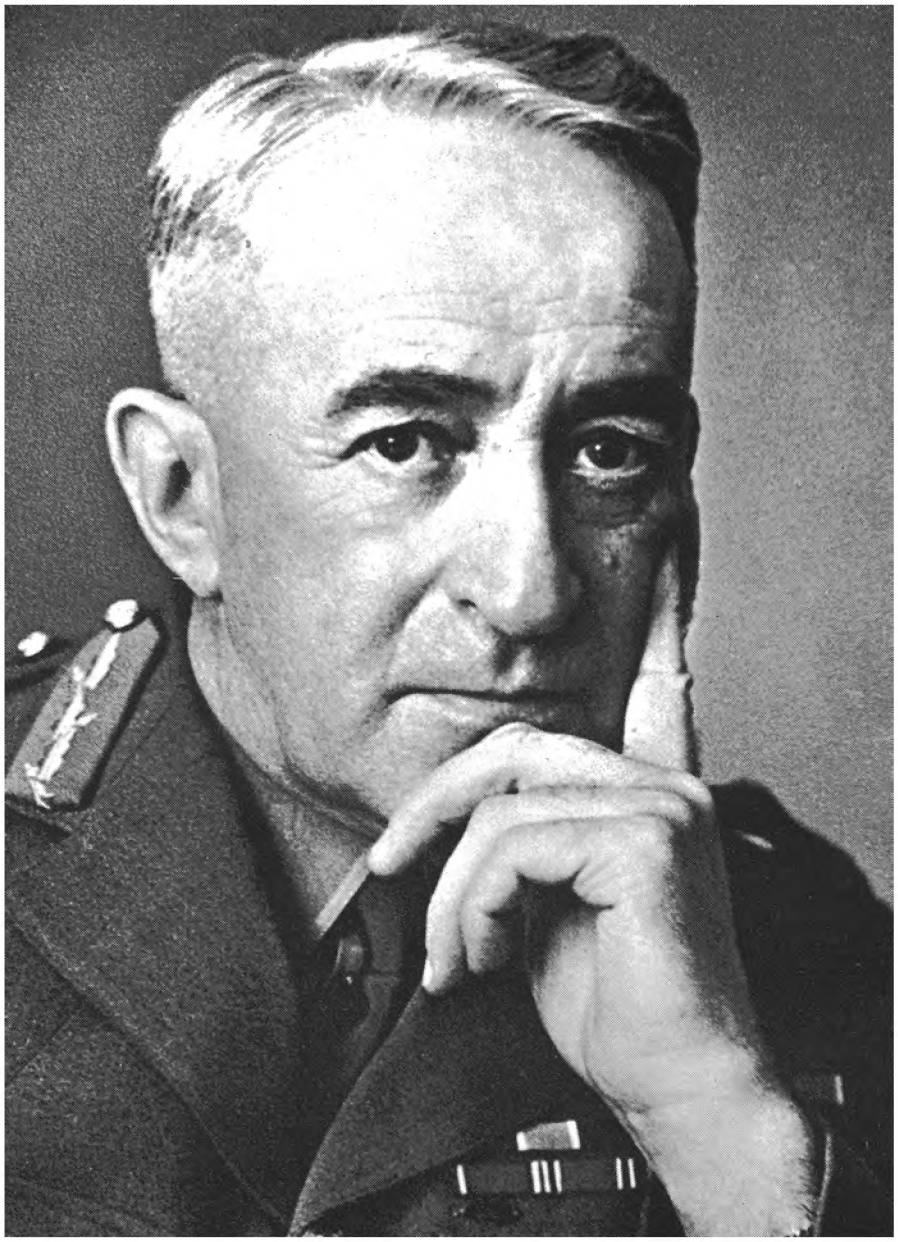
DOCTORS OF THE MINES

Electronic Copy by David W. Stanton
Version: 1.0 December 2003



Major-General A. J. Orenstein, C.B., C.M.G., C.B.E., LL.D., D.Sc., M.D., F.R.C.P., F.R.S.H., the sole surviving member of the group of doctors who founded the Mine Medical Officers' Association in 1921.

DOCTORS OF THE MINES

A commemorative volume published in 1971
to mark the 50th anniversary of the
founding of the Mine Medical
Officers' Association of
South Africa

With a History of the Work of
Mine Medical Officers

by

A. P. CARTWRIGHT

PURNELL

CAPE TOWN JOHANNESBURG LONDON NEW YORK

PUBLISHED BY PURNELL AND SONS (S.A.) PTY., LTD.,
KEEROM STREET, CAPE TOWN

SBN 360 00110 6

FILM SET IN 12 PT. ON 13 PT. MONOTYPE BASKERVILLE
PRINTED AND BOUND IN SOUTH AFRICA
BY THE RUSTICA PRESS, PTY. LTD., WYNBERG, CAPE

Foreword

This is a history of the Mine Medical Officers' Association of South Africa, a body founded fifty years ago to serve as the representative organization of the group of medical practitioners whose task it is to watch over the health of that great army of Bantu men—at present 400 000 strong—who do the manual labour in South African mines. In the early days of these mines the health organization was sketchy. White miners had, and still have, their own sickness benefit organizations with the usual provision for medical attendance. The African workers were looked after by part-time 'mine doctors' who carried on their private practices at the same time and often acted as government district surgeons as well.

No one will be surprised to learn that this system proved unsatisfactory. The time came when the mining companies appointed full-time medical officers whose whole duty was to attend to the African mineworkers. This was rapidly to bring about a spectacular improvement in the health and clinical care of the men.

In 1921 some of the doctors who had been appointed to do this work felt the need for a body that would meet regularly for an exchange of views, publish its proceedings and, if it were necessary, speak for all of them on matters where they thought their views should be heard. Thus was founded, under the aegis of the old Transvaal Chamber of Mines, the Transvaal Mine Medical Officers' Association, its original title.

This history is published to mark the 50th anniversary of the founding of the Association. However, it must be emphasized that the history of this body is essentially the record of the work of the individual members in the conservation of health and the treatment of the sick and injured of the largest congregated body in the world of primitive, illiterate workers.

For convenience of presentation of this record the latter part of the book is divided into chapters headed, for example, 'Pneumonia', 'Tuberculosis', etc.

But it is emphasized that this is not for the purpose of discussing the diseases or injuries but to present the problems with which the mine medical officer is faced in dealing with each of these and to record the means evolved or adopted to solve them.

Contents

As there are persons who mend garments, so there are physicians who heal the sick; but your duty is far nobler and one befitting a great man—to keep people in health.—XENOPHON.

PART III

PROPHYLAXIS AND THERAPY: THE RECORD OVER 50 YEARS

TUBERCULOSIS

Pulmonary and other forms of tuberculosis have been a scourge of many people of Africa for as far back as there are any records, certainly many years before recruiting for mine work was instituted.

The problem facing the mines is, therefore, a dual one—to keep out infected and therefore most probably infective men, and to detect new infections at as early a stage as possible.

To these ends diagnostic procedures are constantly evalued and refined. Many mine medical officers have played an important role in the evaluation of existing methods and the significance of certain findings such as, for example, those of certain lung râles.

The improvements made in the last few decades in the technique of radiography, particularly in the use of small films in mass radiography, enable the use of this most important diagnostic aid in quantity, as well as quality, probably unequalled anywhere else. Mine medical officers read many thousands of lung radiographs every year.

The Chamber of Mines sponsored financially several investigations into the prevalence of tuberculosis in the territories in South Africa. The most comprehensive of these was that carried out under the general direction of the late S. Lyle Cummins.

The prophylactic value of BCG vaccination, and the curative and prophylactic values of newly developed drugs were, and continue to be, investigated.

Because of the importance of tuberculosis both as an industrial health problem and as a national one, the role of mine medical officers in dealing with this matter will be given in some detail.

Only five months after the formation of the Association, the August 1921 meeting was devoted to the discussion of the diagnosis of pulmonary tuberculosis. The first paper was by J. F. Young, medical officer of the Native Recruiting Corporation. He described the procedure of examination of recruits from South African territories at the Witwatersrand depot. There was a preliminary examination at the recruiting centres. The examination at

the depot relied entirely on the physical examination, particularly auscultation.

Dr. A. I. Girdwood, Medical Officer of the Witwatersrand Native Labour Association, dealt with the examination of the recruits from Mozambique. There was a preliminary examination at the Ressano Garcia depot. The examination at the W.N.L.A. depot also relied principally on auscultation. He said: 'There is no doubt that a number of incipient cases of tuberculosis and silicosis escape detection at the initial examination, but the number is comparatively small.'

Recruits were also examined by mine medical officers on arrival at the mines to which they were assigned.

Both Drs. Young and Girdwood stated that they were not very happy about the thoroughness of the procedure adopted, but described it as the best that could be done in the prevailing circumstances. It is to be noted that there was no radiological examination.

The diagnosis of tuberculosis and of silicosis was further discussed at subsequent meetings at which the leading paper was presented by Drs. L. G. Irvine and J. M. Smith. It dealt with the procedure adopted at the Miners Phthisis Medical Bureau. Radiology was used in all cases.

Dr. A. B. Dodds, who had many years' experience in mine work, presented at the October meeting a paper in which he stressed the importance of the general constitution of the recruit, such as ratio of weight to height, respiratory movement and normal lung signs. He said that he rejected all recruits who had crepitations in a lung apex. He favoured the practice of repatriating all who had frequently recurring attacks of bronchitis because these were most apt to acquire tuberculosis. The monthly weighing system, it was agreed, had much merit as a means of screening suspect lung pathology.

At that time the recruits from 'British South Africa' (now the Republic of South Africa) and adjacent territories were concentrated and examined in a depot near Germiston and the 'east coast' natives at the depot in Johannesburg. It was suggested that all recruits should be dealt with at one depot and that an adequate staff be provided there to ensure as efficient an examination as possible. It was agreed to discuss this proposal at a subsequent meeting. Consequently, at the November meeting, Dr. S. Donaldson moved a resolution to that effect. He said that the existing system was not that of examination but of inspection. He quoted a number

of statistical data in support of the proposal. No decision was taken.

This matter came up again a year later, triggered by a paper presented by Dr. Hertslet in which he quoted statistics indicating the serious prevalence of tuberculosis. Donaldson reminded the meeting of his motion and asked that it be dealt with. A decision was postponed pending a report from a subcommittee appointed to consider the broad aspects of the problem. The members of this subcommittee were Drs. Donaldson, Dodds, Girdwood, Irvine and Orenstein. They presented their report at the November 1922 meeting. The report, after acknowledging the assistance of Dr. Peter Allen, the Union Department of Health Tuberculosis Officer, stated :

'The available data are insufficient to permit a definite conclusion as to the prevalence of tuberculosis in the Native territories, nor whether it is increasing or decreasing. But it is safe to say that tuberculosis is widely prevalent.'

The opinion was expressed that tuberculosis was on the increase among native mineworkers.

It was recommended that a memorandum be issued to medical examiners of recruits setting out a detailed procedure. A draft of this was given as an annexure.

Mine medical officers were to be asked to follow this procedure.

The establishment of a central examining board was not justified by the available information, and was not recommended.

The report made recommendations on the disposal of those who had tuberculosis. In brief these were: Local treatment was impracticable, nor was it feasible for the industry to establish treatment facilities elsewhere.

The report was discussed at the next meeting and, with a few minor amendments, and with the addition of the statistical data at the disposal of the subcommittee, was adopted for transmission to the Chamber of Mines.

The concern of mine medical officers with the problem posed by tuberculosis continued to occupy much of the time of the Association's meetings in the following years.

The two subjects which received most consideration were the search for criteria indicating the earliest signs of tuberculosis detectable by physical examination, and the disposal of those found to have the disease.

As regards the latter the Association recommended that, as prolonged treatment locally was impracticable because there were no facilities, and also because once the diagnosis was established the men were entitled to be

repatriated, and insisted on exercising this right, it was important that there should be little delay in arranging repatriation. To this end the Mine Medical Officers' Association recommended that all such cases should be dealt with by a central board at the W.N.L.A. hospital. It was recognized that, from the wider point of view, repatriation of infected cases to their home kraals was undesirable. But at that time it seemed the only possible course open.

This dilemma persisted until recent times, when curative drugs became available and the Bantu, having lost much of their dislike of hospitals, are in many cases willing to stay on for treatment now provided at mine and Wenela hospitals.

At the May 1926 meeting Dr. Butt reported on the proceedings of a committee appointed by the Chamber of Mines in June 1925. The members were: Drs. W. Watkins Pitchford, F. S. Lister, A. Mavrogordato, J. H. H. Pirie of the S.A.I.M.R., A. Pringle of the Miners' Phthisis Sanatorium; and A. Bloom, A. Frew, A. I. Girdwood, A. J. Orenstein and H. T. H. Butt of the Mine Medical Officers' Association.

One action taken was the installation of radiographic facilities at the W.N.L.A.

Both radioscopy and radiography were used, the work being done by an 'expert'. (Radioscopy was proved unreliable as a diagnostic tool.) Further research was to be done on radiography.

The recommendations made included :

Long-service Bantu to be radiographed annually.

Standard weighing machines to be used and the weighing to be well supervised.

A monthly report on tuberculosis to be submitted to the Chamber of Mines by mine medical officers.

In June 1926 the Chamber of Mines directed that :

Mine medical officers should carry out a pre-employment examination, and not rely on the findings of the examination at W.N.L.A. Mining and compound officials should report to the mine medical officer any cases of chronic cough, debility or any signs of possible tuberculosis and that the mine medical officers should examine all such cases.

All Bantu with more than six years' cumulative service should be radiologically examined at least once a year. *Pro forma* record and report forms were to be supplied for use by the mine medical officers.

At the meeting in June 1927 Dr. Mavrogordato reported the result of an investigation carried out by the Chamber of Mines Tuberculosis Committee

appointed in 1925. It covered a population of 160 000 observed for nine months. The results were characterized by Mavrogordato as completely unreliable and even absurd.

An important landmark in the various attempts at dealing with the problem of tuberculosis was the expansion of the Chamber of Mines sponsored 'The Medical Committee on Tuberculosis' into 'The Tuberculosis Research Committee' in 1926. This Committee was financed jointly by the Chamber of Mines, the Government and the Deferred Pay Fund. The membership was enlarged by the addition of nominees by the Government. These were: Drs. Alexander Mitchell, J. T. Denniston, W. A. Murray and Major M. S. Cooke, Director of Native Labour.

The S.A.I.M.R. was represented by Dr. W. Watkins Pitchford, Sir Spencer Lister, Drs. G. Mavrogordato, J. H. Harvey Pirie and G. Buchanan. The Mine Medical Officers' Association was represented by Drs. A. J. Orenstein, H. T. H. Butt, A. I. Girdwood, A. Frew, A. Bloom, A. W. Pringle, and Mr. H. M. Taberer, Labour Adviser to the Chamber of Mines. Mr. B. Orpen, consulting engineer to Gold Fields, was co-opted as representing the Mine Managers' Association. Professor S. Lyle Cummins, Professor of Tuberculosis, Welsh National School of Medicine, was appointed as adviser and consultant and Dr. Peter Allan, Superintendent of Nelspoort Sanatorium, was seconded by Government as Field Research Officer. Dr. W. Watkins Pitchford was chairman. On his resignation because of ill health he was succeeded by Sir Spencer Lister.

The comprehensive report of the Committee's activities and its recommendations was published in March 1932, but was available to mine medical officers and others concerned in 1930. (Publication XXX, vol. V, S.A.I.M.R.)

This report gives a mass of valuable data concerning the clinical and pathological findings, and the incidence of tuberculosis among mine Bantu, as well as among the native population in southern Africa. It records the result of the largest number of tuberculin tests ever carried out in a similar community. All told 93 979 mine natives were thus tested; 65 per cent of these reacted positively.

In 'kraals' the positive rate for males over 20 years of age ranged from 69 to 88 per cent and among female adults from 35 to 83 per cent. This was taken as at least in some part accounting for the decrease of the acute tuberculosis cases and an increase of the type of that usually seen among Europeans. Nevertheless Dr. Allan found that about one-half of repatriated

mine Bantu tubercular cases died within two years.

Professor Lyle Cummins addressed the September 1927 meeting of the Association. After pointing out the importance of tuberculosis to the native peoples of Africa, of which he had had considerable experience in the Sudan, he referred to the manifestation of the infection among European adults and among their infants: slow progress and many recoveries in adults, and in infants rapid progress and high fatality rate. He said it was the latter form which in the past was prevalent among the Bantu, and which still occurred, but much less frequently than it had a few decades earlier. He stressed the importance of establishing the mechanism of transmission of the disease. In this he was supported by the speakers in the discussion that followed.

The help given by mine medical officers in the course of the investigations by the Committee was praised by Lyle Cummins and by other speakers, particularly by Sir Spencer Lister, who said that a heavy burden had been put upon mine medical officers in collecting statistics and that the work had been done not only well but also cheerfully.

The following are a few of the more important recommendations made by the Committee:

1. The value of BCG vaccination in the prevention of tuberculosis was not confirmed, and should be further investigated.
2. More stringent pre-employment medical examination.
3. Periodical examination of long-service mineworkers.
4. Reduction of the number of men occupying compound rooms and physical separation of sleepers where this had not yet been done.
5. Acclimatization to mine work by a graduated increase of the rate of work.

All these were introduced over the following years.

A symposium on tuberculosis was held on 15 February 1940. Three papers were presented and were followed by a discussion. Dr. F. Retief's paper was on the clinical aspect; Dr. E. Grasset of the S.A.I.M.R. spoke about treatment by an endotoxoid vaccine and Dr. A. S. Strachan of the same Institute described the pathology.

Dr. Grasset's paper is particularly noteworthy as it revived a concept which gave hope of vaccine treatment of tuberculosis.

When Koch discovered the tuberculosis bacillus he produced a vaccine. This failed, and was the source of deep disappointment and distress to Koch.

History repeated itself. In Koch's case there were initially a few successes, then failure. And the same cycle was the fate of Grasset's vaccine.

Tuberculosis continued to claim a great deal of the mine medical officer's time and attention. Mass radiography of all recruits and periodical examination plus a further examination prior to discharge, including radiography, were introduced. This was made practicable by the invention of apparatus which can produce a satisfactory lung radiograph on film as small as 35 mm. The procedure used at W.N.L.A. was described by Dr. F. Retief in a paper presented at the April 1945 meeting of the Association. He pointed out, however, that when even a small abnormality was seen on a miniature film, a radiograph on a standard-size film should be made to verify the diagnosis.

The President's report for 1942 is remarkable. It records that despite the fact that 27 of a total of 57 mine medical officers were serving in the armed forces, a number of valuable papers had been presented at eleven meetings held in the twelve months.

An extensive review of tuberculosis in South Africa was presented at a meeting of the Association on 18 November 1943 by Drs. B. A. Dormer, J. Friedlander and T. J. Wiles, of the Union Health Department. As published it is virtually a monograph of more than 40 pages, and is a valuable source of the history of the disease and of various efforts of control and treatment, made from the time of Koch's discovery of the tuberculosis bacillus up to the time of writing this paper. It is published as no. 257, vol. XXIII, of the Proceedings.

The first specific curative drug for treatment of tuberculosis was streptomycin. It is still used in conjunction with PAS and INH. The availability of those medicaments turned thoughts toward treating tuberculosis cases locally. The Association, however, considered that these patients should *not* be treated in the mine hospitals and advised accordingly.

In 1954 the Department of Public Health wrote to the Chamber of Mines suggesting that tuberculosis among the Bantu mineworkers should be dealt with as is done with other diseases.

An *ad hoc* subcommittee was appointed by the Chamber to advise on this matter.

Various consultations which were held culminated in a conference convened by the Secretary for Public Health, held from 2 to 4 May 1954, in which the Chamber of Mines was invited to participate. The Chamber's representatives were Drs. Pringle and Retief and the Chamber's legal adviser.

This was the prelude to the acceptance by the Chamber of the principle of providing treatment for mine Bantu cases, the Government agreeing to pay hospital costs as from the date of certification by the Medical Bureau.

After a six-month trial of the procedure, it was reported that it had operated satisfactorily.

In 1962 the scheme was modified by offering surface work to selected non-infective men after a period of intensive treatment for several months. These men would remain under special surveillance by mine medical officers while so employed. This scheme was suggested by Dr. A. M. Coetzee, Director of Medical Services, Rand Mines Ltd., who pointed out that repatriation after a relatively short period of treatment resulted in a breakdown of a considerable number of cases.

In recent years mine medical officers, individually and as an Association have undertaken some particularly important investigations. Thus, Dr. P. Smit, Chief Medical Officer, Gold Fields, started in August 1962, an investigation of the prophylactic value of INH, a drug of considerable value in the treatment of pulmonary tuberculosis. He used a technique similar to that of the addition of iodine to salt as a preventive measure in populations with a high incidence of goitre. INH is added to marewu, a cold acidulous drink almost universally consumed daily by Bantu. The quantity added is on the basis of 200 mg/man/day of INH calculated on observed average quantity of marewu consumed by a man.

A high rate of reduction of tuberculosis was claimed.

Dr. A. M. Coetzee, Director of Medical Service, Rand Mines, and Dr. J. Berjak, Senior M.O. Crown Mines, reported at the September 1968 meeting of the M.M.O. Association an investigation of the value of BCG inoculation covering the period from October 1964 to date of the Report.

In April 1963 Dr. L. R. B. Birt, Medical Consultant, Anglo American Corporation, wrote to the Research Adviser, Chamber of Mines, that the Corporation was prepared to undertake an investigation of tuberculosis in the mining industry. He considered that the cost of this, estimated at R15 000, should be borne by the industry as a whole. The subcommittee of Group M.O. s endorsed the proposal.

On 20 July 1963 a plan for this investigation was submitted by Dr. J. G. D. Laing of the Anglo American Corporation to the Chamber of Mines Research Adviser, and was agreed to. It was stipulated that interim reports were to be submitted from time to time.

The first such report was submitted on 1 October 1963. This report principally dealt with the efficacy of the several techniques employed. Dr. Laing said at the meeting of the Infectious Diseases Panel held on that date that he considered that there had been satisfactory progress. The Panel confirmed this.

The second interim report, dated 15 January 1964, states that tuberculin negative ratios varied according to the territorial origin of the tested. The lowest ratio—2·5 per cent—was among the Bantu from the Republic. The lowest among these was among the Transkei Bantu — 1·4 per cent. The highest ratio was among Basuto on goldmines—19·5 per cent—but for Basuto on collieries the ratio was only 7·0 per cent. Ratios of Northern Rhodesians (Zambia) was 15·4 per cent; Nyasaland (Malawi)—24·7 per cent.

The third interim report, dated 10 April 1964, is a progress report and is noted as such by the Panel. The fourth interim report is dated 14 July 1966. This report was discussed at a meeting of the Panel on 23 July 1964.

The fifth interim report is dated 10 October 1964. This again is a routine progress report. It was dealt with as such by the Panel meeting on 26 October. At this meeting Dr. Laing said that the Anglo American Corporation was not at present considering the use of prophylactics against tuberculosis, 'but was studying the matter'.

Dr. Laing's final report (of some 100 pages) was submitted to the Panel on 9 February 1966.

The Panel agreed that the report should be carefully studied, particularly as regards the validity of the conclusions therein. A subcommittee for this task was constituted with Dr. K. H. Sartorius (Chairman), Drs. L. R. B. Birt and P. Smit, and was given discretion to co-opt any person it wished.

The subcommittee's report was considered by the Research Advisory Committee on 10 August 1967. This Committee requested that Dr. P. Smit's report on INH as a prophylactic against tuberculosis should be submitted concurrently.

The Group M.M.O.'s Committee considered the comments of the subcommittee (Sartorius *et al.)* on 11 December 1967, together with Dr. Smit's report on INH.

On the subject of research, the members and the Group Medical Officers' Committee thought that they should act independently of the Research Advisory Committee, as they had done in the past when it was deemed advisable to do so. Acting through the R.A.C., it was stated, caused unad-

voidable delay. However, such investigations should be made known and reported upon to the Group M.M.O.'s Committee.

The implementation of the recommendations arising from the Laing report was discussed. It was agreed that this should be through the Gold Producers' Committee.

A memorandum, by Dr. Sartorius on behalf of his subcommittee, dated 30 January 1968, reported to the Group Committee that there were several problems arising from the Laing report which should be clarified.

On the subject of improving the medical and radiological examination of recruits, Dr. Sartorius stated that the present methods, and the standard achieved, were as good as any similar work in other large organizations. However, means of improvement should continue to be pursued.

On 29 March 1967, Dr. Sartorius advised the Group M.M.O.'s subcommittee that a trial of INH on lines similar to that of Dr. P. Smit was to be carried out on three mines in the Evander area. The difference from the Smit method was to be that the additive on one mine would be INH and on the two others a placebo. No one on the mines except Dr. Sartorius and the supplier of the substances used was to know which of the additives was used on which mine. The investigation was to continue for 18 to 24 months. The X-ray films would be read by three doctors, and would be submitted to the Mine Medical Bureau for verification in every case diagnosed as tuberculosis by the mine doctors.

The final report of the Sartorius subcommittee is dated 10 April 1968. It is in the form of a memorandum.

The main points are: The subcommittee accepts the validity of Laing's investigation and recommends the acceptance of the recommendations therein designed to improve the standards of diagnostics. To this end the report recommends additional training of M.M.O. in the techniques of diagnosis, including the interpretation of X-ray films.

The subcommittee suggests that each group might modify any of the recommendations to fit best its own organization and methods. It was suggested that the physical standard for acceptance of recruits required further study and this should be given high priority in the deliberations of the Medical Panel; and there should be an investigation on the risk of employing on surface work Bantu rejected unfit for underground work.

The subcommittee considered the report on INH prophylaxis by Dr. Smit and noted the BCG investigation by the Rand Mines and Anglo American

groups. Finally the subcommittee stated that at that stage it could not express a firm opinion or advise with confidence on the value of these procedures as prophylactics of tuberculosis.

SILICOSIS

The first International Conference on Silicosis to be convened by the International Labour Office—and the only one convened by the I.L.O. in South Africa—was held in Johannesburg from 13 to 27 August 1930.

Dr. Louis G. Irvine, who was elected President of the Conference, with Dr. A. Mavrogordato, of the Institute for Medical Research, and Hans Pirow, the Government Mining Engineer, presented a joint paper, 'A Review of the History of Silicosis on the Witwatersrand Gold Fields'. They divided the history into four periods.

First period : 1886 to 1889. Complete ignorance of the danger, or even existence of silicosis.

Second period: 1901 to 1910. Realization of the menace and introduction of tentative preventive measures. It was during this period that Drs. Donald Macaulay, Andrew Watt and Louis Irvine, pioneered the inquiries.

Third period: 1911 to 1916. Systematic preventive measures were initiated and compensation introduced.

Fourth period: 1916 to 1930. Expansion of preventive and compensation procedures.

In the last three periods, and up to the present, silicosis prevention and compensation were the subjects of many commissions and legislation. The first of these, an important one, dates back to 1902: 'Miners' Phthisis Commission' appointed by Lord Milner. This Commission examined 1201 miners (white). Many refused to be examined, probably for fear of being thrown out of employment. Some 15 per cent were found to have 'miners' phthisis', and another 7·3 per cent were considered suspect. Most of these were men with a history of previous employment in mining, mostly in Cornwall. As there were no radiographic facilities, the incidence of the 'phthisis' was probably higher. In 1911 a 'Medical Commission' was appointed to inquire into the prevalence of miners' phthisis and tuberculosis, and to advise on compensation 'from the medical point of view'. This Commission examined 3 163 miners, 326 radiologically by Dr. A. H. Watt.

This was, so far as is known, the first time radiography was used on such a relatively large scale for the diagnosis of silicosis. Definite disease was found in 26 per cent and doubtful in an additional 5·5 per cent. The average total duration of most to dust exposure was 8·2 years. For those who worked with rock drills it was only 6·1 years.

This Commission's report formed the basis of the 1912 Miners' Phthisis Act. Two stages of the disease were defined. The maximum total compensation was limited, and the miners had to contribute 2½ per cent of their wages to the compensation fund.

A series of commissions, and Acts, followed, as did also many regulations under these Acts. Much improvement in the avoidance of dust production and control was achieved.

From the point of view of mine medical officers, whose concern is almost exclusively the Bantu mineworker, the establishment in 1916 of the Miners' Phthisis Bureau is of major importance.

Until 1916 the certification of Bantu mineworkers was by the Medical Inspector of Mines. Mine medical officers notified the Inspector when they had cases considered by them as probably silicosis or/and tuberculosis. The Inspector then visited the mine and examined the patients submitted. His decision was final. There were of course then no radiographic facilities. This procedure was completely changed after 1916.

Under the law now in force the mine medical officers are 'Examiners' with prescribed duties. These include the surveillance of the Bantu mineworkers to prevent the employment of any suffering from tuberculosis or silicosis.

All new arrivals, the recruits, are examined clinically and radiographically at a reception depot—Wenela. Those recruited direct by a mine are examined by the mine medical officers.

Mine medical officers examine the radiographs taken at the six-monthly periods of work and on discharge from employment, as prescribed by law. They keep a watchful eye on patients in hospital who show any signs of lung trouble that arouse suspicion of silicosis, very often associated in the Bantu with tuberculosis.

Surveillance is also maintained at the monthly weighing routine. Men who show a loss of weight are subjected to clinical and, if it is deemed necessary, radiographic examination.

These prescribed procedures occupy a considerable portion of the time of the medical officers, as related for example by Dr. McDavid in his contribution (page 91).

The colliery medical officers encounter a modified form of silicosis, anthraco-silicosis or anthraco-pneumoconiosis (now shortened to 'anthracosis').

Dr. F. T. Allen, for many years medical officer at collieries in the Witbank district, related his experience in a paper submitted at the September 1951 meeting of the Association. The total number of cases he reviewed was only 77. There were no cases of anthracosis in men with less than ten years' exposure to colliery dust. Fourteen of the 77 had been exposed also to goldmine dust. By itself this paper is of no particular significance, as the number observed was too small, but it is an example of the interest taken in this subject.

Another example of the interest of mine medical officers in pneumoconiosis was the invitation of Prof. E. H. Kettle, an eminent visiting pathologist, to address the Association. This took place at the August 1928 meeting. It was in this lecture that Kettle, basing his view on experimental evidence, propounded the theory that the fibrosis of silicosis was due to the chemical action of silica going slowly into solution in the tissues. Further, he advanced the theory that the presence of the silica in the lung favoured the development of pulmonary tuberculosis which, at that time, was the cause of the high death-rate of the victims of silicosis, and was probably the reason for the term 'miners phthisis' in common use. Both the theory of solubility of silica in the lung tissues and that the presence of silica favours the development of tuberculosis gained wide acceptance. However, only the latter had been confirmed.

Several other theories of the causation of silicosis have been suggested from time to time, though up to date none has been found to be convincing. In all these discussions the Mine Medical Officers' Association and many individual members showed much interest.

The Association also sponsored a symposium on silicosis which took place on 23 October 1930. The proceedings were published as a special supplement to vol. X, no. 18, March 1931.

This publication is a valuable contribution to the literature of the subject. The participants were all acknowledged authorities in their specialities. Drs. E. M. Simpson and A. Sutherland Strachan were pathologists on the staff of the South African Institute for Medical Research, Dr. L. G. Irvine was Chairman of the Miners' Phthisis Medical Bureau, now renamed the Miners Medical Bureau.

Most of the material presented holds true to this day, and indeed is the

foundation on which, through improved techniques, accumulated data and acquired information, the present corpus of knowledge is being built up.

There was another occasion in which the Association participated: a joint meeting arranged by the S.A. Chemical, Mining and Metallurgical Society (now the South African Institute of Mining and Metallurgy) and the South African Geological Society. The meetings took place on 18 and 29 September 1933. The report of these meetings is published as a special supplement to the Proceedings of the Association, vol. XIII, no. 146, September 1933, and covers more than 50 pages. The main theme of the meetings was a paper by Dr. Wm. R. Jones, of the Imperial College of Science, London, a geologist. The interest in his theory was attested by the presence at the meetings of the then Minister of Mines, Mr. Patrick Duncan (later Sir Patrick Duncan, Governor-General of the Union of South Africa).

In brief, Dr. Jones presented certain petrological and other observations which led him to the belief that the true cause of pneumoconiosis was not silica but the associated presence of a substance named sericite—a hydrous silicate of aluminium and potassium. From this followed his suggestion that, as the use of water for suppressing dust did not affect the serecite content, protection should take the form of conducting fresh, dust-free air to the individual miner by connecting a clean air supply to a light cover worn over the mouth and nose—'not a mask'.

In the discussion that followed Prof. R. B. Young, geologist, stated that sericite was present in every specimen of banket that could be taken from any mine on the Rand.

In the event this theory, too, was found to be erroneous.

Of particular value to mine medical officers was a paper, with demonstrations of typical radiographs, presented on 21 September 1950 by Dr. A. S. W. Verster, the chairman of the Silicosis Medical Bureau, as it was then designated. The criteria adopted by the Bureau were then, as they are now, of immediate practical importance to mine medical officers, as it is by these that they have to abide in their almost daily work as 'Examiners under the Act', which they are by virtue of their appointment as mine medical officers.

At the meeting of the Association on 19 October 1950 Dr. A. J. Orenstein reported on the proceedings at the conference on pneumoconiosis convened in Sydney, Australia, by the International Labour Organization, which he had attended on the invitation of the I.L.O. The others invited were: Dr. W. George of Australia, Prof. C. Gernex-Rieux of France and Drs. E.

Middleton of the U.K. and A. Vorwald of the U.S.A.

The Conference was attended by a number of delegates appointed by their respective governments, a total of about seventy-five participants. The agenda included discussion of recent advances in knowledge of the pneumoconioses; diagnosis; functional and laboratory tests relevant to assessment of disability as well as in diagnosis; the clinical manifestations of pneumoconiosis; investigation procedures; and preventive measures.

The Conference was in session from 28 February to 11 March 1950. Several resolutions were adopted, some of which had considerable influence on the orientation of future research. Of immediate practical importance was the recommendation that radiographic images be classified and coded. The coded classification would identify the radiographic features in communications between workers in this field, without having to describe the details seen. It was clearly pointed out, however, that the diagnosis must not rest solely on the radiograph.

The diagnosis of tuberculosis and pneumoconiosis puts much responsibility on the mine medical officer, inasmuch as in this matter not only is he acting as an agent of the Government and as a guardian of the health of the people in his care by eliminating possible sources of infection, but also because in the case of the non-white mineworker, unlike the case of the white worker, even the earliest detectable sign of silicosis—as well as of tuberculosis—excludes the worker from employment underground.

In the past decade much work was done in attempts to establish correlation between the various degrees of exposure to dust in the goldmines and the incidence of pneumoconiosis. This work has of necessity been confined to investigations on white mineworkers; because, as D. G. Beadle, who was* principally engaged in this investigation, pointed out at the meeting of the Association on 15 July 1965, the required essential data are not obtainable in the case of the migratory Bantu workers.

International conferences on pneumoconiosis were held in Johannesburg in 1959 and again in 1969, both sponsored by governmental agencies and the mining industry. In both of these conferences mine medical officers participated.

The Proceedings of both these conferences are published.

* D. G. Beadle died in June 1970.