WORKMEN'S COMPENSATION FOR SILICOSIS
IN THE UNION OF SOUTH AFRICA, GREAT BRITAIN AND GERMANY

GENEVA
1937

Published in the United Kingdom
For the INTERNATIONAL LABOUR OFFICE (LEAGUE OF NATIONS)
By P. S. KING & SON, Ltd.
Orchard House, 14 Great Smith Street, Westminster, London, S.W.1
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INTRODUCTION

The problem of silicosis was one of the first to attract the attention of the International Labour Office, which directed its efforts to assembling data relative thereto; such data were at that time extremely rare, whether it were a case of medical data relating to pneumoconioses or of information as to compensation legislation, such as that in force for instance in Great Britain and in South Africa.

Resolutions presented by the International Stone Workers’ Secretariat calling for compensation of silicosis as far back as 1921 had been preceded by others adopted by national associations affected. In 1925 the Secretariat in question requested the International Labour Office to inscribe pneumoconiosis in the International Schedule of Occupational Diseases for Compensation. This request was strongly supported by similar resolutions emanating from other international organisations of workers, such as the Miners’ Federation and the International Stoneworkers’ Secretariat. The Office then organised an enquiry, chiefly bearing upon radiological diagnosis amongst a certain number of experts competent in the matter, whose replies were later submitted to the Correspondence Committee on Industrial Hygiene at its Dusseldorf meeting (September 1926). At that time, however, medical specialists in the subject did not consider it advisable to propose to the Governing Body of the Office the inscription of silicosis in the International Schedule of Occupational Diseases for Compensation, in view of the fact that the problem in question was complex and difficult, and so far lacked a sufficiently definite scientific basis to justify such an important step. The Committee, on the other hand, invited the Office to continue its research and to submit to a later meeting data concerned chiefly with the early diagnosis of the disease and those elements indispensable to the assessment of the degree of incapacity for work.

Soon, however, as a result of circumstances referred to elsewhere the scope of the studies engaged in began to extend

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beyond the field of activity of the Office, leading to the organisation in 1928, with the generous co-operation of the Transvaal Chamber of Mines, of an International Conference on Silicosis, which was held in 1930 (13-27 August) at Johannesburg and in which specialists on the subject from eight countries (Australia, Canada, Germany, Great Britain, Italy, Netherlands, Union of South Africa, and the United States) took part. The Agenda determined by the Governing Body of the Office in 1928 comprised the following subjects:

(a) Medical aspects of silicosis (pathological and clinical phenomena);
(b) Preventive measures;
(c) Compensation.

A collection of about thirty reports presented by specialists dealt with the question of silicosis or pneumoconiosis in the different countries or with certain special scientific aspects thereof. In adopting its final report on the various aspects of the problem, the Conference made certain recommendations, intended to serve as guiding principles for future research, and which might be grouped under six headings: preventive measures; standardisation of radiological technique and terminology; scientific research (physico-chemical) in regard to dust; medical research (etiology, pathology and diagnosis of silicosis); collection and distribution of new data and of statistics; bibliography.

From 1931 onwards the Governing Body of the Office made certain suggestions to the Governments of the States Members relative to the prevention of silicosis. The Industrial Health Service submitted at the same time to the Correspondence Committee a plan intended to lay down uniform methods to be followed with a view to achieving certain objects.

As regards scientific study, the Office, which to begin with had subsidised a certain amount of research either in laboratories or at the working post, found itself unable to continue this practice, but directed its attention rather to problems of radiological technique and terminology and to the publishing of a bibliography. The latter, published in 1932\(^1\), contained references to the existing literature up to the date of December 1931 arranged under five headings: pneumoconioses; general pathology; experimental research; clinical aspect; industrial pathology (by industry).

The Office also recognised the necessity for following with the closest attention the problem of compensation for silicosis which it had already studied under various aspects when the Governing Body decided in 1933 to insert on the Agenda of the Eighteenth Session of the Conference (1934) partial revision of the 1925 Convention dealing with compensation for occupational diseases with a view particularly to the inclusion of silicosis. The Office then requested the Correspondence Committee to examine the Report prepared and to submit Part III dealing with silicosis to those specialists whose work brought them into closer contact with the scientific and practical problems relative to compensation for silicosis.

Compensation was inscribed in the schedule appended to the Convention (Revised) at the International Labour Conference (1934) in the following terms:

Silicosis with or without pulmonary tuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death.

Further, the Conference adopted the following resolution:

(1) Each Member of the International Labour Organisation which ratifies this Convention should, in establishing a list of the trades and industries in which, in the opinion of the competent national authority, there is a risk of contracting silicosis, give due regard to the progress of scientific and clinical investigations into the etiology of this disease.

(2) Compensation for silicosis should not be considered apart from prophylactic measures. The most important of these is the prevention of dust. Consideration should also be given to the importance of preliminary and periodical examination of employees in at least the occupations involving practically continuous exposure to silica dust.

(3) Experience proves that for the purpose of compensation of silicosis it is essential to entrust the diagnosis and certification of silicosis only to medical men specially qualified for this work, who should be provided with the necessary equipment, especially with facilities for adequate radiological examination.

There should be organised by each national authority some suitable methods of co-ordinating the experience concerning the practice of carrying out medical radiological and pathological examinations as well as the results of scientific investigation.

(4) Special investigations should be made in each country regarding the possible incidence of silicosis and tuberculosis in the coal-mining industries, regarding which our knowledge is at present far from complete.

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2. Ibid., p. 203.
This resolution was the object of a lengthy discussion engaged in by the Correspondence Committee which met in 1934 at the end of the Conference. The Committee had under consideration in particular the report by Dr. Irvine dealing with the radiographic terminology of silicosis. Being specially concerned as to §§ 1 and 2 of the above resolution, which might represent an obstacle in regard to the preparation of national legislation for certain States desirous of ratifying the Draft Convention, the Committee, in its desire to bring the matter to a satisfactory conclusion, passed the following resolution:

"The Committee

"Is of opinion that the application of compensation in respect of the disease would be greatly facilitated if all possible useful information were assembled by the Health Service of the Office and transmitted to the Governments of those countries which so far do not provide compensation for silicosis."

Finally, during its Seventieth Session (April 1935), the Governing Body adopted the Committee's suggestions and authorised the publication proposed, thus taking the first step in giving effect to the resolution passed by the Conference.

A survey of the compensation legislation at present in force in various countries reveals the fact that silicosis is covered in accordance with several systems, which may be grouped as follows:

- Compensation afforded by special legislation.
- Compensation within the framework of the Workmen's Compensation Legislation:
  - (a) Schedule system,
  - (b) One or several special "schemes".
- Blanket coverage.

In view of the impossibility of analysing all existing legislative measures, it was considered preferable to present in detail three typical systems of legislation in force, namely those followed, firstly in the Union of South Africa (special legislation), secondly in Great Britain (special schemes) and thirdly in Germany (schedule).

Analysis of these Acts is given in accordance with a plan which has been made as uniform as possible in order that the results may be comparable: legislation, scope of legislation, right to compensation, certification of the disease, benefits, review, procedure for settling disputes, administration of compensation, prevention.
In Appendix I the reader will find an account of the system of "blanket coverage" and, in particular, of its practical application relative to compensation for silicosis; as well as data connected with radiological technique and terminology proposed or adopted by several specialists; enumeration of products utilised and of industries; statistics bearing on the incidence of silicosis and the cost of compensation in regard to countries where such data are available and, finally, a list of countries which have introduced compensation (pneumoconioses, and in particular silicosis).

The data presented relative to legislation may be considered as accurate up till 7 July 1937.

The Office desires to record here its sincere thanks to certain specialists on the subject who have been kind enough to revise parts of the text prior to publication or to furnish information contained in the text, namely: Dr. J. C. Bridge, Senior Medical Inspector of Factories, Factory Department, Home Office, London, for Great Britain; Dr. A. J. Orenstein, Chief Medical Officer, Central Mining, Rand Mines Ltd., Dr. L. G. Irvine, Chairman, Miners' Phthisis Medical Bureau, Johannesburg, and Mr. G. E. Barry, Legal Adviser, Transvaal Chamber of Mines, for the Union of South Africa.

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1 At the same date the Draft Convention (Revised) of 1934 had been ratified by the following States: Austria, Brazil, Cuba, Great Britain, Irish Free State, Japan, Mexico, Norway, Hungary and Sweden. Ratification had been authorised by the competent authority in the Netherlands and recommended in Iraq, Peru, Rumania and Spain.
Compensation for silicosis is accorded in virtue of the following Acts:

(1) Act to consolidate and amend the laws relating to miners' phthisis, No. 35 of 1925. Assented to 27 July 1925. *(L.S.¹, 1925, S.A. 2.)*

(2) Act to amend the law relating to miners' phthisis, No. 38 of 1930. Assented to 3 June 1930. *(L.S., 1930, S.A. 6.)*

(3) Act to amend the law relating to miners' phthisis, No. 60 of 1934. Assented to 7 June 1934. *(L.S., 1934, S.A. 2.)*

(4) Act to amend the law relating to miners' phthisis, No. 23 of 1936. Assented to 24 June 1936. *(L.S., 1936, S.A. 1.)*

Administrative regulations in virtue of the above Acts are contained in the following Government Notices:


**Scope of Legislation**

The legislation applies to "scheduled mines" and "gazetted mines".

"Scheduled mines" comprise those mines wherein the mineral dust produced by mining operations is or has been, in the opinion of the Minister, of such a nature as to cause silicosis.

"Gazetted mines" comprise those mines, the names of which have been published by the Minister in the Gazette for the purpose of compensation for silicosis.²

The list of "scheduled" or "gazetted" mines drawn up by the Minister of Mines and Industries is published in the form

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¹*L.S.* = Legislative Series; publication of the International Labour Office.

²The difference between these two types of mines is as follows: the "scheduled mines" are situated on the Witwatersrand and are mines which produce silicosis. "Gazetted mines" are not on the Witwatersrand and are mines which produce silicosis, but to a lesser extent. (Both types of mines are gold mines.)
of a notice in the Government Gazette, and the Minister may from time to time by like notice add to or withdraw from the list the name of any mine.

Any holder or lessee of a mine which for the time being is not included in the said list, or any number of miners not being less than one-third of the miners employed in any such mine, or the Miners' Phthisis Board or the Director of Native Labour, may petition the Minister in writing to include the name of that mine in the said list on the ground of the mineral dust produced by the mining operations being of such a nature as to cause silicosis.

Any employer, or any number of miners may, subject to the same conditions, likewise petition the Minister on the ground of the improved health conditions of the mine to withdraw the name of that mine from the said list.

Subsequent to investigation, the Minister has power in the first case either to include or refuse to include the name of the mine in the list, and in the second case to withdraw the name of the mine from the said list or to reduce the amount of the contributions payable to the Miners' Compensation Funds.

The results of investigations and subsequent decisions must be published in the Government Gazette.

When a mine has been scheduled as aforesaid, any land upon which mining operations are thereafter carried on in conjunction with that mine shall be deemed to form part of the mine in conjunction wherewith those operations are carried on.

If the question arises whether mining operations are or were carried on upon any land in conjunction with a scheduled mine or as to the date from which or the period during which any such operations were carried on upon such land, the Minister's decision of that question shall, for the purposes of the above paragraph, be final and conclusive.

The persons covered by the Act are those employed underground — that is to say, on any operation connected with underground work or employment beneath the surface or work or employment upon or about rock crushers in a rock crushing station operated for the purpose of ore reduction, or employment in a sample

1 The only ground for reduction of the amount of contribution would be proof of unquestionable improvement in a given mine as regards the silicosis rate. In practice no such proof has ever been adduced, and the clause simply constitutes a proviso in the event of circumstances arising which might warrant its application.
crushing room or assay office, or in a change house or on any tailings dump.

The Acts provide a definition of the word "miner" for the purposes of compensation.

In the event of doubt or dispute as to whether a person is a miner within the meaning of the Acts, the matter is referred for decision to the Government Mining Engineer, and his decision is final and conclusive.

Government inspectors of mines, including assistant inspectors, deputy inspectors or sub-inspectors, and inspectors of mining leases, are likewise covered by the Acts.

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1 By the term "miner", the Act designates briefly any person who is or has been employed underground at a "scheduled" or "gazetted" mine in any of the scheduled occupations.

(a) Any person employed in any occupation which necessitates spending one hundred or more working hours per month underground or in any of the 51 occupations explicitly enumerated, in respect of each month in which the incumbent is so employed.

(b) Any person employed on surface operations (13 of which are explicitly enumerated, and the list of which may be extended by notice in the Gazette) (repairs and maintenance) and working occasionally underground but less than one hundred hours per month, in respect of each day of which the incumbent is employed underground.

The processes covered are enumerated as follows in the Fourth Schedule of the 1925 Act.

(a) Occupations included in the term "miner" in respect of each month in which the incumbent is so employed.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assayer</td>
<td>Dumpsmen</td>
</tr>
<tr>
<td>Assistant manager</td>
<td>Dust sampler</td>
</tr>
<tr>
<td>Bar-rigger</td>
<td>General miner</td>
</tr>
<tr>
<td>Blaster</td>
<td>Hanging inspector</td>
</tr>
<tr>
<td>Cageman</td>
<td>Jumperman</td>
</tr>
<tr>
<td>Change-house attendant</td>
<td>Leasher</td>
</tr>
<tr>
<td>Crusher-house attendant</td>
<td>Learner</td>
</tr>
<tr>
<td>Developer</td>
<td>Mine captain</td>
</tr>
<tr>
<td>Drain and track cleaner</td>
<td>Mine overseer</td>
</tr>
<tr>
<td>Motor attendant</td>
<td>Stoper</td>
</tr>
<tr>
<td>Onsetter</td>
<td>Surveyor</td>
</tr>
<tr>
<td>Pipeman</td>
<td>Timberman</td>
</tr>
<tr>
<td>Platelayer</td>
<td>Traffic man</td>
</tr>
<tr>
<td>Pumpman</td>
<td>Trammer</td>
</tr>
<tr>
<td>Pump-station man</td>
<td>Truckbuster</td>
</tr>
<tr>
<td>Reclaimer</td>
<td>Underground banksman</td>
</tr>
<tr>
<td>Sampler</td>
<td>Underground blacksmith</td>
</tr>
<tr>
<td>Sandfiller</td>
<td>Underground boilermaker</td>
</tr>
<tr>
<td>Sanitary man</td>
<td>Underground drill sharpener</td>
</tr>
<tr>
<td>Scrap collector</td>
<td>Underground electrician</td>
</tr>
<tr>
<td>Shaft sinker</td>
<td>Underground engine driver</td>
</tr>
<tr>
<td>Shaker attendant</td>
<td>Underground fitter</td>
</tr>
<tr>
<td>Shift boss</td>
<td>Underground handyman</td>
</tr>
<tr>
<td>Skipman</td>
<td>Underground manager</td>
</tr>
<tr>
<td>Stope examiner</td>
<td>Underground native supervisor</td>
</tr>
<tr>
<td></td>
<td>Wastepacker</td>
</tr>
</tbody>
</table>

[Note continued on next page.]
RIGHT TO COMPENSATION

Despite the fact that the expression *Miners' Phthisis* is used in the title of the Acts, this term does not reappear in the text thereof, where the terms currently employed are silicosis of the lungs (with or without tuberculosis) and tuberculosis of the lungs or of the respiratory organs.

Three states of silicosis are distinguished in the Acts:

(a) an ante-primary stage when it is found 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;

(b) a primary stage when it is found 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) a secondary stage when it is found 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 that tuberculosis with silicosis is or has been present.

A person is deemed for the purposes of the Act to be suffering from tuberculosis whenever it is found either:

(a) that such person is expectorating the tubercular bacillus; or

(b) that such person has closed tuberculosis to such a degree as to impair seriously his working capacity and render prohibition of his working underground advisable in the interests of his health; tuberculosis within the meaning of the Act being tuberculosis of the lungs or respiratory organs.

Compensation is accorded for cases of disease or of death.

1) Compensation for disease is accorded in cases of: Silicosis with or without tuberculosis, or tuberculosis without silicosis.

and any other occupation which necessitates spending one hundred or more working hours per month underground.

(b) Occupations included in the term "miner" in respect of each day on which the incumbent is employed underground, but less than one hundred hours per month.

- Carpenter Surface engine driver
- Mechanic Surface fitter
- Surface blacksmith Surface native supervisor
- Surface boiler maker Surface rigger
- Surface drill sharpener Surface truckbuster
- Surface electrician
- Surface stonemason

(added by Government Notice No. 411, dated 8 March 1928)

and any other occupation published by the Minister for this purpose by notice in the Gazette.

The definition likewise covers any miner as defined under any law relating to miners' phthisis in force at any time prior to the commencement of the 1925 Act.
(a) In cases of silicosis with or without tuberculosis:

(i) The miner can at any time claim compensation, provided that he has worked underground on a scheduled mine for a period amounting in the aggregate to five years; that he has worked for some portion of that period subsequent to 1 August 1908; and that he submits his claim within five years from the date at which he last worked underground at a scheduled mine within the meaning of the 1925 Act or preceding Acts.\(^1\)

However, if such a claimant is a resident in the Union, the Mandated Territory of South West Africa, or the adjacent Protectorates of Bechuanaland, Basutoland or Swaziland, he can submit the claim at any time even after five years provided that he satisfies the Board that the disease is the result of underground work at a scheduled mine, and that he had worked underground at a scheduled mine after 1 August 1908.

Any miner who has not resided in the above countries, but has worked underground at a scheduled mine after 1 August 1908, can also obtain compensation at any time provided that the Board is satisfied that he contracted silicosis during and in consequence of work in a scheduled mine and that he has not been engaged during the intervening period in an occupation which in the opinion of the Board is likely to have caused silicosis or to have aggravated it;

(ii) The native worker has similar rights to the miner.

(b) In cases of tuberculosis without silicosis:

(i) The miner must have been employed underground during one or several periods amounting in the aggregate to at least twelve months at any scheduled mine under the same conditions and he must be found to have tuberculosis at a prescribed medical examination within twelve months from the date on which he last so worked underground.

(ii) In the case of native labourers the prescribed period is one month's underground work to qualify for compensation, and the disease must have been certified at the final examination or within six months of cessation of underground work.

(2) Compensation in case of death is accorded to dependants of miners or native labourers when death is due to silicosis or any other cause with which silicosis was present as a contributing or predisposing factor.

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1 These are as follows: the "previous Act": Act No. 35 of 1924; the "principal Act": Act No. 40 of 1919; the "prior Law": Acts No. 19 of 1912, No. 29 of 1914, No. 44 of 1916, No. 44 of 1917 and No. 24 of 1918.
Compensation is likewise accorded to dependants of miners or natives who have died of tuberculosis.

Right to compensation is, however, subject to the observation of a certain number of obligations: compulsory medical examination; conditions to be observed by persons suffering from silicosis or tuberculosis in regard to underground employment, and compensation claims. (See Note, “Medical Examinations”, p. 40.)

Save as regards certain special cases hereafter referred to, miners in receipt of benefits in respect of silicosis or tuberculosis with or without silicosis are prohibited by law from working underground in mines covered by the Act (“scheduled” or “gazetted” mines) or in any other occupation specified by the Minister by means of notification in the Gazette, viz. in other mines, when such occupations are considered as liable to cause or aggravate silicosis and they forfeit all rights to additional compensation if engaged in such work after 1 August 1919 for having contravened the Act.

A miner who was last granted benefits under the Acts in force prior to 1 August 1916 (commencement of Act No. 44 of 1916 under which the Bureau was established) is not prohibited from working underground at a scheduled mine provided that at a medical examination by the Bureau he is granted an “initial” certificate (i.e. that he is free from any disease of the lungs and respiratory organs and is in every respect physically fit for underground work). If such a miner resumes underground work at a scheduled mine and is subsequently found to have silicosis or tuberculosis, or both diseases, he is entitled to benefits under the Act as if he had not received any compensation previously.

A beneficiary miner who was on examination prior to August 1934 found by the Bureau to have neither silicosis nor tuberculosis is permitted to resume work at a scheduled mine in certain occupations and localities (specifically designated by the Minister by notice in the Gazette for this purpose) provided that at a medical examination by the Bureau he is granted a “special authorisation” (i.e. that he has neither silicosis nor tuberculosis and is suitable for work in such special occupations and localities). If such a beneficiary is subsequently certified to have silicosis or tuberculosis, or to be no longer suitable for such work, his special authorisation lapses and he becomes entitled to additional benefit provided by the Act for silicosis or tuberculosis.

Such operations laid down by the Government Mining Engineer are those involving the least degree of exposure to silicosis.
CERTIFICATION OF THE DISEASE

The disease may be reported either in course of the initial medical examination, prior to certification as fit for work, at a periodical examination or any other examination provided for under the Act, or in the course of an examination carried out upon a claim for compensation having been lodged.

Medical examiners on the list (see p. 37) must report to the Medical Bureau within three days cases of tuberculosis or silicosis met with. If upon examination the Bureau confirms that the workman is suffering from tuberculosis or silicosis, it must notify immediately the Miners' Phthisis Board or the Director of Native Labour, according as to whether the patient is a miner or native labourer.

Apart from the above provision, which in practice applies only to native labourers, legislation does not require any other notification of the disease, since its detection, which is at the same time confirmed, is entrusted entirely in the case of European miners to the Medical Bureau.

On the other hand, the miner or native labourer or their dependants considering themselves entitled to compensation may submit to the Miners' Phthisis Board an application for compensation accompanied by the prescribed documents and particulars.

1 A claim for compensation must be transmitted on a prescribed form which differs according to the category of the patient:

(a) European miner:
Miner (form M.P.B. No. 2); widow, or widow and child (form M.P.B. No. 3); other adult dependants (form M.P.B. No. 4); minor dependants (form M.P.B. No. 5).

(b) Non-European miner:
Miner (form M.P.B. No. 6); widow, or widow and child (form M.P.B. No. 7); adult dependants (form M.P.B. No. 8); minor dependants (form M.P.B. No. 9).

(c) Native labourer:
Native labourer (form M.P.B. No. 10); dependants (form M.P.B. No. 11).

(In the case of native labourers the claim is lodged by the Inspector of Native Labour, or in default of this, by the Magistrate, Native Commissioner or Sub-Commissioner for the district and addressed by them to the Director of Native Labour, who, in his turn, notifies the Miners' Phthisis Board.)

The claim must be accompanied by the following documents in the case of:

(a) A miner (European or non-European):
Miner's blasting certificate (if any); his record of service.
If the miner is still in employment at a mine, when he makes his claim, he sends instead of these all his old discharge certificates, his current periodical certificate and, where necessary, an official

[Note continued on next page.]
The Board deals with every claim as soon as possible and, if necessary, has the prescribed medical examinations effected by the Medical Bureau.

In the case of claims for benefits made by miners subsequent to periodical medical examination, no further medical examination is required. When a miner, however, makes application for further benefit, he becomes subject to the "benefits examination" of the Bureau.

Diagnosis of the disease and, in certain cases, confirmation of diagnosis previously made, is entrusted to the Medical Bureau. It is likewise the duty of this body to grant the requisite certificates entitling workers to benefit in response to claims for compensation lodged by the workers or their dependants, or claims made consequent on the medical examinations prescribed.

Certificates to be lodged with Claims for Compensation

After being notified by the Board, the Medical Bureau in its turn deals with the cases, and summons for examination those miners who fulfil the conditions entitling them to compensation. The result of the medical examination is inscribed on forms

certificate of his marriage; and an official birth certificate for each child under sixteen.

(b) A widow:
An official certificate of the death of the deceased miner; an official certificate of marriage; official birth certificate for each child; and the deceased miner's records of service and blasting certificate.

(c) All other dependents:
An official certificate of death of the deceased miner; his records of service and blasting certificate; a statement of the relationship of the dependant to the deceased miner and of the nature and extent to which the dependant was maintained by him, at the time of his death; such official certificates of birth or marriage as may be necessary to establish the relationship of the dependant to the deceased miner.

When application for compensation or payment of funeral expenses is made by a lawful representative of the deceased miner, it must be accompanied by the official letters of authority issued by the Master of the Supreme Court or by similar authority in the country where the estate is being administered.

1 See "Medical Examiners", p. 37.
2 See Note, "Medical Examinations", p. 40.
which vary in accordance with the category of the persons examined and the stage of the disease certified\(^1\).

In cases of death, whenever the Medical Bureau considers it necessary, having obtained the consent of the relatives of the deceased, it nominates and instructs a medical practitioner to conduct a post-mortem examination, and he, having made such examination, forwards his report on a special form (G).

Every medical practitioner who carries out any post-mortem examination upon the body of any person who was employed in or about any scheduled mine must, if he finds on such examination silicosis or tuberculosis to be present in the lungs of the deceased, send such lungs to the Bureau accompanied by his report thereon: provided that if any such person was employed in any occupation within the meaning of the term "miner", the medical practitioner must send such person’s lungs to the Bureau accompanied by his report thereon whether or not he finds silicosis or tuberculosis to be present.

After examination of the lungs and relative documents, the Medical Bureau makes its report on the post-mortem examination (form I), stating whether the deceased miner died from silicosis or a cause other than silicosis and whether silicosis was or was not present as a contributing or predisposing factor, and whether at the time of his death he had or had not silicosis (mentioning the stage) or tuberculosis.

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\(^1\)The certificates for miners are inscribed on the following forms:

<table>
<thead>
<tr>
<th>Forms</th>
<th>Diseases certified</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. C.</td>
<td>Neither tuberculosis nor silicosis.</td>
</tr>
<tr>
<td>B (4)</td>
<td>Silicosis (neither in primary nor secondary stage).</td>
</tr>
<tr>
<td></td>
<td>Certificate only issued to cases certified prior to 1916 (beneficiaries under previous legislation) and it indicates that silicosis in the ante-primary stage is present. (At the time these cases were originally certified no provision was made in the Act for cases in the ante-primary stage.) The certificate further states, contrary to the practice in other certificates, that the patient is fit or unfit for underground work.</td>
</tr>
<tr>
<td>B. Pr.</td>
<td>Primary silicosis without tuberculosis.</td>
</tr>
<tr>
<td>B. Sec.</td>
<td>Secondary silicosis without tuberculosis.</td>
</tr>
<tr>
<td>B. E.</td>
<td>Silicosis with tuberculosis.</td>
</tr>
<tr>
<td>B. D.</td>
<td>Tuberculosis (open or closed) without silicosis.</td>
</tr>
</tbody>
</table>

With the exception of the first mentioned, the certificates indicate the expectation of life, the degree of working capacity — ordinary, moderate, light, no work — and state whether the applicant is physically fit or unfit for work on an agricultural settlement.

The certificate for native workers is made out on form B.N. and indicates whether the applicant is suffering from silicosis, at what stage and whether with or without tuberculosis, or on the other hand states that the applicant has not silicosis in a stage entitled him to benefits and is not suffering from pulmonary tuberculosis.
Certificates delivered subsequent to Medical Examinations

1. No person is permitted to work as a miner in a scheduled mine until he has first passed a medical examination and received from the Medical Bureau an "initial" certificate of fitness.

The so-called "initial" certificate must state that the applicant is free from disease of the lungs and respiratory organs and is in other respects physically fit for underground work.

The so-called "special" certificate delivered to workers who, from time to time, are engaged on underground work (less than one hundred hours per month) must state that the applicant is not suffering from tuberculosis.

The certificate must bear mention of the date at which it expires and beyond which it is of no effect.

Where the Medical Bureau is not in a position to grant a certificate, it furnishes a notification to the effect that the said certificate cannot be accorded. In the case of the temporary rejection of a candidate at an initial examination, the Medical Bureau fixes the date on which the applicant may present himself for further examination 1.

2. Subsequent to periodical medical examination, the Medical Bureau may be required to deliver, according to the conditions found, the following certificates: absence of tuberculosis; tuberculosis with or without silicosis; silicosis in its various stages 2.

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1 The applicant presents his application on form O, the certificates are inscribed on the following forms:

<table>
<thead>
<tr>
<th>Form</th>
<th>Initial Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.</td>
<td>European miner.</td>
</tr>
<tr>
<td>P.N.E.</td>
<td>Non-European miner.</td>
</tr>
</tbody>
</table>

By "non-European" is meant a person other than a "white" European. It does not mean a native (negro). It means such persons as Asiatics, Euro-Africans, Eurasians, etc.

<table>
<thead>
<tr>
<th>Notification of Rejection</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. Temporary rejection.</td>
</tr>
<tr>
<td>R.R. Final rejection.</td>
</tr>
<tr>
<td>Q. Special certificate (not issued to non-Europeans).</td>
</tr>
</tbody>
</table>

Forms P.N. (initial certificate) and R.R.N. (notification of rejection) intended for native labourers are no longer in use, the records being kept on the card system at the individual mine on which the native seeks employment.

2 Forms for certificates granted subsequent to periodical examinations:

<table>
<thead>
<tr>
<th>Form</th>
<th>European and Non-European Miners</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>No tuberculosis. (Certificate permits examinee to remain at work.)</td>
</tr>
<tr>
<td>D</td>
<td>Tuberculosis without silicosis.</td>
</tr>
<tr>
<td>E</td>
<td>Tuberculosis with silicosis.</td>
</tr>
</tbody>
</table>

[Note continued on next page.]
The forms used differ also in accordance as to whether it is a question of European, non-European miners, or native labourers, and whether the examination of non-European miners or native labourers is conducted by a medical practitioner ("examiner") or by the Medical Bureau.

The certificate is transmitted directly to the miner, and in the case of a native labourer to his employer, whose duty it is to inform him forthwith of the contents thereof.

Further, the Medical Bureau must advise the Miners’ Phthisis Board or the Director of Native Labour, as the case may be, of any person found to be suffering from silicosis or tuberculosis or from both diseases at any periodical examination.

3. The final examination of native labourers is conducted by "examiners", who draw up a report in each case of tuberculosis, silicosis or both diseases, which they submit to the Bureau on a form AN.

4. The "special authorisation" certificate previously referred to for underground work in a scheduled mine, in a locality or occupation defined by the Minister, is made out on a form SA(F) for a beneficiary miner when a medical examination shows him to be free from tuberculosis or silicosis and suitable for underground work. This certificate is valid for a period of six months, after which re-examination is necessary.

When it is not possible to issue the special authorisation certificate, the Medical Bureau transmits a notification thereof on the form SA(R).

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Note. — D and E notifications entail compulsory removal from underground employment.

Note continued from previous page.

Native Labourers

Examination by Examiner on Mines

No forms issued to examinee.

Only forms AN and 10 are used. Form AN is a report to the Bureau by an examiner, and Form 10 is a statement of the industrial history of the native labourer issued by the Native Affairs Department.

Examination by Medical Bureau

Form DN: Tuberculosis without silicosis.

Form EN: Tuberculosis with silicosis.

Forms DN and EN entail compulsory removal from work.

Form RN is an omnibus form for certification of no silicosis or tuberculosis, tuberculoses, silicosis in all its stages and tuberculosis with silicosis. Removal from work is compulsory in the case of tuberculosis with silicosis.

1 In practice this provision applies only to beneficiaries who were granted compensation prior to the institution of the Medical Bureau in 1916.
As a general rule the certificates are addressed directly to the miner in the case of a miner and to the Director of Native Labour in the case of a native labourer.

The Medical Bureau or the Medical Board of Appeal has power, apart from the sanctions provided by the Act, to cancel or amend any medical certificate which has been altered or forged.

The Miners’ Phthisis Board makes its decisions only after receiving a certificate of the Medical Bureau or the Medical Board of Appeal. In the case of native labourers, however, it is the Director of Native Labour to whom is entrusted the task of following the procedure in regard to compensation (collecting compensation and transmitting it to those entitled, etc.).

Benefits

The Act provides in the case of disease or death for a benefit which is payable either as a lump sum or as a varying monthly payment according to the disease in question and its stage of development and also to the category of the beneficiaries (earnings, dependants, etc., of miners or native labourers).

Sickness

In cases of ante-primary silicosis the miner and native labourer receive an amount payable in one sum or in instalments calculated as follows: twelve times that part of the month’s earnings\(^1\) which does not exceed £29 3s. 4d., and six times that part of the month’s earnings exceeding £29 3s. 4d. but not exceeding £37 10s. 0d., and three times that part which exceeds £37 10s. 0d.

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\(^1\)“Month’s earnings” means one-sixth of the amount earned by the miner or native labourer in question for the 156 days on which he worked as such last, prior to the date upon which he was first certified by the Bureau to have developed silicosis or tuberculosis to a degree entitling him to any benefit under the Acts. In the case of a native labourer, monthly earnings mean the actual wages paid or credited to him exclusive of any ex gratia payments or the value of any food, accommodation or any other thing or service supplied to him by his employers.

Every employer must, upon request by the Miners’ Phthisis Board or the Director of Native Labour, supply a true and correct statement of the amount earned by the miner or native labourer for the number of days specified in the request, as well as all other information necessary relative to duration of employment; provided that if for any reason the amount of the month’s earnings cannot be ascertained, the amount shall be taken to be a sum to be determined by the Miners’ Phthisis Board or the Director of Native Labour as the case may be.

Special provisions exist in regard to the calculation of the earnings of miners to whom allowances are payable under the prior law.
**Primary silicosis.**

The miner and native labourer receive the amount provided for silicosis in the ante-primary stage increased by 50 per cent. Further, miners who have already received an award for ante-primary silicosis receive under certain conditions the supplementary 50 per cent. when they are found at a later date to be suffering from primary silicosis.

**Secondary silicosis including tuberculosis with silicosis.**

1. The miner receives a monthly allowance calculated as follows:

   For the miner himself: one-half of that part of his month's earnings which does not exceed £20 and one-quarter of that part of his month's earnings which exceeds £20 but does not exceed £28 6s. 8d. and one-twentieth of that part of his month's earnings exceeding £28 6s. 8d.;

   For his wife: one-fifth of the total amount payable in respect of the miner;

   For each child under sixteen years (not exceeding three)¹: one-tenth of the amount payable in respect of the miner, and for each such child in excess of three, one-tenth of such amount.

   If a miner formerly certified as suffering from ante-primary or primary silicosis is not granted any compensation (he having presumably continued at underground work) until he is certified to be suffering from secondary silicosis including tuberculosis with silicosis he receives the full monthly allowance for the secondary stage plus the amount payable for the ante-primary stage of silicosis. That is to say, he receives a lesser amount in compensation by the difference between the ante-primary and the primary compensation.

2. The native labourer receives the amount granted for ante-primary silicosis, augmented by 100 per cent.

**Tuberculosis without silicosis.**

1. The miner receives the same benefit as in the case of primary silicosis;

2. The native labourer receives a benefit similar to the miner's if the disease is detected at the "final" visit or within six months following the cessation of underground employment.

¹"Children" means, in this connection and subject to certain conditions, sons and daughters as well as legitimate step-children of the miner and adopted sons and daughters if "adopted" in terms of the Act.
Tuberculosis with silicosis (see above).

As a general rule, benefits are not granted to any miner who has left the Union on or after 1 August 1917, unless he has undergone a medical examination at the Office of the Bureau or unless the Bureau, for good cause shown, authorises an examination of such miner resident outside the Union by a medical practitioner approved of by it for that purpose.

Death

1. In the case of the death of a miner his dependants are entitled to such benefits or further benefits as he was entitled to at the time of his death, but if he was, before or after his death, found to have silicosis in a secondary stage or tuberculosis with silicosis, or if he died from silicosis, or if silicosis was a contributing or predisposing factor in the causation of his death, they receive a monthly allowance calculated as follows:

(a) Widow and children under 16 years of age, double the allowance prescribed for the wife and children in the case of the allowance to the sick miner (see p. 23).

(b) In default of persons mentioned in (a) persons wholly dependent on the deceased: the allowance prescribed for the widow.

(c) In default of persons mentioned in (a) and (b) persons partly dependent on a miner: allowance equal to the average

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1 "Child under 16 years of age" includes a child who, although over the age of 16, is in the opinion of the Bureau unable to earn a living by reason of physical or mental incapacity.

If any child of 16 years and over in respect of whom an allowance has been granted is in the opinion of the Bureau unable by reason of ill-health to earn a living, such allowance shall be continued for so long as in the opinion of the Board it might reasonably have been expected that the miner would have continued to contribute to the support of such child.

2 Dependents within the meaning of the Act comprise widow, legitimate or illegitimate children under 16 born prior to the date of the certificate of the Medical Bureau certifying the presence of the silicosis in the secondary stage or tuberculosis with silicosis, or before 1 August 1919, whichever date is later. In default of the above-mentioned persons, the following persons are likewise considered as dependants: legitimate or illegitimate children over the age of 16; father, mother, step-father, step-mother, brothers, sisters, half-brothers, half-sisters and any of their children, grandparents and grandchildren and any other relation by consanguinity or affinity, provided that in respect of the latter categories of persons payments are no longer made to anyone who has contracted a marriage after the death of the deceased person upon whom he was dependent. In each particular case it is the Board which decides without review or appeal which persons are to be considered as dependants.
monthly support given by the miner, but not exceeding the allowance prescribed for the widow of a miner.

The monthly allowance granted to a dependant (other than a widow and children under sixteen years) continues for so long as, in the opinion of the Board, it may have been reasonably expected that the miner would have continued to contribute to the support of such dependant. The allowance ceases in the case of death or marriage of the dependant, and likewise in the case of death or remarriage of a widow. Should a widow re-marry, however, she is paid in one sum on such remarriage 24 times her monthly allowance.

Special provisions deal with payment of an allowance to the widow and children of a miner who has died outside South Africa and with beneficiaries of monthly allowances (miners or dependents) who have left South Africa without the written permission which the Board can grant for temporary purposes, or outside the period limited by such permission, who are no longer entitled to any payment when once the sum paid reaches £750, unless any such miner or dependant has returned to reside in South Africa before 1 August 1933, in which case the payment may be continued beyond the said sum; such payment ceases, however, should the beneficiary again leave South Africa without the written permission of the Board.

An allowance for dependants (other than a widow and children under sixteen years wholly or partly dependent upon the deceased) is not granted for more than one dependant.

Special provisions apply in certain cases to dependants of a deceased miner who had been granted benefits under the prior law and made application after the coming into force of the 1925 Act.

1 Upon the death of a beneficiary (miner or dependant) any balance of any benefit remaining in the hands of the Miners' Phthisis Board may be paid to dependants of the deceased, and if there are no such dependants such balance or portion thereof may at the discretion of the Board be paid to any heir or legatee of the deceased. Provided that if such deceased miner left no dependant, the Board may in its discretion pay to any person who in the opinion of the Board is a creditor of the deceased, any monies which at the time of his death had accrued to the deceased by way of a monthly allowance. If not so paid the balance or remainder lapse to the Compensation Fund or Gazetted Mines Fund.

2 Further, no award of a monthly allowance is granted to the dependants of a deceased miner where such dependants entitled to claim the allowance are resident outside of South Africa if at the date of the miner's death the allowances paid to and in respect of the miner has exceeded the sum of £750 calculated from the date of the award of a monthly allowance granted to such miner.
Benefits are payable to dependants or such other persons as the Board may designate in the interest of the beneficiary or his dependant, in such instalments or such other manner as it may from time to time consider most advantageous to the beneficiary concerned or his dependants.

No amount payable as a benefit under the Acts is assignable or transferable or capable of being hypothecated or pledged, or liable to be attached or subjected to any form of execution under a judgment or order of any court of law and in respect of any debt contracted before the award was made; the same applies to any property, movable or immovable, purchased with such amount or any part thereof.

Whenever the whereabouts of a dependant are unknown, any balance still due to such beneficiary lapses to the Compensation Fund after a period of three years from the date of the last payment, until such time as the whereabouts of the said person may again become known, when the claim may be reviewed.

2. In the case of death of a native labourer two classes of benefit are provided for:

(a) Where silicosis has not been certified prior to death and where the medical bureau is satisfied and certifies that death was due to silicosis or to any other cause, provided that silicosis was present as a predisposing or contributing factor (from a post-mortem examination or other valid satisfactory evidence), dependants of the native labourer who have not already received benefits are entitled to a lump sum similar to that provided in the case of secondary silicosis or tuberculosis with silicosis.

(b) Where the presence of silicosis has been certified prior to death and where for any reason the deceased had not received compensation, the dependant is entitled to the benefit which would have been granted to the native labourer.

In both the above cases where the deceased leaves more than one dependant, allocation of the amounts which each person shall receive is made by the Director of Native Labour.

Upon the death of a native labourer in receipt of compensation, any balance of an award remaining in the hands of the Director is paid to the dependants of the native labourer or, in his absolute discretion, to such persons as he may consider heirs of the deceased, or in default of these, the balance is repaid to the employer.
Various Benefits

In addition to the above the Miners' Phthisis Board grants a certain number of payments either to the miner or his dependants.

Funeral expenses. — A sum not exceeding £25 is payable in respect of reasonable burial expenses and medical attendance or other reasonable expenses during the last illness in the case of a miner who, at the time of his death, was in receipt of benefits or was entitled to receive such.

Travelling expenses. — A beneficiary in receipt of a monthly allowance (a miner or the dependants of a deceased miner) who desires to quit South Africa may, at the discretion of the Board, be granted a passage to his destination for himself and any dependents, together with a sum not exceeding £10 for incidental expenses.

Expenses of transfer. — A beneficiary miner receives such expenses as the Board may deem reasonable as incidental to his transport, together with his wife and children under 16 years of age, to places within the Union where employment has been obtained for him.

Special supplementary benefits. — Special grants may be accorded from the Miners' Phthisis Special Fund (see later) in favour of a beneficiary miner in necessitous circumstances who is, in the opinion of the Medical Bureau or Medical Board of Appeal, unfit for moderate work owing to age, disease or physical incapacity, or, though not so unfit is, in the opinion of the Board through no fault of his own, unable to obtain employment or earn sufficient for his maintenance and that of his dependents. The amount and duration of such grants are left entirely to the discretion of the Board.

Similar benefits may be accorded to a deceased miner's dependants who are beneficiaries, or dependants of deceased beneficiaries and in necessitous circumstances.

Miners entitled to these grants must have been, from 1 August 1933 or the date on which they became for the first time beneficiaries (whichever date is the later), resident in the territory of the Union, Bechuanaland, Basutoland, Swaziland or the Mandated Territory of South West Africa.

Beneficiary dependants entitled to the above grants must have resided from 1 August 1933 or the date of death of the miner, whichever is later, in the territory of the Union,
Bechuanaland, Basutoland, Swaziland or the Mandated Territory of South West Africa.

The monthly payments referred to above cease from the time at which the beneficiaries no longer satisfy the conditions laid down.

**Review**

Revision of benefits granted can take place either:

(a) on an application by the beneficiary or his dependants, if it is found that he is suffering from a more advanced degree of silicosis than previously certified by the Medical Bureau;

(b) on the Board being satisfied that such benefits have been obtained by fraud or in other improper manner or as a result of lack of evidence or again on account of modification of the certificate granted by the Medical Bureau.

Subsequent to such revision, benefits may be suspended, diminished or increased.

**Procedure for Settling Disputes**

*Administrative.* — The decisions of the Miners' Phthisis Board (or of the Director of Native Labour in the case of native labourers) upon any question of fact are final and not subject to appeal or review by any court of law. In the case, however, of a grant or refusal of benefit or of any other of the functions of the Board or the Director the decision is subject to review by the Transvaal Provincial Division of the Supreme Court upon the ground of illegality or gross irregularity, but not otherwise.

The Board, the Medical Bureau, or the Director of Native Labour may of their own or his own motion or at the request of any person interested state a special case for the decision of the Transvaal Provincial Division of the Supreme Court. Where such a request is refused, the said Provincial Division may, on application made within one month thereafter by any persons interested, order that such request be complied with. Any person interested may, without leave being obtained, appeal from the decision of the said Provincial Division upon a special case to the Appellate Division in accordance with the rules governing appeals to the last-mentioned Division.
The Board, Medical Bureau or the Director of Native Labour may, of their or his own motion or on the application of any person interested, review any previous decision if such previous decision is not in accordance with the judgment given upon a special case so stated as aforesaid and on such review make an order or award or issue a certificate in accordance with the said judgment.

Medical. — Any miner ¹ dissatisfied on medical grounds with the certificate granted by the Medical Bureau subsequent to periodical examination or any examination for benefit and who has not accepted any benefits under an award made as a result of such certificate may, within three months after the receipt by him of the Bureau's certificate of such examination, apply in writing to the Bureau to reconsider his case in the presence of his own medical adviser or appeal to the Medical Board of Appeal.

Every such appellant must be X-rayed if necessary and clinically re-examined by the Medical Board of Appeal which must, if deemed necessary, consult with the members of the Medical Bureau and carry out any other requisite investigations.

Any dependant of a deceased miner, dissatisfied with the decision of the Medical Bureau as to the cause of such miner's death or as to whether he did or did not have silicosis or tuberculosis or both these diseases at the time of his death, may appeal from that decision to the Medical Board of Appeal within a delay of three months.

The Medical Bureau and the Board must, if required, produce to the Medical Board of Appeal all records in their possession in respect of the appellant.

A certificate of the findings of the Medical Board of Appeal together with its report thereon are submitted to the Medical Bureau and to the Miners' Phthisis Board.

The decision of the Medical Board of Appeal is final.

Administration of Compensation

The system of insurance in force is based on the collective liability of employers. Nevertheless in the case of native workers employed in scheduled mines it is the employer himself

¹ According to the definition of the term "miner" which means any person other than native labourers it follows that the latter have no right of appeal.
who is personally responsible for the compensation (lump sum) payable.

When a native labourer is found to be suffering from silicosis or tuberculosis, if he is still employed on underground work the amount payable is paid by the employer in whose service the native labourer is registered for underground work. In any other case the amount payable is paid by the employer in whose service the native labourer was last registered for underground work. The sums due from the employer responsible are paid to the Director of Native Labour.

Where the mine is closed down or withdrawn from the list of scheduled mines, the said amount is on application of the Director of Labour paid to him by the Miners' Phthisis Board out of the Compensation Fund.

In the case of "miners" (European and non-European) engaged in scheduled mines and native labourers engaged in gazetted mines, employers being collectively responsible for compensation, benefits are payable by the following compensation funds.

1. The Miners' Phthisis Compensation Fund is applied principally to the payment of any benefits and allowances awarded to miners and non-European workers engaged in scheduled mines.

It likewise has power to contribute to the extent of a sum not exceeding 50 per cent. to the cost of establishing and maintaining one or more sanatoria for purely silicotic patients and also to the creation and maintenance of a reserve fund in cash or investments or both. The Act also provides that the Fund should organise and maintain an Outstanding Liabilities Fund (see later) and Trades and Industries Fund (see later).

The Compensation Fund is also applied to defray certain expenses: gratuities granted on termination of a certain period of service, on retrenchment, superannuation or retirement, to the staff of the Miners' Phthisis Board, the Medical Bureau or the Medical Board of Appeal; any expenses incidental to the carrying out of the provisions of the Act; payment of any loan from the Compensation Fund to the Gazetted Mines Fund (see later).

The assets of the Fund consist chiefly of contributions levied quarterly on employers possessing or working scheduled mines.  

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1 Accessory payments to the Fund comprise interest from investments, donations or legacies, fines recovered for infringement of provisions or regulations dealing with the laying of dust, ventilation and protective measures against silicosis and tuberculosis.
The Miners' Phthisis Board fixes the amount of the contributions which it considers necessary and levies the sums in question on employers as follows:

50 per cent. of the amount in proportion to the silicosis rate for each mine;  
30 per cent. of the amount in proportion to the earnings in a scheduled mine during the previous period of three months of the miners employed;  
20 per cent. of the amount in proportion to the sum for which such employer was assessed for normal income-tax in respect of the penultimate accounting period of such employer for that mine.

No variation or inaccuracy shall invalidate any such levy, but the Board shall so soon as conveniently may be after the last day of March in every year, correct all such variations and inaccuracies which may have occurred during the year preceding

1 This rate is ascertained annually by adding together periods of employment — during the 10 years preceding the dates on which miners had been certified by the Bureau for the first time to have silicosis in a stage entitling them to any benefit (under the principal Act, the previous Act or the 1925 Act) — of all miners who have been so certified during the 5 years ending the 31st day of July last previous; and by distributing the total period thus obtained among the employers in proportion to the aggregate period during which such miners were employed at each employer's scheduled mine.

Provided that if the silicosis rate as thus ascertained for each mine when divided by the average number of miners employed on that mine during the 10 years ending 31 July last previous yields a quotient which is greater than double the corresponding quotient yielded by treating all scheduled mines as one unit, the silicosis rate in respect of that mine shall be reduced in the proportion which double such corresponding quotient bears to such quotient.

Further the Minister may add each or all of the following considerations to which regard may be had in computing the silicosis rate:

the results of dust-sampling investigations;  
conclusions drawn by an actuary appointed by the Minister from records of the periods worked by beneficiaries in each scheduled mine;  
the reports of inspectors of mines as to breaches in any scheduled mine of any law or regulation prescribed for the laying of dust or for the improvement of ventilation or generally for the prevention of silicosis in mines;  
the prevalence of silicosis as revealed by the periodical examination of miners and native labourers.

The Medical Bureau on the first day of October in every year informs the Board of the silicosis rate for the year of each mine. Records of service or any information as to the service of miners suffering from silicosis during the preceding five years must be furnished on request of the Medical Bureau or the Miners' Phthisis Board.
such last day of March by imposing a further levy upon, or granting a refund to, any employer affected by such variation or inaccuracy.

Every employer must lodge with the Board for inspection the receipt issued by the Commissioner for Inland Revenue in respect of the normal income-tax assessed upon such employer for the penultimate accounting period. He must likewise transmit to the Board quarterly a true and correct statement showing the amount of earnings of the miners employed by him during the preceding three months; the accuracy of such statement shall, if necessary, be verified by the Board.

Whenever for any reason the amount of the earnings of any miner is not evident, the Board may fix such amount.

The Board may call upon any employer to give security to its satisfaction for the payment of all amounts payable in respect of the Compensation Fund and the other Funds under the various Acts on miners' phthisis. In the event of such security not being given within a period specified by the Board it may demand payment of the whole of the employer's outstanding liability as if the mine had closed down.

Any amount not paid to the Compensation Fund or the Outstanding Liabilities Fund may be recovered together with costs and interest at 5 per cent. per annum from the employer by action in a competent court at the suit of the Chairman of the Board. Any claim of the Board for sums due to it by an employer at the date of sequestration or assignment of his estate or at the date of the commencement of the winding up if the employer is a company shall have priority over all other debts whatsoever, except debts due as wages or which are preferent to wages (Insolvency legislation).

2. The Outstanding Liabilities Fund, depending on the Compensation Fund but distinct from it, has to meet obligations incurred by scheduled mines which are closed down or withdrawn from the list of scheduled mines.

Each year an Actuary appointed by the Minister determines the total amount of the outstanding liabilities of the Compensation Fund and apportions the amount thus obtained amongst the employers. In making such apportionment the Actuary must

1 This Fund levies contributions only on "scheduled mines".
consult any Actuary whom the employer may appoint for the purpose.  

The amount thus apportioned to each employer is payable immediately to the Outstanding Liabilities Fund whenever the mine in question is closed down or withdrawn from the list of scheduled mines.

3. The Gazetted Mines Fund assures the payment of benefits to miners and native labourers (and on their behalf) employed in gazetted mines.

Its assets are represented by quarterly contributions from employers the amount of which is fixed for each mine by the Miners’ Phthisis Board, after taking into consideration:

(a) the earnings of miners and native labourers employed on the mine during the previous three months;

(b) the sum for which the person working the mine was assessed for normal income-tax in respect of the penultimate accounting period;

(c) the number of miners or native labourers found by the Medical Bureau to have contracted silicosis or tuberculosis on such mine and the amount of the benefits granted to or in respect of such miners or native labourers.

In the event of the amount paid into the Fund being insufficient to meet the payment of benefits the difference is covered by the Consolidated Revenue Fund of the Union.

Where a miner or native labourer has worked partly in a gazetted mine and partly in a scheduled mine the liability for compensation of the Gazetted Mines Fund and the Compensation Fund in respect of such miner or native labourer is apportioned

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1 In determining the total outstanding liabilities the Actuary must include in his calculations: existing monthly allowances, other awards and outstanding balances of such awards, such further allowances and awards arising from silicosis or tuberculosis as the Actuary may estimate as likely to be awarded in the future. The Actuary in assessing the portion due by the employer must include in his calculations in addition to the above such other matters and circumstances as in his opinion can rightly be considered as influencing the determination of such portion.

2 Whilst in scheduled mines the benefits to natives are payable by the employers, in the case of “gazetted mines” they are payable by the Gazetted Mines Fund.

3 The quarterly statement of wages transmitted by the employer to the Board must show the earnings of native labourers as well as of miners.

4 The Consolidated Revenue Fund is the moneys obtained by the Treasury from all revenue. The two gazetted mines closed down years ago and in practice all benefits granted from the Gazetted Mines Fund are recovered from Consolidated Revenue.
by the Board whose apportionment is final. The same holds good of grants made in respect of funeral expenses.

The benefits paid to a Government inspector are paid out of the Consolidated Revenue Fund provided that if such inspector was at any time employed as a miner the Board must refund to the Consolidated Revenue Fund such portion of the amount so paid as it may deem equitable under the circumstances.

4. The *Miners' Phthisis Special Fund* referred to as the “Special Fund” has been established for the purpose of paying special grants already referred to (see p. 27). Its assets are:

- amounts received by the Board from the Consolidated Revenue Fund for the relief of distress among beneficiary miners and their dependants;
- such sums (“lapsed balances”) as the Board may in its absolute discretion transfer from the Compensation Fund to the Special Fund. When these lapsed balances are exhausted the Board may transfer amounts not exceeding £75,000 in any one financial year.

5. *Miner's Phthisis Board*. The administration of compensation and the application of the Acts are entrusted to an organisation entitled the “Miners' Phthisis Board”.

Apart from levying contributions on employers and paying benefits the Board has the following functions:

(a) to provide for training in trades or industries of beneficiary miners, their wives and children and beneficiary widows and children;

(b) to conduct a bureau or co-operate with other bureaux for the purposes of obtaining employment for such persons as those mentioned in the preceding paragraph;

(c) to assist financially in establishing or carrying on any undertaking in which beneficiary dependants or dependants of beneficiary miners are employed, and to co-operate with any individual or institution, Government Department, municipality or provincial administration in any of the undertakings referred to above or other activities entrusted to it;

1 These comprise: any balance of an award (other than a monthly allowance) which has lapsed to the Compensation Fund on the death of a beneficiary miner who left no dependants, or on the death or marriage of a beneficiary dependant where there are no other dependants of the deceased miner; any amount which has lapsed to the Compensation Fund in other circumstances (fines, donation, legacies to the Board or the funds under its control unless made or bequeathed for a specific purpose).
(d) to establish or assist in establishing workshops for such persons as are mentioned in paragraph (a)\textsuperscript{1}.

To give effect to these different aims there has been created the "Trades and Industries Fund"\textsuperscript{2} which is administered by the Board.

The Miners' Phthisis Board consists of a chairman and not less than three, nor more than six, other members appointed by the Minister of Mines and Industries for a period of three years, the members being appointed by reason of their special knowledge or experience and being eligible for reappointment. The Minister may appoint alternate members or chairman to act during temporary absences. Remuneration and conditions of service are fixed by the Minister.

The Board, subject to confirmation by the Minister, appoints a secretary and such other persons as may be necessary for carrying out effectively its functions.

The Board may delegate any of its functions or powers other than those of granting benefits to a Committee consisting of not less than two of its members, but any resolution or action taken by any Committee of the Board must be confirmed by the Board. A meeting of the Board is held as often as required but at least once a week. Three members of the Board form a quorum and matters which come up for decisions are decided by a majority of members present and, in the case of equality of votes, the chairman or member acting as chairman has a casting vote in addition to his deliberative vote.

All salaries or other remuneration paid to any member of the Board, to its secretary or other officers (with the exception of gratuities accorded to the staff of the Board after a continuous period of five years' service, on retrenchment, superannuation or retirement which are payable from the Compensation Fund), as well as all expenses incurred in connection with the administration, valuation, adjustment and audit of the funds, are paid out of the Consolidated Revenue Fund.

\textsuperscript{1}The measures of prevention in respect of beneficiary miners entrusted to the Board are enumerated on p. 39.

\textsuperscript{2}Its assets consist principally of moneys appropriated from the Compensation Fund from time to time as it may require, but not exceeding an amount of £5,000 quarterly; any amounts accruing to the Board in carrying out its functions; and of any donations or legacies to the Trades and Industries Fund.
6. The application of legal measures for compensation are based on active collaboration between the Board and several health organisations mentioned below:

(a) The Medical Bureau consists (October 1936) of a Chairman, Vice-Chairman and nine examining officers, as well as a radiologist and pathologist, all full-time officials appointed by the Minister.

Its activities comprise (a) conducting, directing and controlling all the prescribed medical examinations required by the Act (see Note p. 40), excepting those entrusted to the Medical Board of Appeal and the Joint Medical Board; (b) assisting the Board in collecting, compiling and tabulating statistics and information relating to the incidence or cause of silicosis and tuberculosis, and itself collecting, compiling and tabulating such statistics and information; (c) submitting to the Minister an annual report on its activities.

The Bureau, subject to the confirmation of the Minister, appoints a secretary and such other officers as may be necessary for effectively carrying out its functions.

The remuneration of members of the Bureau and its staff and the expenses incurred in carrying out its functions are paid out of the Consolidated Revenue Fund with the exception of gratuities accorded to members of the staff which, as in the case of members of the staff of the Board, are paid by the Compensation Fund.

Final decisions are taken on a majority vote of the members present at a meeting of the Bureau. The legal quorum at meetings is five members. The Chairman has a deliberative and casting vote unless in the case of decisions relating to the state of health or disease of an examinee, when he has a casting vote only.

On all purely medical questions the advice and decision of the Bureau are accepted by the Board and by all persons mentioned in the Act.

(b) The Medical Board of Appeal consists of three medical practitioners (one of whom is the chairman), with special knowledge of diseases of the lungs and respiratory organs appointed by the Minister, consideration being given by him to a list of medical practitioners submitted by the unions representing the underground workers. The Medical Board of Appeal meets as often as is required, but at least once a month to examine
appeals relative to medical questions lodged with it by miners or their dependants (see p. 28).

The remuneration of the members of the Board is determined by the Minister and paid out of the Consolidated Revenue Fund.

(c) The Joint Medical Board consists of two members of the Medical Bureau appointed by the Chairman thereof, two medical practitioners appointed by the War Pensions Board and a chairman appointed by the Minister. This Board has ceased to function for some years.

It deals with cases of miners who, having been refused benefits under previous legislation (prior Law and principal Act), on the ground that they had not tuberculosis or silicosis in a stage entitling them to such benefits and were volunteers during the war (as defined in the War Special Pensions Act, No. 42 of 1919), and whose application for a benefit under that Act in respect of lung disablement or aggravation thereof was refused on the ground that such disablement or aggravation thereof was due to their occupation as miners. According to circumstances such miners are entitled to benefits either under silicosis compensation legislation or under the War Pensions Act, and decisions of a majority of the Joint Medical Board are without appeal.

Certificates of the Medical Board of Appeal or the Joint Medical Board, as the case may be, are deemed for the purposes of the Act to be certificates of the Bureau.

(d) The medical organisation is completed by a body of "Medical Examiners", who have power to carry out prescribed examinations (initial, periodical and final) of native workers, to deliver the medical certificates under the Act and to attend natives, i.e. those employed in or about scheduled or gazetted mines.

Every mining employer is obliged to engage the services of at least one, or where necessary, several such examiners, except in the case of the less important mines in regard to which the Minister may grant exemption from this provision. In practice approval is made by the Chairman of the Miners' Phthisis Bureau. When so gazetted the mine medical officer becomes a "medical

\[1\] These "medical examiners" must notify the Medical Bureau of all cases of tuberculosis and silicosis met with and forward to it subsequent to any post-mortem examination the lungs of the deceased for anatomo-pathological examination.
examiner" under the Miners' Phthisis Act. The list published in the Government Gazette may be amended by notice likewise published.

Whilst all the medical examinations required in view of compensation are exclusively dealt with by the Medical Bureau (or Medical Board of Appeal, or Joint Medical Board), all other medical examinations may be effected either by the Bureau or by mine medical officers.

It is the Medical Bureau which supervises and controls this work chiefly by means of periodic visits of inspection in the different mines.

In certain cases however the Medical Bureau may, where good cause is shown, arrange for the examination of an applicant for benefits resident in the Union by a medical practitioner approved of by it for that purpose.

Likewise in the case of an applicant for benefits resident outside the Union, the medical examination may be entrusted to a medical practitioner duly registered or likewise legally authorised to practise as such in the country where such applicant resides.

Every member of the Board or of the Bureau or the Medical Board of Appeal or any other Committee, appointed as well as the examiners, has the right to enter upon any scheduled mine premises in the exercise of any powers or in the performance of any duty conferred or imposed upon him.

* * *

Under the compensation scheme in force the obligations of employers are, generally speaking, as follows:

(a) to grant entry to all scheduled mine premises to any member of the Miners' Phthisis Board, of the Medical Bureau or of a scientific research committee (campaign against dust or any other problem relative to hygiene in mines) as well as to any authorised medical practitioner;

1 In 1935 there were about forty medical examiners. The number obviously varies with the number of mines in operation and the number of workers employed. Theoretically it is possible to have a mine medical officer who is not empowered by having been gazetted to be an examiner under the Miners' Phthisis Act, but in practice such circumstances do not arise.
(b) to abstain from employing underground in a scheduled or gazetted mine any person suffering from tuberculosis;
(c) to afford to any person covered by the Act every facility for submitting himself to the medical examinations prescribed by the Act;
(d) to abstain from engaging for underground work a beneficiary miner prohibited from such work;
(e) to carry out any Order given by the competent authority for the prevention of silicosis or tuberculosis;
(f) to carry out in general all legal provisions.

Infringements of these requirements make the offender liable to conviction and payment of a fine not exceeding £50 (where no penalty is specially provided) in respect of each person the subject of the offence, and, if the offender is an incorporated company, every director, manager, mine manager or mine overseer knowingly a party to the offence is liable to be prosecuted therefor.

Prevention

Medical examinations on admission (initial and special certificates) and periodical examinations represent an effective means for detecting the disease at an early stage and organising the requisite means of prevention.

The Miners' Phthisis Board may furnish from the revenue of the Compensation Fund an amount not exceeding half the cost of establishing and maintaining one or more sanatoria for purely silicotic patients and exercises likewise the function of collecting, compiling and tabulating statistics and information relating to the incidence and cause of silicosis and tuberculosis and the results of the grant of benefits to those affected.

The Act explicitly states that the Governor-General of South Africa may, out of the moneys specially appropriated by Parliament for the purpose, incur expenditure for investigating the means of preventing and for the better carrying out of any regulations lawfully made to prevent silicosis or tuberculosis on any mine.

For this purpose the Minister may appoint a commission to investigate and report and to advise him upon the means of prevention of dust and on matters affecting health conditions
in and upon any mine. Such a committee has power to enter and examine any mine at any time and to take samples of air therein and to make experiments or observations with a view to determining the amount of dust and the health conditions in such mine. The fees prescribed for members of this committee are paid out of the Consolidated Revenue Fund.

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**Note**

**MEDICAL EXAMINATIONS**

Miners and native labourers are obliged under the terms of the Act to submit themselves to a certain number of medical examinations, and employers are likewise obliged to afford facilities for such examinations.

**Examination on Engagement**

(a) Any person desiring to engage for the first time in underground employment as a miner is obliged to submit himself to an initial medical examination ¹.

If fit he receives the "initial certificate" certifying that he is "free from any disease of the lungs and respiratory organs and in other respects physically fit for underground work".

This initial certificate, which bears the date at which it expires, is valid for six months, at the end of which the holder thereof, provided that he has been employed in the interval as a full-time miner, is entitled to submit himself to periodical examination as a "working miner".

If the applicant is not fit he receives a notification that the Bureau is unable to grant to him the initial certificate.

The "special" certificate is granted to persons engaged in work which necessitates them going underground from time to time (less than 100 hours per month) and who are not "miners" as defined by the Act: surface artisans going underground now and then for repairs or similarly intermittent duties, some mine managers, inspectors and others (see p. 20).

This certificate certifies that the holder is not suffering from tuberculosis and must also bear mention of the date at which it expires. If the examinee is not fit the Medical Bureau furnishes a notification that it is unable to grant him the certificate.

(b) On the occasion of the initial examination of native labourers the initial certificate or the notification indicating that the certificate cannot be granted is transmitted to the Director of Native Labour.

¹ It should be noted that in the case of European miners a radiographic examination is part of the medical examinations (initial, periodical and benefit) but in the case of natives such radiographs are only made when the clinical examination shows a suspicion of silicosis or tuberculosis or after five years' service (see later).
Periodical Examinations

(a) All working miners (within the meaning of the Act) are obliged to submit themselves to periodical medical examination at intervals not exceeding six months.

Miners not in employment remain eligible for the periodical examination for an indefinite period provided that they present themselves for examination at intervals of not more than two years from the date of expiry of the last periodical certificate issued to them. If they fail to do so they are again subjected to an "initial" examination.

Any person other than a native labourer, resident throughout in South Africa who was granted an initial certificate and has thereafter been employed underground in scheduled mines for an aggregate period of at least three years, who has not yet been found to have silicosis or tuberculosis and whose capacity for work is not in the opinion of the Bureau seriously impaired by any other disease or disability, is eligible for periodical examination notwithstanding the lapse of a period of two years.

At every periodical examination the miner is required to deliver to the Bureau the last periodical certificate issued to him.

The periodical medical certificate indicates that the miner is not suffering from tuberculosis, and entitles him to continue in or offer himself for employment in any of the occupations specified in the Act.

Every periodical certificate must bear the date of its expiry.

Once granted, the periodical certificate is renewed in the case of all miners who remain eligible and submit themselves for examination, unless the holder is found upon examination to be suffering from tuberculosis or tuberculosis with silicosis.

When the miner is found to have silicosis or tuberculosis a certificate is granted stating that he is suffering from silicosis and in what stage, or from tuberculosis with or without silicosis, and in the event of his being found to have tuberculosis he is excluded from underground work and from further examination for the periodical certificate.

Any miner suffering from silicosis unaccompanied by tuberculosis, whether in the ante-primary, primary or even secondary stage, and notified of this fact, may continue to work and refrain from claiming compensation without thereby forfeiting his right to compensation later should he develop secondary silicosis in the case of the first two alternatives or silicosis accompanied by tuberculosis in the case of all three alternatives.

(b) In the case of a native labourer the periodical examination as a matter of fact takes place approximately every five weeks. It consists essentially of weighing the natives naked and making a rapid clinical examination; further a medical examination of such as have lost 5 lbs. weight between two weighings, or 6 lbs. in all between three weighings; all natives whose clinical examination leads to suspicion of silicosis or tuberculosis are examined radiographically. Natives on

1 Any person who goes underground in any scheduled mine knowing that he is suffering from tuberculosis is guilty of an offence.
2 The 1934 amendment did in fact nullify the former provisions of the Act which granted any miner suffering from silicosis and notified of this fact a maximum delay of three months in which to give up his work and file his claim for compensation under pain of forfeiting for good all right to compensation in excess of the amount granted him when first notified of his condition.
reaching five years' service are examined medically and radiographed. Thereafter these are kept under special observation by the mine medical officers and radiographically re-examined when considered necessary. This is the present practice.

After every examination or re-examination the native labourer is certified as (a) suffering from silicosis and in what stage, and is granted a periodical certificate that he is not suffering from tuberculosis; or (b) a certificate that he is suffering from tuberculosis and stating whether with or without silicosis. In case of tuberculosis, the native labourer is compulsorily removed from work.

Periodical medical examination of native labourers is effected by "examiners" who report the results of their observations on special forms and must send to the Medical Bureau for further examination any native labourers in whom they detect signs of tuberculosis and silicosis.

Subsequent to each initial, special or periodical examination, the examinee is informed of the results, except in the case of a native labourer, in which case the information is transmitted to his employer whose duty it is to inform him forthwith.

After a periodical examination the Medical Bureau or the "examiners" notify to the Miners' Phthisis Board or the Director of Native Labour as the case may be all cases of silicosis or tuberculosis or both diseases.

Apart from the certificates transmitted to them the examinees are always free to request information as to their condition 1.

The initial, special or periodical certificate is absolutely necessary for all engaging in underground work.

**Final Examinations**

The employer of any native labourer must notify the Bureau or medical practitioner nominated by it of the date upon which such native labourer ceases to be employed on underground work, or goes on leave.

Any native labourer having worked underground for a period of not less than thirty days, whether continuously or otherwise, must be stethoscopically examined by the Medical Bureau or by a medical practitioner nominated (either generally or specially by the Bureau) whenever he ceases to work. If during this examination the native labourer is found to be suffering from silicosis or tuberculosis the Medical Bureau must notify the Director of Native Labour immediately, and further if at such examination or at any other medical examination held within six months from the date upon which he ceased to work underground he is found to be suffering from tuberculosis without silicosis he is entitled to the benefits provided.

**Medical Examination for "Special Authorisation"**

This examination is intended for beneficiary miners who had received benefits under previous legislation and who in reality are no longer

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1 This request is inscribed on form 40A and the corresponding forms for replies furnished by the Miners' Phthisis Board are as follows: Ante-primary silicosis: 40B (AP); primary silicosis: 40B (Pr); secondary silicosis: 40B (Sec); no silicosis: 40B (1).

In certain cases the miner however receives a letter of notification (form 40C) informing him that underground work constitutes a risk for his health and that he would do well to consult his doctor.
suffering from tuberculosis or silicosis. With the written permission of the Miners' Phthisis Board such miners may submit themselves to a prescribed medical examination by the Medical Bureau which thereafter transmits to them a special authorisation or, as the case may be, notification that the Bureau is unable to grant them such authorisation.

Benefits Examinations (Miners)

Every miner who may, as the result of a prescribed examination, become entitled to any benefits or increased benefits can claim the following medical examinations (whether he has undergone an examination by the Medical Board of Appeal or not) if he is not entitled to the periodical examination provided for working miners:

(a) Not less than six months after the last periodical examination;
(b) Not less than one year after an examination under previous legislation, or under the above legislative provisions;
(c) If so directed by the Bureau or at the request to the Bureau by the Chairman of the Board, a working miner or a beneficiary miner may submit himself to medical examination by the Bureau at shorter intervals.

Subsequent to such examinations the Medical Bureau notifies the Board whether the person so examined has tuberculosis with or without silicosis or silicosis and in what stage.

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1 The delays imposed under (1) and (2) signify that a miner who is not subject to periodical examination, that is to say who is not actively employed, may not ask for a special examination until six months have expired from his last periodical examination and until not less than one year has expired after any special examination, such as an examination for benefit. In other words, the purpose of this is to prevent miners frivolously asking for examinations at frequent intervals, but as a matter of fact enables a miner by showing good cause to obtain an examination at a shorter interval.
Compensation for silicosis is provided in Great Britain by various "Schemes" issued under Section 47 of the Workmen’s Compensation Act, 1925, extended by the Workmen’s Compensation Act, 1930. These Schemes, applying to different industries or groups of industries, have been developed by stages in the light of increasing knowledge of the disease, and after discussion with representatives of the industries concerned which accounts for some of the differences between one Scheme and another. The first Scheme, made in 1919, was for the “Refractories Industries”, a small group including ganister mining and silica brick making in which there is exposure to dust containing a high percentage of free silica. A special feature of the Scheme for this group of industries is a limited form of compulsory insurance — all the compensation is paid from a special fund to which employers in the industries have to subscribe, thus tending to distribute the liability among employers whose work has contributed to the slowly developing disease in question. The Scheme was somewhat revised in 1925 on a review of its working, after which Schemes were made for metal grinding (1927) and various other industries (1928), the most important being certain mining and quarrying operations, dressing, etc., of certain kinds of stone in the building trade, and certain processes in pottery manufacture. In 1929 sandstone quarrying was taken out of this Scheme and made the subject of a special Scheme with a compensation fund, on the same lines as the Refractories Scheme. In 1931 the medical arrangements for all the Schemes were developed and co-ordinated under a Silicosis and Asbestosis (Medical Arrangements) Scheme, the other Schemes being at the same time reissued with the omission of various medical provisions. This Scheme was further extended in 1934.

The Schemes now (1937) in force in addition to the Medical Arrangements Schemes are as follows:

1. The Metal Grinding Industries (Silicosis) Scheme, dated 30 April 1931. S. R. & O., 1931, No. 343. (Came into force on 1 June 1931 in substitution for the Schemes of 1927, No. 380, and 1930, No. 118.)

2. The Refractories Industries (Silicosis) Scheme, dated 11 May 1931. S. R. & O., 1931, No. 345. (Came into force on 1 June 1931 in substitution for the Schemes of 1919, No. 12, and 1925, No. 79.)

3. The Sandstone Industry (Silicosis) Scheme, dated 20 May 1931. S. R. & O., 1931, No. 346. (Came into force on 1 June 1931 in substitution for the Scheme of 1929, No. 171.)
(4) The Various Industries (Silicosis) Scheme, dated 30 April 1931. S. R. & O., 1931, No. 342. (Came into force on 1 June 1931 in substitution for the Schemes of 1928, No. 975, and 1930, No. 1095.)

(5) The Various Industries (Silicosis) Amendment Scheme, dated 22 October 1934. S. R. & O., 1934, No. 1155. (Came into force on the date of the Order.)

(6) The Various Industries (Silicosis) Amendment Scheme, dated 29 January 1935. S. R. & O., 1935, No. 69. (Came into force on 1 March 1935.)

**Scope of Legislation**

Compensation for silicosis is therefore provided for workmen employed in processes or industries recognised as involving exposure to the risk of the disease, as follows:

1. **The Metal Grinding Industries.** — The grinding of metals by means of a grindstone composed of natural or manufactured sandstone and certain incidental processes, and also racing or trueing up of the grindstone. It does not apply to grinding which is occasional only and for not more than eight hours in any week; or to the manufacture, repair or sharpening of tools or implements for use in the factory, unless the workman is mainly employed in such work; or to file grinding by machine in which the grindstone is completely enclosed and the metal being ground is immersed in water.

2. **The Refractories Industries.** — Processes carried on at mines, quarries, factories and workshops at which refractory material containing not less than 80 per cent. total silica \( (\text{SiO}_2) \) is got or manipulated with a view to manufacture or sale: namely, all processes in or in connection with the getting, handling, moving, breaking, crushing, grinding and sieving of such material and all processes in the manipulation of such material in the manufacture of bricks or other articles containing not less than 80 per cent. total silica \( (\text{SiO}_2) \).

   [The limit of 80 per cent. silica \( (\text{SiO}_2) \) in the definition excludes the fireclay industry.]

   Not included: mines and quarries in which refractory material is only occasionally worked; iron or steel works in which refractory material is crushed, ground or pugged for use only in the works; quarries of natural sand.

3. **The Sandstone Industry.** — This Scheme covers all processes in or incidental to the getting or manipulation of
sandstone\textsuperscript{1} with a view to manufacture, sale or use, which are carried on at mines or quarries or on premises worked in conjunction with a mine or quarry, provided that the sandstone got, manipulated or worked contains more than 50 per cent. silica (free and combined).

Not included: mines and quarries in which sandstone is worked occasionally only; premises not being part of a mine or quarry in which sandstone is manipulated for the purpose of the manufacture of silica flour; processes in the manufacture of artificial stone (except breaking, crushing or grinding of sandstone and any handling in or incidental to such process); employment as craneman, engineman, fitter, blacksmith, where the workman is employed exclusively in such occupation.

[Workers contracting silicosis in mines and quarries exempted from the scheme would have a claim under the Various Industries Scheme.]

\textit{(4) The Various Industries.} — Any processes specified in the following industries: \textit{mining and quarrying of silica rock};\textsuperscript{2} getting of silica rock; drilling and blasting of silica rock in or incidental to the mining or quarrying of other minerals with the exception of certain specified processes under certain conditions; \textit{getting and manipulation (dressing) of granite (including any igneous rock)}; all underground operations in \textit{coal mines} and \textit{iron ore (hematite) mines}; all underground operations and the breaking of ore above ground in \textit{tin mines}; \textit{manipulation and working of silica rock}: sawing, planing, dressing, shaping, cutting or carving; working and manipulation (breaking, crushing, grinding, sieving, mixing or packing), and handling or moving of silica rock or other siliceous products (dried quartzose sand, dry residue of silica, flint) or any dry admixture containing such material; certain specified processes in \textit{potteries}, in milling of flint or crushing or grinding of silica rock or dried quartzose sand; in the manufacture of \textit{china or earthenware including sanitary earthenware, electrical earthenware and earthenware tiles}; polishing, sorting or grinding on a power-driven wheel in connection with grinding of glostware or tile-slabbing; \textit{foundries and metal works: (a) in manufacture of steel}

\textsuperscript{1} "Sandstone" includes ganister, gritstone and quartzite rocks, but does not include rotten stone or natural sand.

\textsuperscript{2} Silica rock means quartz, quartzite, ganister, sandstone, gritstone and chert but does not include natural sand or rotten rock.
or in steel foundries: crushing, grinding or handling of silica rock, bricks or other articles containing not less than 80 per cent. total silica (SiO₂); freeing of steel castings from adherent sand; (b) sandblasting of metal or metal articles by means of compressed air with the use of quartzose sand or crushed silica rock or flint.

The scope of application of each Scheme being expressly defined, the provisions of one Scheme do not apply to employment in the processes enumerated in the other Schemes. For this reason each claim for compensation must indicate the Scheme under which it is made.

Under the Act of 1925 the expression "workman" means any person who has entered into or works under a contract (expressed or implied, oral or in writing) of service or apprenticeship, whether by way of manual labour, clerical work or otherwise, provided the contract is valid or treated as such for compensation purposes under certain special provisions (Section 3 (3)).

The Act applies equally to workmen employed by or under the Crown, when engaged in the industries or processes covered.

It does not apply to any person employed otherwise than by way of manual labour, whose remuneration exceeds £350 per annum, or to any person whose employment is of a casual nature and who is employed otherwise than for the purpose of the employer's trade or business, or to out-workers, or to any member of the employer's family dwelling in his house.

**RIGHT TO COMPENSATION**

Compensation for silicosis, that is to say, fibrosis of the lungs due to silica dust, as well as silicosis accompanied by "tuberculosis" (this means, as stated in the different Schemes, tuberculosis of the lungs), if due to employment in an industry or process covered by the Schemes, is provided, subject to conditions enumerated below, in cases of:

(a) compulsory suspension from employment;
(b) total disablement;
(c) death.

(Compensation is not given for tuberculosis alone or for suspension merely on account of inadequate physique.)
Further compensation is only accorded subject to the following provisions:

(1) The workman must within *three years* previous to the date of the injury have been employed in an industry or process covered by the Scheme under which compensation is claimed, or have been in receipt of weekly payments under the Scheme (or under a previous Scheme for the same group of industries). Beyond this time limit the worker is not entitled to compensation.

The "date of the injury" is the date of suspension or of total disablement indicated in the certificate issued by the Medical Board or, in cases where a workman dies without having been certified as totally disabled or suspended, the "date of the injury" is the date of death.

Where compensation is paid by agreement between the parties without a certificate from the Medical Board the date of suspension is deemed to be the date of the agreement or such other date as may be agreed upon between the parties (Metal Grinding Industries, Various Industries).

(2) In cases where the workman has been employed in an industry or process covered by the Scheme for a period or periods amounting to not less than five years, silicosis, or silicosis accompanied by tuberculosis, is deemed to be due to employment in that industry or process unless the employer proves the contrary. In other cases the onus of proof that the disease is due to the employment is on the workman or dependants. The Silicosis Medical Board may, however, if satisfied that the disease cannot have been contracted in a particular industry or process owing to the shortness of the time the workman has been employed therein, give a certificate to this effect which is conclusive on the point.

(3) The workman or his dependants must not be in receipt of compensation for silicosis under any other Scheme or enactment providing compensation whether in Great Britain or elsewhere (e.g. compensation for miners' phthisis, South Africa).

(4) Obligation on the part of the workman (where required) to submit himself to a medical examination on admission, and

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1 The Schemes are not retrospective, that is to say, they apply only to workers employed in the processes covered on or after the date on which they came into force respectively.

2 In theory under the other two Schemes also.
periodically thereafter as provided for by the Medical Arrangements Scheme and any of the other Schemes.

(5) Obligation on the part of the workman certified as totally disabled or suspended from employment not to re-engage in processes involving exposure to the risk of silicosis, except so far as may be allowed by certificate of the Medical Board.

(6) Obligation on the part of the workman to furnish to the employer certain information as to previous employment in any process covered by the Schemes, and as to whether he is in receipt of compensation under any other Scheme or enactment for the disease whether in Great Britain or elsewhere.

Failure to comply with any of these last three requirements involves loss of right to compensation except in certain circumstances (bona-fide mistake or other reasonable cause) appreciation of such being left to the County Court Judge, Joint Committee, or other arbitrator under the Scheme.

Further, right to compensation is subject to special provisions included in the different Schemes thus, for example:

(7) As regards the Refractories Industries, the three-year limit does not apply provided the workman proves to the satisfaction of the Joint Committee (see under "Review") that since his last employment in the refractories industries he has not been employed in any of the occupations covered by the other Schemes (metal-grinding, sandstone, various industries) or in any process in South African mines.

(8) As regards the Sandstone Industry, right to compensation is forfeited when the workman has left the industry unless he can prove to the satisfaction of the Joint Committee that, since his last employment therein, he has not been employed in any of the occupations covered by other Schemes.

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1 Initial and periodic examinations are only prescribed for workmen employed in certain industries and occupations as specified in the First Schedule to the Medical Arrangements Scheme.

2 That is to say, processes covered by any of the Schemes as well as work in South Africa in those mines scheduled under the Miners' Phthisis Acts.

3 See p. 13, footnote.
CERTIFICATION OF THE DISEASE

Unless the employer agrees to pay compensation on some other medical certificate ¹, compensation can only be claimed on a Certificate of the Silicosis Medical Board. Such a certificate may be issued as a result of medical examination made on commencement of the employment (initial examination) ² or one of the examinations made periodically thereafter in accordance with the Medical Arrangements Scheme, or it may be issued on an application to the Medical Board lodged by the workman or his dependants.

A certificate issued as a result of an initial or periodic examination is given free of charge to the workman. Where application for a certificate is made by the workman or his dependants a fee has to be paid but a proportion of it is returned if the compensation claim is successful (a fee being then charged to the employer or Compensation Fund).

In practice, a workman before making an application to the Board for a certificate, applies to his Society under the National Health Insurance Act, which arranges for him to be examined by the regional medical officer. If the officer in question is satisfied that there is “reasonable cause for suspecting the existence of silicosis” he certifies to this effect, and this certificate entitles the workman to be examined by the Medical Board at a reduced fee. The workman transmits the certificate and the prescribed fee to the Medical Board stating the Compensation Scheme under which the claim is made, the name and address of the employer who last employed him in a process included in the Scheme, the nature and duration of employment, and the date when he left such employment.

If the regional medical officer refuses a certificate the workman may still proceed with his application for examination by the Medical Board.

¹ The Metal Grinding Industries and the Various Industries Schemes indicate that payment of compensation may be effected without a certificate from the Medical Board where the employer agrees that he is liable for payment of compensation to the worker. In the Refractories Industries and Sandstone Industry Schemes the right exists, but the Company Funds have never agreed to exercise it.

² The examination on commencement of employment may be made by another doctor (e.g. local tuberculosis officer) authorised by the Secretary of State; but if he thinks the workman has silicosis or tuberculosis or does not satisfy certain other requirements as to physique he must refer the case to the Medical Board for their decision.
In case of death the dependants or their representatives desiring a certificate apply direct to the Medical Board. The Medical Board issues certificates, on Forms prescribed under the Medical Arrangements Scheme, (1) of compulsory suspension from employment; (2) of total disablement for employment; (3) that death was caused by silicosis, or silicosis accompanied by tuberculosis.

(1) The certificate of compulsory suspension from employment is issued either on account of failure to satisfy certain requirements with respect to physique at the first examination after entering the employment (Form F.), or on account of silicosis or silicosis accompanied by tuberculosis (Form C.) or on account of tuberculosis unaccompanied by silicosis (Form E.). Suspension normally follows when the workman, though not totally disabled, is found by the Board to be suffering from silicosis or tuberculosis or silicosis accompanied by tuberculosis to such a degree as to make it dangerous for him to continue work in the industry or processes covered by the Scheme; where tuberculosis is present (alone or with silicosis) suspension is also a measure of protection for other workers. In certain cases, however, the Board are not bound to suspend but the wishes of the worker are ascertained. Thus, the provision with regard to suspension on account of failure at the initial examination to satisfy the requirements as to physique does not apply (unless tuberculosis is found) to a skilled mason over 21 years of age entering the sandstone industry from the building or other industry in which he has been employed as a mason. Again, a workman is not liable to suspension, except on his written application, when found at the periodical examination to be suffering from silicosis not accompanied by tuberculosis, if (a) he is aged 45 (40 in the sandstone industry) and has been employed for at least 20 years in the industry concerned or (b) he is a skilled craftsman engaged in the pottery industry.

In the case of compulsory suspension due to silicosis or silicosis accompanied by tuberculosis, the certificate (Form C.) indicates

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1 These are: (i) the chest must be at least of average development and the respiratory passages must be free from obstruction; (ii) there must be no signs of disease of the lungs or heart; (iii) there must be no tuberculosis of any region.

2 Skilled craftsmen are defined as including all persons carrying on any of the processes covered, excepting assistants and apprentices, and mill men, china biscuit odd men, and china biscuit warehouse workers.
also the stage which the disease has reached and further, whether
the workman's general physical capacity for employment is
impaired by reason of the disease, and if so, to what degree,
and the class or character of work outside the dangerous industry
or process for which the workman is fit.

(2) In cases of total disablement from silicosis or silicosis
accompanied by tuberculosis, the certificate (Form B.) requires
the Medical Board to certify the date from which the total
disablement is to be reckoned as having commenced. If they
are unable to certify such date, the date of total disablement
is deemed to be the date on which the certificate is issued.

(3) The certificate of death (Form A.) is furnished by the
Medical Board after a post-mortem examination of the deceased
workman. The only exception to this rule is in cases in which
weekly payments under the compensation scheme were payable
to the workman; and only then if the Medical Board is satisfied
that a post-mortem examination is unnecessary. The post­
mortem is not necessarily made by a member of the Board but
he must, if possible, be present, and, particularly if he is not,
arrangements are usually made to enable the Board to examine
the lungs and other material from the body if desired. It will
be observed that the Board only certifies as to whether or not
the death was caused by silicosis or by silicosis accompanied
by tuberculosis; it does not certify the actual cause of death
apart from the disease.

If in any class of case (i.e. fatal or other) the Medical Board
is satisfied that the silicosis or silicosis accompanied by tuberculosis
cannot, owing to shortness of employment, have been contracted
in the industry or process in question, the certificate must bear
an indication to this effect.

Before deciding on an application for a certificate the Medical
Board must send notice of the application to the employer from
whom the compensation would appear to be recoverable or to
the managers of the Compensation Fund (Refractories Industries
and Sandstone Industries Schemes) and must consider any
statement made or submitted to them on behalf of the employer,
or the Compensation Fund, within 10 days from the date of notice.

The Medical Board addresses the certificate

(a) to the injured worker or his dependants in the case of
the Metal Grinding Industries Scheme or the Various
Industries Scheme;
(b) to the competent Joint Committee in the case of the Refractories Industries or Sandstone Industries Scheme.

In case (a) the ordinary provisions of the Act are applied as to giving notice of disablement by an industrial disease and of claim to compensation, i.e. it rests with the claimant to see that the appropriate employer or his representative is made aware as soon as practicable of the effect of the Board's certificate (sending a copy if demanded), and to lodge the claim to compensation within six months of the date of the injury or date of death; but failure to notify, or any defect or inaccuracy in such notice, is not a bar to the maintenance of proceedings in regard to the claim for compensation if the employer is proved to have had knowledge of the disease from any other source, or if it is found that such failure, defect or inaccuracy does not prejudice the employer in his defence, or was occasioned by mistake, absence from the United Kingdom, or other reasonable cause.

In case (b) the Secretary of the Joint Committee sends to the workman or his representative a copy of the Board's certificate and a copy of the appropriate form on which to submit his claim to compensation, which will be investigated and adjudicated upon by the Joint Committee.

Benefits

Benefits are substantially the same as in the case of disablement or death from accidents and other industrial diseases under the Workmen's Compensation Act, but there are also some benefits in cases of suspension from the dusty employments at an early stage of the disease when the workman's general physical capacity for employment is not impaired. The liability is to make monetary payments, but in assessing these regard may be had to payments, allowances or other benefits which the workman may receive from the employer during incapacity. It should be noted that the workman will generally obtain medical attention and treatment from other sources, e.g. National Health Insurance. Benefits are the same irrespective of whether the case is one of silicosis or one of silicosis accompanied by tuberculosis.

(1) The amount of compensation in cases where the workman though not totally disabled is suspended from employment on
account of the disease varies according to whether the workman's
general physical capacity for employment is or is not impaired
by the disease, as certified by the Medical Board.

A. In cases where the general physical capacity is impaired:

(i) Metal Grinding Industries and Various Industries: the
workman receives during impairment by reason of the
disease a weekly payment fixed in the same way as
compensation for partial incapacity due to an accident
under the 1925 Act 1.

(ii) Refractories Industries and Sandstone Industry:
   (a) if the workman is unable to obtain immediately
       other suitable employment at a rate or remuneration
       not less than he was earning in the processes, a
       weekly payment, for a period of two weeks from the
date of suspension, equal to the full amount of his
       wages;
   (b) thereafter during the impairment, a weekly payment
       for partial incapacity calculated substantially in
       accordance with the 1925 Act 1;
   (c) such sum as the Joint Committee may consider
       reasonable for the expenses of removal where the
       workman is compelled on suspension to leave the
       district in order to obtain other suitable employment,
       the sum in question not to exceed five pounds.

B. In the case of suspension without impairment of general
physical capacity due to the disease.

If the workman is unable to obtain suitable employment
(other than that prohibited) at a rate of remuneration not less
than what he was earning in the processes, he is entitled while
he remains out of such employment, to a weekly payment the
rate and duration of which vary according to the Scheme under
which compensation is obtained.

(a) Metal Grinding Industries and Various Industries:
    payment to be fixed by agreement or, in the absence
    of such agreement, by the County Court judge or other

1 Total incapacity benefits. If the workman's average weekly earnings
were 50s. or upwards he is entitled during total disablement to a weekly
payment, up to a maximum of 30s., of not more than one-half of these
earnings. If the average weekly earnings were less than 50s. he is entitled
to an addition on a sliding scale which in effect increases the percentage
progressively above 50 per cent. up to 75 per cent. where the earnings
were 25s. a week or less.
arbitrator, provided that the amount does not exceed 50 per cent. of the workman's average weekly earnings before the suspension and is not payable for more than 13 weeks in all.

(b) Refractories Industries and Sandstone Industry: if the workman is unable to obtain immediately other suitable employment at a not less rate of remuneration, a weekly payment for a period of two weeks from the date of suspension equal to the full amount of his wages; thereafter, if still unable to obtain aforesaid employment, a weekly payment not exceeding 50 per cent. of his average weekly earnings before the suspension for a further period or periods not exceeding 11 weeks in all.

(c) A sum to meet the expense of removal as in A (ii) (c).

(2) Compensation for total disablement: a weekly payment payable during the period of total disablement on the same scale as is allowed under the Act for injury by accident.\(^1\)

Redemption of weekly payments. When a weekly payment has continued for not less than six months, the liability may be redeemed for a lump sum, of such amount as will be sufficient to purchase a Post Office annuity for the workman equal to three quarters of the annual value of the weekly payment. This provision is however seldom used in practice.

(3) Payment in case of death. In cases of death the amount of compensation is determined in accordance with the provisions of the Workmen's Compensation Act, 1925, as to compensation for death by accident.

(i) If the workman leaves a total dependant or dependants, the compensation is £200 or 3 years' earnings, whichever is the higher, up to a maximum of £300.

(ii) If the workman leaves only partial dependants, the compensation is such sum not exceeding the amount specified under (i) as is reasonable and proportionate to the loss sustained by such dependants.

\(^1\) Partial incapacity benefits. Where the average weekly earnings are 50s. a week or upwards, a weekly payment, up to a maximum of 30s., equal to one-half the difference between his average weekly earnings before suspension and the average weekly amount which he can earn in a suitable employment thereafter; and where the earnings were less than 50s. a week the percentage is progressively increased up to 75 per cent. for earnings of 25s. a week or less.
(iii) If no dependants are left, reasonable expenses of medical attendance and burial are payable up to a maximum of £15.

Where the dependants include a child or children under the age of 15 (as well as a totally dependant widow or some other member of the family over 15), in addition to the compensation mentioned above, an allowance is payable in respect of each child varying according to the child's age. The total compensation, however, payable to the dependants, including the children's allowance, must not exceed £600. If any of these dependants were only partially dependant on the deceased workman's earnings, the additional compensation for children under 15 is such proportion of that above-mentioned as may be agreed or in default of agreement, as may be determined by arbitration to be reasonable.

The amount of the weekly payments, if any, made to the workman before his death (or the sum paid in redemption of such payments) is deducted from the amount payable to the dependants provided the lump sum is not reduced below £200.

No deductions are allowed from the children's allowance on account of weekly payments made to the workman during life, but deductions may be made in respect of any lump sum paid in redemption thereof.

Under the Metal Grinding and Various Industries Schemes the compensation payable in the case of death is not paid direct to the dependants but is paid into the County Court to be invested, applied or otherwise dealt with as it thinks best for the benefit of the dependants.

Under the Refractories Industries and Sandstone Industry Schemes it is payable to the Public Trustee or other person nominated as trustee by the Secretary of State, except that where the sum payable is less than £50, it may be paid over to the persons entitled thereto as the Joint Committee may direct.

**Review**

The amount of the weekly payment in respect of suspension from employment or of total incapacity may be reviewed from

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1 This sum is fixed as follows: 15 per cent. of the product of the workman's average weekly earnings and the number of weeks elapsing between the workman's death and the child's fifteenth birthday; for the purpose of this calculation earnings are deemed to be £1 or £2 if actually less or greater than these rates respectively.
time to time on change of circumstances on application by the beneficiary, the employer or the Compensation Fund. For the purpose of deciding whether there has been a change in the workman's physical condition there may be a reference to the Medical Board, if no agreement is reached on reports from employer's and workman's doctors (Various Industries and Metal Grinding Schemes), or application direct to the Medical Board for re-examination and a certificate (on Form D) stating whether since the last examination the impairment of the general physical capacity of the workman is altered or not and, if it has, indicating what changes in condition and fitness for work on account of the disease have occurred since the previous examination. The fee for such reference or re-examination is payable by the applicant.

A workman cannot be required to submit himself to medical examination for this purpose more frequently than once in every three months (six months in cases of total disablement).

Review of an award may, according to the circumstances, involve cessation, reduction or increase of the weekly payment. In the Refractories Industries Scheme and the Sandstone Industry Scheme the decision is taken by the Joint Committee; in the other Schemes, decision as to the amount payable is settled by agreement or in default of agreement by arbitration under the Act.

Review on workman reaching 21 years of age. — Where the workman was at the date of the injury under twenty-one years of age and the review takes place more than six months thereafter and the application for the review is made before or within six months after the workman attains the age of twenty-one years, the amount of the weekly payment may be increased to such an amount as would have been awarded if the workman had at the date of the injury been earning the weekly sum which he would probably have been earning at the date of the review if he had remained uninjured.

PROCEDURE FOR SETTLING DISPUTES

The procedure for settling of questions varies according to the different schemes.

A. Under the Schemes for the Metal Grinding Industry and for Various Industries the procedure for settling questions is that provided in the Act as regards accidents and any regulations
(except those determining the fees payable to medical referees) and rules of Court made in pursuance thereof, which apply accordingly.

The functions of medical referee are, however, fulfilled by the Medical Board, except that the provision of the Act relative to the appointment of a medical referee to sit as assessor with the judge is not applicable in the cases coming within the Schemes.

Questions arising in any proceedings as to compensation (right to compensation, the amount and duration of compensation or any indemnity and determination as to who are dependants within the meaning of the Act) are, in default of agreement between the parties, settled by arbitration (generally by the County Court Judge).

The rules of Court make provision for the conditions under which the parties seeking the decision may be represented during the arbitration procedure. Any question settled by means of an agreement, by a committee or by an arbitrator must be made the subject of a memorandum to be registered with the County Court.

Any Committee, arbitrator or judge may submit to a medical referee — in this case the Medical Board — for report any matter material to any question arising in the arbitration.

B. Under the Refractories Industries Scheme and the Sandstone Industry Scheme the procedure for the settling of matters in dispute is twofold.

If any question arises under Part II of these Schemes as to the application to any particular process or to any individual workman, that is whether a levy is payable by the employer to the Compensation Fund in respect of such employment, the question is referred for decision to the Secretary of State or, if the parties prefer, to a single arbitrator approved (or failing agreement appointed) by the Secretary of State in accordance with the rules made by him for this purpose.

When the question at issue is as to the amount and apportionment of compensation (if any) it is decided by a Joint Committee whose decision is final except that, where either the Company administering the Compensation Fund or the workman is aggrieved by any determination of the Joint Committee on the ground that it is based on a misinterpretation of the provisions of the Scheme and makes representation to the Secretary of State within twenty-eight days, the Secretary of State
may, if he thinks fit, give a ruling on the point raised and if the Committee's decision is not in accordance with such ruling the Committee are required to revise it so as to bring it into conformity with the ruling.

Joint Committees\(^1\) are composed of an equal number of representatives\(^2\) of employers and workmen, presided over in each case by an independent chairman. The chairman and members are appointed by the Secretary of State.

Each Joint Committee appoints a secretary subject to the approval of the Secretary of State on such terms and at such remuneration as he may approve.

Each Joint Committee deals with all cases arising within the area assigned to it in accordance with the provisions of the Scheme and rules of procedure made by the Secretary of State.

Any question arising in an area for which no Joint Committee has been established may be assigned for settlement to such Joint Committee as the Secretary of State may select. Decisions of the Committee are decided by a majority of the votes of the members present at the meeting, or in case of an equality of votes by a casting vote of the independent chairman. The chairman and members of the Joint Committee are unpaid, but they are entitled to reimbursement from the Fund of travelling expenses incurred.

**ADMINISTRATION OF COMPENSATION**

**Liability**

Compensation for silicosis is based on the principle of the employers' liability:

\( (a) \) Individual liability\(^3\) for those employers who are subject to the Metal Grinding Industries (Silicosis) Scheme, and the Various Industries (Silicosis) Scheme;

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\(^1\) There are (September 1934) seven Joint Committees established under the Refractories Industries Scheme and six under the Sandstone Industry Scheme.

\(^2\) These representatives are appointed after consultation with any employers' associations and trade unions affected, or otherwise as the Secretary of State may think most suitable for the purpose of ascertaining the views of the employers and workmen concerned.

\(^3\) The employer may insure against his liability by entering into a contract with an insurance company, or may belong to a mutual insurance association of employers. In the coal-mining industry one of these two alternatives is compulsory unless the employer maintains a special trust fund for meeting all his compensation liabilities; but this third method is only appropriate in the case of fairly large undertakings employing a considerable number of workers.
(b) Collective responsibility for those subject to the Refractories Industries (Silicosis) Scheme and the Sandstone Industry (Silicosis) Scheme.

(a) Individual Liability.

In the schemes for the Metal Grinding Industries and for Various Industries, compensation is recoverable from the employer who last employed the workman in one of the processes coming within the Scheme, except that under the Various Industries Scheme if the workman is suspended from further employment at the initial examination after taking up a new engagement, the liability (if any) falls on the employer who last previously employed him in the processes.

Nevertheless, any other employers who employed the workman in the processes during the five years preceding the date of the injury are liable to make to the employer from whom compensation is recoverable such contributions towards compensation as, in default of agreement, may be determined by arbitration. This latter provision does not, however, apply in any case where the employer from whom compensation is recoverable has admitted liability to pay such compensation without requiring a certificate from the Medical Board.

(b) Collective Liability.

In the case of the Refractories Industries and the Sandstone Industry, the Scheme provides for the creation of a General Compensation Fund to which all employers in the industry are bound to subscribe and from which all the compensation is payable. There are also met out of this Fund such fees as may be payable by or on behalf of any employer in respect of any medical examination made or certificate given under the Silicosis (Medical Arrangements) Scheme. This Fund is administered and compensation claims are (where in dispute) contested by a company managed by employers in the industry, and the company cannot be dissolved without the consent of the Secretary of State. It is the duty of the company in compliance with any directions given by the Secretary of State to fix, levy and enforce the subscriptions from the employers, to invest or otherwise deal with all moneys received by the Fund, and to secure that no moneys or securities belonging to the Fund are applied directly or indirectly for any purposes other than those authorised under the Scheme. The company is required by the Secretary of State to prepare in prescribed forms a revenue account, balance sheet
and statement of cases dealt with. The accounts of the Fund are audited at least once per annum by one or more chartered accountant(s), and a copy of the report of the auditor or auditors is lodged with the Home Office.

The liability of the Fund to pay compensation in any particular case is not affected by any failure on the part of an employer to pay the sums due to the Fund or by the employer ceasing to be engaged in the industries.

The subscriptions payable to the Compensation Fund by the employers subject to the Scheme take the form of periodical levies based on the wages of the workers employed; and employers are obliged to give such guarantees as the company may, with the approval of the Secretary of State, determine. Any sum due by an employer to the Fund under this Scheme may be recovered by the company summarily as a civil debt.

No alteration in the rate of levy shall take effect until approved by the Secretary of State.

The company may, if the Secretary of State so requires, adopt different rates of levy for different risks, such rates being determined, for instance in the case of the Sandstone Industry, by the composition of the sandstone, the conditions under which it is got or manipulated, etc., and such rates may be applied to different classes or groups or works or processes or to any particular works or process 1.

Every employer commencing to carry on any process to which the Scheme applies, or recommencing to carry on any such process after having discontinued it for a period of twelve months, must notify the company accordingly.

Further, every employer must keep a correct record of every workman employed by him in the industries, showing the number of days of employment in each year, the nature of the work on which he is from time to time engaged and the wages paid. This record must be available for inspection by the officers of the company administering the Compensation Fund.

In the event of failure on the part of the employer to furnish adequate information, the company is entitled to assess the amount of the subscription to be paid by the defaulting employer on such information, from whatever source, as it may have in

1 The levies were at September 1935 as follows: Refractories Industries: $6 \frac{3}{4} \text{ per cent. of the wages}; Sandstone Industry: variable according to the type of occupation and risk: 3d. in the £ for labourers, 6d. in the £ for rock-getters, and 10d. in the £ for dressers of stone and masons.
its possession, provided that if, within fourteen days from the date on which notice of assessment is served on him, the employer furnishes the company with the requisite record of information, the company may, after inspection, revise the assessment in accordance with such record.

An employer who fails to comply with any duty expressly imposed upon him by the Scheme or the Silicosis and Asbestosis (Medical Arrangements) Scheme (see "Procedure for Settling Disputes") is liable to pay to the Fund an additional subscription not exceeding £5 for every day on which the contravention or failure occurs or continues.

Medical Procedure

As will be seen from the foregoing, medical procedure as regards compensation for silicosis is based on the operations and decisions of the Medical Board, the organisation of which is regulated by the Silicosis and Asbestosis (Medical Arrangements) Scheme dated 1931, and subsequent amendments.

The Medical Board consists of specially qualified medical practitioners appointed by the Secretary of State under the

1 The provisions of the 1925 Act concerning civil liability also apply to the various Schemes.

2 The Silicosis and Asbestosis (Medical Arrangements) Scheme dated 30 April 1931. S. R. & O., 1931, No. 341 (came into force on 1 June 1931).

The Silicosis and Asbestosis (Medical Arrangements) Amendment Scheme 1934, dated 4 August 1934. S. R. & O., 1934, No. 889 (came into force on 1 September 1934).

The Silicosis and Asbestosis (Medical Fees) Regulations, 1931, dated 18 May 1931, made by the Secretary of State with the approval of the Treasury as to the fees to be paid in respect of examinations made and certificates given under the Silicosis and Asbestosis (Medical Arrangements) Scheme 1931. S. R. & O., 1931, No. 412 (came into force on 1 June 1931).

The Silicosis and Asbestosis (Medical Fees) Amendment Regulations, 1933, dated 15 September 1933, made by the Secretary of State with the approval of the Treasury as to the fees to be paid in respect of examinations made and certificates given under the Silicosis and Asbestosis (Medical Arrangements) Scheme, 1931. S. R. & O., 1933, No. 930 (came into force on 1 September 1933).

The Silicosis and Asbestosis (Medical Fees) Amendment Regulations, dated 24 September 1934, made by the Secretary of State with the approval of the Treasury as to the fees to be paid in respect of examinations made and certificates given under the Silicosis and Asbestosis (Medical Arrangements) Scheme, 1931. S. R. & O., 1934, No. 1063 (came into force on 1 October 1934).

3 In 1935 the Board consisted of a Chief Medical Officer and eight Medical Officers and was divided up into four "panels" of two Medical Officers each, with centres at Bristol, Manchester, Sheffield and Stoke-on-Trent, the Chief Medical Officer being stationed at Sheffield. In addition part-time members of the Board have also been appointed to assist in cases in the London area (two), in Cornwall one and Aberdeen (one).
chief medical officer, whose duty it is to supervise the working of the medical arrangements with a view to securing a uniform standard of efficiency. Their duties are to carry out the various medical examinations required on commencement of the employment or periodically thereafter, or on the applications of persons desiring to claim compensation or in connection with arbitration proceedings and reviews of weekly payments; and to issue the various certificates required under the Compensation Schemes. They have power to arrange for radiographic examinations.

The Board are required to keep a record of every examination made under the Scheme.

Certificates and reports issued by the Medical Board for the purposes of the Schemes must be signed by not less than two members of the Board. Their certificates form conclusive evidence of the matters therein certified.

The Board is financed from a special Medical Expenses Fund, which is administered by trustees, assisted by an executive officer, all appointed by the Secretary of State, the officer in question acting as secretary of the Fund. It is the duty of the Secretary to collect and recover any fees due to the Fund and to make the payments¹ authorised, keeping full and true accounts which are audited once at least in every year by an auditor appointed by the Secretary of State.

The Fund is maintained by (1) an annual State contribution and (2) fees payable mainly by the employers, but in some cases paid in part (see “Right to Compensation”, and “Benefits”) by workmen or dependants applying for an examination, fees so deposited with the Medical Board being paid over by the Board into the Fund.

Any sum due to the Fund under the Scheme may be recovered summarily or otherwise as a civil debt.

Under the Silicosis and Asbestosis (Medical Arrangements) Scheme it is the duty of employers:

¹These payments are: remuneration of the members of the Medical Board or of duly qualified medical practitioners appointed by the Secretary of State; any expenses necessarily incurred by them in the exercise of their duties under the Scheme; cost of radiological or post-mortem examinations arranged for by the Board; any travelling or other expenses reasonably incurred by workmen in submitting themselves for examination when so required by the Medical Board (subject to any scale approved by the Secretary of State); such other expenses incurred in the administration of the Fund as are approved by the Secretary of State.
(1) to give notice to the Medical Board of commencing to carry on any industry or process in which medical examination of workmen on entering employment and periodically thereafter is compulsory;

(2) to make the arrangements necessary for the medical examination of new entrants and furnish certain facilities to enable the Medical Board to carry out these and the periodic examinations at the works, or other convenient place approved by the Medical Board;

(3) not to engage or to continue to employ in any industry or process coming within the Schemes any workman who has refused or wilfully neglected to submit himself to the examinations in question, or, except so far as may be allowed by certificate of the Medical Board, a workman who has been suspended or certified to be totally disabled;

(4) to furnish and renew where necessary, for each workman subject to periodical medical examination, a personal register, in which are entered certain particulars as to present and previous employment and as to his medical examinations. A duplicate of this register is kept by the employer and forwarded by him to the Medical Board when the workman leaves his employment.

In the case of contravention or non-compliance on the part of an employer with these provisions the employer is liable on summary conviction to a fine not exceeding £5 for every day on which the contravention or failure occurs or continues. Alternatively, in the case of the Refractories Industries and Sandstone Industry there may be substituted for the above fine such additional subscription to the Compensation Fund as may be fixed by the Secretary of State.

Prevention

There are requirements under other Statutes for the prevention of dust, etc., but the Compensation Schemes also provide for preventive and prophylactic measures. The periodic medical examinations\(^1\) and records of the Medical Board afford useful

\(^1\) The prescribed interval between periodic medical examinations varies according to the degree of danger found to exist in different occupations and other circumstances. In some cases (e.g. ganister miners, silica brickmakers, masons in the sandstone industry and certain occupations in potteries) it is eighteen months; in others it is three years.
information not only as to the diagnosis of the disease but also as to where the conditions of employment are especially dangerous, so that additional precautionary measures may be considered; while compulsory suspension from employment in the light of periodic and other examinations is valuable for checking the entry of persons of defective physique into processes in which they are specially likely to contract silicosis, for transferring to less dusty occupations men found to be suffering from tuberculosis or silicosis in its early stages, and for preventing the spread of tuberculosis among other workers.
GERMANY

LEGISLATION

Third Order dated 16 December 1936 to extend accident insurance to cover occupational diseases (L.S., 1936, Ger. 3).

Silicosis is compensated in virtue of the third Order of 16 December 1936 relative to the extension of accident insurance to cover occupational diseases which came into force on 1 April 1937, the Order being issued in pursuance of Articles 547, 922 and 1057 (a) of the Federal Insurance Code (text of 9 January 1926). (L.S., Ger. 1, amended by the Act of 20 December 1928 (L.S., 1928, Ger. 3 c.)

SCOPE OF LEGISLATION

The Order covers persons engaged in industrial, agricultural and maritime employment in those establishments covered by the accident insurance scheme (see Note 1).

Accident insurance covers the following persons: workers, assistants, journeymen, apprentices, works' officials inclusive of foremen and technicians in the establishments covered, as well as those engaged in domestic and other services to which insured persons employed mainly in the establishment or in insured activities are assigned by the owner of the undertaking or his authorised representative.

The owner of an undertaking and the husband or wife of the owner as the case may be are, if employed in the undertaking, likewise liable to insurance but may be declared exempt therefrom when not exposed to special risk.

RIGHT TO COMPENSATION

According to the terms of column II of the schedule appended to the Order, compensation is provided for:

(a) serious pneumoconiosis (silicosis);

1 On this date the second Order of 11 February 1929 (L.S., 1929, Ger. 1) was repealed. Cases in course of settlement, however, are dealt with in accordance with the provisions of the repealed Order.
(b) pneumoconiosis (silicosis) occurring in conjunction with pulmonary tuberculosis when the general clinical picture is serious and the pneumoconiotic lesions constitute the essential cause of the active and progressive evolution of tuberculosis.

In terms of the Order simple silicosis or silicosis accompanied by pulmonary tuberculosis resulting in serious illness are assimilated to an injury due to an accident and death by such disease to death resulting from an accident and are compensated as such.

There is "serious silicosis" when there are found in the lungs pneumoconiotic neoformations of the connective tissue (nodules and coalesced nodules) — shown on the radiograph in the form of pictures of intense and disseminated mottling (snowstorm pictures) or compact and diffuse opaque pictures — and injuries causing reduction of the respiratory capacity affecting the circulation to such an extent as to involve a marked reduction of the working capacity of the individual.

This definition expressly refrains from a description of the radiographic picture, the reference thereto above given in parentheses being merely inserted by way of example. The Order simply declares that the state of health entitles the worker to compensation, leaving out of account symptoms which often lead to differences of interpretation.

As regards silicosis occurring in conjunction with tuberculosis, right to compensation does not depend on the presence of a state of serious silicosis as above defined (see Note 2), but it suffices that the general state of health resulting from the coexistence of the two diseases should be serious, and that there are revealed in the lungs marked silicot changes such as may constitute an essential cause of the general morbid condition.

"Essential cause" within the meaning of the Order exists when it can be affirmed that, in the absence of the injury considered as the cause, the state of the disease would not have been produced at all, or would not have been produced so quickly, or would have followed a definitely less serious course. (For the history of the interpretation in virtue of the second Order see Note 2.)

Compensation is in general accorded at the earliest from the date on which the Order came into force, i.e. from 1 April 1937.

1 Retrospective effect. — Nevertheless provided that at this date an insured worker is suffering from an occupational disease which could not be compensated in virtue of the second Order, compensation will be accorded
CERTIFICATION OF THE DISEASE

Certification of the disease is subject to detailed procedure outlined in the Insurance Code and which applies both to notification of the disease and to supervision of cases lodging claims.

Notification of the Disease

Notification of the disease must be effected both by the employer of the insured worker and by the doctor who makes the diagnosis.

Notification by the Employer.

The owner of an establishment or his representative are obliged to notify cases of silicosis coming to their knowledge which have occurred in their establishment and which involve total or partial incapacity for more than three days or death, whether the disease be due to employment in the establishment in question or in any other.

Notification made within three days after the owner of the establishment is aware of the occurrence of the case is made on a form prescribed by the Federal Insurance Office (Form A). The notification must be submitted to the local police authorities, and to the office of the accident association. In the case of failure to make the necessary notification or to do so within the prescribed time, a disciplinary fine may be imposed on the person responsible by the accident association. The police authorities must without delay forward notifications received to the appropriate accident association.

when the insured case occurred subsequent to 30 January 1933. More explicitly the commencement of the disease within the meaning of the sickness insurance provisions (date of the first medical treatment, of the first delivery of medicines, etc., date of incapacity for work), or the commencement of loss of earning capacity within the meaning of the accident insurance, must be later than the date above referred to.

As regards silicosis in particular, the retroactivity clause shall apply to cases which were not covered by the second Order and which will be covered by the third Order (silicosis complicated by tuberculosis) for which compensation is no longer subject to the presence of serious silicosis; cases of silicosis occurring in occupational categories which were not inscribed in the second column of the schedule appended to the second Order. Compensation in these various cases will on no account be accorded prior to 1 April 1937. There is no special delay in regard to notification of these retroactive cases to which the general provisions of the Federal Insurance Code apply.

1 The accident association of undertakings is the institution responsible for insurance. Besides these associations there are in certain cases special institutions set up by the Reich, the States, the communes and other public bodies (for details see footnote, p. 81).
Notification by the Doctor.

Any medical man\(^1\) who diagnoses or suspects the presence of silicosis must at once notify this disease on a special form (B)\(^2\) to be submitted by him to the appropriate accident association or to the Government medical inspector\(^3\) for the establishment employing the insured worker.

Where several medical men diagnose or suspect the presence of silicosis in a worker, each one of them is obliged to make the requisite notification; they may, however, come to an agreement that one of them shall undertake this task on behalf of the others. Should a medical man be aware that the necessary notification has already been made by a colleague, he is not obliged to make a further notification himself. All that is required of him is that he should forward to the local insurance office a short communication to the effect that the notification has been made.

The medical man notifying the disease must base his diagnosis on sufficiently definite objective symptoms leaving out of account the possibilities of medical treatment or other means of effecting a cure, and the consideration as to whether the patient is capable of continuing work or whether the disease is serious or not.

No time limit is fixed with regard to the lodging of the notification, the legal provisions being confined to requirement of notification “without delay”, that is to say, without delay subsequent to diagnosis. The notifying medical man is not obliged to provide detailed information or to engage in supplementary research with a view to confirming diagnosis of silicosis or suspected silicosis, which is a matter entirely for the Insurance Office (control of diagnosis by a skilled medical man) or for the accident association affected.

At the demand of the medical inspector or the accident association the competent medical association may reprimand any medical practitioner who fails to make the requisite notification or does not make it in due time.

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\(^1\) Doctor attending the case as well as any other qualified doctor whether in practice or not who may be called upon to diagnose silicosis: hospital doctor or doctor attending a clinic, doctor called in to give expert opinion (even though diagnosis of the silicosis is not the result of such expert opinion), factory doctor, medical official, medical inspector of factories, medical examiner in connection with war pensions (Versorgungs­arzt).

\(^2\) The Federal Insurance Office intends to introduce certain changes in the forms at present used.

\(^3\) Translation of the term “Staatlicher Gewerbearzt” used in the Order.
The medical practitioner may claim from the accident association a fee in respect of the notification, the amount of which is fixed in accordance with the provisions in force; at present (January 1937) fixed at 4 marks.

Notification is also compulsory whenever the medical man (doctor in charge of the case, doctor called in to certify death or to effect autopsy without having treated the patient) discovers the existence of the disease subsequent to death during autopsy or otherwise. Nevertheless, no legal provision exists in regard to autopsies apart from the entry 15 of the medical certificate, in accordance with which the doctor is requested to state whether an autopsy has been carried out or not and to indicate the results thereof.

Notification by the Sickness Fund.

Further, Sickness Funds are obliged to notify to the accident associations all cases of disease which they suspect of being of occupational origin. The director of the Sickness Fund informs the accident association to which the establishment where the case has occurred belongs.

* * *

The accident association must within the two days following the receipt of notification of a case of occupational disease send the original notification to the competent Government medical inspector, and a copy to the factory inspector\(^1\) in charge of the district in which the insured worker was employed.

The attention of the inspector is thus drawn to the disease in question, and in the case of the occurrence of numerous cases of the same disease he will thus be in a position to adopt the requisite measures in collaboration with the Government medical inspector and the accident association.

The Government medical inspector who receives such notification directly (for instance, from another medical inspector not competent with regard to the particular case, or from any authority with the exception of the accident association) sends a copy of this notification to the accident association affected and carries out the measures of control referred to below.

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\(^1\) The current English expression "factory inspector" is used, though maritime work and agriculture and other occupations are covered by the Order.
Should he not be competent in the matter (case occurring outside of his district) he sends the original notification either to the accident association or to the competent medical inspector.

In the case of diseases occurring in undertakings working under contract for the Federal Government, or affecting workers engaged on the Federal railways, a copy of the notification is sent to the officials of these administrations, or to any persons designated by them for this purpose. It is the management of these administrations which in its turn transmits a copy or an abstract of the notification to the Government medical and factory inspectors.

Examination of the Claim

The method of enquiry provided for by the Insurance Code for accidents does not apply to occupational diseases, but is replaced by a special enquiry in their case. In fact, whatever method is followed the notification of the disease by the doctor or by the accident association is always received by the Government medical inspector, whose task it is to examine the case. This includes examination of the sick worker and, where necessary, the carrying out of an enquiry by the accident association. In the first instance the medical inspector confirms the doctor's notification with a view to its completion, where necessary.

Examination of the Insured Worker.

In accordance with the provisions of the Order, it is the duty of the medical inspector to examine the insured worker without delay, or have him examined at the expense of the accident association by a medical man appointed for the purpose, and transmit his report to the accident association.

In practice, however, medical inspectors are requested not to examine the insured workers themselves, though they have a right to do so, but to entrust such examination to medical men residing either within or beyond their district who appear to them specially qualified for this task.

The report of the medical man so appointed is addressed to the medical inspector who draws up the final report, or if he does not do so, completes that of the appointed medical man either by providing a covering letter or by a supplementary
report. In any case the medical inspector must in an explicit manner express his opinion as to the causal relation existing between the disease and the occupational activity exercised by the insured worker.

Substitutes for the Government Medical Inspector. — In certain exceptional cases — districts having no medical inspector, absence or illness of the medical inspector or of the medical man so appointed — the Federal Minister of Labour may entrust to other health officials control of the cases notified as occupational diseases and carrying right to compensation. Medical men thus acting as substitutes are in the case in question considered as medical inspectors within the meaning of the Order on compensation of occupational diseases without, however, being invested with the other powers of such officials. For their duties in carrying out the provisions of the Order, medical inspectors and their substitutes at present receive remuneration from the accident association.

Enquiry.

In certain cases the medical man who notifies the disease and the medical inspector (or his substitute) may easily discover the occupational origin of the disease. This, however, is not always so, and it is then essential to effect an enquiry. Though the medical inspector cannot do so himself, nor can he entrust it to other officials, he has nevertheless power in virtue of the Order to demand the accident association to proceed with the enquiry, the accident association being obliged to comply with any demand of this nature. As regards the enquiry, the hearing of witnesses or of experts, examination of workers on the spot or other similar procedure the accident association is obliged to inform the medical inspector in good time as to the time and place at which such occur.

When the accident association itself undertakes an enquiry prior to submission of the report by the medical inspector, it is obliged to inform the latter of the proposed measures, and to acquaint him with the results of the enquiry.

The medical inspector may always, moreover, in his capacity of medical official and inspector, confirm during his visits of inspection to the undertakings coming within his competence the information provided in the notification of the disease.
BENEFITS

For the purposes of benefits, the date of the outbreak of the disease is the day on which the disease commences within the meaning of the accident insurance provisions\(^1\), or where the latter is more advantageous for the insured worker, the day on which the loss of earning capacity commences within the meaning of the accident insurance provisions.

If the disease or loss of earning capacity commenced whilst the insured worker was still employed in an undertaking subject to insurance, in respect of the application of §§ 1546 and 1547 of the Insurance Code\(^2\), the date of commencement of the disease is that of the termination of employment of the insured worker in the establishment subject to insurance.

Silicosis may, however, commence when the insured worker is no longer employed in an undertaking liable to insurance. It is with a view to giving consideration to this fact that the date of the outbreak of the disease is, in accordance with the provisions of the Order, deemed to be the date of the last day on which the insured worker was employed in an undertaking liable to insurance against silicosis. Benefits accorded are of two types: in kind or in cash:

Benefits in Kind

Benefits in kind comprise medical treatment and vocational rehabilitation.

Medical treatment comprises medical attendance, provision of medicaments or other necessary therapeutic means, or any means adopted with a view to alleviating the consequences of the disease, and the provision of attendance.

Attendance by nurses or other attendants is accorded where the insured worker cannot dispense with such attendance which may be provided in his own household or family or by means of payment of a monthly allowance made for this purpose.

Attendance in the worker’s home is accorded when for a sufficient reason (number of children, illness in family, or other

\( ^{1}\) Within the meaning of the sickness insurance provisions, the beginning of the disease dates from the first medical treatment, provision of medicaments, or other means of treatment, or where more favourable for the insured worker, from the date of disability.

\( ^{2}\) If compensation is not assessed ex officio, the claim must be lodged within a delay of two years from the outbreak of the illness, under penalty of forfeiture of right to bring action.
adequate family reason) treatment and care cannot be given by the insured worker’s relatives, or again where admission to hospital is impracticable.

Insured workers have free choice of a doctor from among those inscribed in the list or authorised for the purpose by the insurance organisation. Where the insured worker is not insured with a Sickness Fund, the doctor may be chosen from a list of medical men authorised for the purpose as the result of an agreement arrived at between the Sickness Fund and the accident association.

Hospital treatment is only imposed with the consent of the insured worker except where the nature of the case demands treatment or care which it is not possible to provide in the worker’s home, or where the insured worker has repeatedly disobeyed the rules for sick persons (§ 347) or the instructions of the medical practitioner in attendance.

Benefits in kind are supplied by:

(1) the sickness insurance scheme during the first 45 days, provided the benefits involved are payable under the sickness insurance scheme. All other charges are borne by the competent accident association.

(2) It is the accident association which is thereafter responsible for further charges.

Medical treatment is at all times subject to revision by the accident association when it considers that a new course of curative treatment may result in increased working capacity of the insured worker in receipt of occupational disease compensation or likewise by the Sickness Fund which, independently of the insured worker under treatment, may demand resumption of curative treatment.

Vocational rehabilitation is provided for in the legislative provisions with a view to ensuring recovery or improvement of working capacity in the exercise of the occupation involved or to aiding the insured worker towards obtaining work in an occupation which may be reasonably assigned to him. Where necessary, training in an entirely new occupation may be provided.

Refusal on the part of the worker to undergo vocational rehabilitation does not involve reduction of the pension.

The Federal Minister of Labour may within the framework of the Insurance Code issue any complementary provisions relative either to medical treatment or to vocational rehabilitation.
Cash Benefits

Sickness Benefits.

These benefits comprise, in accordance with the stage of evolution of the disease, a daily allowance or pension for incapacity.

(a) Daily Benefit. — Daily benefit or so-called sickness benefit, equalling half of the basic wage for every calendar day, is paid to the insured worker from the fourth day of the illness onwards or from the day in which incapacity for work commences if this is later.

The allowance is suspended during maintenance in hospital. Where hospital treatment is granted to an insured worker who has hitherto maintained relatives wholly or mainly out of his earnings, a family allowance is paid in addition to the relatives.

The payment of money benefits is effected as in the case of benefits in kind by: (i) the Sickness Fund, during the first 45 days; (ii) the accident association is responsible for payment of benefits from the forty-sixth day to the twenty-sixth week.

It should, however, be recalled that at the twenty-seventh week, the last week for sickness insurance benefit payable by the accident association, there arises in general the question of invalidity within the meaning of the accident insurance legislation and of the granting of a pension. The latter may, however, be accorded earlier, that is to say as soon as the daily benefit ceases to be paid under the sickness insurance provisions.

(b) Pension for Incapacity. — From the twenty-seventh week, or even earlier, from such date as may be fixed by the accident association, the insured worker receives, (i) during the whole period of his total earning incapacity, a pension equal to two-thirds of his annual earnings (full pension); (ii) during the whole period of his partial earning incapacity, a pension equal to a proportion of the full pension corresponding to the extent of the loss of earning capacity (partial pension).

1 The amount of the annual earnings is established by multiplying the average daily earnings by 300. Where it is not possible to ascertain the annual wage of the insured worker, the amount is fixed by taking the wage earned in the course of the year preceding the date of the outbreak of the disease by a worker belonging to the same category in the establishment, or in an establishment which is identical, similar, or as similar as possible. The average salary of this insured worker for one working unit is multiplied by the number of days during which work was being carried on in the establishment in the course of the year preceding the date of the outbreak of the disease.
When a pension for incapacity amounts to 50 per cent. or upwards of the full pension, it is increased 10 per cent. for each legitimate child or each child legally recognised as legitimate under the age of 15, or 18 in case of a child still under vocational training and maintained by the insured worker.

The total amount for the pension and children's allowance must not exceed the total annual earnings.

When the insured worker is sent for treatment on the decision of the association to a curative institution, the pension is suspended. Nevertheless, the association is authorised to grant a special subsidy to the insured worker and his dependants when its statutes permit of this being done.

On the other hand, so long as the worker in receipt of a pension for partial incapacity is unemployed through no fault of his own as a result of his occupational disease, the accident association may temporarily increase the partial pension to an amount not exceeding the full pension.

If, at the moment of the outbreak of the disease, the injured person was already permanently and totally incapacitated for work, only medical attendance is granted 1.

(c) Allowance for Suspension from Work. — When, in the course of medical examinations effected in pursuance of the Factory Act, there is reason to fear that continuation of work might be likely to cause, aggravate, or occasion a further outbreak of an occupational disease, the accident association must, subsequent to enquiry, order suspension from the work in question of the insured worker, the occupation being regarded as a menace to his health. In order to compensate the reduced wage thus caused and all other eventual economic consequences to the worker, the accident association accords a pension to him, known as the "transitional pension" (Übergangsrente) amounting to the half of the entire annual pension, or an indemnity known

1 Temporary allowance: Should there be delay in fixing the amount of the permanent pension allocated to an insured worker, the accident association is authorised to accord a provisional pension during the first two years following the occurrence of the disease, and to modify the rate of this pension in accordance with any changes in circumstances. In the case of disputes (see below) the competent insurance authorities (superior Insurance Office and the Federal Insurance Office) have power to assess within the same time limit a provisional pension where a claim which the responsible accident association has disallowed is recognised as legitimate.

The permanent pension must be assessed not more than 2 years after the outbreak of the disease. A change in the circumstances is not a prerequisite of this assessment; and the previous assessment of the bases for the calculation is not binding in respect of it.
as the "transitional benefit" (übergangsgeld) amounting to half the amount of the entire pension for one year.

The payment of this indemnity in either of the above forms is subject to the presence of risk for the health, on the one hand, and, on the other, to the existence of economic loss sustained by a cessation of employment.

The accident association is not strictly bound to deliver the allowance for suspension from work; it is, however, required to ascertain in each case whether the necessary conditions are complied with, and if so to grant the allowance. The supervisory authority (for the accident associations, the Federal Insurance Office) may examine the decision reached in each case, and where necessary compel the accident association to accord the allowance. On the other hand, the applicant is not entitled to appeal to the social insurance courts against a refusal on the associations's part, but may draw the attention of the supervisory authority to his case. In any case, the association exercises freedom of decision as to what form the allowance shall take — pension or lump sum (the latter for instance in the case of migration to another district which may offer possibilities of suitable employment). This decision is not subject to control by the inspection service.

The possibility of a transitional pension being ultimately granted in addition to a transitional benefit, the amount of which is restricted, is not excluded.

Death Benefits.

In fatal cases benefits granted to dependants from the date of death are as follows:

(a) A pension equal to one-fifth of the annual earnings to the widow until her death or remarriage.

The pension may be raised to two-fifths should the widow as a result of illness or other infirmity have lost the half of her earning capacity for a period exceeding three months.

If the widow remarries, she receives three-fifths of the annual earnings by way of commutation of the pension.

On the other hand, the widow of an insured worker whose death is due to a cause other than the disease receives a lump sum equal to two-fifths of the annual wages of the deceased.

(b) A widower receives a pension equal to two-fifths of the annual earnings so long as he is in want until his death
or remarriage, provided that the deceased wife maintained him wholly or mainly out of her earnings on account of his incapacity for work.

(c) Every legitimate child or every child legally recognised as such receives a pension equal to one-fifth of the annual earnings up to the age of 15, or 18 if still under vocational training.

(d) Relatives in the ascending line for whose maintenance the deceased worker was responsible receive a pension equal to one-fifth of the annual earnings so long as they are in need thereof.

Pensions to survivors must not exceed in all two-thirds of the annual earnings. If they exceed that amount they must be reduced, pensions of a widow, widower, children and grand-children being reduced by equal amounts. Relatives in the ascending line have a claim only in so far as the pensions of the above do not exhaust the maximum amount. On the withdrawal of any one of the survivors, the pensions of the others are increased up to the permissible amount.

No pension is granted to the widow or widower of a deceased worker if marriage was contracted after the commencement of the disease or if death occurs during the first year of the marriage. The accident association may, however, grant a pension in special circumstances.

Funeral Expenses.

A sum equal to one-fifteenth of the annual earnings, with a minimum fixed at 50 RM. is granted to cover funeral expenses.

Review

Where there occurs an essential change in the circumstances on the basis of which the pension was fixed, the accident association or the worker himself may demand that a new rate should be fixed.

The claim for revision lodged by the insured worker must be addressed to the accident association or the local insurance office. In the latter case the application is forwarded without delay to the accident association together with the date of receipt.

During the first two years following the outbreak of the disease a new assessment of the benefit may be made or demanded whenever any change occurs in the condition of the beneficiary.
If within the two years a permanent rate of pension has been assessed, or if this period has expired, a new assessment cannot be made or demanded at intervals of less than a year; nevertheless these intervals may be reduced by agreement with the worker concerned.

When, subsequent to revision, the accident association finds that benefits have without due grounds been totally or partially refused, withdrawn or suspended, a reassessment may be effected.

The local insurance office informs the accident association when a pension has to be reassessed or withdrawn owing to a change in the circumstances.

When the demand of the worker has been previously rejected because the silicosis was only of average severity, the procedure is similar to that laid down in regard to a first demand for compensation, but the insured worker must produce proof that the disease has become "serious" to an extent entitling him to compensation. Generally this proof takes the form of a medical report accompanied by a radiograph.

**PROCEDURE FOR SETTLING DISPUTES**

The 1936 Order provides for the possibility of appeal by those affected, whenever disagreement exists as to whether a disease is entirely or partly occupational within the meaning of the Order or in regard to the substance of the claim for compensation. This appeal is addressed to the Federal Insurance Office which always passes legal judgment in regard to compensation cases in the form of statements of principle. The decisions of the insurance office are arrived at on the basis of reports requested from the most qualified experts whose conclusions the office is not, however, obliged to accept.

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1 For instance: existence of a morbid condition; assessment of incapacity; assessment of benefits, of pensions, etc.; conditions relative to insurance (undertakings not coming within the Act; diseases not included in the schedule, etc.); connection between the occupation and the disease, etc.
ADMINISTRATION OF COMPENSATION

Liability

The accident association in its role of accident insurance carrier is likewise liable for diseases of occupational origin within the meaning of the accident insurance legislation 1.

The accident associations are bodies with legal personality for the joint covering of risks to which undertakings employing insurable workers are obliged to belong. They are under the supervision of the Federal Insurance Office, and they comprise the owners of insured establishments and include all undertakings belonging to the branches of the industry in which they have been set up. Where an establishment comprises important departments belonging to different branches of industry it is allocated to the accident association to which the main establishment belongs.

Some of them comprise all the undertakings of a particular kind in the whole of Germany, others only those to be found in a limited area. The associations for the building industry have branches covering non-industrial building.

The owner of the undertaking must affix a notice in every establishment showing the accident association and section thereof to which his establishment belongs.

The accident association must pay compensation for occupational diseases described in the schedule occurring in an establishment liable to insurance carried on on account of an owner not belonging to the association, provided that an owner belonging to the association has ordered the work to be done and is liable for payment of the remuneration.

The accident association is managed by a leader assisted by an advisory council. The leader may modify, in consultation with the advisory council, the statutes of the association, and examine and adopt its annual accounts, etc.

1 There are also special insurance institutions set up by the Reich and the States responsible for undertakings carried on on their own account; or by the communes, federations of communes and other public bodies, under certain conditions, in particular for operations carried on on their own account, in connection with certain work. The liability of the special institutions is subject to similar principles of insurance. The law requires that compensation payable by these institutions shall be the same as that allowed by the associations of undertakings, and the institutions are subject to the same judicial authorities in the case of disputes. Nevertheless, in respect of certain given undertakings the Federal or other administrative authorities may become affiliated to the competent accident associations.
Membership of heads of undertakings in the association commences with the opening of an establishment or with the date on which it becomes liable to insurance.\(^1\)

The head of an establishment who becomes a member of an association must, within the delay of one week, notify the local insurance office in the district of the purpose and nature of the establishment, the number of insured persons employed and the accident association to which the establishment belongs.

The local insurance office must, within one week therefrom, transmit a copy of the notification assigning the establishment to the accident association specified therein.

Should the local insurance office consider that the establishment belongs to an accident association other than the association specified, it must inform the first association, the owner of the undertaking, and likewise the other association involved.

The accident association must keep registers of establishments on the basis of the register communicated to them by the Federal Insurance Office, and likewise of establishments subsequently assigned to them.

The owner of an undertaking must notify the accident association within a fixed time limit of any change in the person on whose account the establishment is carried on as well as of any alteration in his establishment which might affect its membership of the accident association.

The accident association may, where it considers it advisable on the application of the owner or ex officio transfer an establishment to another accident association and in this case must communicate the fact to the accident association concerned and to the owner, through the local insurance office, stating the reasons for the transfer.

**Distribution of Liabilities.**

Accident associations may agree to bear jointly all or part of their liabilities in respect of compensation; the agreement made in this connection requires the approval of the Federal Insurance Office.

Thus in the case of silicosis where several accident associations are involved distribution of the liabilities is, in the absence of other factors, determined in accordance with an agreement adopted

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\(^1\) For the Reich and States, communes, federations of communes and other public bodies, the date of the beginning of membership is regulated by special provisions of the Insurance Code.
on 7 September 1933 on the basis of the duration of employment in each industry¹. (Varied coefficient of risk from exposure to dust, for instance.)

Administrative Procedure

The payment of benefits through the intermediary, as provided in the Insurance Code, of the association or of the managing committee of the local sections or special committees, is effected by the accident association subsequent to any further investigations which it may consider necessary. The participation of at least one representative of the insured person is required in the formal assessment of benefits.

The accident association must inform by written decision the insured worker where a formal assessment is prescribed, such decision being completed by a statement that it is irrevocable, unless the claimant lodges an appeal with the superior Insurance Office within a month of the communication of the decision.

The accident association may issue rules to govern the conduct and supervision of beneficiaries suffering from occupational diseases, such rules to be established after consultation with and approval of the Federal Insurance Office. The latter may fix a time limit for issue of rules and may itself issue such rules in case of failure to issue them before the time limit has expired.

Financial Resources: Contributions

The accident associations obtain money to cover their expenditure² by contributions from their members which cover the requirements of the preceding financial year. Members' contributions are assessed annually according to the remuneration paid to insured workers in their establishment, and graduated in accordance with a schedule calculated in proportion to the

¹ Further, certain accident associations in 1919 concluded an agreement in regard to which the burden of procedure and compensation in regard to a case of silicosis devolved on the accident association to which belonged the establishment in which the insured worker had last worked whatever the duration of employment, in the case of workers who had worked successively in undertakings, members of the accident associations, signatories to the convention.

² Payment of benefits, expenses of management, accumulation of reserve, prevention, procuring of employment for sick workers, creation of institutions for vocational rehabilitation, establishment of curative or convalescent institutions or institutions or homes for orphans or invalid workers.
class of risk determined for each establishment. This system of assessment of risk is subject to the control of the Federal Insurance Office.

The schedule of risks is revised for the first time after not more than two financial years, and thereafter at intervals of five years with reference to the accidents and diseases which have occurred. The schedule of risks and all amendments thereof require the approval of the Federal Insurance Office, which after hearing the administrative body of the accident association has power to draw up the said schedule, where the accident association has failed to do so, within the prescribed time limit, or should it not have been approved.

The accident association may reallocate any establishment for the duration of the schedule of risks, should it appear that the data supplied by the owner were incorrect or should a change have taken place in the establishment. The accident association may impose supplementary contributions on owners or authorise rebates for the next schedule period or a part thereof, according to the number of cases which have occurred in their establishment.

With a view to assessment of contributions every member must transmit to the accident association within six weeks after the close of the financial year a wages return showing the insured persons employed in their establishment during the preceding financial year, the number of working days, the remuneration paid; where the remuneration paid is not taken as the standard, a calculation of the remuneration which is to be taken into account in the assessment of the contribution and finally the class of risk to which the establishment is allocated. In certain instances and under certain conditions the accident association may base the calculation of the contribution on a fixed sum or may levy uniform contributions.

The owner of an establishment has the right of appeal against allocation of risk or fixing of supplementary contributions, and such appeal must be lodged with the superior Insurance Office within a time limit of 60 days.

Civil Liabilities

Owners of undertakings or their authorised agents or representatives are not liable under other legal provisions towards insured persons and their dependants (even where the latter have no claim to a pension) for payment of compensation due
to occupational disease unless it has been established by a criminal verdict that they have intentionally caused such disease. In this case the liability of the owner is limited to the amount by which such compensation exceeds the compensation under the scheme for compensation of occupational diseases. Further, where it has been established by criminal verdict that the owners of establishments or their representatives have caused the said disease intentionally or by negligence through a failure to observe the care which they were specially bound to exercise in virtue of their office, occupation or industry in regard to measures of prevention, they are liable for all expenditure entailed upon communes, sickness, relief and other funds as a result of the occupational disease in question. Owners of undertakings and their representatives are liable to the accident association for its expenses even in the absence of a criminal verdict.

**Prevention**

The Order of 1929 as well as the Insurance Code outline certain measures of prevention for occupational diseases. Thus, for example, the former contains measures concerning compulsory notification by the medical man of any suspected or confirmed case of silicosis, transmission of this notification by the local insurance office to medical officials and the department of the factory inspectorate with a view to collaboration with the administrations particularly affected in regard to the prevention of disease of occupational origin (measures of prevention).

The competent administrative authority may further draw up for medical officials the necessary guiding principles enabling them to assemble the elements relative to notification or to amplify the latter, and likewise provisions relative to withdrawal from work of the sick worker and to the allocation of a transitional benefit.

The *Federal Insurance Code* enumerates in Article 848 the obligations incumbent on the accident associations requiring them to engage in efforts of prevention and in case of accident to provide effective first aid in so far as this is permitted by technical and medical progress and the economic resources of the industry. The accident association must therefore issue the necessary regulations respecting: (1) arrangements to be made and rules to be issued by members with a view to the prevention of occupational diseases in their establishments; (2) the precautions to be observed by the insured people themselves for the same purpose.
These regulations are drawn up by the accident association in collaboration with representatives of the insured persons and submitted for approval to the Federal Insurance Office. They may impose obligations on members with respect to first aid and on insured persons with respect to their conduct in case of accident. Regulations may also be issued for particular districts, branches of industry or only for certain classes of establishments.

The accident association communicates the regulations to the superior administrative authorities in the districts affected (Federal Inspectorate).

A suitable time limit is fixed within which members must make the arrangements prescribed in regard to prevention. The regulations prescribe the manner in which they are to be brought to the notice of insured persons by being posted up in the establishments in question in German and, where other nationalities are employed, in any other language corresponding to the nationality of such workers.

The accident associations must provide for the carrying out of the regulations dealing with the prevention of accidents.

With this in view accident associations are entitled or, if requested by the Federal Insurance Office, are bound to appoint a sufficient number of technical inspection officials to supervise the observance of the regulations for the prevention of accidents and to take cognisance of the equipment of the establishments where this affects membership of the accident association or the allocation of establishments to classes of risk. The Federal Insurance Office issues regulations for technical inspection officials relative to their co-operation with representatives of the establishment, and the Federal Ministry of Labour with the consent of the Federal Council may issue regulations respecting collaboration between the accident associations and the industrial inspection authorities.

The accident association communicates to the superior administrative authorities concerned the names and addresses of the technical inspectors.

Owners of undertakings are bound, under pain of a fine, to allow access to their premises at any time during working hours to the permanent members of the Federal Insurance Office whose duty it is to supervise the carrying into effect of the regulations in regard to prevention.
Note 1

Undertakings Subject to Accident Insurance

1. Mines, salt works, ore-dressing works, quarries, pits (open workings).
2. Factories, shipyards, metallurgical works, pharmacies, breweries and tanneries.
3. Builders' yards, industrial establishments in which building, decorating, stonemason's, locksmith's, smith's or well-sinking work is carried on, stonebreaking establishments, and building work done otherwise than in building establishments carried on by way of trade.
4. The chimney-sweeping, window-cleaning and butchering trades, and bathing establishments.
4a. Fire brigades and undertakings for giving assistance in accidents.
4b. Hospitals, convalescent and nursing homes, maternity homes and other institutions receiving persons for curative treatment or nursing, also institutions and organisations connected with public and free social welfare work and health services.
4c. Natural science, medical and technical research and experimental laboratories.
4d. Theatrical undertakings, exhibitions, performances, musical productions, singing and declamatory recitals, all irrespective of the artistic value of the performance, cinematograph businesses (manufacture, production and presentation of cinematograph films) and wireless broadcasting.
5. The whole establishment of the railways and the postal and telegraph departments, establishments belonging to the department for the Federal defence forces (army and navy), and establishments belonging to the former military and naval departments which have been transferred to civil departments of the Federal Government.
5a. Undertakings under the Air Ministry, including undertakings for aerial defence and for exercises in aerial defence, or undertakings for instruction in aerial defence recognised by the Air Ministry.
6. Inland navigation, timber floating, barge and ferry undertakings, towing (tracking), fishing in inland waters, pisciculture, fishpond management and icecutting, if these operations are carried on by way of trade or are managed by the Federation, a State, a commune, a federation of communes or other public body; dredging operations, and the keeping of vessels on inland waterways.
7. Cartage and carriers' establishments, livery stables (vehicles and animals for riding), and stabling establishments, if they are carried on by way of trade; the keeping of conveyances other than those for water transport, if they are propelled by natural forces or animal power, and the keeping of animals for riding.
8. Warehousing, storing and cellarage establishments, if they are carried on by way of trade.
9. The packing, loading, handling, sorting, weighing, measuring, inspecting and stowing of goods by way of trade.
10. Establishments for the transport of persons or goods and tree-felling establishments, if they are connected with a commercial establishment the operations of which extend beyond the scope of a small-scale establishment.

11. Subject to the same proviso (No. 10), establishments for the handling and manipulation of goods.

12. Undertakings for guarding industrial and private property.

**Note 2**

**Silicosis and Silicosis Complicated by Tuberculosis**

The following pages were drafted before the Third Order had been issued. It should be remembered that the Second Order reads as follows:

"**Serious pneumoconiosis (silicosis)**“  
If serious pneumoconiosis occurs simultaneously with pulmonary tuberculosis, the tuberculosis shall, for the purpose of compensation, be deemed to be pneumoconiosis.”

Interpretation of the above text gave rise to much discussion. The first interpretation was as follows: pneumoconiosis is considered "serious” only when accumulation in the lungs of dust containing silica causes nodulation, distributed in a more or less uniform manner throughout both lungs, the nodules being fairly large, at least of the size of a pea. Pneumoconiosis can only be detected radiographically in the form of pictures which are partly spherical or partly flat-surfaced; being clinically manifested by dyspnoea resulting from pulmonary sclerosis accompanied in certain cases by disturbance of the circulation even to the point of marked cardiac deficiency. It is only where "serious pneumoconiosis” occurs in conjunction with pulmonary tuberculosis that the latter is considered to be pneumoconiosis for the purposes of compensation.

Though this definition already referred to radiological, functional and clinical symptoms, nevertheless it happened in practice that undue stress was laid on the radiological symptoms and the functional state was on the other hand generally neglected. Further, certain authorities have adopted as radiological criteria some two, others three, “stages” or degrees of pulmonary shadows showing:

(a) pictures with slight mottling;

(b) macronodular pictures (serious pneumoconiosis), or

(i) the presence of ill-defined isolated spots with a reticular and honeycombed pattern and thickening of the hilar shadows;

(ii) the presence of more numerous small nodules with more dense shadows and approaching the snowstorm or lead shot picture, and distributed more symmetrically throughout both lungs;

(iii) the presence of clearly outlined spots with thick shadows distributed more or less symmetrically on both sides and giving a marked snowstorm or lead shot picture; or in rounded agglomerations giving extensive flat-surfaced, massive shadows.
In time a certain evolution occurred in the sense that the medical authorities were time and again obliged to refer to the significance of the functional condition, more especially of respiration and circulation, at rest and during physical effort (climbing a stair, bending the knees, dumb-bell exercises).

This resulted naturally in creating a certain number of difficulties in regard to assessment of cases, more particularly as a result of the criteria of invalidity adopted in Germany, that is to say, the reduction in the earning capacity by more than $66\frac{2}{3}$ per cent. "Serious" silicosis should in fact present a symptomatology sufficiently grave to involve invalidity, that is to say a reduction in the earning capacity, of more than $66\frac{2}{3}$ per cent. Numerous authorities, however, deduced the presence of serious silicosis from serious radiographic symptoms with, however, only slight functional reduction, for instance a reduction in the earning capacity of 35 and 40 per cent.

These conceptions were contradictory. The radiographic picture of the third stage should be accompanied by a reduction in functional capacity of at least 50 per cent. Inversely, there exist cases in which serious functional incapacity precedes radiographic changes in the lung.

Further, even were the definition of "serious silicosis" unaccompanied by tuberculosis to be established, other difficulties would be met with in the case of silicosis accompanied by tuberculosis.

According to the clear and definite description given in the Order, tuberculosis accompanying silicosis could not be considered as an occupational disease unless co-existing with "serious" pneumoconiosis. In practice, these combined nosological forms, more particularly in the case of advanced tuberculosis, do not always render possible accurate assessment of the degree of silicosis which is present. Thus a Standing Commission for Occupational Diseases established within the Federal Insurance Office decided that a combination of silicosis and pulmonary tuberculosis should be considered as a "serious" occupational disease even when it was only possible to diagnose silicosis of average severity on condition that the whole nosological picture was a serious one. (Decision of 25 February 1930. Entschl. und Mitteilungen d. RVA, Vol. 26, page 523.)

In accordance with this decision the German factory doctors on the occasion of the Conference held 13 June 1933 drew up the following definition of "serious pneumoconiosis":

"Serious silicosis" as interpreted for the purposes of compensation legislation is present in the following cases:

(a) presence of pulmonary changes typical of silicosis of the third stage (lead shot or tumourlike pictures), involving considerable derangement of respiration and of the circulation;

(b) in the absence of pulmonary changes characteristic of silicosis of the third stage, presence of serious functional derangement of the respiratory and circulatory systems, due essentially to silicosis alone or in conjunction with other diseases of the respiratory or circulatory systems;

(c) presence together with considerable, but so far not definitely serious, silicotic changes, of tubercular lesions, association of the two giving rise to a serious nosological picture.
These guiding principles served for a fairly long time as the basis of assessments.

At the end of 1933, however, a decision made by another Standing Commission within the Federal Insurance Office once more established the description given in the Order and made it valid.

The Order prescribed the existence of "serious" pneumoconiosis. It was therefore still necessary to determine that this condition existed and it was only subsequent thereto that assessment of accompanying tuberculosis could be made. Accompanying tuberculosis could therefore not be recognised unless the picture of "serious" silicosis had been first of all established. (Decisions of 6 September and 8 November 1933.)

Since then all assessments have been made on this basis.

The formula inscribed in the third Order (see pp. 67-68) constitutes a return to the first interpretation adopted by the Federal Insurance Office dated 28 February 1930.
APPENDICES

Appendix I

COMPENSATION OF OCCUPATIONAL DISEASES BY THE SYSTEM OF BLANKET COVERAGE

In accordance with the Report submitted by Lewis R. Thompson, Assistant Surgeon-General, Chief of the Scientific Research Division, U.S. Public Health Service, to the tenth Meeting of the Correspondence Committee on Industrial Hygiene this method of compensation may be described as follows:

Workmen's Compensation Acts as originally adopted by the various States concerned themselves primarily with accidents and made little or no provision for occupational disease. Thus, in a few States all occupational diseases come under workmen's compensation laws, in other States only certain specified diseases, and in the greater number of States no diseases at all come under compensation.

At the present time, eight States (California, Connecticut, Illinois, Massachusetts, Missouri, New York, North Dakota and Wisconsin — one Territory — Hawaii, and the Philippine Islands have Workmen's Compensation Acts that cover occupational diseases generally. Blanket coverage for diseases is also provided by three Federal laws administered by the United States Employees' Compensation Commission.

Whether a State shall adopt blanket coverage or a limited number of compensable diseases listed in a schedule is still a subject of controversy. It is frequently stated that any system other than blanket coverage is unfair, unjust, illogical and ineffective. On the other hand, the opponents of complete coverage state that with laws having no schedules the advantage of prompt payment of compensation is often lost, and that confusion frequently arises through legal and other entanglements. In the matter of the additional cost necessitated in changing to blanket

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1 According to an article published in May 1937 (C. O. Saffington: "Medico-Legal Trends in Occupational Diseases", Industrial Medicine, p. 233) compensation for occupational diseases is said to be accorded in the United States in the following States: California, Connecticut, District of Columbia, Illinois, Indiana, Massachusetts, Missouri, New York, North Dakota, Wisconsin. In Maryland, where the definition of occupational disease has been fixed by the Courts, and in the following States which have adopted the schedule system: North Carolina, Kentucky, Ohio, Washington, Western Virginia, Minnesota, Nebraska, New Jersey, Rhode Island. In the last four, silicosis is not, however, included in the schedule.

2 The same system is also in force in the following countries: Costa Rica, Ecuador, Guatemala, Paraguay, Salvador.
coverage casualty insurance rate-makers have stated that the change would involve not more than one per cent. increase in the rates of a State that already has a compensation law but without occupational disease coverage; the increase from a schedule to blanket coverage would, of course, be less.

In no other State has a Workmen’s Compensation Act been operating longer than in Wisconsin where it became effective in 1911. Eight years later, in 1919, occupational diseases in the form of blanket coverage were included in the Act.

The Law pertaining to Occupational Disease in Wisconsin

A. Definitions. — "Injury" is mental or physical harm to an employee caused by accident or disease. "Date of onset of disease" is the last day of work for the last employer whose employment caused disability.

B. Conditions of Liability. — (1) Liability shall exist against an employer only where the following five conditions occur:

(a) Where the employee sustains an injury;
(b) Where, at the time of the injury, both the employer and employee are subject to the provisions of this chapter;
(c) Where, at the time of the injury, the employee is performing service growing out of and incidental to his employment. Every employee going to and from his employment in the ordinary and usual way, while on the premises of his employer, shall be deemed to be performing service growing out of and incidental to his employment;
(d) Where the injury is not intentionally self-inflicted;
(e) Where the accident or disease causing injury arises out of his employment.

(2) Where such conditions exist the right to the recovery of compensation pursuant to the provisions of this chapter shall be the exclusive remedy against the employer.

(3) In the case of disease, intermittent periods of temporary disability shall create separate claims, and permanent partial disability shall create a claim separate from a claim for any subsequent disability which latter disability is the result of an intervening cause.

C. Incidental Compensation. — (1) Treatment. The employer shall supply such medical, surgical and hospital treatment, medicines, medical and surgical supplies as may be reasonably required for ninety days immediately following the injury to relieve from the effects of the injury, and for such additional period of time as in the judgment of the Commission will tend to lessen the period of compensation disability, or in the case of permanent total disability for such period of time as the commission may deem advisable, not to exceed the period for which indemnity is payable.

(2) Physician, Selection. — The employee shall have the right to make choice of his attending physician from a panel of physicians to be named by the employer.

Results

In discussions of blanket coverage it may be asked, "What per cent. of all compensated injuries is due to occupational diseases?"
and "What per cent. of all costs is represented by occupational diseases?"

In Wisconsin during the ten-year period, 1920—1929, the total number of compensated cases, that is all injuries including occupational diseases, was 200,791; of this number, 3,019 or 1.5 per cent. were listed as occupational diseases. During the calendar year 1929, there were 22,630 compensated cases of which 414 or 1.8 per cent. were occupational diseases.

Respecting the relationship of occupational disease costs to all costs, reference will be made to the experience of Wisconsin for the period 1920—1933. During these fourteen years a total of $59,595,901 was paid for all industrial cases; of this total, $1,423,569 or less than 2.4 per cent. were paid for occupational diseases. In the tabulation of occupational disease statistics the Wisconsin Industrial Commission has included the cost figures for those types of occupational disease that under the law of that State and of most States are rated as accidental. For example, compressed air illness, carbon monoxide poisoning, typhoid fever, sunstroke, freezing, and ivy, oak, hemlock and similar poisonings are usually compensable regardless of legislation covering occupational disease. This group of disease cases usually produces from 30 to 40 per cent. of the total cost, so that the Wisconsin experience, for cases depending on the blanket provision for relief, cost materially less than 2 per cent. of the whole.

Available data make it possible to present material on occupational diseases compensated during the years 1920—1929. This material concerns (1) proportionate incidence, (2) proportionate indemnity paid, and (3) average indemnity per case. During the ten years there were 3,019 cases of occupational diseases that were compensated; of this number approximately 100 resulted in death or in permanent or partial disability, and the remaining cases were classified as temporary injuries. Taking exclusively hazards believed to be associated with ten or more per cent. of the total cases it is found that the largest number, namely, 840 cases or 27.8 per cent. of the total, was related to toxic fluids, 396 cases (13.1 per cent.) to irritant dusts and fibres, 353 cases (11.7 per cent.) to toxic vapours, gases and fumes, and 320 cases (10.6 per cent.) to miscellaneous irritants. This order with respect to proportionate incidence is not necessarily the same as the order of the hazards when arranged according to the amount of indemnity paid. A total of $575,052 was paid in the case of all occupational diseases. Hazards that necessitated the expenditure of ten or more per cent. of the total indemnity paid may be written in decreasing order of magnitude as follows: toxic vapours, gases and fumes (25.4 per cent.), irritant dusts and fibres (20.5 per cent.), toxic fluids (10.6 per cent.) and miscellaneous irritants (9.7 per cent.). The average indemnity paid per case for all occupational disease hazards was $191. When the hazards referred to above are arranged in decreasing order of magnitude with respect to the average indemnity paid per case, they read as follows: toxic vapours, gases and fumes ($414), "germs" ($322), irritant dusts and fibres ($290), toxic fluids ($262) and miscellaneous irritants ($184).

The Workmen's Compensation Acts under the system of blanket coverage adopted in those States mentioned above (in Missouri insurance is elective on the part of employer and employees) may — according to Keiser — enable silicosis to be deemed an occupational disease.

Silicosis and particularly accompanying tuberculosis have for several years been made subject to compensation in the States of California, Connecticut, Massachusetts and Wisconsin.
Attention here will, however, be confined to the measures adopted by Wisconsin, giving a general idea of the methods of administration and the results obtained.

For details relative to this system the reader is referred to the study by H. A. Nelson, Director of the Workmen’s Compensation Wisconsin Industrial Commission, from which the following passages have been extracted and summarised:

Compensation boards and commissions are established as expert bodies with the task of studying compensation problems, both from scientific and from ordinary factual standpoints, so that skilled interpretations and conclusions may be made in a manner not possible under the old common law system. The fear of mistake or incompetency in a decision has been demonstrated to be largely fanciful, and it may be said that the degree of intelligent and capable administration characteristic of the great majority of commissions and boards does not give ground for the apprehension which formerly existed.

It is the belief in Wisconsin that any programme which falls short of compensation benefits on the same basis for occupational disease as for accidental injury is inadequate. When it is appreciated that silicosis in its later stage often develops into tuberculosis, involving the necessity for prolonged medical and sanatorium treatment, the inadequacy of any other method than a full medical and compensation provision will be comprehended.

Since the passage of the Occupational Diseases Act in Wisconsin in 1910, the silicosis problem has been largely solved in this State. Had it not been for the depression with so many persons out of employment, the burden to industry would not have been as great as it has been. During a period of several years many silicosis claims were made to the commissions, many of which had little or no foundation, whilst others were genuine cases calling for benefits. In some months as many as 30 or 40 applications were filed. Since May 1935 only 6 applications per month have been filed on an average, and in the last 3 months the applications have averaged only one. That means that the liability in the numbers of potential cases which existed a few years ago has been determined; that industry has discharged its current obligations to silicotics without incurring the undue expense so often loudly threatened, and that the future holds forth the highest hope that the burden will be in fact a very moderate one indeed, and one involving little contention as to its assumption by the industries involved.

By far the greatest objective attained by legislation in force in Wisconsin is that those industries which have dust hazards have installed apparatus or adopted working methods which have enabled them to reduce the silicosis hazard to a remarkable degree. That is, after all, the outstanding desideratum and one which can only be achieved when the expense of continuance of the hazard has been so great that the employer finds it economical to adopt means for its eradication.

One of the most fascinating pages in the history of industrial hygiene could be written on the methods utilised by industries in combating the hazard of deleterious dust: catching of dust at its point of origin; its removal; automatic working in enclosed apparatus with exhaust device; dangerous processes effected mechanically; cleansing of the dusty atmosphere by various systems and under certain circumstances by the Cottrell System; replacement of silica by less harmful products; hygiene of the workshops, etc.

Other measures have also been adopted in addition to those mentioned above. Employers have introduced the practice of medical examinations;

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rotation of employees from dusty work to non-hazardous occupations, the employees being kept in the dusty environment for periods so short that no damage can be incurred. Medical examinations are necessary both on admission to dusty industries and periodically thereafter, since mildly incipient silicosis may still be rendered harmless by removal from exposure to dust and transference of the workers, at least temporarily, to work on which the dust hazard is absent.

To condemn an employee to continue at work which involves daily exposure to a toxic substance certain to cause disability or death if continued, is not in keeping with humanitarian ideals, or with the admirable social legislation which has attained almost worldwide acceptance in the last 25 years.

Wisconsin industries since 1919 have assumed the compensation costs which should have been included by coverage in the first draft of all compensation Acts. In order to accomplish this purpose the following supplementary legislative measures have had to be adopted:

(a) General measures of prevention deal with liberation of dust fumes, vapours and gases (adopted in 1932) in addition to safety measures and equipment, setting up a maximum content of deleterious dust which may be maintained in any plant depending both upon quantitative and qualitative elements. It has been graphically shown that the code reforms are not only possible of realisation, but that with proper devices even better conditions may be attained.

(b) Insurance carriers must cover by compensation insurance any employer who is in good faith entitled to insurance coverage. This is accomplished by a statutory provision constituting all insurers carrying workmen's compensation insurance as members of the Workmen's Compensation Bureau, and imposing upon the Bureau the duty of designating a member to issue a policy containing usual and customary provisions, but for each undertaking all members of the Bureau are to be reinsurers as among themselves, in the amount which the compensation insurance written in the State during the preceding calendar year by such member bears to the total compensation insurance written during that year by all members of the Bureau. In other words, every insurance carrier, as a condition precedent to the writing of compensation insurance, agrees to assume its proportion of insurance for unwanted risks. The employer who complies with safety and hygiene provisions and pays his premium is entitled to coverage and will have no difficulty in obtaining it. If he fails to do so he will find it difficult to procure insurance and will be required to close his business because of its operation in contravention of the law.

(c) Merit rating accords to an employer a lower insurance rate when it is shown that he has reduced the dust hazard to a certain point, and at the same time penalises the employer who fails to institute similar measures. The law wisely places all employers initially on the same basis and rewards employers who are able to improve their plant conditions as to dust hazards. As soon as employers required to pay a higher rate realise that they can place themselves in a better position without undue expenditure, they fall into line.

(d) Any employer instituting oppressive medical examinations is penalised. This provision was adopted following a conference with representatives of both labour and industry, and aims at medical examination which has for its purpose elimination of employees from work which would be dangerous to them and to their fellow-workers, while avoiding any suggestion of selection for work of workers possessed exclusively of a high degree of physical fitness. The writer of the article here summarised believes that the silicosis problem can never be successfully handled without adequate medical examination of those exposed in the course of their occupation to the inhalation of harmful dust. No other means exists of detecting in its initial stages a diseased condition which may be arrested if discovered in time and properly treated. That does not, however, mean abuse of the
privilege of medical examination, and for this reason legislation in Wisconsin provides that any employer who applies or promotes any oppressive plan of physical examination and rejection of employees or applicants for employment shall forfeit the right to the advantage of experience rating (rating which permits a lower premium in the case of those employers whose record for injuries or cases of occupational disease is below a given standard). The determination of the Industrial Commission in this connection is subject to review in court, so that the employer is fully protected. Though this provision was first passed in 1933, it has never been found necessary to carry it into execution. A mere suggestion to an employer tempted to institute oppressive examinations has sufficed. In the case of self-insurers, the Commission would under no circumstances permit exemption from carrying insurance where oppressive medical examinations were made. In the case of insured risks, employers would find it too expensive even to consider the institution of such examinations.

(e) There is further provided payment of compensation for non-disabling silicosis on a rehabilitation basis. Compensation Acts provide for payment of wage loss arising from injury or disease. Some courts have held that unless the physical condition of the employee is impaired to such an extent as to interfere with his work at least to some degree, no compensation may be awarded. This leaves out of consideration any worker whose injury has produced a reputed stigma which, although not impairing his manual capacity for work, nevertheless causes wage loss because of inability to procure work, or of the necessity for accepting work at a lower wage than he has previously earned. In many States, therefore, compensation is provided for disfigurement which may involve discrimination against the employee in securing employment. Analogous to the disfigurement provision is the one which provides for compensating of non-disabling silicosis. If an employee is discharged by his employer because of physical examination disclosing silicosis which has not yet proved disabling (and may never prove disabling), but which is such as to cause discrimination against him in other employment for fear of the disease progressing and entitling him to compensation, the employee may receive an award not to exceed compensation based on one year's wage with a view to enabling him to rehabilitate himself and to find work which will not prove dangerous to him in view of his condition. This provision does not prohibit further payment of compensation should actual disability develop, nor does it entitle the non-disabled employee to payment of compensation unless wage loss can actually be established because of his discharge from work, his inability to procure other work by reason of such discharge, and the consequent loss suffered by him on account of early silicosis.

The effects of the legislative enactments applied by the commission, as approved, modified, or reversed by the Supreme Court of Wisconsin may be summarised as follows:

1. Prior to the amendment in 1935, to have a valid claim, a worker had to prove that his disability occurred while the employer-employee relationship existed.

2. Subsequent to the amendment in 1935, making the date of liability “the last day of work for the last employer whose employment caused disability”, an employee who became disabled subsequent to discharge had a valid claim against the last employer whose employment was a contributing factor to his silicosis.

3. Disability prior and subsequent to the 1935 amendment must be demonstrable in wage loss, and not simply potential wage loss or medical disability.

4. The employer in whose employment a worker is at the time of his disability, or the last employer whose employment was a contributing factor in his disability, must bear the full cost of compensation even though that period of employment was not sufficiently long to cause the condition, it being sufficient if it contributed thereto.

As a result of these rules, the 1935 legislature enacted the following amendments to the compensation law:

(a) A final award dismissing a claim because the disease had not as yet caused disability was not to be a bar to a claim for disability developed subsequently. (Sec. 102.18.)

(b) In cases of discharge from employment because of non-disabling silicosis, thus occasioning wage loss, the commission may allow compensation not to exceed 70 per cent. of the employee’s average annual earning; but a payment of such a benefit was to bar any subsequent recovery from silicotic disability. (Sec. 102.505.)

The purposes of these amendments obviously were (1) to safeguard the right of an employee to be entitled to compensation when actually disabled, even though an earlier claim had been dismissed because no disability could be proved at the earlier date, and (2) to provide for a method of rehabilitating workers barred from following their regular occupations because they had contracted silicosis, even though not disabled. They represent an attempt to couple wage loss with the termination of employment and thus to meet the standard prescribed by the Supreme Court.

Neither of these two amendments has as yet run the gauntlet of judicial opinion.

Incidence of Silicosis.

During the 17-year period from 1920 to 1936 inclusive, 799 claims (a subsequent recheck has raised this figure to 893) for disability resulting from silicosis were filed and passed upon by the Industrial Commission of Wisconsin.

In 469 of the 799 cases compensation was paid, although sometimes in small amounts as compromises. In 330 the claims were disallowed or, in some instances, withdrawn by the claimants themselves. Fully 55 per cent. of all compensated claims and 62 per cent. of those rejected were filed in the two years 1933 and 1934.

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1 This allowance of 70 per cent. has been changed by a recent amendment to a sum of $3,500.
1. — COMPENSATED SILICOSIS CASES IN WISCONSIN, CLASSIFIED BY INDUSTRY, 1920 TO 1936

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<td>Stonecutting and quarrying</td>
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<td>Enamelled-ware industry</td>
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<td>Foundries</td>
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<td>Other metal industries</td>
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<td>Machinery industry (including transportation equipment)</td>
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2. — COMPENSATED SILICOSIS CASES IN WISCONSIN, CLASSIFIED BY OCCUPATION, 1920 TO 1936

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<td>Polishers, machine (stone)</td>
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1 The data to be published later by the Industrial Commission of Wisconsin will also contain an analysis by length of exposure. Errors in the preliminary data made inadvisable the inclusion of such an analysis here.
### 3. COMPENSATED SILICOSIS CASES IN WHICH PAYMENTS WERE MADE IN WISCONSIN, 1920 TO 1936

#### Year of first information to industrial commission
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<th>Temporary disability</th>
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<td>108</td>
<td>107</td>
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#### Average per case

1. It was not possible to separate the amounts paid as compromises into payments for various types of disabilities and medical and funeral expenses.

2. More complete data showed a total of $1,850,963 paid from 1920 through 1936.

3. No silicosis claim filed in 1921.

4. Data incomplete.

### 4. COMPARISON OF COST OF ALL INJURY CASES AND SILICOSIS CASES IN WISCONSIN, 1920 TO 1934

#### Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
<th>Compensation</th>
<th>Cost of medical care</th>
<th>Total cost</th>
<th>Average cost per case</th>
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<th>Number of cases</th>
<th>Compensation</th>
<th>Cost of medical care</th>
<th>Total cost</th>
<th>Average cost per case</th>
</tr>
</thead>
</table>

1. Data on all injuries apply to cases settled during the year. Silicosis data apply to settled cases tabulated according to year of filing of claim with industrial commission. The tabulation was made to disclose general trends, but is not to be taken as an accurate measure of annual silicosis cost relative to over-all injury cost, even though percentages to that end are given.

2. To arrive at the non-silicosis data, the silicosis data were deducted from the all injuries data.
Appendix II

TERMINOLOGY OF RADIOGRAPHIC FINDINGS IN RESPECT OF SILICOsis

The Correspondence Committee on Industrial Hygiene of the International Labour Office in course of its Eighth Session (21 to 23 June 1934) discussed the following draft terminology of radiographic findings in respect of silicosis submitted by Dr. Irvine, Chairman of the Miners' Phthisis Bureau in Johannesburg (South Africa):

Proposed General Terminology of Radiographic Findings in Cases of Silicosis

I. The matter of devising a generally acceptable terminology descriptive of the radiographic appearances met with in cases of silicosis presents considerable difficulty in view of the many variations in the radiographic picture of the disease, produced by variations in the underlying pathological condition arising from differences in the character of the inhaled dust, the intensity and duration of exposure to such dust, and the varying amount of modification produced by the intrusion of an infective element, particularly by a tuberculous infection.

Owing to differences in one or other of these factors, the pathological types of the disease may and do differ in different silicosis-producing industries, and even under changing occupational conditions in the same industry at different times. The radiographic picture will necessarily reflect these differences in pathological type, so that complete uniformity in the radiographic appearances of the disease is not to be expected, particularly when the causative occupational conditions differ considerably.

II. The main object of an agreed terminology of radiographic findings would be their rapid, but approximately accurate, classification into a limited number of groups, the general character of which would be readily intelligible. The employment of such a terminology would be found to be of particular value in succinctly reporting the results of large-scale investigations of men engaged in any silicosis-producing industry, as a means of indicating the general nature and proportion of the predominant types of radiograph found.

With this object, and in view of the differences in the type of the disease, the proposed terminology should conform to two simple principles: (a) it should be drawn up upon very general lines, and should not aim at too minute a sub-division of types; and; (b) it should be succinctly descriptive simply of the appearances seen in the radiograph, and should not in itself convey any implication regarding the pathological character of the conditions producing these appearances, or be regarded as affording, per se, a classification of cases of silicosis for medico-legal purposes.

In a contribution to the discussion on the radiological appearance of the lungs in different varieties of pneumonoconiosis, held by the Pathological Section of the British Medical Association at the London meeting in 1932 (British Medical Journal, 6 August 1932, p. 256), Dr. Tattersall described four main groups: (a) "sharply defined nodular" — typically seen in true silicosis; (b) "striate" — after exposure to silicates, asbestosis being the most typical.

[Note continued on next page.]
One stresses the importance of this second principle, since similar radiographic appearances do not necessarily represent identical pathological conditions.

It should be noted that the agreed terminology would in no way supersede the careful study of radiographs as an aid to diagnosis in individual cases. The radiograph is an invaluable adjunct to diagnosis. But the only method by which full value can be obtained from the indications which it gives is by an extensive correlation of the results of clinical, radiological and pathological evidence based upon the investigation of a large series of individual cases, and it is essential that such a correlation should be effected separately and in detail in each silicosis-producing industry.

III. Following upon the discussions at the Silicosis Conference, a terminology based upon the principles suggested has been adopted by the Miners' Phthisis Medical Bureau at Johannesburg, at which some 150 radiographs of gold miners have to be reported upon every day, and it has been found to be of great practical value as a means of rapidly classifying these radiographs into their appropriate general groups as a preliminary to detailed study. The terminology adopted by the Medical Bureau is based upon the results of a correlation of clinical, pathological and radiological evidence which has been carried out as a routine measure for a considerable number of years and which has been of cardinal value in enabling the Bureau to attain reliable standards of diagnosis in respect of the predominant types of silicosis which have been met with during the past sixteen years on the Witwatersrand.

Among these cases one meets with three main distinguishable clinical and pathological types:

1. Silicosis of simple or uncomplicated type;
2. Silicosis of infective type; and
3. Silicosis with tuberculosis.

IV. In cases of **Silicosis of simple type** the essential pathological feature of the silicotic process is the progressive development of a discrete miliary nodulation or nodular fibrosis originating at certain defined sites at which silica dust has been aggregated in the lung substance and under the visceral pleurae, together with a corresponding fibrosis of the root glands, the latter indeed being usually the first sites to show obvious fibrosis. There is always an accompanying bronchitis of dry type, and in well-marked cases a varying degree of emphysema. This condition tends to progress, even after cessation of exposure to dust and without the intervention of infection, up to a point determined apparently by the amount of dust retained in the lung.

From the pathological aspect, cases of silicosis of this simple nodular type can readily be grouped in a continuous series in terms of the number, size and density of the palpable (at necropsy) fibroid nodules present. The radiographic picture corresponds pari passu, and there is a general, although by no means an exact, correspondence between the degree of nodular fibrosis indicated by the radiograph and the amount of disability revealed by clinical examination.

In this type of case therefore a consistent terminology of the radiographic appearances met with can be readily drawn up, which can be applied to the appearances shown by radiographs ranging from that of the normal thorax up to those shown by the various degrees of silicosis of this simple type.

[Note continued from previous page.]

(c) "light mottling with increased striation" — coal miners and trimmers; and

(d) "coarse mottling, striation and large dense opacities" — underground workers with machine-drills in coal and haematite mines and some coal trimmers.

This is not a systematic classification, but it complies in general with the two principles indicated and has the essential value of at once suggesting to the mind the type of radiograph described.
The following terminology is employed by the Medical Bureau to define this gradation. It is fully described and illustrated in the publication *Silicosis in South Africa* by Simson, Strachan and Irvine.

The first three types —

1. Normal Thorax;
2. Slight Increase in Linear Radiation (or Striation);
3. Moderate Increase in Linear Radiation (or Striation), are within normal limits, the first being really that of the "ideal" normal thorax;
4. Generalised Arborisation (well-marked general increase in linear radiation or striation);
5. Generalised Arborisation, with partial small mottling;

The definitely "specific" sign of a miliary silicotic nodulation is the appearance in the negative of the familiar discrete "mottling" of the lung fields caused by the shadows thrown by individual nodules. In the above terminology Type No. 3 is the first which shows this indication and is the general standard accepted by the Medical Bureau as definitely indicative of a slight degree of simple silicosis. Type No. 4 is a borderline type, which may or may not be associated with a slight degree of nodular fibrosis, and due allowance is made in practice for this circumstance. The types grouped under No. 6 are indicative respectively of moderate, well-marked, and advanced degrees of silicosis of simple type — subject to the qualification that the first description may also apply to the appearances shown in cases of miliary tuberculosis, which may very closely simulate those of a moderate degree of simple silicosis.

V. If the discrete nodular type of silicosis were all one had to deal with, the question of terminology would be a simple one. Largely, however, although not solely owing to the frequent intrusion of an infective factor and notably of tuberculous infection in cases of the disease, one meets with many variations from the orderly picture so far described.

1. In many instances, both in those of the above general types which are not definitely indicative of silicosis and in those which are, the radiograph may present indications of minor modifications which, particularly if present in combination, are usually indicative of "old" or latent (and usually tuberculous) infection — namely such appearances as "increase in hilus shadows"2, "enlarged or apparently calcareous root glands", "peribronchial thickening" and an "asthenic type of heart".

In certain cases where these characteristic signs are associated with a generalised arborisation or "striation" they are indicative of a slight degree of tuberculo-silicosis, found on autopsy, but may be found also in individuals who have never been exposed to dust.

It is difficult to find a single term distinctive of this characteristic combination, which is almost invariably associated with the general physique characteristic of the "phthinoid" type of individual, who is not of robust type but may be perfectly healthy. The Medical Bureau makes the distinction by adding to the term descriptive of the general type into which the radiographs falls the expression "partly or mainly infective in type" and has found this procedure useful, not least so in the assessment of the condition of non-silicotic recruits as suitable or unsuitable for mining work.

---


2. Admittedly increase in the hilus shadows may be due to simple fibrosis of root glands. It is the combination of the above appearances which is characteristic of the type under discussion.
(2) In cases of silicosis major modifications due to grosser pathological changes, and indicated in the radiograph by definite areas of diffuse opacity, are frequently met with. Leaving aside, however, appearances produced by acute intercurrent infection, such as pneumonia, pleurisy with effusion, empyema, etc., one finds the appearance of areas of diffuse opacity in the silicotic lung is due in the main to one or other of the following conditions:

(a) To a simple massive fibrosis produced by a localised close aggregation of nodules in advanced cases of silicosis of simple type. In types of silicosis in industries in which exposure to dust is very intense, diffuse opacities of this mode of origin, but associated with a greater amount of interstitial fibrosis in the neighbourhood of the nodules than is usual in Witwatersrand cases and with simple inflammatory changes, are common.

(b) To the presence of chronic indurated areas of consolidation of mixed infective and silicotic type. Lesions of this nature are very common, owing to the characteristic modifications in the direction of excessive fibroid reaction which certain infections and particularly a local tuberculous infection tend to produce and to undergo in a silicotic lung. Such lesions are in general slowly progressive, but frequently undergo prolonged periods of virtual arrest. They are not associated with the customary local signs of active disease or with general toxic symptoms or significant deterioration in the general health. The Medical Bureau is accustomed to distinguish these cases on clinical and pathological grounds as cases of Silicosis of infective type. Some cases show these features from the outset, and the radiograph may then present the characteristic appearances of a chronic fibroid tuberculosis, without any evidence of a generalised silicotic nodulation. In others a condition of infective silicosis may form an intermediate stage, often however of long duration, between a condition of silicosis of simple type and one of active "tuberculosis with silicosis".

(c) To a condition in which silicosis is associated with a clinically detectable active and physically deteriorating tuberculosis. It is to this type of case that the Medical Bureau on clinical and medico-legal grounds applies the term silicosis with tuberculosis.

A distinction between the first two conditions specified and the third is frequently possible on radiographic grounds, provided that repeated examinations are made. On a single examination, however, it is difficult or impossible to draw such a distinction, and the final interpretation of the case can only be made on clinical grounds.

Hence it would appear that, for the purposes of a simple general terminology, the most feasible plan would be to group all cases showing well-marked diffuse opacities under some such general heading as

<table>
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<tr>
<th>Limited</th>
<th>Moderately extensive</th>
<th>Extensive</th>
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</thead>
<tbody>
<tr>
<td>diffuse opacity</td>
<td>in the apical / middle / basal zone of the right / left / both lung fields.</td>
<td></td>
</tr>
</tbody>
</table>

It would then remain for the radiologist to append a provisional diagnosis in each individual case.

In a case in which the plate would be indicated as "Generalised small mottling, with extensive diffuse opacity in the apical and middle zones of the right lung" the "provisional diagnosis" of the radiologist would be "Moderate degree of silicosis, with active tuberculosis right".

VI. One is led by the foregoing considerations to suggest the following simple scheme for radiological report in order to comply with the objects aimed at and with the degree of simplicity desired:

Name ........................................
Date ........................................
Place ........................................

Serial No.

Initials of Radiologist.
The radiograph shows:

1. Normal thorax.
2. Slight increase in linear radiation (or "striation").
3. Moderate increase in linear radiation (or "striation").
4. Generalised arborisation (well-marked general increase in linear radiation or "striation").
5. Generalised arborisation, with partial small mottling.
6. Generalised mottling, sparse / close / small / medium / large or "coarse".
7. With hilus shadows increased:
   - enlarged / apparently calcareous root glands;
   - peribronchial thickening;
   - heart shadow... of asthenic type;
   - mottling irregular in size and distribution.
8. With diffuse opacity: light / moderately dense / dense;
   limited / moderately extensive / extensive in area;
   in apical / middle / basal zone of right / left / both lung fields.
9. Other changes, viz:
   (e.g. heart enlarged; aorta enlarged; pneumothorax, etc.)
10. Provisional diagnosis of radiologist:
     Signature:

* Underline terms which are relevant.

In the practice of the Medical Bureau a report form of this type has been found of great practical value in rapidly classifying the large number of radiographs handled daily into their appropriate general groups, as a preliminary to further study. The scheme shown above is the simplest practical report form which would suit the work, and is the outcome of sixteen years' experience of the examination of some 36,000 radiographs of miners in each year.

What is wanted is not a terminology which would attempt to define pathological "stages" of silicosis from the radiograph, but a system which would enable one to visualise with approximate accuracy the general type of radiograph described. A reliable interpretation of the radiograph in terms of the underlying pathology is quite another matter and can only be satisfactorily worked out in each silicosis-producing industry by means of the method of correlation described above, which alone can furnish reliable standards of diagnosis.

VII. With regard to radiographic technique in use by the Bureau, see the following Appendix.
Appendix III

RADIOGRAPHIC TECHNIQUE IN RESPECT OF SILICOSIS

SOUTH AFRICA

The radiograph technique at present in use at the Medical Bureau\(^1\) is as follows (1934):

- Generator, 3 phase, rectified by kenetron valves.
- Tube 20 Kw. Film focus distance, 36 inches.
- Current through tube, 200 milliampères. Kilovolts applied to tube terminals, 55.
- Films Kodak 10in. × 12in. and 12in. × 15in., with double "Agfa" intensifying screens.
- Developing solution according to Kodak's formula; temperature of developer 65°F., checked by recording thermometer; time of development, 5 minutes in each case.

The average number of radiographs taken is 150 during the morning hours of each working day.

Exposures are made in the prone position. The upright position is in many respects preferable, but by adopting the horizontal method there is less likelihood of movement during exposure and fewer adjustments have to be made, thus saving time in securing the correct position, a consideration of much practical importance in dealing with large numbers of examinees.

As all the conditions, viz., focal distance, kilovolts and milliampères remain constant, the length of exposure is dependent on the depth of the man's thorax and varies from 0.05 secs. for a thin individual to seven times that duration for a large robust man.

The film focus distance is 36 inches. The general tendency in radiographical work at present is to work 72 inches. The Medical Bureau, however, has found that small nodules which cast a shadow up to 36 inches may tend practically to disappear with a greater film focus distance. Accordingly the 72 inches technique was abandoned and 36 inches adopted as the Bureau standard. A further advantage is that only one-fourth of the exposure is required at 36 inches as compared with that required at 72 inches.

Owing to the improvements in apparatus and adjuncts the technique is being constantly altered and adjusted to suit new conditions, and finality has not yet been reached. At the moment the chief difficulty is in obtaining tubes and valves to stand up to the heavy work they are required to perform owing to the number of examinations made within a limited time: on the average an examination is made every two minutes.

After the exposure a stencil plate recording the appropriate number of the individual, the class of examination, and the date is placed on the cassette, and the current turned on again. The stencil record is superimposed on the heart shadow so that each item is clearly shown. The name of the examinee and length of exposure are subsequently pencilled on the film in the dark room before the negative is developed. The double check eliminates possible errors in identification.

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The Sub-Committee on Radiograms of the Committee on Industrial Pulmonary Diseases set up by the Medical Research Council has established a plan of standardisation of technical methods of radiology recommended for radiologists called upon to collaborate as experts in regard to compensation for silicosis (May 1924).

This technique is as follows:

1. Patient standing with the back towards X-ray tube, and the arms in front around the cassette.

2. Tube centred opposite the 4th-5th dorsal vertebra or 3rd rib cartilage.

3. Double screen film (12 x 15) in cassette in front of patient at a distance of 4 ft. from the centre of the X-ray tube.

4. The cassette should be as nearly as possible in contact with the chest, i.e., where the abdomen is prominent, the cassette should be inclined backwards — the patient should not bend forwards in order to obtain contact, as this leads to distortion. A simple wooden stand with an adjustable cassette carrier is quite efficient for this purpose and it takes little floor space.

5. Breasts to be drawn aside before the patient comes forward in contact with the cassette. Occasionally it may be advisable to bandage pendulous breasts in order to displace them effectively.

6. Exposure to be made in full inspiration. N.B. It is important to educate the patient in this before the exposure is made, preferably under screen observation.

7. Radiographic technique will vary within wide limits with the apparatus in use and it is not possible to set any standard. The exposure will vary with the apparatus, but if possible should not be more than 1/10 sec. at a kilovoltage of 50-70, the milliamperage varying from, say, 50 to 150. With less powerful apparatus it may be necessary to increase the kilovoltage to perhaps 90 K.V. to obtain the necessary speed, but the result will be much less satisfactory and it will be found more satisfactory to increase the time of exposure rather than to increase the kilovoltage, even though there may be some loss of detail owing to movement. The exposure will vary not only with the apparatus and the size of the patient, but with the individual; it does not follow that two subjects of exactly the same build, radiographed under identical conditions, will give identical films.

Development of Film.

A very large proportion of unsatisfactory results is due to faulty darkroom technique.

The safety lights of the dark room should be tested by exposing a film for a minute in the usual position where films are manipulated. Films should be handled as little as possible. Developer should be reasonably fresh and must be at a standard temperature of 65°. This is a vital factor for uniform results. The time of development will vary from 4-7 minutes, according to whether the developer is fresh or used up.

It is very strongly recommended that the developer be purchased ready made to dissolve in water for tank development. Subjoined is a method for testing the developer.

The Type of Film.

The type of film to be aimed at is one that shows the intervertebral discs as far as the arch of the aorta, but shows practically no trace of the vertebrae below this. Bone structure should be seen in the ribs. If detail is required in a grossly diseased area of the lung, it will be shown by giving a little longer exposure, but this will obliterate finer detail in the unaffected areas.
Method of testing Developer.

Place a metal band across a film and give it a standard exposure, e.g. such as will give a satisfactory radiograph of a hand. Cut this film into strips across the line of the shadow of the metal and store in a light tight box for use.

Take two strips. Develop one for 20 secs., the other for 25 secs., and fix.

There is a time factor for each developer. Usually this factor is 12, and if the time taken for the first faint appearance of the image on the film is multiplied by the factor, it gives the proper length of development to obtain the optimum result; e.g. if the shadow of the band fails to show on the strip developed at 20 secs. but is just discernible on that developed for 25 secs., the time that the chest film should be left in the tank is \(25 \times 12 = 300\) secs. = 5 mins.

Developer should be changed before 7 mins. if necessary.
Appendix IV

STAGES OF SILICOSIS

BELGIUM

Dr. E. Streignart of the Hortense Dispensary at Montegnée, Liège, on the basis of his experience of 600 to 700 lung cases which he has examined radiologically, draws attention to the interest attaching to certain outlines which, whilst signifying merely normal wear and tear in the case of older subjects, when met with on the other hand in a young subject denote definite pathological broncho-vascular sclerosis. This observation acquires a certain importance when it is considered that the signs of premature wear and tear of the broncho-vascular system are more frequent among workers in dusty industries.

In the case of pneumoconioses the radiological pictures may be described as follows:

Pictures of the miliary nodular type: most frequently these occur, whether taken individually or together, with dimensions, contour details, differentiation one from another, and manner of distribution throughout the pulmonary field, which are all highly variable. They imitate more or less all types of generalised miliary tuberculosis.

This miliary aspect in the uncomplicated state may occur not only at the outset of the disease as in the case of certain workers chosen for the enquiry on account of the excellent state of their health, but may equally be present in the final stage of evolution of forms of pneumoconiosis.

Pictures of sclerosis striation: the pulmonary outline being naturally highly variable, the picture of sclerosed broncho-vascular arborisations may also be very variable.

Sclerosis on the other hand varies equally, from slight accentuation of the so-called normal outline up to formation of thick dense striation in the large and small trunks and marked accentuation of the fine pulmonary reticulum. The latter may occur in such a form that it is no longer easy to distinguish it from certain so-called acinonodular forms.

There may also be met with lesions which produce bundles of thin lines in juxtaposition at times confluent at certain places, situated right inside the parenchyma and forming an extension of the sclerosed broncho-vascular arborisations.

Finally, certain sclerosis striation occurring in pictures with compact formations produces images having the appearance of the shrouds of a mast or of tent ropes.

These forms of fibroses may in numerous cases represent the final stage in the radiological evolution of pneumoconioses.

Massive shadows: two types of these may be distinguished:

(a) true pseudo-tumoural pictures, real mass formations with well-defined borders, very variable forms often elongated, drawn out here and there into long pointed shapes towards their angles. These points
meet either at the diaphragm, at the thoracic wall or at the mediastinum in sclerosis striae which appear to subtend the fibrous block formations;

(b) dense flat-surfaced pictures more or less extensive, with truncated angles and a flaky, fuzzy aspect except the contours which are more or less definite, a blurred picture though often becoming clearer towards the periphery, passing imperceptibly into the picture of finely mottled nodulation.

Combination of the above pictures: all these pictures may further be found more or less combined.

The author is of the opinion, that in certain cases the radiological picture, though not free from difficulty of interpretation, nevertheless may in itself at times suffice to give an idea of the aetiology.

Further, whilst more or less simple nodular pictures, sclerosis striation, certain pictures of mass formations, or of dense flat-surfaced formations may and do give rise to confusion with various diseases encountered in the population in general, there exist nevertheless pictures of a type not found elsewhere than in silicotic subjects, i.e. pictures of mass formations with sharp angles extending into sclerosis striae. The author emphasises the importance of clinical examination and recalls that certain workers working in certain surroundings where the atmosphere is polluted with dust, show a special nosological picture which is more or less constant, though not present to the same degree in the case of all individuals (who spend a fairly similar period of time in the working surroundings in question). It is characterised by a good general state of health with a frequent tendency to stoutness, dyspnœa on effort, at times continual dyspnœa, most usually thoracic pains with or without expectoration and without a very definite character, absence of Koch bacillus in the sputum after repeated analysis, ordinary signs of emphysema on sounding, bronchitis, sclerosis at times with consolidation, and with a pleuro-pulmonary radiological and cardiac picture which is at times typical, though variable within certain limits, but which mostly is not even suspected on account of the lack of objective clinical symptoms.

The relation between the clinical symptoms and the radiological picture justifies the statement that there is more frequently definite and absolute discrepancy between the clinical manifestations both objective and subjective, and the extent as well as the form of the injuries as revealed by radiology.

Thus for instance, a serious clinical picture and very distressing subjective symptoms do not always, or even in the majority of cases, correspond to the pseudo-tumoural picture, characteristic of the third stage in the classification by stages of silicosis radiograms. The contrary is not of infrequent occurrence and subjects showing a radiological picture of the first or second stage are clinically at times found in a rather precarious state of health.

Thus it is seen that cases with intense dyspnœa, poor general condition, thoracic pains, abundant bloodstained expectoration without Koch bacillus (tested for on various and repeated occasions) are seen to present merely radiological pictures of emphysema with sclerosis showing moderate striation, relatively few nodules, of small volume and non-confluent, as compared with other cases.

According to the author, in order to effect diagnosis of pneumoconioses, it is essential in the case of any affection whatsoever to give due consideration to all circumstances and data, and even to the aetiological conception.
GERMANY

Silicosis

1. Radiological changes in slight and serious cases of silicosis and tuberculosis.

2. Changes accompanying:
(a) slight silicosis or incipient tuberculosis.
(b) serious silicosis and advanced tuberculosis.

Symmetrical in the sagittal plane.

In both central fields irregularly distributed mottling. Absence of silicosis striation proceeding from there to the hilus.

Large nodes isolated from the hilus.

Hilus ganglia especially in advanced cases small and often invisible.

Streaks running from the nodes towards the diaphragm.

Upward movement and peaking of the diaphragm.

Shrinkage of the thorax and lungs mostly bilateral and of slight extent.

Formation of cavities only at an advanced stage.

Tuberculosis

Asymmetrical.

At the apexes mottling arranged in series in presence of striation directed towards the hilus.

Well-defined confluence of the relatively blurred mottling towards the hilus, assuming a wedge-shaped form the point of which is directed towards the hilus.

Hilus ganglia mostly enlarged and definitely recognisable.

Absence of striation running from the shadow foci to the diaphragm.

Copious flake-like adherences with the diaphragm.

When present, unilateral and often extensive shrinkage.

Often formation of cavities at an already early stage.


GREAT BRITAIN

Stages of Silicosis

Silicosis is divided into three stages by workers on the subject in this country.

The first stage is characterised by:

(a) The appearance of the earliest detectable physical signs of the disease: poor expansion; a somewhat hyper-resonant percussion note; prolonged expiration, coarse râles and rhonchi on auscultation.
(b) Radiographic films presenting large root areas, in which there are nodular shadows, and a generalised enlargement of the trunk shadows and pulmonary reticulum — more marked at the base than at the apex. The diaphragm is not altered at this stage, although on screening it may be noted that the medial area is restricted in movement on deep inspiration. This may be due to the enlarged roots and the thickened trunks.

There may or may not be impairment of capacity for work. The patient usually only complains of shortness of breath and a slight cough.

The second stage is characterised by:

(a) Further development of the physical signs found in the first stage: very poor expansion at apices and bases particularly, clubbing of fingers, hyper-resonance, weakened breath sounds or broncho-vesicular breathing, and numerous râles and rhonchi.

(b) Radiographic films showing an increase of the area of the nodular shadows, with a tendency to confluence of the individual nodules. Typically small rounded areas, varying in size from a pinhead to a pea, are scattered throughout the lungs, more marked on the right side than on the left to begin with, and more dense round the root areas. The diaphragmatic excursion is lessened, but irregularities of the contour and peaking are not noted; these belong to the third stage. The hilar and trunk shadows at this stage do not necessarily show a further increase in size. As the lymph stream is diverted from the roots, the dust cells cease to accumulate further there. The snowstorm-like picture presented at this stage is typical, and is not likely to be confused with anything else, except miliary tuberculosis and possibly broncho-pneumonic tuberculosis. The clinical examination readily differentiates the condition.

At this stage the patient is to some degree, but not totally, incapacitated for work.

The third stage it is almost unnecessary to define. It implies a total incapacity for work. There are present marked cyanosis, clubbing of fingers, well-marked dyspnœa, and evidences of extensive dullness, of cavity formation and of pleurisy.

Radiograms of cases in the third stage are of three types:

1. In the first there are large irregular masses due to coalescence of the pseudo-tubercles. It may be difficult to say whether a patient is in the second or third stage — in deciding the diaphragm should be looked at.

2. In the second there are more or less diffuse masses, in which nodules may be seen. The picture may be indistinguishable from that presented by a case of chronic ulcerative phthisis. There may be associated a diffuse snowstorm-like effect.

3. In the third, very dense masses of consolidation are noted, often symmetrical. These are more strikingly brought out by the associated emphysema.

In all types at this stage, fibrotic thickening of the normal arborisation is seen, and dense bands may extend in various directions, particularly towards the base. They may be connected to the diaphragm. The diaphragm is always altered in contour. There may be peaking. As the condition progresses, marked retraction of the organs occurs.

Briefly, the three stages radiographically are these:

1. Large hilar shadows and trunk shadows. No nodules.
(2) Nodules present, but discrete. No deformity or alteration of the diaphragm.

(3) Coalesced nodules and altered diaphragmatic contours.

It is not right to give a definite opinion or a decision regarding silicosis without a good radiogram.

Tuberculosis does not usually develop in the first stage. When it does, it is usually acute, and miliary or broncho-pneumonic in character. Tuberculosis should be suspected in the second stage if there is a sudden onset of toxaemia, loss of weight, irregularity of temperature, anorexia, night sweats, etc. Tuberculosis is very commonly present in the third stage. The sputum is frequently laden with tubercle bacilli.

As a general rule, in the radiography of silicosis one should:

(1) Never diagnose definitely unless fine mottling is seen.

(2) Always give rapid exposures — movement of the heart may blur the picture.

(3) Remember that a silicosis case is characteristically dyspnoic; he cannot take a deep breath and hold it for any length of time. The breath should be held at a point short of deep inspiration during the taking of the radiogram.

(4) Always interpret what is present on the film in the light of one’s knowledge of the anatomy, physiology, and pathology of the lungs. Anything abnormal should be considered in terms of pathology, and deductions should be made on a pathological basis. Superimposed tuberculosis may give doubtful radiograms.

Silicosis and Tuberculosis

Not only does silicosis favour the development of tuberculosis; tuberculous infection accentuates the production of silicosis.

Mavrogordato considers that massive areas presented on radiograms in the third stage always indicate superimposed tuberculous infection. Foci of tuberculosis form between conglomerated masses of pseudo-tubercles. Alveolitis and fibrosis follow, and a dense mass results, in which the silicotic nodules are incorporated.

Several other interesting facts are noted in the combination of these two diseases — tuberculosis and silicosis:

(1) The tuberculosis usually is relatively non-toxic, much less toxic than the extent of the dullness would lead one to expect.

(2) Tuberculosis in the presence of silicosis seems to be less infective to others; the death-rate from tuberculosis of the families of such workers is relatively low.

(3) In first and second stages of silicosis, acute tuberculous conditions are commonly met with: tuberculous pneumonia and broncho-pneumonia, and miliary tuberculosis.

(4) In advanced silicosis chronic tuberculous conditions occur: very rarely are acute lesions seen. The widespread fibrosis may limit the spread of the condition.

UNITED STATES OF AMERICA

Correlation between the Histopathological Anatomy and Radiological Findings in Silicosis

A Committee composed of Dr. Pancoast, Dr. Pendergrass, Dr. Riddell, Dr. Lanza, Dr. Sayers, Dr. McConnel, Dr. Sampson and Dr. Gardner drew up on 18 November 1934 a table containing, in one column, the radiological changes found in silicosis and in the opposite column the corresponding pathological lesions.

<table>
<thead>
<tr>
<th>RADIOLOGICAL FINDINGS</th>
<th>HISTOLOGICAL FINDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Lungs and Adnexa</td>
<td></td>
</tr>
<tr>
<td>1. Healthy lungs as defined by the National Tuberculosis Association Committee's report¹.</td>
<td></td>
</tr>
<tr>
<td>2. Irregular exaggeration of the linear-markings with possibly some beading confined to the trunks.</td>
<td></td>
</tr>
<tr>
<td>3. Increased root shadow.</td>
<td>1. Essentially the normal tissues of the vascular tree, the mediastinum, the bronchi and trachea.</td>
</tr>
<tr>
<td></td>
<td>2. Cellular connective tissue proliferation about lymphatic trunks in the walls of vessels and bronchi. Beading may be due to various causes, such as blood vessels seen end on, arteriosclerosis, minute areas of fibrosis in lymphoid tissues along the trunks.</td>
</tr>
<tr>
<td></td>
<td>3. Cellular reaction in the tracheobronchial lymph nodes with extensions along afferent lymphatic trunks.</td>
</tr>
</tbody>
</table>

These changes come within normal variations when not accompanied by recognised organic disease.

Simple Silicosis

4. Nodulation. Discrete shadows not exceeding 6 mm. in diameter, tending to uniformity in size, density and bilateral distribution, with well-defined borders surrounded by apparently normal lung shadows. The outer and lower lung fields characteristically show fewer nodules.

4. Circumscribed nodules of hyaline fibrosis located in the parenchyma of the lung. Occasionally some of these nodules may show microscopic foci of central necrosis.

5. Conglomerate shadows that appear to result from a combination or consolidation of nodules, usually with associated emphysema manifested by:

(a) localised increased transparency of the lung with loss of fine detail;
(b) intensification of the trunk shadows by contrast;
(c) depression of the domes with possible tendency towards individualisation of the costal components of the diaphragm;
(d) lateral view: increase in the preaortic and retrocardiac space with exaggerated backward bowing of the spine. Widening of the spaces between the ribs may or may not be present.

Silicosis with Infection

The characteristic appearances described under simple silicosis are modified by infection as follows:

6. Localised discrete densities and or string-like shadows accompanying those of simple silicosis described above.

7. Mottling. Shadows varying in size with ill-defined borders and lacking uniformity in density and distribution, accompanying simple silicosis.

8. Soft noddulation. The nodular shadows above described under simple silicosis (4) have now assumed fuzzy borders and or irregularities in distribution. The change may, or may not, accompany the simple mottling of 7.

9. Massive shadows of homogeneous density not of pleural origin symmetrically or asymmetrically distributed.

5. The result of coalescence of discrete nodules; an area in which the nodules are closely packed and most of the intervening lung is replaced by more or less hyaline fibrous tissue. The lung architecture is partially obscured. No demonstrable evidence of infection. Emphysema is a compensatory dilatation of the air spaces with or without thickening of the septa.

6. Strands of fibrous tissue often along trunks and septa, with or without areas of calcification indicative of "healed" infection.

7. (a) Areas of broncho-pneumonia with or without caseation, i.e. acute infection.
(b) Lobular areas of proliferative reaction with or without caseation; chronic infection.

8. Perinodular cellular reaction either exudative or proliferative in character.

9. Extensive areas of fibrosis probably due to organised pneumonia of tuberculous or non-tuberculous origin, superimposed upon a co-existing silicotic process. Outlines of normal structures may be partially destroyed.

Appendix V
SILICOSIS STATISTICS

GERMANY

1. — Silicosis Statistics from 1929 (Date of the Inscription of this Disease in the Schedule of Occupational Diseases) up to 1934 inclusive

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases notified</th>
<th>Cases compensated for the first time</th>
<th>Sequelae of the disease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute number</td>
<td>Percentage of all occupational diseases</td>
<td>Absolute number</td>
</tr>
<tr>
<td>1929</td>
<td>14,482</td>
<td>65.06</td>
<td>1,209</td>
</tr>
<tr>
<td>1930</td>
<td>10,161</td>
<td>41.06</td>
<td>2,289</td>
</tr>
<tr>
<td>1931</td>
<td>3,976</td>
<td>31.77</td>
<td>1,397</td>
</tr>
<tr>
<td>1932</td>
<td>1,904</td>
<td>28.54</td>
<td>1,079</td>
</tr>
<tr>
<td>1933</td>
<td>1,569</td>
<td>21.16</td>
<td>651</td>
</tr>
<tr>
<td>1934</td>
<td>1,268</td>
<td>15.54</td>
<td>622</td>
</tr>
<tr>
<td>1935</td>
<td>1,601</td>
<td>17.53</td>
<td>627</td>
</tr>
</tbody>
</table>

(Amtliche Nachrichten für Reichsversicherung. Heft 12, 1930, and following.)

2. — Ruhr Miners
RESULTS OF THE EXAMINATION OF MINERS CARRIED OUT BETWEEN 1927 AND 1935

<table>
<thead>
<tr>
<th>Duration of work on rock-cutting</th>
<th>1-5 years</th>
<th>5-10 years</th>
<th>10-15 years</th>
<th>15-40 years (with an average of 20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of workers examined: 10,867</td>
<td>3,662 = 100</td>
<td>2,171 = 100</td>
<td>2,126 = 100</td>
<td>2,908 = 100</td>
</tr>
<tr>
<td>No silicosis</td>
<td>2,793 = 76.3</td>
<td>1,020 = 47</td>
<td>644 = 30.2</td>
<td>452 = 15.6</td>
</tr>
<tr>
<td>Slight silicosis</td>
<td>823 = 22.5</td>
<td>1,054 = 48.5</td>
<td>1,278 = 60.1</td>
<td>1,780 = 60.5</td>
</tr>
<tr>
<td>Average silicosis</td>
<td>46 = 1.2</td>
<td>80 = 4.1</td>
<td>154 = 7.7</td>
<td>579 = 19.0</td>
</tr>
<tr>
<td>Serious silicosis</td>
<td>0 = 0</td>
<td>8 = 0.4</td>
<td>20 = 1.0</td>
<td>117 = 4.0</td>
</tr>
</tbody>
</table>

(Amtliche Nachrichten für Reichsversicherung. Heft 12, 1930, and following.)
At the end of 1933 the workers employed in the Ruhr district amounted to 217,000 men, of whom 11,500 were chiefly engaged in rock cutting.

From 1930 to 1933 in the mining district (Oberbergamtsbezirk) of Dortmund more than 2,400 miners died of serious silicosis.

During the same period 4.4 million marks were paid to the dependants of these workers and further, from 1 January 1934 benefits were paid to over 2,100 workers suffering from serious silicosis, as well as about 2,500 widows and 1,100 orphans.

In all, payments for silicosis amounted from 1930 to 1933 to 17.4 million marks and in 1934 the total paid in benefits amounted to 5.3 million marks.

GREAT BRITAIN

1. — Compensated Cases

The total number of cases in which compensation was paid under the schemes has gone on increasing since 1930 as shown by the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
<th>Amount of compensation in £ stg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930</td>
<td>662</td>
<td>53,235</td>
</tr>
<tr>
<td>1931</td>
<td>889</td>
<td>83,628</td>
</tr>
<tr>
<td>1932</td>
<td>1,084</td>
<td>93,777</td>
</tr>
<tr>
<td>1933</td>
<td>1,399</td>
<td>109,286</td>
</tr>
<tr>
<td>1934</td>
<td>1,560</td>
<td>122,198</td>
</tr>
</tbody>
</table>

Since the Act came into force the total number of cases has amounted to 4,620 and the sum paid in compensation to £ 457,025.

The following table shows the number of cases of silicosis and the amount of compensation paid under the respective schemes in force in the various industries covered by the Act.

---

### COMPENSATED CASES CLASSIFIED BY INDUSTRY FROM 1930 TO 1934

<table>
<thead>
<tr>
<th>Industry</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>1933</th>
<th>1934</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Num. of cases</td>
<td>Cost £ stg.</td>
<td>Num. of cases</td>
<td>Cost £ stg.</td>
<td>Num. of cases</td>
</tr>
<tr>
<td><strong>Refactories Industries</strong></td>
<td>247</td>
<td>12,105</td>
<td>12</td>
<td>1,552</td>
<td>256</td>
</tr>
<tr>
<td><strong>Sandstone Industries</strong></td>
<td>3</td>
<td>2,261</td>
<td>15</td>
<td>3,900</td>
<td>66</td>
</tr>
<tr>
<td><strong>Metal Grinding Industries</strong></td>
<td>11</td>
<td>2,196</td>
<td>8</td>
<td>2,417</td>
<td>18</td>
</tr>
<tr>
<td><strong>China and Earthenware Industry</strong></td>
<td>8</td>
<td>9,008</td>
<td>34</td>
<td>12,284</td>
<td>107</td>
</tr>
<tr>
<td><strong>Metal Industries</strong></td>
<td>20</td>
<td>2,270</td>
<td>13</td>
<td>3,062</td>
<td>25</td>
</tr>
<tr>
<td><strong>Coal-mining Industry</strong></td>
<td>1</td>
<td>361</td>
<td>1</td>
<td>303</td>
<td>6</td>
</tr>
<tr>
<td><strong>Builders, etc.</strong></td>
<td>4</td>
<td>1,058</td>
<td>9</td>
<td>2,036</td>
<td>11</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>322</td>
<td>23,281</td>
<td>90</td>
<td>24,054</td>
<td>479</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industry</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>1933</th>
<th>1934</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Num. of cases</td>
<td>Cost £ stg.</td>
<td>Num. of cases</td>
<td>Cost £ stg.</td>
<td>Num. of cases</td>
</tr>
<tr>
<td><strong>Refactories Industries</strong></td>
<td>247</td>
<td>11,235</td>
<td>10</td>
<td>1,369</td>
<td>257</td>
</tr>
<tr>
<td><strong>Sandstone Industries</strong></td>
<td>110</td>
<td>9,118</td>
<td>23</td>
<td>4,528</td>
<td>166</td>
</tr>
<tr>
<td><strong>Metal Grinding Industries</strong></td>
<td>122</td>
<td>22,524</td>
<td>30</td>
<td>5,860</td>
<td>142</td>
</tr>
<tr>
<td><strong>China and Earthenware Industry</strong></td>
<td>26</td>
<td>2,621</td>
<td>13</td>
<td>8,769</td>
<td>30</td>
</tr>
<tr>
<td><strong>Metal Industries</strong></td>
<td>54</td>
<td>8,653</td>
<td>30</td>
<td>8,661</td>
<td>103</td>
</tr>
<tr>
<td><strong>Coal-mining Industry</strong></td>
<td>18</td>
<td>4,504</td>
<td>10</td>
<td>1,818</td>
<td>49</td>
</tr>
<tr>
<td><strong>Builders, etc.</strong></td>
<td>30</td>
<td>5,704</td>
<td>17</td>
<td>5,104</td>
<td>50</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>607</td>
<td>62,659</td>
<td>133</td>
<td>31,118</td>
<td>797</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industry</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>1933</th>
<th>1934</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disabl.</td>
<td>Fatal</td>
<td>Disabl.</td>
<td>Fatal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Num. of cases</td>
<td>Cost £ stg.</td>
<td>Num. of cases</td>
<td>Cost £ stg.</td>
<td></td>
</tr>
<tr>
<td><strong>Refactories Industries</strong></td>
<td>257</td>
<td>12,921</td>
<td>6</td>
<td>1,887</td>
<td></td>
</tr>
<tr>
<td><strong>Sandstone Industries</strong></td>
<td>216</td>
<td>16,254</td>
<td>25</td>
<td>5,084</td>
<td></td>
</tr>
<tr>
<td><strong>Metal Grinding Industries and Various Industries</strong></td>
<td>180</td>
<td>18,806</td>
<td>24</td>
<td>4,797</td>
<td></td>
</tr>
<tr>
<td><strong>China and Earthenware Industry</strong></td>
<td>35</td>
<td>3,303</td>
<td>8</td>
<td>2,156</td>
<td></td>
</tr>
<tr>
<td><strong>Metal Industries</strong></td>
<td>192</td>
<td>20,899</td>
<td>38</td>
<td>9,855</td>
<td></td>
</tr>
<tr>
<td><strong>Coal-mining Industry</strong></td>
<td>72</td>
<td>7,223</td>
<td>14</td>
<td>8,205</td>
<td></td>
</tr>
<tr>
<td><strong>Builders, etc.</strong></td>
<td>55</td>
<td>6,700</td>
<td>23</td>
<td>6,838</td>
<td></td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,007</td>
<td>89,896</td>
<td>138</td>
<td>92,302</td>
<td></td>
</tr>
</tbody>
</table>

## 2. — Deaths from Silicosis (England and Wales)

<table>
<thead>
<tr>
<th>Industry</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>1933</th>
<th>1934</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandblasting</td>
<td>10</td>
<td>17</td>
<td>5</td>
<td>10</td>
<td>3</td>
<td>45</td>
</tr>
<tr>
<td>Steel dressing and cleaning of castings</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>—</td>
<td>7</td>
</tr>
<tr>
<td>Flint and pebble crushing</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Refractories industries</td>
<td>11</td>
<td>19</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>51</td>
</tr>
<tr>
<td>Scouring powders and abrasive soaps</td>
<td>—</td>
<td>1</td>
<td>3</td>
<td>—</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Enamel maker</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Metal grinding</td>
<td>35</td>
<td>37</td>
<td>31</td>
<td>21</td>
<td>18</td>
<td>142</td>
</tr>
<tr>
<td>Glaziers' diamond setter</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Sandstone quarrying and dressing</td>
<td>17</td>
<td>25</td>
<td>13</td>
<td>29</td>
<td>33</td>
<td>117</td>
</tr>
<tr>
<td>Sandstone masons</td>
<td>35</td>
<td>48</td>
<td>44</td>
<td>75</td>
<td>53</td>
<td>255</td>
</tr>
<tr>
<td>Gravediggers</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Tunnel mining (sewage works)</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Granite quarrying and dressing</td>
<td>2</td>
<td>1</td>
<td>—</td>
<td>3</td>
<td>—</td>
<td>6</td>
</tr>
<tr>
<td>Slate quarrying and dressing</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Slate dressing with sand</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Gold mining (South Africa)</td>
<td>24</td>
<td>28</td>
<td>16</td>
<td>18</td>
<td>18</td>
<td>104</td>
</tr>
<tr>
<td>Tin mining</td>
<td>10</td>
<td>18</td>
<td>28</td>
<td>17</td>
<td>18</td>
<td>91</td>
</tr>
<tr>
<td>Lead mining</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>—</td>
<td>13</td>
</tr>
<tr>
<td>Copper mining</td>
<td>—</td>
<td>2</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>Iron ore (haematite) mining</td>
<td>—</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>13</td>
<td>36</td>
</tr>
<tr>
<td>Barytes mining</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Fluorspar mining</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Mining engineers</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Diamond mine manager</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Coal mining</td>
<td>41</td>
<td>50</td>
<td>76</td>
<td>74</td>
<td>85</td>
<td>326</td>
</tr>
<tr>
<td>Fireclay mining</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Pottery, mfr. of</td>
<td>53</td>
<td>57</td>
<td>63</td>
<td>53</td>
<td>44</td>
<td>270</td>
</tr>
<tr>
<td>Leather dressing</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Metallurgist</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
</tbody>
</table>

| Total                                 | 247  | 330  | 308  | 329  | 307  | 1,521 |

Coal Mines.

Certificates issued by the Medical Board for silicosis and silicosis with tuberculosis during the period 1 June 1931 to 31 December 1935.

<table>
<thead>
<tr>
<th>Mines</th>
<th>Number of wage-earners on 14 December 1935</th>
<th>Number of certificates issued for</th>
<th>Suspension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Death</td>
<td>Total disablement</td>
</tr>
<tr>
<td>England</td>
<td>531,694</td>
<td>22</td>
<td>66</td>
</tr>
<tr>
<td>Wales</td>
<td>139,228</td>
<td>147</td>
<td>512</td>
</tr>
<tr>
<td>Scotland</td>
<td>84,238</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>755,160</strong></td>
<td><strong>169</strong></td>
<td><strong>581</strong></td>
</tr>
</tbody>
</table>

Pottery Industry.

Fatal cases (silicosis with or without tuberculosis) during the five years 1930 to 1934.

<table>
<thead>
<tr>
<th>Occupations exposing workers to dust of</th>
<th>Numbers employed</th>
<th>Deaths in 5 years</th>
<th>Annual mortality rates per 1,000 employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flint</td>
<td>1,015</td>
<td>44</td>
<td>8.66</td>
</tr>
<tr>
<td>Sanitary ware (body)</td>
<td>736</td>
<td>25</td>
<td>6.78</td>
</tr>
<tr>
<td>General earthenware (body)</td>
<td>3,688</td>
<td>107</td>
<td>4.17</td>
</tr>
<tr>
<td>China (body)</td>
<td>1,178</td>
<td>17</td>
<td>2.89</td>
</tr>
<tr>
<td>Tiles (body)</td>
<td>975</td>
<td>12</td>
<td>2.48</td>
</tr>
<tr>
<td>Placing sand</td>
<td>947</td>
<td>11</td>
<td>2.32</td>
</tr>
<tr>
<td>Saggers</td>
<td>608</td>
<td>1</td>
<td>0.33</td>
</tr>
</tbody>
</table>

1 MIDDDELTON, The Lancet, 4 July 1936, pp. 7-8.
UNION OF SOUTH AFRICA

1. Original Awards made by the Board during the Period 1 August 1919 to 31 March 1936, classified according to the Various Stages of Silicosis and Tuberculosis, differentiating in respect of Miners between those born in South Africa and those born elsewhere.

<table>
<thead>
<tr>
<th>Periods</th>
<th>S.A. O. S.A. O. S.A. O. S.A. O.</th>
<th>Miners</th>
<th>Dependants of deceased non-beneficiary miners</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ante-primary silicosis</td>
<td>Primary silicosis</td>
<td>Secondary silicosis or silicosis with tuberculosis</td>
<td></td>
</tr>
<tr>
<td>1.8.19-31.3.20</td>
<td>125</td>
<td>210</td>
<td>205</td>
<td>482</td>
</tr>
<tr>
<td>1.4.20-31.3.21</td>
<td>140</td>
<td>229</td>
<td>99</td>
<td>166</td>
</tr>
<tr>
<td>1.4.21-31.3.22</td>
<td>110</td>
<td>116</td>
<td>8</td>
<td>43</td>
</tr>
<tr>
<td>1.4.22-31.3.23</td>
<td>147</td>
<td>165</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>1.4.23-31.3.24</td>
<td>120</td>
<td>135</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>1.4.24-31.3.25</td>
<td>245</td>
<td>210</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>1.4.25-31.3.26</td>
<td>275</td>
<td>196</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>1.4.26-31.3.27</td>
<td>228</td>
<td>251</td>
<td>14</td>
<td>33</td>
</tr>
<tr>
<td>1.4.27-31.3.28</td>
<td>216</td>
<td>158</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>1.4.28-31.3.29</td>
<td>181</td>
<td>121</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>1.4.29-31.3.30</td>
<td>217</td>
<td>108</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>1.4.30-31.3.31</td>
<td>140</td>
<td>93</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>1.4.31-31.3.32</td>
<td>154</td>
<td>81</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>1.4.32-31.3.33</td>
<td>148</td>
<td>66</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1.4.33-31.3.34</td>
<td>134</td>
<td>54</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>1.4.34-31.3.35</td>
<td>121</td>
<td>62</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>1.4.35-31.3.36</td>
<td>147</td>
<td>62</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>2,900</td>
<td>2,323</td>
<td>384</td>
<td>332</td>
</tr>
</tbody>
</table>

S.A. = South African born.
O. = Born elsewhere.

1 Union of South Africa. Department of Mines: (Report of the Miners' Phthisis Board for the Period 1 April 1935 to 31 March 1936, p. 43.)

2 Figures for period of eight months.
### 2. Awards and Expenditure, 1 August 1919 to 31 March 1936

<table>
<thead>
<tr>
<th>Period</th>
<th>Ante-primary silicosis</th>
<th>Primary silicosis</th>
<th>Tuberculosis</th>
<th>Monthly Instalments, all Acts</th>
<th>Monthly allowances, 1919 and 1925 Acts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
</tr>
<tr>
<td>1.8.19-31.3.20</td>
<td>127,378</td>
<td>410,828</td>
<td>24,133</td>
<td>93,517</td>
<td>147,586</td>
</tr>
<tr>
<td>1.4.20-31.3.21</td>
<td>155,462</td>
<td>100,105</td>
<td>21,544</td>
<td>72,086</td>
<td>215,978</td>
</tr>
<tr>
<td>1.4.21-31.3.22</td>
<td>100,751</td>
<td>37,267</td>
<td>18,959</td>
<td>38,759</td>
<td>205,999</td>
</tr>
<tr>
<td>1.4.22-31.3.23</td>
<td>131,008</td>
<td>27,489</td>
<td>11,453</td>
<td>23,952</td>
<td>201,117</td>
</tr>
<tr>
<td>1.4.23-31.3.24</td>
<td>122,157</td>
<td>23,355</td>
<td>10,547</td>
<td>16,136</td>
<td>206,593</td>
</tr>
<tr>
<td>1.4.24-31.3.25</td>
<td>178,308</td>
<td>37,441</td>
<td>5,155</td>
<td>12,847</td>
<td>213,938</td>
</tr>
<tr>
<td>1.4.25-31.3.26</td>
<td>179,901</td>
<td>48,734</td>
<td>25,740</td>
<td>258,446</td>
<td>258,846</td>
</tr>
<tr>
<td>1.4.26-31.3.27</td>
<td>204,100</td>
<td>78,010</td>
<td>25,671</td>
<td>170,053</td>
<td>287,522</td>
</tr>
<tr>
<td>1.4.27-31.3.28</td>
<td>142,595</td>
<td>62,997</td>
<td>10,962</td>
<td>103,456</td>
<td>292,039</td>
</tr>
<tr>
<td>1.4.28-31.3.29</td>
<td>116,241</td>
<td>61,543</td>
<td>21,240</td>
<td>81,120</td>
<td>306,168</td>
</tr>
<tr>
<td>1.4.29-31.3.30</td>
<td>124,363</td>
<td>45,521</td>
<td>20,465</td>
<td>70,597</td>
<td>295,988</td>
</tr>
<tr>
<td>1.4.30-31.3.31</td>
<td>87,372</td>
<td>36,437</td>
<td>18,419</td>
<td>56,826</td>
<td>302,418</td>
</tr>
<tr>
<td>1.4.31-3.3.32</td>
<td>93,622</td>
<td>40,869</td>
<td>17,251</td>
<td>33,693</td>
<td>294,795</td>
</tr>
<tr>
<td>1.4.32-31.3.33</td>
<td>78,322</td>
<td>88,945</td>
<td>11,555</td>
<td>25,362</td>
<td>295,988</td>
</tr>
<tr>
<td>1.4.33-31.3.34</td>
<td>69,974</td>
<td>42,594</td>
<td>14,929</td>
<td>10,529</td>
<td>313,998</td>
</tr>
<tr>
<td>1.4.34-31.3.35</td>
<td>55,307</td>
<td>43,689</td>
<td>9,090</td>
<td>16,488</td>
<td>333,314</td>
</tr>
<tr>
<td>1.4.35-31.3.36</td>
<td>54,813</td>
<td>29,514</td>
<td>6,412</td>
<td>14,057</td>
<td>325,338</td>
</tr>
<tr>
<td><strong>Total £</strong></td>
<td><strong>1,999,652</strong></td>
<td><strong>1,256,018</strong></td>
<td><strong>281,325</strong></td>
<td><strong>1,102,670</strong></td>
<td><strong>4,470,941</strong></td>
</tr>
</tbody>
</table>

(UNION OF SOUTH AFRICA. DEPARTMENT OF MINES : Report of the Miners' Phthisis Board for the Period April 1935 to 31 March 1936, p. 41.)

### 3. Total Monetary Benefits paid under the Acts up to 31 March 1936

<table>
<thead>
<tr>
<th>Miners</th>
<th>In receipt of allowances</th>
<th>Payments ceased</th>
<th>Dependents of deceased miners</th>
<th>In receipt of allowances</th>
<th>Payments ceased</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than £1,250</td>
<td>675</td>
<td>565</td>
<td>1,046</td>
<td>1,045</td>
<td>3,334</td>
<td></td>
</tr>
<tr>
<td>£1,250 to £1,499</td>
<td>178</td>
<td>64</td>
<td>482</td>
<td>274</td>
<td>998</td>
<td></td>
</tr>
<tr>
<td>£1,500 to £1,999</td>
<td>208</td>
<td>73</td>
<td>693</td>
<td>292</td>
<td>1,266</td>
<td></td>
</tr>
<tr>
<td>£2,000 to £2,499</td>
<td>249</td>
<td>31</td>
<td>546</td>
<td>104</td>
<td>930</td>
<td></td>
</tr>
<tr>
<td>£2,500 to £2,999</td>
<td>165</td>
<td>20</td>
<td>307</td>
<td>34</td>
<td>528</td>
<td></td>
</tr>
<tr>
<td>£3,000 to £3,499</td>
<td>88</td>
<td>7</td>
<td>129</td>
<td>9</td>
<td>233</td>
<td></td>
</tr>
<tr>
<td>£3,500 to £3,999</td>
<td>66</td>
<td>—</td>
<td>58</td>
<td>6</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>£4,000 to £4,499</td>
<td>48</td>
<td>—</td>
<td>21</td>
<td>—</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>£4,500 and over</td>
<td>17</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td><strong>Total in £ stg.</strong></td>
<td><strong>1,694</strong></td>
<td><strong>760</strong></td>
<td><strong>3,282</strong></td>
<td><strong>1,767</strong></td>
<td><strong>7,503</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum amount paid in each class (£ stg.)</td>
<td>4,760</td>
<td>3,305</td>
<td>4,471</td>
<td>3,849</td>
<td>4,760</td>
<td></td>
</tr>
</tbody>
</table>

(UNION OF SOUTH AFRICA. DEPARTMENT OF MINES : Report of the Miners' Phthisis Board for the Period 1 April 1935 to 31 March 1936. p. 17.)
4. — Cost of Compensation

The income and expenditure of the Miners' Phthisis Compensation Fund from 1 April 1933 to 31 March 1934 was as follows.

<table>
<thead>
<tr>
<th>Income</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employers' contributions</td>
<td>800,000</td>
</tr>
<tr>
<td>Interest</td>
<td>93,073</td>
</tr>
<tr>
<td>Fines</td>
<td>279</td>
</tr>
<tr>
<td>Other revenue</td>
<td>4,978</td>
</tr>
<tr>
<td>Transfer from Outstanding Liabilities Fund</td>
<td>66,193</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>964,523</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awards granted under previous legislation</td>
<td>219</td>
</tr>
<tr>
<td>Awards granted under Act No. 40 of 1919</td>
<td>147,737</td>
</tr>
<tr>
<td>Awards granted under Act No. 35 of 1925</td>
<td>544,866</td>
</tr>
<tr>
<td>Medical treatment and funeral expenses</td>
<td>5,076</td>
</tr>
<tr>
<td>Interest</td>
<td>989</td>
</tr>
<tr>
<td>Other expenditure</td>
<td>9,020</td>
</tr>
<tr>
<td>Transfer to &quot;Trade and Industries Fund&quot;</td>
<td>16,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>723,907</strong></td>
</tr>
</tbody>
</table>


UNITED STATES OF AMERICA

For United States (Wisconsin) see pp. 98-99.
The most important industries and processes exposing workers to silicosis may be enumerated as follows:

| Stone industries | Getting and rough working: quarrying, cutting, sculpture, paving blocks, manufacture of grindstones, etc. (granite, sandstone, flint, alabaster, slate, marble, diatomaceous earths, tripoli, etc.).
|                  | Preparation of artificial products, for instance, sandlimestone bricks involving use of moderately pure sharp angular sand preferably finer than 20 mesh, together with a small percentage of finely powdered silica.
|                  | Coal.
|                  | Metal (gold, tin, copper, iron, etc.).

**Types of Silica used**

- Flint, tripoli, and chert, amorphous silica preferred, also all other categories of very pure silica all finely ground.
- Fairly pure quartz known as ganister (containing at least not less than 97 per cent. of SiO₂ nor more than 0.40 per cent. of alkalis. Tightly interlocking grains desired.
- Massive quartz or quartzite.
- Pure quartz sand.
- Very pure massive quartz preferred.

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1 The data in this table are taken from the following article: New York State Department of Labor: *Industrial Bulletin “Review of Silicosis”*, by A. Ross Smith, 1933, Vol. 12, pp. 32-33.
Uses of Silica

Abrasives:
- In scouring and polishing soaps and powders
- In sandpaper
- In sandblasting

Products used for:
- Metal buffing, burnishing and polishing
- For sawing and polishing of marble, granite, etc.
- As whetstones, grindstones (buhrstones, pulpstones, oilstones)
- Tube-mill lining
- Tube-mill grinding pebbles
- Lithographers' graining sand
- In toothpowders and paste
- Wood polishing and finishing
- Metallurgical uses:
  - In making silicon, ferro-silicon and silicon alloys
  - As a flux in smelting basic ores
  - Foundry-mould wash
  - Foundry parting sand
  - Chemical industries:
    - As a filtering medium

Types of Silica used

- Quartz, quartzite, flint, chert, sandstone, sand, tripoli and diatomaceous earth: all in finely ground state.
- Quartz, quartzite, flint, sandstone and sand:
- Quartz, quartzite, sandstone and sand, crushed into sharp angular grains uniform in size.
- Ground tripoli and other forms of ground silica.
- Sharp, clean sand graded into various sizes.
- Massive sandstone from very fine to moderately coarse grained.
- Chert, flint, quartzite in dense, solid blocks.
- Rounded flint pebbles.
- Medium to fine sand or rather coarsely ground silica and tripoli.
- Various forms of pure silica finely ground.
- All forms of silica ground to medium fineness.
- Moderately pure sand, massive crystalline quartz, sandstone, quartzite or chert.
- Massive quartz and quartzite.
- Ground sandstone, quartz and tripoli.
- Fine sand and ground tripoli.
- Massive and finely ground diatomaceous earth and tripoli, sand; finely granulated quartz or quartzite, finely ground tripoli and other forms of silica.
- Finely pulverised quartz sand, pure tripoli and diatomaceous earth.
- Pure quartz sand.
- Finely ground crystalline quartz, quartzite and flint; also finely ground sandstone, sand and tripoli.
- Finely ground crystalline quartz, quartzite, flint, tripoli and other types of ground silica.
In fertilisers and insecticides
As a filler in rubber, hard rubber, pressed and moulded goods, phonograph records, etc.
In road asphalt surfacing mixtures
Decorative materials:
In the manufacture of gems, crystal balls, table tops, vases, statues, etc.
Insulating materials:
Heat insulation for pipes, boilers, furnaces, kilns, etc.
Sound insulation in walls, between floors, etc.
Optical materials:
Optical quartz for the manufacture of lenses and accessories for optical instruments
As above.
Finely ground silica of all types.
As above.
Rock crystal, amethyst, rose quartz, citrine, quartz, smoky quartz, chrysoprase, agate, chalcedony, opal, onyx, sardonyx, jasper, etc.
Massive and ground diatomaceous earth.
As above.
Clear, colourless, flawless rock crystal or massive crystallised quartz.
## Appendix VII

**PNEUMOCONIOSES LEGISLATION**

The following table simply contains a list of the compensation enactments in force relative to pneumoconioses, taken from documents in the possession of the International Labour Office at the end of 1937.

The second column shows diseases enumerated in the text of the schedules appended to the Acts or in the text of the Acts themselves. Where an explicit definition of silicosis or of tuberculosis accompanying it is provided in the Act, this is indicated in a footnote.

Where a system of blanket coverage is in force which may include silicosis, the relative information will be found in the appendices.

The information contained in the fourth column includes no reference to amendments to the principal Act unless such amendments involve any change in the definition of the disease (column 2) or in the enumeration of the occupations covered (column 3).

<table>
<thead>
<tr>
<th>Countries</th>
<th>Diseases</th>
<th>Trades, industries or processes</th>
<th>Legislative measures</th>
<th>Reference Nos. of Legislative Series, I.L.O.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Argentine Republic</strong></td>
<td>Anthracosis, Pneumoconiosis, Siderosis, Tabacosis.</td>
<td>All operations which involve presence of the worker in surroundings in which solid particles of siliceous material or industrial dust are liberated, inhalation of which is a specific cause of pneumoconioses.</td>
<td>Act No. 9688 relative to liability for industrial accidents, dated 11 Oct. 1915. Decree dated 14 Jan. 1916. Preliminary Draft Decree dated 22 Nov. 1935.</td>
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</tr>
<tr>
<td>Countries (1)</td>
<td>Diseases (2)</td>
<td>Trades, industries or processes (3)</td>
<td>Legislative measures (4)</td>
<td>Reference Nos. of Legislative Series, I.L.O. (5)</td>
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<tr>
<td><strong>Australia (ctd.)</strong></td>
<td><strong>New South Wales</strong></td>
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<tr>
<td></td>
<td>1. <strong>The whole State</strong> Disease contracted by gradual process other than a disease caused by silica dust.¹</td>
<td></td>
<td><strong>Workers’ Compensation Act 1926-1929 (Act No. 38 dated 29 Nov. 1929).</strong></td>
<td><strong>L. S., 1929, Austral. 9-A.</strong></td>
</tr>
<tr>
<td></td>
<td>2. <strong>Districts of Cumberland, Camden and Northumberland</strong> Fibroid phthisis or silicosis of the lungs. Silicosis accompanied by tuberculosis or any other disease of the pulmonary or respiratory organs caused by exposure to silica or other dust.²</td>
<td><strong>Workmen employed in the sandstone industry as stonemasons, quarrymen, rock-choppers or sewer miners.</strong></td>
<td><strong>Act No. 13 to provide payment of compensation for fibroid phthisis or silicosis of the lungs dated 19 Nov. 1920.</strong></td>
<td><strong>L. S., 1926, Austral. 5, Appendix.</strong></td>
</tr>
<tr>
<td></td>
<td>3. <strong>Broken Hill</strong> Pneumoconiosis and or tuberculosis.</td>
<td></td>
<td><strong>Act No. 15 dated 18 March 1929.</strong></td>
<td><strong>L. S., 1926, Austral. 6.</strong></td>
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<td></td>
<td><strong>Act No. 13 dated 20 May 1936.</strong></td>
<td><strong>L. S., 1936, Austral. 1.</strong></td>
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<td></td>
<td><strong>Metalliferous mines at Broken Hill.</strong></td>
<td><strong>Act No. 36 dated 31 Dec. 1929, to provide payment of compensation (metalliferous mines) for pneumoconiosis or tuberculosis.</strong></td>
<td><strong>L. S., 1929, Austral. 9-C.</strong></td>
</tr>
</tbody>
</table>

¹ By a recent decision of the High Court of Australia, if any worker is incapacitated for work by inhalation of dusts other than silica dust, he is entitled to claim compensation under the Act and the onus of proving that the dust disease which disables the worker was caused by silica dust rests upon the employer. I.L.O.: *Industrial and Labour Information*, 20 May 1935, p. 242.

² See Scheme of 1927, Article 3.
<table>
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<tr>
<th>Countries</th>
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<th>Trades, industries or processes (2)</th>
<th>Legislative measures (3)</th>
<th>Reference Nos. of Legislative Series, I.L.O. (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australia (c.d.)</strong></td>
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<tr>
<td><strong>Victoria</strong></td>
<td>Miners' phthisis defined as fibrosis of the lungs caused by inhalation of dust and including such a condition accompanied by tuberculosis but not including tuberculosis only.</td>
<td>Mining or dry crushing or rock crushing about any mine only when: (a) two or more miners are employed below surface; (b) where metaliferous mining (other than alluvial mining) is being carried on at a depth of not less than 20 feet from the surface.</td>
<td>Act No. 4438, for relief of persons suffering from miners' phthisis, dated 21 Dec. 1936 (not yet proclaimed 1 Jan. 1937).</td>
<td>L.S., 1936, Austral. 6.</td>
</tr>
</tbody>
</table>

1 Tuberculosis means tuberculosis of the lungs or of the respiratory organs.
2 See Article 5 of the Act of 1932.
3 See section 34 a inserted under the Act No. 47, dated 10 Jan. 1934, for definition of stages of silicosis.
4 Not yet proclaimed.
<table>
<thead>
<tr>
<th>Countries</th>
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</thead>
<tbody>
<tr>
<td><strong>Australia (excl. Tasmania)</strong></td>
<td><a href="https://en.wikipedia.org/wiki/Pneumoconiosis">Pneumoconiosis</a> with or without pulmonary tuberculosis where the pneumoconiosis (silicosis) causes incapacity for work (or service) or death of a worker (or employee).</td>
<td>(2) any process in connection with the dealing with, trading or handling of the above substances for the purposes aforesaid; (3) dealing with, trading or handling in connection with such process as aforesaid of any by-products or residues produced by or arising from such process; (4) Cutting, dressing, shaping or working upon any stone, granite, marble or similar substance; (5) Quarrying of blue metal, freestone or limestone; (6) The manufacture of cement — but the term &quot;mining operations&quot; does not include sluicing, dredging or any similar operations, nor does it include mining of coal or shale, or quarrying or crushing of any material required for the construction or maintenance of roads.</td>
<td>Act No. 40 dated 16 Dec. 1929 to amend the above. Act No. 27 dated 8 Dec. 1931. Act No. 47 dated 10 Jan. 1934. Ordinance No. 6 dated 13 May 1931. Federal Act No. 107 respecting social insurance in industry dated 29 March. 1935. Second Order in application of the above. No. 203/35 dated 28 June 1935.</td>
<td>L.S., 1934, Austral. 13-A-B-C.</td>
</tr>
<tr>
<td><strong>Northern Territory</strong></td>
<td>Pneumoconiosis.</td>
<td>Quarrying or stone-crushing or cutting. (1) mines and stone quarries containing quartz including sorting, grinding and collecting of sand; (2) manufacture and manipulating of glass and porcelain as well as manufacture of refractory products and abrasives; (3) metal work when substances containing quartz are used; (4) Chemical works (services) which involve liberation of dust from substances containing quartz.</td>
<td></td>
<td>L.S., 1931, Austral. 1.</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td>Pneumoconiosis. (silicosis)</td>
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<td></td>
<td>L.S., 1935, Aus. 2.</td>
</tr>
<tr>
<td>Countries (1)</td>
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</table>
| Belgium      | Pneumoconioses due to industrial dusts when such pneumoconioses involve death or permanent, total or partial incapacity for work, and arise out of or in course of employment, together with the direct sequelae of such diseases 1. | Manufacture of pottery tiles; manufacture of earthenware; manufacture of china and of refractory products. | Act respecting compensation for occupational diseases dated 24 July 1927. Royal Order dated 10 Sept. 1937. | L.S., 1927, Bel. 7.  
|              |                                                                              |                                                                                                  |                                                                                         | L.S., 1937, Bel. 3 4. |
|              | Byssinosis                                                                   |                                                                                                  |                                                                                         |                                                                                       |

1 A Departmental Ordre will fix the conditions of a medical orde to be fulfilled by forms of pneumoconioses in order that they may be considered as occupational diseases entitling those affected to compensation.
2 Information received when going to press.
<table>
<thead>
<tr>
<th>Countries</th>
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<tr>
<td>Canada</td>
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<tr>
<td>Alberta</td>
<td>Pneumoconiosis deemed to be: silicosis, siderosis, lithiosis.</td>
<td>Quarrying, cutting, crushing, grinding or polishing of stone or grinding or polishing of metal.</td>
<td>The Workmen's Compensation Act dated 1918 and Amendment thereto dated 21 March 1928. Act No. 23 assented to 14 April 1937.</td>
<td></td>
</tr>
<tr>
<td>Manitoba</td>
<td>Silicosis ¹</td>
<td>Mining, iron, steel, and metal foundries.</td>
<td>The Workmen's Compensation Act (Consolidated 1924) as amended by the Act dated 7 April 1933.</td>
<td></td>
</tr>
<tr>
<td>Ontario</td>
<td>Stone workers' or grinders' phthisis.</td>
<td>Quarrying, cutting, crushing, grinding or polishing of stone; or grinding or polishing of metal.</td>
<td>Workmen's Compensation Act of Ontario 1927, Ch. 179 as amended by Act dated 3 April 1928 (Ch. 26 of the Statutes).</td>
<td>Act (Ch. 37 of the Statutes) dated 2 April 1931.</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>Miners' phthisis.</td>
<td>Mining.</td>
<td>The Workmen's Compensation (Accident Fund) Act dated 2 Feb. 1929, Statute 1928-1929, Ch. 73.</td>
<td>Act (Ch. 70 of the Statutes) dated 18 April 1933.</td>
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</table>

¹ For definition of silicosis, see Article 11 of the 1937 Act.
² See Article 6 of the Act of 7 April 1936 for definition of silicosis and tuberculosis.
³ See Article 4 of the Act of 1933 for definition of silicosis and tuberculosis.
⁴ See Article 113 of the 1929 Act for definition of silicosis and tuberculosis.
<table>
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<tbody>
<tr>
<td>Chile</td>
<td>Diseases caused by the inhalation of dust; pneumoconiosis.</td>
<td></td>
<td>Decree No. 379 dated 18 March 1925.</td>
<td>L.S., 1925, Chile 4.</td>
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<tr>
<td></td>
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<td></td>
<td>Regulations relative to occupational diseases.</td>
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<td>Decree dated 21 April 1927.</td>
<td>L.S., 1927, Chile 2.</td>
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<td>Legislative Decree No. 178 dated 13 May 1931 to ratify the Labour Code and repeal and consolidate the 1925 Act and the 1927 Decree.</td>
<td>L.S., 1931, Chile 1.</td>
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<td></td>
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<td>The Regulations (Legislative Decree dated 1931) remain nevertheless in force.</td>
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</tr>
<tr>
<td>Cuba</td>
<td>Silicosis with or without pulmonary tuberculosis where silicosis is the cause of incapacity or death.</td>
<td>Pottery industries, sand (excavating, loading and selling), pottery and bottle making, quarries, cement factories, work on demolition and excavating (in siliceous ground), scouring powders, bricks, artificial marble (manufacture of), marble works: saving of, and operations in the workshop; mixing machines for chemical ma­nures, mines (surface and under­ground work), no­sale work, stone work (crushing ma­chine), navvy's work, tiles.</td>
<td>Act respecting Industrial accidents, Decree No. 2857 dated 15 Nov. 1933.</td>
<td>L.S., 1933, Cuba 3.</td>
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<td>Legislative Decree No. 599 dated 18 Feb. 1936.</td>
<td>L.S., 1936, Cuba 1-A.</td>
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<td>Decree No. 1049. dated 22 April 1936.</td>
<td>L.S., 1936, Cuba 1-B.</td>
</tr>
<tr>
<td>Cescho­lovakia</td>
<td>Serious pneumoconiosis caused by quartz or iron dust. If serious pneumoconiosis occurs simultaneously with pulmonary tuberculosis, the tuberculosis is for the purposes of compensation deemed to be a disease caused by dust.</td>
<td>Handling and manufacture of tobacco.</td>
<td>Act respecting compensation for occupational disease, dated 1 June 1932.</td>
<td>L.S., 1932, Cz. 1.</td>
</tr>
<tr>
<td>Countries</td>
<td>Diseases</td>
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<tr>
<td>Danzig</td>
<td>Serious pneumoconiosis (silicosis). If serious pneumoconiosis occurs simultaneously with pulmonary tuberculosis, the tuberculosis is for the purposes of compensation deemed to be pneumoconiosis.</td>
<td>(a) Undertakings for quarrying, rough working and finishing of sandstone; (b) undertakings for metal-grinding; (c) chinaware undertakings; (d) mining undertakings.</td>
<td>Order to amend the Federal Insurance Code dated 3 Nov. 1933. Second Orders to extend accident insurance to cover occupational diseases, dated 3 Nov. 1933.</td>
<td>L.S., 1933, Danz. 5.</td>
</tr>
<tr>
<td>Denmark</td>
<td>Diseases of the lungs caused by the inhalation of stone dust and dust of mineral substances.</td>
<td>Manufacture of scouring powder, porcelain and pottery industries, stone industry, certain branches of the metal industry, grinding, sandblasting, casting, scouring, cement industry, brick and tile works, millstone industry.</td>
<td>Act No. 183 respecting insurance against accidents, dated 20 May 1933.</td>
<td>L.S., 1933, Den. 5.</td>
</tr>
<tr>
<td>Finland</td>
<td>Pulmonary disease which can be shown by means of X-ray examination to be due to the influence of stone dust (silicosis). Increasing dyspnoea in conjunction with pulmonary changes accompanied by the X-ray picture characteristic of silicosis. Pulmonary tuberculosis accompanied by pulmonary changes and an X-ray picture characteristic of silicosis.</td>
<td>Stone dust: dry boring in mines and quarries; crushing and working up of minerals and rocks in a dry condition; grinding with natural or artificial stone; crushing and mixing in a dry condition of materials for glass manufacture. Sandblasting.</td>
<td>Act respecting compensation for certain occupational diseases, dated 19 Apr. 1935. Order dated 31 Dec. 1935.</td>
<td>L.S., 1935, Fin. 2; L.S., 1935, Fin. 3.</td>
</tr>
<tr>
<td>Germany</td>
<td>(a) Serious pneumoconiosis (silicosis). (b) Pneumoconiosis (silicosis) in conjunction with pulmonary tuberculosis when the general clinical picture is serious and the pneumoconiotic lesions constitute the essential cause of the active and progressive evolution of tuberculosis. (c) Serious pneumoconiosis due to asbestos (asbestosis).</td>
<td>Undertakings, establishments and services subject to accident insurance.</td>
<td>Third Order respecting compensation for occupational diseases, dated 16 Dec. 1935.</td>
<td>L.S., 1936, Ger. 3.</td>
</tr>
<tr>
<td>Countries</td>
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</tbody>
</table>
| Great Britain | Silicosis (that is to say, "fibrosis of the lungs due to silica dust") or "fibrosis of the lungs due to asbestos dust, or either of these diseases accompanied by tuberculosis") 1. The various schemes specify as follows the diseases to be compensated:  
Silicosis or silicosis accompanied by tuberculosis;  
Silicosis or silicosis accompanied by tuberculosis;  
Silicosis or silicosis accompanied by tuberculosis;  
Grinding of metals on grindstones composed of natural or artificial sandstone and certain incidental processes (racing and trueing up of the grindstones).  
Processes carried on at mines, quarries, factories and workshops at which refractory material containing not less than 80 per cent. total silica is got or manipulated with a view to manufacture or sale, and all processes in the manipulation of such material and in the manufacture of bricks and other articles containing not less than 80 per cent. of silica.  
All processes in or incidental to getting or manipulation of sandstone containing not less than 50 per cent. of silica (free and combined) with a view to manufacture, sale or use, at mines or quarries or on premises worked in conjunction with these with a view to manufacture, sale or use. | Act dated 22 Dec. 1925.  
Act dated 1 Aug. 1930.  
Compensation schemes:  
No. 343 dated 20 April 1931 (Metal-grinding).  
No. 345 dated 11 May 1931 (Refractories Industries).  
Compensation schemes:  
L.S., 1925, G.B. 3.  
Compensation schemes:  
L.S., 1925, G.B. 3.  
Compensation schemes:  
L.S., 1925, G.B. 3.  
Compensation schemes: |

1 See Article 47 of the 1925 Act and Articles 3 and 4 of the Schemes for the Metal-Grinding Industry, Various Industries, Sandstone Industry, Refractories Industries.
<table>
<thead>
<tr>
<th>Countries (1)</th>
<th>Diseases (2)</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Silicosis or silicosis accompanied by tuberculosis.</td>
<td>Mining and quarrying of silica rock; getting and manipulation of granite (including any igneous rock; all underground operations in coal mines and iron ore mines (hematite); all underground operations and breaking of ore above ground in tin mines; manipulation and working of silica rock (sawing, packing, dressing, etc.); the working and manipulation (breaking, crushing, grinding, sieving, mixing and packing) and handling or moving of silica rock or other siliceous products, or any admixture thereof; certain specified processes in potteries: milling of flint or crushing or grinding of silica rock or dry quartzose sand in the manufacture of china or earthenware; polishing, sorting or grinding on a power-driven wheel in connection with the grinding of glassware or tile slabbing; work in foundries and metal works: steel manufacture: crushing, grinding or handling of silica rock, bricks or other articles containing not less than 80 per cent. total silica; freeing of steel castings from adherent sand; sand blasting of metal or articles of metal by means of compressed air with the use of quartzose sand or crushed silica rock or flint.</td>
<td>No. 342 dated 30 April 1931 (Various Industries).</td>
<td>Amendment No. 1155 dated 22 Oct. 1934. Amendment No. 69 dated 29 Jan. 1935.</td>
</tr>
<tr>
<td>Countries</td>
<td>Diseases or processes</td>
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<tr>
<td>Irish Free State</td>
<td>Silicosis with or without pulmonary tuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death.</td>
<td>All processes of extraction and manipulation of sandstone involving exposure of the workers to the action of dust with a silica content. Polishing and grinding of metals on grindstones composed of natural or artificial stone with a silica content. All operations in the manufacture of china or earthenware articles involving exposure of workers to the action of dust with a silica content.</td>
<td>Act No. XXII dated 23 Oct. 1935 embodying in the legislation the Draft Convention on Workmen's Compensation (Occupational Diseases) (Revised) 1934 Ministerial Order dated 30 Dec. 1936.</td>
<td>L.S., 1936, Hung. 5.</td>
</tr>
<tr>
<td>Japan</td>
<td>Silicosis or silicosis accompanied by tuberculosis.</td>
<td>Mines. Factories.</td>
<td>Mines Act No. 45 dated 8 March 1905, amended by the Act No. 22 dated 2 July 1924, and later Amendments (miners' relief). Factory Act No. 46 dated 28 March 1911 (amended by various Imperial Orders. The Schedule common to both these Acts will be found in the Ministerial Circular No. 55 dated 3 July 1936.</td>
<td>L.S., 1924, Jap. 2.</td>
</tr>
</tbody>
</table>

* See Schedule appended to the 1930 Act and Articles 3 and 4 of the Asbestos Scheme.
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Mexico, United States of</strong></td>
<td>Silicosis.</td>
<td>Quarrying, building and transport industries.</td>
<td>Act No. 54 respecting first aid to workers in case of accident, dated 1 April 1931, and Imperial Ordinances No. 270 dated 27 Nov. 1931 and No. 599 dated 28 Nov. 1935.</td>
<td>L.S., 1931, Jap. 1-A.</td>
</tr>
<tr>
<td></td>
<td>Silicosis.</td>
<td>Miners (mineral and metaliferous mines), quarrymen, lime burners, cement factory workers, grinders and masons, workers in sand pits and workers employed in china-ware factories.</td>
<td></td>
<td>L.S., 1931, Jap. 2-B.</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis.</td>
<td>Miners (when silicosis has been incurred previously).</td>
<td></td>
<td>L.S., 1931, Mex. 1.</td>
</tr>
<tr>
<td></td>
<td>Siderosis.</td>
<td>Iron workers (file cutters, metal turners and persons engaged in handling iron oxide).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tabacosis.</td>
<td>Workers in the tobacco industry.</td>
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<tr>
<td></td>
<td>Other lung diseases due to the inhalation of dust.</td>
<td>Carpenters, workers employed in the cotton, wool, jute, silk, skin and feather industries; workers cleaning by means of a blow-pipe; painters and cleaners using compressed air (sprayers).</td>
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<tr>
<td><strong>Norway</strong></td>
<td>Silicosis with or without pulmonary tuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death.</td>
<td>Industries covered by the Workmen’s Accident Compensation Act.</td>
<td>Act on Workmen’s Compensation, dated 24 June 1931, and Royal Resolution dated 11 Jan. 1935.</td>
<td>L.S., 1931, Nor. 3.</td>
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<td>Peru</td>
<td>Pneumoconiosis (with or without tuberculosis)</td>
<td>Industrial undertakings in which dust is liberated (silica).</td>
<td>Act No. 7975 respecting compensation for occupational diseases dated 12 Jan. 1935.</td>
<td>L.S., 1935, Peru 2A.</td>
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<td>Portugal</td>
<td>Injuries due to the action of dust.</td>
<td>Mining industry, cement factories, glass polishing, industries in which dust containing silica, silicates or tobacco is liberated.</td>
<td>Decree dated 27 Dec. 1935.</td>
<td>L.S., 1935, Peru 2B.</td>
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<td>Rumania</td>
<td>Silicosis with or without pulmonary tuberculosis provided that silicosis is an essential factor in causing resultant incapacity or death.</td>
<td>Industries or processes in which silica is worked or employed.</td>
<td>Act to unify the social insurance system dated 7 April 1933. Decision No 20349 of the Ministry of Labour respecting occupational diseases, dated 13 June 1936.</td>
<td>L.S., 1933, Rum. 3.</td>
</tr>
<tr>
<td>Spain</td>
<td>Pneumoconiosis (silicosis with or without tuberculosis, anthracosis and other respiratory diseases due to dust).</td>
<td>Any industry or process involving exposure to risk of silicosis. Coal industry and storing of coal. Any industry or process involving exposure to the risk of a disease caused by mineral, metallic, vegetable or animal dust.</td>
<td>Act respecting occupational diseases, dated 15 July 1936.</td>
<td>L.S., 1936, Sp. 2.</td>
</tr>
<tr>
<td>Sweden</td>
<td>Pulmonary disease which can be shown by means of an X-ray examination to be due to the influence of stone dust (silicosis); increasing dyspnoea or obstructate cataarrh of the respiratory passages in conjunction with pulmonary changes accompanied by X-ray picture characteristic of silicosis. Pulmonary tuberculosis accompanied by pulmonary changes and an X-ray picture characteristic of silicosis.</td>
<td>Stone dust: dry boring in mines and quarries; crushing and working up of minerals and rocks in a dry condition; grinding with natural or artificial stone; crushing and mixing in a dry condition of materials for glass manufacture. Manufacture of china. Sand blasting.</td>
<td>Act No. 131 respecting insurance against certain occupational diseases, dated 14 June 1929, amended by the Act No. 335, dated 12 Sept. 1939, Royal Notification No. 396, dated 7 Nov. 1939, amended by Royal Notification dated 13 March 1931. (Act No. 384 dated 26 June 1939.)</td>
<td>L.S., 1929, Swe. 1.</td>
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<td>L.S., 1930, Swe. 4.</td>
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<td>L.S., 1930, Swe. 4-B.</td>
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<td>L.S., 1931, Swe. 2.</td>
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<td>L.S., 1936, Swe. 6.</td>
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1 Voluntary compensation is accorded in virtue of the decision of the governing body of the Swiss National Accident Insurance Fund, dated May 1932.
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<td>Silicosis or tuberculosis or both of these diseases *</td>
<td>Scheduled mines and gazetted mines (underground operations specified in the Act).</td>
<td>Act No. 35, dated 27 July 1925.</td>
<td>L.S., 1925, S.A. 2.</td>
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<td>U. S. R.</td>
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<tr>
<td>United States of America</td>
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<tr>
<td>Illinois</td>
<td>Blanket coverage (all diseases arising out of and in course of employment), with special provisions relative to diseases caused by inhalation of silica and asbestos dusts.</td>
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<tr>
<td>Indiana</td>
<td>Do.</td>
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<tr>
<td>North Carolina</td>
<td>Asbestosis.</td>
<td>The employment subject to the hazards of asbestos and or silicosis to be determined by the Industrial Commission.</td>
<td></td>
<td>States Compensation Law, Chapter 120 of the Public Laws of 1929, Section 50 1/2 (26 March 1935).</td>
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* See Article 76 of the 1925 Act.
* Insurance is elective.
* See paragraph K of the Law of 1935.
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<td>Ohio</td>
<td>Silicosis (silicosis shall mean a disease of the lungs caused by breathing silica dust (silicon dioxide) producing fibrous nodules, distributed through the lungs and demonstrated by X-ray examination or by autopsy).</td>
<td>Any industry where intense dust prevails.</td>
<td>Act of 1937 to amend section 1465-68 A of the General Code, pertaining to the Workmen's Compensation Law.</td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>Diseases not specified.</td>
<td></td>
<td></td>
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<td>West Virginia</td>
<td>Silicosis ¹.</td>
<td>Without specifying processes affected ².</td>
<td></td>
<td>Ch. 79 of the 1935 Laws (Law of silicosis, dated 8 March 1935) to amend Article VI, Ch. 23 of the 1931 Code.</td>
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¹ See Article 5 of the Law of 1935.
² Insurance is elective.

**ADDENDUM**

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<td><strong>Canada</strong></td>
<td><strong>British Columbia</strong></td>
<td>Uncomplicated silicosis or silicosis complicated with tuberculosis. (Silicosis means a fibrotic condition of the lungs caused by dust containing silica and evidenced by specific X-ray appearances accompanied by a substantially lessened capacity for work).</td>
<td>Metalliferous mining industry (underground work in any mine, ore or rock crushing except where wet; excluding employment in or about a coal or other mine not involving exposure to dust containing silica ³).</td>
<td>An Act to amend the Workmen's Compensation Act. Assented to 20 Nov. 1936. Now incorporated in Workmen's Compensation, Revised Statutes, 1936, Chap. 312, sections 2 and 8.</td>
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³ Abridged text.
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