dr. E. Fritze, Chefarzt.
Dr. A. Drews.
Dr. K-A. Rosenkranz.
Dr. R. Nicolas.
Dr. Werner.
Dr. Weber.
Dr. W. Schroeder.

(b) **Cologne**

Medical University Clinic

Priv.-Doz. Dr. W. Hollman.

6. Belgium

(a) **Hasselt**

Instituut D'Hygiene des Mines

Professor A. Houberechts, Director.
Professor F. Lavenne.

(b) **Lanaken**

Medisch Instituut Sinte Barbara

Dr. A. Minette, Medisch-Directeur.
Dr. Weekers.

7. France

Nancy

Hospital Maringer

Professor J. Lacoste.
Dr. Q. T. Pham.

ANNEXURE B

V.C. or Vital Capacity:

The patient is instructed to take a maximum inspiration and then, when his lungs are filled, to breathe out as rapidly and forcefully as possible. The volume of air expired in this manner is known as the vital capacity.

F.E.V. 1 sec. is the expiratory volume, after maximum inspiration, which can be expressed forcibly by the lung in 1 second.

Tiffeneau Index:

Tiffeneau and his co-workers found that, if the F.E.V. 1 sec. was expressed as a direct percentage of the vital capacity, the resulting figure was fairly constant in normal subjects, with an average value of 83.8 per cent.

M.B.C. or Maximum Breathing Capacity is the maximum ventilation that a patient is voluntarily capable of performing in one minute. The test is usually carried out over a period of 15 seconds, and the results corrected to a period of one minute.

R.V. or Residual Volume is the volume of air left in the lung after a maximum voluntary expiration.

N.B.—Total deflation of the lung is impossible to achieve in life.

Measurement of pH, pO_2 and pCO_2 during Exercise:

The pH is the hydrogen ion concentration in the blood or the relative acidity or alkalinity. The pO_2 and pCO_2 is the partial pressure of oxygen and carbon dioxide in the blood and they indicate the saturation of these gases in the blood. Changes in these values from normality during exercise are a reflection of the efficiency of the lung function.