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The Career of A. J. Orenstein: 1914–1960

South Africa was the first state to compensate silicosis or miners' phthisis (1911) and pulmonary tuberculosis (1916) as occupational diseases. It was the first to establish a government body of medical specialists, the Miners' Phthisis Medical Bureau (1916), to adjudicate compensation claims. Despite their apparent objectivity, both the science and the legislative control of the mines were the outcome of an intensely political process. The complexities and controversial aspects of this process can be seen vividly in the career of Alexander J. Orenstein, who is widely regarded as the founder of South Africa's occupational medicine. His career was certainly unique in terms of its longevity and in the degree of his influence over mine medicine. As Superintendent of Sanitation for Rand Mines Ltd, Orenstein dominated mine medicine in the period from 1914 until the mid-1960s. According to conventional wisdom, he saved the lives of many thousands of black migrant workers by improving hygiene, nutrition, accommodation, medical care and access to

compensation.¹ Dr E.H. Cluver, himself a major figure in public health, viewed Orenstein's influence as profound.²

The ban on Tropical labour, imposed in 1913, was a blow to an industry which had come to depend upon a constant flow of migrant workers. To have it lifted, in 1913 the Chamber invited Major William Gorgas, famous for his work on the Panama Canal, to find a remedy. In his report, Gorgas made a number of recommendations to improve medical care, hygiene, rations and living conditions. While the other mining houses ignored the Gorgas Report, the Chair of Rand Mines Ltd, Evelyn Wallers, was determined to reduce the death rates. On Gorgas' recommendation, he appointed A.J. Orenstein to oversee sanitation. Orenstein reported directly to Wallers, who encouraged him to reorganise the company's health services.³

Alexander J. Orenstein (1879–1972) was born in Odessa, in Russia. Soon after, his parents emigrated to the USA. In 1905 Orenstein graduated in medicine from Jefferson College in Philadelphia and became a naturalised US citizen. After a brief period with the American Armed Forces, he was posted to the Panama Canal. For seven years, he assisted William Gorgas in reducing the dreadful mortality rates from pneumonia, yellow fever and malaria. In 1914, he joined the Rand Mines Ltd. Little is known about Orenstein as neither his personal papers nor what would have been his voluminous professional correspondence have survived. What has survived is a glowing reputation. Following his death in July 1972 at the age of 92, the Chamber of Mines initiated the A.J. Orenstein Memorial Lecture at the University of the Witwatersrand in recognition of his achievements.

¹ See 'Obituary A.J. Orenstein'. *British Medical Journal*, 19th August 1972, p. 478 and 'Obituary A.J. Orenstein'. *Proceedings of the Mine Medical Officers' Association of South Africa*, Vol. LII, No. 413, May–August 1972, pp. 1–2. See also Phillip Tobias. 'Darwin, "Descent" and Disease'. *Transactions of the Royal Society of South Africa*, Vol. 40, Part 4, December 1972, p. 239.

² Dr E.H. Cluver. 'Development of Health Services on the Gold Mines'. First A.J. Orenstein Memorial Lecture, 18th September 1974, p. 6. Adler Medical Museum, University of the Witwatersrand. See also Bruce Fetter. 'Changing Determinants of African Mineworker Mortality: Witwatersrand and the Copperbelt, 1911–1940'. *Civilisations*, Vol. 41, No. 1/2, 1993, pp. 347–359.

³ A.P. Cartwright, *Doctors of the Mines: A History of the Work of Mine Medical Officers*. Cape Town: Purnell and Sons, 1971, pp. 38–39.

Orenstein's obituary in *The South African Medical Journal* is full of praise for a man: '[w]ho was to a great extent responsible for bringing order in the routine examination of miners and for their proper compensation if they contracted silicosis'.⁴ Through the role he played at national and international forums, Orenstein also exerted a major influence on research. The transcripts of the numerous commissions of enquiry on which he served, or before which he appeared as an expert witness, show that through the force of his personality Orenstein's views often prevailed. From 1917, he served on the Miners' Phthisis Prevention Committee, which produced important reports in 1919 and 1937. Orenstein was the first vice-president of the Mine Medical Officers Association, which he co-founded in 1921 and of which he remained an active member for fifty years. Between 1928 and 1932, Orenstein served on the Tuberculosis Research Committee and wrote substantial parts of its influential reports. In 1925 and again in 1938, he was a delegate to the ILO conferences in Geneva. In 1930, he was Conference secretary and edited the proceedings of the ILO's Silicosis Conference held in Johannesburg. In 1956, at the age of 77, Orenstein became the foundation Director of the Pneumoconiosis Research Unit within the Department of Mines, a position he held for three years. He continued to work as a consultant with Rand Mines Ltd until his death in 1972.

Orenstein enjoyed a number of significant advantages over contemporaries such as Anthony Lanza (USA), J.S. Haldane (UK) and Dr J.H.L. Cumpston (Australia), who worked on pneumoconiosis. The Johannesburg research community was arguably the best in the world, and prior to Orenstein's arrival in 1914 a series of commissions into miners' phthisis had confirmed once again the risks of silica exposure and the synergy between silica dust and tuberculosis.⁵ In addition to having access to a world-class research community, Orenstein had the opportunity to conduct his own research. His employer, Rand Mines Ltd, was one of South Africa's most profitable mining companies. If Orenstein had deemed it necessary, it could well have afforded to fund research. Finally,

⁴'Obituary A.J. Orenstein'. *The South African Medical Journal*, 19th August 1972, p. 1188.

⁵Jock McCulloch. *South Africa's Gold Mines and the Politics of Silicosis*. Oxford: James Currey, 2012, pp. 1–13.

South Africa's gold mines were the first to be subject to a comprehensive system of state regulation, which resulted in the collection of massive volumes of data on dust levels and disease rates. The system, which began with the Miners' Phthisis Act of 1911 and was extended by the subsequent Acts of 1912, 1916, 1919 and 1925, had no parallel anywhere in the world.

Despite the quality of the Johannesburg research community and the state regulation of the mines, there were a number of factors which worked against mine safety. The gold mines were South Africa's most important industry and dominated employment, foreign exchange and state revenue. The relatively stable price of gold meant that individual mining houses did not face one of the fundamental pressures of a competitive commodity market. Rather, through the Chamber of Mines, they were able to pursue an agreed set of policies regarding recruitment, risk, occupational disease and workers' compensation. While that gave the mining houses an unusual degree of political power, the industry was fragile. The pricing of gold made production costs even more important than in other industries, since increases in working costs could not be passed on to consumers. Apart from wages and expenditure on the compounds housing migrant workers, occupational health and compensation were areas where costs could be contained.

When Orenstein arrived in Johannesburg, the mine hospitals were overcrowded and lacked equipment and trained staff. Some mines did not even provide casualty rooms for men injured underground.⁶ Mine doctors were part-time employees, and they were regarded by managers as members of their administrative staff and therefore subject to their authority. The mine hospitals were no better than barracks, and nursing was carried out by poorly trained male orderlies. The operating theatres were poorly lit and had neither steam sterilisers nor X-ray equipment. There were few surgical instruments to care for a workforce among whom traumatic injuries were common.⁷ In addition to silicosis, tuberculosis and bacterial pneumonia, meningitis was a major cause of death. Within

⁶ See Julie J. Baker. 'The Silent Crisis': Black Labour, Disease, and the Economics and Politics of Health on the South African Gold Mines, 1902–1930. PhD, Queen's University, Ontario 1989, pp. 76–138.

⁷ Cartwright, *Doctors of the Mines*, p. 39.

a year, Orenstein had reduced overcrowding in Rand Mines' compounds, established a central sanitation and safety committee and installed X-ray equipment at the Crown Mines Hospital. He introduced first-aid courses and, in the face of strong opposition from mine managers, appointed black nurses to replace inefficient male orderlies. He also improved miners' rations and persuaded the Rand Mines board to install water-borne sewage. In line with Gorgas' recommendations, between 1917 and 1919 Orenstein re-organised four central hospitals from the existing services within the Rand Mines Ltd group. He also obtained funding for additional 96 beds at the City Deep hospital.⁸ The improvements dramatically reduced the official mortality rates from pneumonia. Despite the clear benefits of these measures, the other mining houses for a long time chose not to follow Orenstein's initiatives. The issue of providing separate bunks in compounds to reduce the risk of infection, for example, continued to be fought out in committees well into the 1930s.⁹ As always, the sticking point was cost.

In addition to his clinical work, Orenstein quickly developed a second set of responsibilities, which took up more and more of his time. The medical system was riven with tensions and between 1910 and 1954 there were more than fifteen commissions and committees of enquiry into occupational disease. Those commissions were driven by the white MWU and its two main concerns. The first was the struggle faced by its members in gaining compensation for silicosis. The second was the high tuberculosis rate among black miners, which the MWU believed put white miners and their families at risk. As forums where the issue of risk was open to public scrutiny, the Commissions were a point of vulnerability for the industry. The Chamber always made elaborate submissions backed up by expert testimony. Its favoured witness, A.J. Orenstein, believed he was far more knowledgeable about black miners than were the Bureau physicians who dealt principally with whites.¹⁰

⁸ Baker, 'The Silent Crisis', pp. 108–111.

⁹ Cartwright. *Doctors of the Mines*, p. 44. See also 'Sanitary Conditions on the Gold Mines. GES 934 708 Correspondence Gold Producers Committee'. SANA.

¹⁰ See Letter from A.J. Orenstein, Rand Mines to A.B. Du Toit, Chairman of the Miners' Phthisis Medical Board 21st December 1925. SANA NTS 6720 33/315 Vol. 1 Miners Phthisis.

Limits to Improving Public Health Practices

At the end of the nineteenth century, the work of Thomas Legge, John S. Haldane and Thomas Oliver established the synergy between silica dust exposure and tuberculosis, a finding accepted by the 1907 Industrial Diseases Committee in Britain.¹¹ In South Africa, that body of knowledge was further endorsed by the Miners' Phthisis Commissions of 1902 and 1912, as well as the Tuberculosis Commission of 1914. Within four years of arriving in Johannesburg, Orenstein began attacking this orthodoxy. He denied the relationship between silica exposure and tuberculosis and refuted claims that the mines were spreading tuberculosis to labour-sending communities. His assaults on established medical knowledge continued after the Second World War, whenever the issues of tuberculosis or silicosis were raised. It is ironic that while Orenstein's early professional success was built on his relationship with William Gorgas, his South African career was dedicated to dismantling some of the key foundations of the report Gorgas prepared for the Chamber in 1914.

In July 1919, the Low-Grade Mines Commission was established as a result of lobbying by Evelyn Wallers, who at the time was President of the Chamber of Mines, and William Gemmill, the Chamber's Secretary. Many mines were struggling to make a profit and Wallers wanted the government to lift the ban on Tropicals.¹² The Commission was chaired by the Government Mining Engineer, Sir Robert Kotze, and its eight members included Wallers and Gemmill. While its final report was sympathetic to the Chamber, the Commission stopped short of recommending the reintroduction of Tropical labour.¹³ A.J. Orenstein appeared as an expert witness.

To justify the return of Tropicals, Orenstein had to convince the Commission that the mines were safe. He acknowledged that acquired

¹¹ See Arthur McIvor. 'Germs at Work: Establishing Tuberculosis as an Occupational Disease in Britain, C.1900–1951'. *Social History of Medicine*, Vol. 24, No. 4, 2012, pp. 812–829.

¹² David Yudelman. *The Emergence of Modern South Africa: State, Capital, and the Incorporation of Organised Labor on the South African Gold Fields, 1902–1939*. Cape Town: David Philip, 1984, p. 138.

¹³ See *Report of the Low-Grade Mines Commission*. Cape Town: Government Printer, 1919, pp. 25–37.

immunity to infection was a vital element in the disease rates for both tuberculosis and pneumonia.¹⁴ The other factor was the physical condition of labour. Mining requires a high level of fitness and if a man was run down infection was more likely.¹⁵ Orenstein was confident that fatalities could be prevented by improved hygiene and nutrition. He proposed that Tropicals be housed in cubicles within compounds (as had been done at the Rand Mines Ltd), be provided with blankets and be given government approved rations.¹⁶ Orenstein was asked what he considered a reasonable mortality rate if the ban was lifted. He replied that the answer depended upon the death rate in the areas from which labour was recruited. Although he had no data, Orenstein suggested the natural annual death rate in Central Africa would be around 30 per 1000 per annum, excluding children. If that was so, then bringing men to the mines would save lives.¹⁷ This was a spurious argument given that miners were a physical elite who were the least likely members of their home communities to die prematurely. Orenstein ended his evidence with an appeal to the Commission: ‘You cannot undertake any large enterprise without certain deaths and the sum total of the deaths, even if it does exceed the death rate among these people, will not be sufficiently great to make it prohibitive, it is important to the [gold] industry to have the natives from the tropics’.¹⁸ Since Tropicals would die if they stayed at home, they may as well die on the mines.

Much of Orenstein’s testimony, including the data he cited on pneumonia deaths prior to the ban, was fraudulent. During the first months of 1913, the official returns put the annual mortality rate at well over 100 per 1000 per annum; Orenstein told the Commission the rate was 13.¹⁹

¹⁴Dr Orenstein, evidence before the Low-Grade Mines Commission, Minutes of Evidence 18th July 1919. SANA K160 Low Grade Mines Commission, Vol. 1, pp. 416–418.

¹⁵Orenstein, evidence, 1919, p. 392.

¹⁶Orenstein, evidence, 1919, p. 388.

¹⁷Orenstein, evidence, 1919, pp. 399–400.

¹⁸Orenstein, evidence, 1919, pp. 422; 437.

¹⁹See Memo from Prime Minister Botha, Cape Town, to the Governor General 12th May 1913. Draw Attention to the Misleading Nature of Statistics. SANA GG 1541 50/301 Mortality Among Tropical Natives.

Pneumonia was still a major problem in 1919; Orenstein's own data on tuberculosis at City Deep mine (discussed below) was compelling evidence that the ban should remain.

Deaths Underground

Beginning in 1911, Miners' Phthisis Acts made it illegal to employ a man with tuberculosis, and the system of medical surveillance was largely designed to exclude infected men from the mines. In theory, the system was so rigorous it was unthinkable that a seriously ill man could continue to work underground. For that reason, the sudden deaths of three black miners at Rand Mines in less than twelve months led to an enquiry.

On 27 May 1925, a miner named Fish became seriously ill while working underground at the Crown Mine. On that day Fish coughed up blood and died in a skip before he could be brought to the surface. A post-mortem established tuberculo-silicosis as the cause of death. Between February and May Fish had lost 7 lbs in weight but he had not been referred for further examination as required under the legislation. His workmates said Fish had been unwell for some time and that he coughed constantly.²⁰ The second death was that of John who had worked at Crown Mines for just over five years. A post-mortem revealed a major cavity in his right lung as the cause of death.²¹ The final death was that of Tom who died suddenly at City Deep on 9 January 1926. Over the previous two years he had been admitted to hospital on four occasions following accidents. Tom died in a skip while being hauled to the surface. The attending medical officer, Dr Dodds, suggested that Tom may have suffocated as the men were packed into the skips 'like sardines'.²² A post-mortem showed a 'marked degree of tuberculosis'. At the City Deep

²⁰ Minutes of Evidence and Proceedings Committee of Enquiry into the Circumstances Surrounding the Deaths of the Native Labourers Fish, Tom and John, 23rd February 1926, Appendix L, p. 4. SANA. GES 1005 9 17 A TB in Mines Natives.

²¹ Report of the Medical Committee appointed to Enquire into the Deaths of Certain Mine Natives 8th February 1926 to 26th May 1926, pp. 1–2. SANA. GES 1005 9 17 A TB in Mines Natives.

²² Report Dr G.M. Kapp, MPMB Native Tom, 21st January 1926. SANA. GES 1005 9 17 A TB in Mines Natives.

hospital tuberculosis cases were kept in general wards, and it seems likely that is where Tom became infected. The deaths of Fish, Tom and John suggested a serious breach of mine regulations, and the Department of Public Health established a Committee of Enquiry into the fatalities. Dr Watkins-Pitchford, head of the Bureau and the most distinguished pulmonary specialist in South Africa, was appointed chair.

The Committee soon identified a further six cases between January 1925 and February 1926. Most of the dead came from two mines, Crown and City Deep, and in one instance the deceased had been employed for just five weeks. No similar death had occurred in a white miner since the Bureau was established in 1916, an outcome Watkins-Pitchford attributed to the routine use of X-rays. Watkins-Pitchford also had no doubt about the importance of the cases. ‘The Government very rightly think that if the fact of these deaths in such circumstances were made public, it might cause a serious scandal—that the boy should have had this disease and yet have continued to work until he died of it; that is the way the public press would put it.’²³

After two months of deliberations, the Committee found that Rand Mines Ltd. accounted for most of the ‘overlooked’ tuberculosis cases.²⁴ It also found the company’s claim that the presence of terminally ill men posed no threat to other miners as both ‘dangerous and disingenuous’. The Committee concluded: ‘Even a few tuberculosics on the mines constitutes a dangerous focus of infection and their presence involves a potential loss of life and money the magnitude of which one can scarcely overestimate’.²⁵ Watkins-Pitchford made a number of recommendations for the improvement of entry, periodic and exit medicals. In particular, he wanted X-rays to be used routinely with black miners.

²³ Minutes of Evidence and Proceedings Committee of Enquiry into the Circumstances Surrounding the Deaths of the Native Labourers Fish, Tom and John. 10th March 1926, p. 21. SANA. GES 1005 9 17 A TB in Mines Natives.

²⁴ Report of the Medical Committee appointed to Enquire into the Deaths of Certain Mine Natives, 8th February 1926 to 26th May 1926, p. 20. SANA. GES 1005 9 17 A TB in Mines Natives.

²⁵ Comments by the Committee on Dr Orenstein’s Memorandum undated, April 1926? p. 8. SANA. GES 1005 9 17 Mines Natives.

As the senior medical officer at Rand Mines Ltd., Orenstein was outraged by Watkins-Pitchford's report, and he challenged every one of the Committee's findings. Orenstein did not agree that the nine deaths reflected badly on the medical system or on the officers involved. Neither did the presence of a few open cases in a compound justify a large expenditure of money. In particular, Orenstein objected to the suggestion that Tom may have contracted tuberculosis while being treated in hospital for an injury. Tuberculosis was not, according to Orenstein, a dangerous communicable disease. 'We cannot accept that tuberculosis, even among natives, is so highly infectious that a few weeks' residence in hospital might be the source of infections.'²⁶ Radiography was expensive and time consuming and Orenstein was sure that if X-rays were introduced for black miners, other methods of detection would be neglected, thereby leading to more early cases being overlooked. To X-ray every black miner at regular intervals would in itself be expensive. It would also require increasing the complement of medical officers four or five-fold.²⁷

The Watkins-Pitchford report brought no change to mine medicals; black miners continued to die underground from tuberculosis. The enquiry did, however, have one major casualty and that was Dr Wilfred Watkins-Pitchford. On 17 May 1926, he resigned as Chair of the Bureau and as Director of the SAIMR.²⁸ The official reason for his resignation was ill health. Watkins-Pitchford returned to England, which he had left twenty-five years previously. That decision is puzzling: it is hard to imagine that England offered a better climate or diet for a sick man than did South Africa. Watkins-Pitchford lived on in apparent good health until his death in 1952.²⁹ During that period he was an active member of the British Medical Association but with one exception he made no further

²⁶ Letter from Dr Orenstein, Rand Mines Ltd to the Secretary, Committee of Enquiry, Miners' Phthisis Medical Bureau, 19th April 1926, pp. 3–4, 6. SANA. GES 1005 9 17 Mines Natives.

²⁷ Report of the Medical Committee appointed to Enquire into the Deaths of Certain Mine Natives, 8th February 1926 to 26th May 1926, pp. 5–6, 13. SANA GES 1005 9 17 A TB in Mines Natives.

²⁸ Marais Malan. *In Quest of Health: The South African Institute of Medical Research, 1912–1973*. Johannesburg: Lowry Publishers, 1988, p. 37.

²⁹ See 'Obituary Wilfred Watkins-Pitchford'. *British Medical Journal*, 11th October 1952, pp. 834–835.

contribution to the literature on silicosis or miners' phthisis on which he was a world authority. The enquiry into Rand Mines had effectively ended his career.³⁰

As Infectious as Toothache

In May 1930 Orenstein appeared as a witness before the Commission into Miners' Phthisis. He had been with Rand Mines for almost fourteen years and with the resignation of Dr Watkins-Pitchford had become the Johannesburg expert on occupational disease. Like so many others, the Commission, chaired by Mr James Young, was the result of agitation by the white MWU, which claimed that the high tuberculosis rate among black miners put its members at risk.³¹ During his testimony, Orenstein made numerous references to research that he and his colleagues at Rand Mines Ltd had completed on tuberculosis, but no data from those studies was tendered in evidence.³² That research was not cited in SAIMR's 1932 Tuberculosis Report which Orenstein co-authored, nor was it presented at any of the monthly meetings of the MMOA Orenstein habitually attended.³³ It seems likely that it never existed.

Most of Orenstein's evidence was in defence of the medical examinations of black miners. Orenstein opposed the use of X-rays on the grounds that mine medical officers were expert in identifying early-stage disease. Three studies conducted by Rand Mines Ltd. had shown that: 'Any attempt to make the examination of blacks standardised on a basis of white experience would be a horrible mistake'.³⁴ Besides, even if cases

³⁰ Jock McCulloch. 'Medicine, Politics and Disease on South Africa's Gold Mines'. *The Journal of Southern African Studies*, Vol. 39, No. 3, 2013, pp. 543–556.

³¹ *Report of the Miners' Phthisis Commission of Enquiry 1929–30*. Union of South Africa. Pretoria: The Government Printer, 1930. U.G. Number 38, 1930.

³² See, for example, Dr Alexander Orenstein, evidence before the Miners' Phthisis Commission, Minutes of Proceedings 27th May 1930, SANA K105 Miners Phthisis Commission Correspondence Vol. 3, pp. 562; 572.

³³ See *Tuberculosis in South African Natives*. The South African Institute for Medical Research, Johannesburg, 1932.

³⁴ Dr Alexander Orenstein, evidence before the Miners' Phthisis Commission, Minutes of Proceedings, 27th May 1930, SANA K105 Miners Phthisis Commission Correspondence Vol. 3. 1930, pp. 563–565; 572.

were missed, there was little risk to white miners. 'Tuberculosis to the European is not an infectious disease in adult life in any sense of the word any more than toothache ... but it is an infectious disease to such natives as have not been tubercularised.'³⁵ Orenstein made no mention of exposure to silica dust which, according to contemporary science, put all hard rock miners at a greatly enhanced risk of disease.

One commissioner suggested that the WNLA doctors were over-worked, and he asked whether the examinations of black miners should be handed over to the Bureau. Orenstein strongly opposed putting the medicals of blacks on the same footing as for whites. The existing medicals were far superior to anything that could be achieved by a centralised organisation.³⁶ When asked about the number of tuberculosis cases amongst serving miners, Orenstein replied: 'I should say nil in the course of a year', meaning that all cases were quickly identified, segregated and returned to rural areas.³⁷ Orenstein also rejected the suggestion that black miners be examined every six months, as were whites.

There was, according to Orenstein, no evidence that tuberculosis was being spread by infected men in the compounds. Given that infected black miners were repatriated, Orenstein was asked if those men were likely to spread disease to their home communities. 'There is very little risk', he replied, 'as such men soon died'. When asked if repatriated miners should be educated about the risk of infecting their families Orenstein again replied no. It was 'extraordinarily difficult to teach the native anything by word of mouth', and 'giving the native a piece of paper, as you would a European, is absolutely hopeless'. Orenstein also rejected the idea of providing treatment in rural areas as it would be 'perfectly hopeless' to establish sanatoria for blacks. Paradoxically, he favoured information programmes to educate the white public about the risks of infection.³⁸

The most telling aspect of Orenstein's evidence was his dismissal of the connection between silica dust and tuberculosis. Orenstein

³⁵ Orenstein, evidence 1930, p. 569.

³⁶ Orenstein, evidence 1930, pp. 571–573; 577.

³⁷ Orenstein, evidence 1930, pp. 593–594.

³⁸ Orenstein, evidence 1930, pp. 581–585.

acknowledged the medical orthodoxy that hard rock miners have a lower resistance to tuberculosis than do other workers, an orthodoxy which was well established by the late nineteenth century. He told the Commission that it did not apply in South Africa, where complex statistical analysis, too difficult for lay people to understand, showed that the conditions underground were no more conducive to tuberculosis than were those on the surface. Consequently, the infection rate among white miners was no higher than for the general population. There were, he admitted, certain other occupations in which tuberculosis was common, such as home tailoring or sweat shops. Those employed to put the tops on tam-o-shantas [a type of a hat] were at particular risk, as were type-setters working in the dark.³⁹ Orenstein made no mention of silica dust.

Orenstein's evidence was in sharp contrast to that of his colleague, Dr L.G. Irvine, who had replaced Watkins-Pitchford as Bureau Chair. According to Irvine, the data showed that of those white miners who received awards from the Bureau for simple tuberculosis, 25 per cent were subsequently diagnosed with silicosis and therefore re-classified for the purposes of compensation. Of those white miners who were compensated for tuberculosis and at death were given a post-mortem, around half were found to also have silicosis.⁴⁰ In South Africa as in the hard rock mines of the USA, Western Europe and Australia, tuberculosis and silicosis were inseparable.

Post-mortems

Four months before Orenstein appeared before the Young Commission, Dr W.O. Fischer, a medical officer with the Rand Mines, published an important study which puts Orenstein's evidence into context. The article was based on 1402 post-mortems conducted at the City Deep Native Hospital, one of the Rand Mines' institutions which Orenstein helped upgrade, in the period from 1922 to 1928. The majority of cases were

³⁹Orenstein, evidence 1930, pp. 586; 590.

⁴⁰Confidential Memo from Dr L.G. Irvine, Chair of the Miners' Phthisis Bureau, to the Miners' Phthisis Commission, 7th May 1930. SANA K162 Miners' Phthisis Commission 1929.

admitted to hospital as the result of accidents. The seriously injured were a random group, although one would expect accidents to be more common among novice miners, who may be over-represented in Fischer's cohort. The subjects were aged between twenty and forty years. In terms of geographical origins, they were divided equally between South Africans and East Coasters (Mozambicans). In addition to the autopsies performed by Fischer, 73 of the examinations were conducted by Dr Orenstein, Fischer's immediate superior.

Fischer's results were startling. Of all deaths on the mine during that period 302, or 21.5 per cent, were due to tuberculosis, and many of those men had died while working underground. Of that group as a whole, 42 had what he called 'general tuberculosis', 48 pulmonary and 136 acute miliary, with the remainder occurring in other organs. There were also 30 cases (or just over 2 per cent) of tuberculosis with silicosis. Presumably, in addition to those who died at work, there would have been many more who succumbed to tuberculosis on the way home and after being repatriated. Fischer also notes that a total of 468 (or 33 per cent) of deaths were due to lobar pneumonia and another 125 (or 9 per cent) to bronchial pneumonia, suggesting that the ban on Tropicals which was in place at the time was saving lives.⁴¹

Fischer's data was a fragment of a broader set of post-mortems, all of which produced similar results.⁴² Under the Miners' Phthisis Acts Consolidation Act of 1925, any miner who died suddenly was subject to a post-mortem and the results were published in the Bureau's annual report. Each year over 500 miners perished on the mines and most of the autopsies were performed on that group. The Bureau's data shows far higher rates of silicosis and tuberculosis than were identified in living miners. That in itself is not surprising, as it had long been acknowledged that post-mortems may uncover lung disease missed in living subjects.

⁴¹ W.O. Fischer. 'A Preliminary Report on 1,402 Consecutive Autopsies on Native Mine Workers'. *Journal of the Medical Association of South Africa*, 28th September 1929, pp. 511–512.

⁴² See *Report of the Miners' Phthisis Medical Bureau for the twelve months ending 31st July 1924*. Pretoria: Government Printer, 1925, p. 4, *Report of the Miners' Phthisis Medical Bureau for the year ended the 31st of July 1928*. Government Printer, Pretoria, 1929, p. 7; and *Report of the Miner's Phthisis Medical Bureau for the three years ending 31st July 1941*. Pretoria: Government Printer, 1944, p. 7.

What is surprising is the dramatic difference between the two sets of figures, with the Bureau's post-mortem data from 1924 until 1950 revealing disease rates 100 times higher than the official morbidity figures. Fischer's article, like the Bureau's data, shows that contrary to the evidence Orenstein presented to the Young Commission, he was aware that tuberculosis and pneumonia remained a grave problem.

The International Setting

The problem of silicosis was one of the first to which the International Labour Office (ILO) turned its attention after it was formed; from 1921 it collected data and monitored the science. Following the Johannesburg Conference of 1930, silicosis was placed on the ILO's schedule of occupational diseases. Ten countries, including Britain and Brazil, ratified the convention; South Africa did not. The Second ILO Silicosis Conference was held in Geneva in September 1938 and attracted delegates from a dozen countries including the USA, Australia and Britain. Dr L.G. Irvine and Dr A.J. Orenstein represented South Africa. Orenstein was elected Conference Chairman.

The Conference provides some insight into Orenstein's behaviour at such forums. When speaking about medical examinations, Orenstein would without acknowledgment use the data from one small and unrepresentative cohort, namely white miners, when referring to mine workers in general. As a result, the Conference was greatly impressed by his depiction of the South African system. One delegate, Dr Langelez, commented that if criteria as strict as those applied to entry medicals in South Africa were adopted in Belgium, it would immediately lead to a labour shortage.⁴³ Like the other delegates, Dr Langelez had no way of knowing that the medicals to which Orenstein referred to applied only to white miners, who represented at most ten per cent of the workforce.

One of the most important questions the delegates considered was that of diagnosis. After much discussion, the Conference endorsed the

⁴³ *Silicosis: Proceedings of the International Conference held in Geneva from 29th August to 9th September 1938*. London: International Labour Office, 1938, p. 77.

findings of the 1912 Miners' Phthisis Commission that the diagnosis of silicosis requires an employment history, a complete clinical examination and an X-ray. The examinations should be carried out by specially trained medical staff and preferably, as in South Africa, those examinations should be conducted by a government Bureau.⁴⁴ Neither Orenstein nor Irvine told the Conference that the medicals of black miners met none of those requirements. There were no X-rays, there was no clinical examination and no work or medical histories were taken.

Orenstein's most mischievous claim concerned silicosis. He explained to the Conference that African miners did not work continuously as did Europeans, and as a result very few developed silicosis. The total number of cases among migrant workers with fifteen- or sixteen-years' underground experience was too low to provide reliable data.⁴⁵ The delegates left Geneva believing there was virtually no lung disease among a workforce which numbered over 300,000. For the first time in modern history, it seemed, a major industry had eradicated silicosis.

After serving with distinction during the Second World War, Orenstein returned to his post with Rand Mines Ltd. The most important post-war change to mine medicine was the introduction of treatment for tuberculosis, a medical advance which posed a new challenge for the industry. Chemotherapy was effective but it was also expensive: the regime usually took two years to complete and required careful monitoring. As always, the mining houses wanted to minimise their costs and they were determined that the state should pay.

Following a damning Report into the industry's management of tuberculosis by the Oosthuizen Committee,⁴⁶ the Secretary for Health wrote to the Chamber in July 1954. He noted that since recruits were given a pre-employment medical, those who fell ill with tuberculosis must have contracted the disease on the mines. If those men were treated successfully, it would benefit the communities from which the industry recruited

⁴⁴ *Silicosis: Proceedings 1938*, pp. 96–97.

⁴⁵ *Silicosis: Proceedings 1938*, p. 63.

⁴⁶ See *Report of the Departmental Committee of Enquiry into the Relationship Between Silicosis and Pulmonary Disability and the Relationship Between Pneumoconiosis and Tuberculosis*. August 1954. F 33/671 Treasury SANA.

its labour. The Chamber's legal advisor, B.T. Tindall, was unsympathetic. Many migrant workers in other industries returned to the Native Territories with infective tuberculosis, and therefore treatment by the mines alone would not halt the spread of disease. Tindall added that since gold mining was the only industry liable to compensate tuberculosis, it would be unfair of government to single out the mines for further expenditure. In Tindall's view, the industry should not pay.⁴⁷

In October, the Group Medical Officers Committee met to discuss how best to respond to the Secretary's request. The meeting was chaired by Dr A.J. Orenstein and included WNLA's senior medical officer Dr Frank Retief and the Chamber's Legal Adviser. Contradicting a century of medical orthodoxy, the Group concluded that even in cases where miners had heavily dusted lungs there was no conclusive evidence that pulmonary tuberculosis was associated with silicosis. They recommended that the Chamber go no further than acknowledge that the presence of silica in the lungs favoured the development of infection. The Committee also agreed that the exit examinations were adequate, citing as proof that over the previous year only three former miners in the Territories had been compensated. A better explanation is that former miners faced such obstacles in lodging a claim very few bothered and even fewer succeeded. Orenstein suggested that as a compromise, the industry might agree to an X-ray at the final examination for that small group of black miners with two years' continuous service. Two weeks later the Group Medical Officers met again to prepare a Statement of Evidence. They agreed to submit that the incidence of tuberculosis uncomplicated by pneumoconiosis was lower in black miners than among the general population.⁴⁸ The flow of disease was from the rural areas to the mines. Dust exposure was not the cause of tuberculosis.

⁴⁷Memorandum from B.T. Tindall, Legal Adviser to the Manager Transvaal and Orange Free State Chamber of Mines, Johannesburg, 17th July 1954. TEBA Archives, University of Johannesburg. WNLA 20L March Diseases & Epidemics Tuberculosis Witwatersrand Native Labour Association 1953–Nov. 1954, p. 1.

⁴⁸Minutes of the Meeting of the Sub-Committee of Group Medical Officers held on Monday, 25th October 1954, in the Chamber of Mines Building. TEBA Archives, University of Johannesburg. WNLA 20L March 1953–Nov. 1954 Diseases & Epidemics Tuberculosis.

Conclusion

A.J. Orenstein's career spanned a period which saw major safety improvements in the hard rock mines of Australia, the USA and Western Europe, most often as a result of trade union pressure. Unlike mine officials in those countries, Orenstein did not have to adjust to a gradual liberalisation of work regimes or industrial practices. On the contrary, black migrant workers in South Africa had even fewer rights under apartheid than they did prior to 1948. Orenstein's career was also unusual in that he spent virtually all of his working life with a mining company. The other prominent figures in mine medicine worked initially as mine medical officers before taking senior appointments with state agencies. L.G. Irvine became Chair of the Bureau, Spencer Lister became Director of the SAIMR while Andrew Watt spent the second half of his career as senior medical officer with Rand Mutual Life Assurance Company.

During his first ten years in Johannesburg, Orenstein saved thousands of lives by improving hygiene, nursing and nutrition. The remainder of his career left a darker legacy. Orenstein was the key architect of a medical orthodoxy about miners' phthisis which may have led to hundreds of thousands of deaths. The Orenstein orthodoxy can be easily summarised. The system of mine medicine was so effective that by 1920 South Africa's gold mines had all but eradicated silicosis, the oldest of the occupational diseases. Exposure to silica dust played no role in tuberculosis, which was not spread from the mines to rural areas but was brought to the mines by infected migrant workers. Finally, the mines benefitted blacks who returned to their homes far healthier than when they left. Orenstein repeated that orthodoxy at the monthly meetings of the Mine Medical Officers Association; to committees such as the Gold Producers Committee, a key organisational unit within the Chamber on which he often served as chairman; and at the numerous commissions of enquiry before which he appeared as an expert witness. It also featured in his presentations to international audiences such as the ILO Silicosis Conferences in Johannesburg, Geneva and Sydney. In those forums, no specialist had more influence than Orenstein.

The evidence Orenstein presented to his peers was formulaic. When discussing tuberculosis, he usually referred to the rates among white miners, which were far lower than those among blacks, to argue that the mines were free of infection. When silicosis was the issue, he used the confirmed rates among black miners, who were rarely compensated for the disease, to claim that there was no silicosis. There were also numerous occasions on which Orenstein simply lied. He told the Young Commission in 1930, for example, that the exit examinations of black miners at the WNLA were conducted by Bureau specialists.⁴⁹ Under the Miners' Phthisis Acts from 1916, the Bureau was in theory responsible for 'the overall supervision' of medicals at individual mines and at the WNLA compound, but because of the workloads that never happened. The only black miners examined by Bureau interns were that tiny proportion set aside for compensation. Even with those men the medicals were at best cursory.⁵⁰

During a fifty-year career, Orenstein produced little research. His authority came from his association with Gorgas, his position at Rand Mines Ltd. and his longevity. Over time, he became the moderator of knowledge of miners' phthisis to a lay audience. While common sense suggested that conditions on the mines produced occupational disease, he often repeated, highly complex statistical analyses proved that was not the case. Two questions dominated Orenstein's performances as an expert witness. They were the origins of tuberculosis on the mines and the best way to manage infection. In answering those questions, Orenstein racialised the science to a far greater degree than did any of his contemporaries. He did so by using notions of racial weakness to override the play of well-established environmental factors such as dust exposure, malnutrition and unhygienic compounds to explain the incidence of tuberculosis among migrant workers. Orenstein was highly successful as an expert witness and while often challenged, his preferred approach to repatriations, the education of black miners and their families and the provision of sanatoria in labour-sending regions remained largely unchanged until after the Leon Commission in 1994.

⁴⁹ Orenstein, evidence 1930, p. 570.

⁵⁰ See Jock McCulloch. 'Hiding a Pandemic: Dr G.W.H. Schepers and the Politics of Silicosis in South Africa'. *The Journal of Southern African Studies*, Vol. 35, No. 4, 2009, pp. 835–848.

Occupational diseases are negotiated political categories which usually arise from the complex play of social, political, cultural and economic circumstances.⁵¹ Orenstein was a master at articulating those forms of knowledge to a lay audience. He worked tirelessly over a long career to erase from public debate the knowledge accumulated by South African scientists in the period before his appointment in 1914. The result was a medical fraud which allowed the gold mines to masquerade as safe when in fact they were highly dangerous, especially for migrant workers. The contrast between Orenstein's success in improving sanitation and his baleful influence on the management of tuberculosis identifies the limits to mine medicine. His testimony as an expert witness tells us what the industry would and would not tolerate in terms of medical discourse. The distance between the image of occupational health Orenstein helped to manufacture and the one which emerged during the recent miners' class action is a testament to the changed constellation of political forces.

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⁵¹ See Allard E. Dembe. *Occupation and Disease: How Social Factors Affect the Conception of Work-Related Disorders*. New Haven: Yale University Press, 1996. See also Paul-André Rosental. 'Silicosis and Global Public Health'. In Rosental, ed. *Silicosis: A World History*. Baltimore: Johns Hopkins University Press, 2017, pp. 1–13.

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