

Lead Poisoning and Disease at Broken Hill New South Wales

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In Broken Hill at the end of the nineteenth century, the ‘incidence of disease and the state of public health was described as the worst in Australia’. Both the working and living conditions at the Barrier contributed to the ill health of many of the local population. The occurrence of lead poisoning (plumbism) among local miners and some of the general population constituted a major health problem. It was considered as not only an industrial problem but also a wider community issue with its adverse effects on children and other local residents. Some domestic animals kept in close proximity to the processing were also affected. In the rest of Australia lead poisoning on an industrial scale was relatively unknown. It has been suggested that a connection existed between the 1892 local miner’s strike (of 18 weeks duration) in opposition to the introduction of the contract system, with the negative effects of lead poisoning on the community. The ‘hidden grievances’ over the issue of lead poisoning provided a serious undercurrent to the strike.¹

Besides the incidence of lead poisoning, the Barrier also experienced serious outbreaks of typhoid in the period 1888 to 1900, which reached epidemic proportions. This was attributed to the contamination of the local water supply following long periods of drought conditions and the resulting chronic water shortages for both industrial and domestic use. In March 1888, 160 cases of typhoid were reported. During the first quarter of 1892, 16 per cent of the total deaths in Broken Hill (32 out of 197) were due to typhoid. The disease was also estimated to be responsible for 39 per cent of deaths over 3 years. In 1889 a group of 50 miners from New Zealand lost half of their number from the disease. The infant mortality rate of children (from various causes) was exceptionally high. Reports indicated that over 50 per cent of the total deaths in Broken Hill in this critical period were of children less than 10 years of age.²

Adverse working and living conditions together with an acute shortage of clean water contributed to the high incidence of ill health during this period. The smoke from the mine stacks, contaminated with lead particles, often collected on roofs and following rain, ran-off into domestic water tanks and on to business premises. By 1892 28 smelters operated on the ‘line of lode’ emitting dust, smoke and noxious fumes resulting in pollution of the tanks and reservoirs as well as affecting the centrally-located schools and businesses.³

Stephen’s Creek supplied some water to the town, unless drought conditions prevailed. Local sources of water were often reported as being polluted by animal carcasses and rotting vegetation and were also contaminated as the result of such mining processes as ‘driving, blasting and shovelling’. Addressing the continual water shortages during drought periods involved transporting supply over long distances, resulting in high costs and some mine managers were obstructive to such ventures as it

increased their costs of production. Water scarcity also impacted on the miners' capacity to fight underground fires.⁴

Nature of lead poisoning: a debilitating condition

Lead is an irritant and a slow and insidious poison involving the inhalation and swallowing of fine oxide particles resulting in miners being unable to perform physical tasks. Some presented with symptoms associated with the nervous system known locally as 'lead fits' or 'spasms'. In the early stages of their illness they often showed such symptoms as lack of appetite, facial pallor, general lassitude, indigestion and the persistence of a metallic taste in the mouth. Many Broken Hill miners, during the early development of the mines, were itinerant or nomadic though some (especially bachelors), displayed greater mobility than others. When already showing early symptoms of lead poisoning they often returned to the coastal areas and mines of South Australia. Consequently the real extent of their disease was concealed and did not appear in the local Broken Hill official health surveys and reports of advanced poisoning.⁵

Political background to the Establishment of the Board of Inquiry 1892

The 1890s and early twentieth century in New South Wales experienced a wave of legislation, essentially reforms directed at mining and the regulation of social problems. They included the various types of mining (both coal and metalliferous), health, as well as marriage and divorce.⁶

At the 1891 New South Wales general election, 35 members representing the new party (Labor Electoral League, later known as Labor) won 35 seats in the Legislative Assembly. LEL members clearly held the balance of power in the 141 seat lower house and attracted 28.9 per cent of the popular vote. Most of these elected LEL members were former miners or had connections with the mining industry. Following the 1891 election, the membership of the House was as follows:

- Protectionists (Dibbs' party) 51 seats.
- Free Trade (Parkes' party) 47 seats
- LEL (Labor) 35 seats
- Unopposed and others 8 seats⁷

Between 1891 and 1895, John Henry Cann [1860-1940] (Labor) member for the Broken Hill seat of Sturt and a former miner took a leadership role in mobilising support both inside and outside Parliament for the Lead Poisoning Bill. The LEL approach to policy and legislation was to support the party that would advance its agenda which focussed on addressing the lead poisoning problem and reform of the mines. Other Barrier district representatives, Richard Sleath (Wilcannia) and Josiah Thomas (Alma), both elected in 1894, supported the endeavours of Cann.⁸

Between 1891 and 1892, John Henry Cann pressed the New South Wales Government and minister Sydney Smith to set up a Board to investigate the causes and extent of lead poisoning at the Broken Hill silver-lead mines located in the Albert

Mining District. Cann was especially prominent in raising the issue in the New South Wales Parliament on 2 August, and also on 25 November 1891, when he asked the Mines' Minister whether the government intended doing anything to mitigate the effects of lead poisoning. The minister responded with '... the mine wardens have been requested to approach the matter'. Shortly afterwards, Sydney Smith framed a Cabinet minute relating to the establishment of a board to investigate the lead poisoning issue in Broken Hill. The local branch of the Amalgamated Mining Association (AMA) was also active in lobbying for an inquiry, and kept the issue on the agenda of the minister. In a strident speech, AMA official Josiah Thomas expressed the view that 'miners were selling their health as well as their labour'. At a meeting of the branch he moved that 'Mr Cann MLA be requested to urge upon the Government to appoint a royal commission to inquire into the effects of lead poisoning on the working men of Broken Hill'. The motion was carried unanimously.⁹

Figure 1: *John Henry Cann in 1902*



Source: Government Printing Office of New South Wales:

<https://commons.wikimedia.org/w/index.php?curid=25155086> Accessed 16 February 2016.

In connection with the proposed inquiry, the local newspaper, *The Barrier Miner*, had enlisted 'special reporters' to collect expert information and statistics on the prevalence of the disease. It printed a series of articles on the disease based on interviews with former miners, local general practitioners and some mine and union officials. In one interview, Mr H.H. Schlapp, BHP mines metallurgist, claimed that the ventilation at the mine had improved, but stressed the need for greater personal cleanliness among the miners. He claimed that many miners get sick as the result of heavy drinking. Richard Sleath commended the editor and staff of the local newspaper for publicising the issue of lead poisoning and for gathering relevant information from

a variety of sources.¹⁰

On 3 October 1891 Dr J. Archburton Thompson, New South Wales Government Medical Officer, presented to the Board of Health a brief preliminary report on lead poisoning in New South Wales. It identified the 'unhealthy nature of mining in Broken Hill', emphasising the dangers of lead mining 'across the line of lode', and indicating that the poisoning was not confined to humans but also affected domestic animals. As lead poisoning was relatively unknown in the rest of Australia at this time, medical knowledge of the condition was sparse. Some details of his report are given below.

Though plumbism (lead poisoning) appears as the cause of death only four times in the records for 1890, I have reason to believe that lead poisoning is a frequent cause of serious illness here, and that all cases do not fall under medical treatment within the town. I believe that men come to work from a distance,

expect to fall ill and at the approach of the symptoms retire to their neighbourhoods. Besides, it is a well established fact that cats and dogs cannot be kept near mines and slag heaps and they invariably die. Wild birds are noticeably absent from the town. The condition of milch cows kept in town deteriorates but on removal they improve.

Lead poisoning is a matter of general importance causing permanent damage to the constitution. It does not, as a rule, cause death speedily. It is an indirect cause of death and often incapacitates the sufferer from pursuing his living. Therefore it is desirable, in a town containing so many persons directly exposed to the dangers of lead poisoning that an attempt should be made:

- 1) To ascertain the extent to which lead poisoning exists.
- 2) The circumstances under which it arises with the view to publicising the facts if they turn out to be of sufficient importance
- 3) To take precautionary measures seen as useful and practical.
- 4) The inquiry should not be made by the Board of Health but undertaken by local medical practitioners and their participation be recognised.

SIGNED

J. Ashburton Thompson
Chief Medical Inspector
New South Wales Board of Health
25 November 1891.¹¹

The Lead Poisoning Board- Procedures and Report

The Board of Inquiry into Lead Poisoning at Broken Hill was established on 28 May 1892, and its first meeting held on 22 June at the local council chambers. At the opening of proceedings the Board Secretary announced that he had decided to write to the managers of the different mining companies requesting them to furnish a statement showing the following information:

- The number of hands employed in the various departments of each mine during the period 1890 to 1891 indicating the classes of miners, truckers, feeders, smelters and others including tradesmen.
- To provide a brief description of the general character and nature of the lead content of the ore treated during 1890-91.

It held ten full meetings between 22 June and 4 July 1892. It was originally composed of Dr. J. Ashburton Thompson (Chairman), W.H. Hamlet, (Government Analyst), John Howell (BHP General Manager) and Richard Sleath representing the Amalgamated Mining Association (AMA). As a result of his role in the 18-week miners' strike of 1892 and his incarceration for six months, Sleath was replaced by AMA President Josiah Thomas on 1 January 1893.¹²

The local press was critical that it took almost six months to replace Sleath on the Board. Mr John Howell was forced to absent himself from attendance at several of the meetings as the result of the long-running local miners' strike. Full Board meetings were adjourned on 8 July 1892 until 17 January 1893 and nine meetings were then held until 7 February 1893. The Board's *modus operandi* as part of its inquiries was twofold. It visited some local mines examining above and belowground conditions (when it was

permitted). Some mine managers were interviewed (but not under oath) at the Council Chambers, and questioned about the incidence and causes of lead poisoning and any efforts taken to prevent the disease. It was generally recognised that the local 18-week strike over the introduction of scoping by contract, appeared to divert community attention away from the Board's investigations.¹³

The first visit, to the Block 14 mine occurred on 21 June 1892. A senior staff member informed the Board that the Manager Zebina Lane 'had gone fishing' and left instructions that Board members were not to descend the mine. On 23 January and 31 January 1893 the Board was still not allowed to descend the mine, based on the manager's instructions, and only inspected the surface workings. Although the Board received a letter from Lane withdrawing his opposition to other visits, Lane was 'either away from the mine' or 'he could not be found'. Following the Board's consideration it was determined 'that they had been obstructed by Lane in their endeavours to act on the authority conferred on them by the Government'. Other mines visited included the British Block, South Mine and Central where the Board was not obstructed. From reading some of the Board minutes it appears that some mine managers resented the interference of the Board in that it lacked legitimacy, as it did not possess the powers of a royal commission.¹⁴

Medical testimony to the Board.

Several local general practitioners submitted oral and written evidence to the Board. Dr Belgrave claimed that there were no verifiable figures produced on the disease in general practice but only estimates. Nevertheless he informed the Board that he met with approximately 300 cases of lead poisoning during a year. He emphasised that it would be impossible to find more than 1 to 2 per cent of all miners working in the Block 14, British and the Proprietary mines, who had escaped leading. Taking both surface and underground workmen together, he claimed that 'three-quarters became leaded sooner or later'.¹⁵

When Dr Belgrave was recalled to contribute further to the inquiry, he suggested the following preventive measures.

1. Dressing rooms and lavatories be provided for all underground workers.
2. Warm baths be provided.
3. That men be forbidden to eat meals underground or in places where there is much dust.
4. Serious attempts be made to treat the dust.
5. Where there is considerable dust there should be an interval of time allowed between the two shifts.
6. Fines be imposed on miners for inattention or neglect of precautionary measures and the money should be directed to the local sick fund and hospital.
7. There should be compulsory arrangements covering the medical attendance of miners (a medical insurance scheme). A compulsory contribution (six pence a week) be deducted from wages as payment for hospital treatment. Where patients were too destitute to contribute (when leaded), the scheme should cover them for the cost of medical treatment.
8. Where possible, in cases of lead poisoning, a change of occupation or residence be facilitated.¹⁶

Another local general practitioner Dr Bartley told the inquiry that he had classified 294 cases of leading admitted to the local hospital between 1 Jan 1890 and 30 June 1892 while he was a surgeon there. They included 85 per cent cases of colic (a mild form of lead poisoning), 13 per cent in which the brain was seriously affected (epilepsy, dementia and apoplectic encephalopathy) while 2 per cent presented with muscular paralysis. In his opinion, susceptibility to lead varied widely in different workers depending on a 'constitutional peculiarity'. Dr Bartley concluded that 'leading is an extremely common cause of illness among working men at Broken Hill'.¹⁷

Dr W. Blaxham, in evidence, was of the opinion that some large mines were responsible for more cases than others because they produced higher amounts of lead. He gave the examples of the Block 14, British and Proprietary Mines. He asserted that some people (including children) were more susceptible to lead than others. In response to a Board members' question, the doctor confirmed that 'everyone who works with lead is sure to get leaded sooner or later'. Other general practitioners who presented statements included Dr H.J. Groves who saw about 2-3 cases per week, and claimed that some miners 'go away to Adelaide for treatment after the first effects of lead poisoning and then leave the field'. He stated that 'unmarried men (who batch) are more susceptible than married men and they get leaded quicker'.¹⁸

Other testimonies

A small number of former miners came forward and gave evidence to the Board. Josiah Thomas (before he replaced Sleath) testified to the Board that after 6-week's work he had suffered from illness, 'was off work for 5 weeks', and following recovery was unable to regain employment. Some other miners, he claimed 'when leaded left the field for good'. Another former miner, Andrew Eddy told the inquiry that having worked for 21 months in the local mines he fell ill after 3 months. He informed the Board that he had worked on contract and earned five pounds a week but was careful about washing. Having worked with six different mates he confirmed that five of them became leaded and in spite of the good wages he asserted that he would never take another similar job. He claimed that several weeks of sickness added to his medical expenses. William Strachan, a former miner, leaded at the British Mine, also gave testimony to the Board. Miner A.J. O'Connell, (Secretary Underground Branch, AMA) claimed that during 14 months work at the mines he had twice suffered from lead poisoning. One miner informed the Board that the late manager of the British Mine had died of lead poisoning.¹⁹

Some mine managers appeared before the inquiry. They included C. Morgan (British mine), J. McKay (South Mine), M. Ormsley, (Proprietary) T.P. Uren (Proprietary), and J. Warren (Block 10). Local Mine Warden and Police Magistrate Mr Barnett addressed the Board relating how he had conferred with local managers and medical men. As a result he estimated that 'there had been considerably more than 1,000 cases of leading in the Barrier during the past 5 years'. Local representatives of trade unions who gave evidence included Josiah Thomas (President District AMA), and J. Tiplatt and P. O'Donnell representing the Smelter's Branch of the AMA). Also

present at the inquiry were representatives of the local municipality as well as the local branches of Friendly and Mutual Benefit Societies. Mr Hubbard, government Mines Inspector, was also in attendance.²⁰

The Report, signed by all Board members, was presented to Under Secretary Harrie Woods on 17 April 1893, and contained numerous recommendations designed to reduce the health hazards associated with lead mining. General Manager Proprietary Mine, John Howell, expressed serious reservations with several of the recommendations maintaining that they were 'impossible to implement'. His concerns were contained in a Note of Dissent attached to the Report.²¹

In general, the Report revealed that a large amount of lead poisoning was occurring daily on the Barrier and that only those presenting with urgent forms of the illness were admitted to the local hospital. The Report recognised how lead poisoning affected not only the workmen at the mines and smelters but how it impacted on the town's general population living in the houses clustered around the mines. It also acknowledged that lead poisoning had important economic and social effects. Over time it reduced the capacity of the miners to work effectively. It was also claimed that socially, the poisoning interfered with their pro-creative process, as some chronically poisoned persons were unable to produce offspring or produced those who died soon after birth.²²

The Report of the Inquiry described the different symptoms and stages of the illness experienced by sufferers. It claimed that lead poisoning affected persons in different ways and was not always immediately identifiable although most was of the chronic variety. Medical evidence was presented to the Board to show that a significant amount of poisoning had occurred and was still occurring daily in Broken Hill. Local hospital statistics quoted in the Report revealed that approximately 118 cases were admitted per year but that due to scarce resources only urgent cases were admitted. It also claimed that local families (including children) were exposed to lead poisoning.²³

Analysis of the smoke emissions from the smelter stacks undertaken by Board members and associates, was found to contain particles of lead and silver. The proportion of lead in the flue dust varied between 20 percent and 40 percent. The remaining effluence was classified as either 'fume' or 'flue dust'. It was also found that two-thirds of the flue dust was discharged into the air. Although the chimney stacks reached heights of 200-300 feet above the local houses, prevailing winds frequently directed smoke towards the north of the town enveloping worker's houses. As a result various forms of lead and other mineral components were deposited on roofs and in the soil.²⁴

The Report recorded that on 31 January 1893, smoke from both the British and Block 14 mines was blown over the town, resulting in considerable pollution in the business district of Crystal and Argent Streets. The Report concluded that the matter of lead poisoning was of far-reaching importance and urgently required attention in the general public interest; it caused repeated attacks of graver illnesses, which incapacitated some workers completely. The Board recognised that lead poisoning had both economic and social effects in reducing the power of effective work.²⁵

Recommendations of the Board

The Board, in its Report, made the following recommendations:

1. It should be illegal to employ females at works in any capacity where lead, lead ores or lead compounds are mined, dressed, smelted or manufactured.
2. It should be illegal to employ any boy below the age of 16 years underground at any mine where lead-containing minerals are mined; or to employ any such boy on the surface where lead ores or lead compounds are handled; or to employ any boy below the age of 14 years
3. Every mine manager required to record name, age, occupation and length of employment of every workman laid-off by leading and to dispatch a copy of the record to the minister every month.
4. Mine managers to make ample supply of drinking water available at the mine.
5. On mine floors and main drives where dust is raised, water sprinklers be provided to ameliorate the impact of dust; provision also be made for hand washing at crib time.
6. Every mine to provide (free of charge) bath houses and changing rooms (to include plunge baths and showers), reasonably lighted and warmed in cold weather.
7. Flue dust to be wetted and no accumulation permitted. Emission of flue dust from smelter stacks should be greatly reduced.
8. Underground workmen should be required to change their ordinary clothes for working clothes before descending to work, in changing rooms provided; and to change into their home clothes on finishing work at leaving time. Surface workmen should be free to make similar changes and should be encouraged to but the provision is not compulsory.
7. To be illegal for any workman to engage in repairing of a 'furnace in blast'; furnaces to be surrounded with a jacket to capture fumes from molten metal and slag.
8. Mine inspectors should be proficient in the process of estimating the proportion of carbon dioxide present in the atmosphere and it would be their duty to ensure that air and ventilation in the workings is always satisfactory to ensure the purity of the air in the mine.
9. Inspectors to have power to ensure compliance with this regulations, with non-compliance being subject to a financial penalty.
10. These regulations to be printed and presented by managers to workmen. Such regulations to be enforced by mining inspectors, with penalties imposed for infringements. The regulations be framed and should leave as little as may be to the discretion of the Inspector or to be dealt with as a matter of opinion between managers and the Inspector.²⁶

The report also made some pertinent observations on the conduct of mining in Broken Hill. It identified the poor siting of the town in relation to the mines; noxious fumes from the smelting process circulating near the town; severe water shortages; and that lead particles collected on roofs ending up in domestic water tanks. It reported that:

... lead was found in eight sources of water supply out of 31 samples examined.

The largest quantity of lead in the town itself was found in the water tank attached to the Central Public school.²⁷

Note of Dissent

BHP General Manager John Howell appended a Note of Dissent to the Report, identifying several difficulties involved in implementing some of the recommendations. In his opinion if they became law it would be impossible to comply with the recommendation of recording monthly returns of men reporting as leaded. This he claimed was particularly when men took 3-4 days off a week without consulting a doctor, thus not enabling them to provide proof of their illness.

He also noted that the present method of supplying drinking water to underground workers was superior to the one recommended (i.e. using canvas bags filled at the mine). Many men he pointed out used covered billycans either filled at home or at the mine. From long experience, miners and smelter staff preferred to change their clothes underground or at home rather than using the changing rooms provided.

Howell also saw as realistic that a considerable quantity of the dust created in the mining and smelting processes 'must of necessity escape into the atmosphere. Strong draughts are needed to carry off smoke and gases'. He believed the current method of handling the dust was satisfactory and the charge levelled in the Report was exaggerated. The recommendation that jackets be placed around furnaces to catch fumes had been found to be ineffectual.

He also believed it impossible for Mines Inspectors to measure the quantity of carbon dioxide in stopes and drives at Broken Hill mines, as 'the gas is found irregularly in the mine often impounded in small crevices in the ore'.²⁸

Lead-poisoning and reform 1895

John Henry Cann was successful in the passage of the Bill amending the Mining Acts. It passed the Legislative Assembly and was intended to give the Mines' Minister power to make regulations for the prevention of lead poisoning in the mines of New South Wales. When the Boards' report was published it was noticed that the Board had made recommendations for the enforcement of certain regulations in all mines and works where employees were liable to be affected by lead. On submitting the matter to the Attorney General, it was ruled that the Mines' Department did not have the power to make the regulations as recommended by the Board, as in legal terms it had acted '*ultra vires*'. Cann informed the House on 6 March that he intended to remedy the defect. He informed the Assembly that the regulations had to be framed by the Governor-General and laid on the table before they could be enforced. Cann said that 'the chief object of the regulations will be to protect the life and health of miners and they will apply equally to miners and mine owners'. New Mines' Minister, Slattery, supported the measure.²⁹

Under the direction of the Minister for Mines, Sydney Smith, the Governor-in-Council promulgated a set of regulations under Act 57, Vic. 18 to address many of the health and safety problems identified by the Board of Inquiry into Lead Poisoning in the

Broken Hill mines. The regulations incorporated the recommendations contained in the Boards' report.

The first official collection of statistics on the incidence of lead poisoning at Broken Hill occurred in 1895, when 89 workmen were diagnosed as 'mildly' or 'seriously poisoned'. It was suggested that other affected miners may have been unaccounted for as they had left Broken Hill. By 1898 cases of poisoning decreased to a rate of 2 to every 1,000 men, the decline in numbers diagnosed being attributed to the transfer of smelting operations to Port Pirie, as well as the employment of more efficient production processes.³⁰

The Technical Commission of Inquiry (NSW) 1919-1920

The long miners' strike and closure of 1919-1920 at Broken Hill, over health and safety conditions in the mines, produced intense enmity between mine management and the local miners. As a result, the New South Wales Government established the Technical Commission of Inquiry, chaired by Professor Henry G. Chapman, to investigate the incidence of industrial diseases at Broken Hill. It was a two-year detailed inquiry involving medical examinations, as well as bacteriological and chemical tests of 6,538 mine workers. Both the local trade unions and mining companies actively participated in and supported the process. The Commission produced two detailed reports, in 1919 and 1920, with the inquiry finding that 61 men were suffering from the effects of lead poisoning at the time of the examinations. This 'confirmed the long-standing belief that conditions in the mines encouraged the development of lung diseases and lead poisoning among long-term workers'.³¹

It was an influential report, which eventually led to passage of specific legislation to provide compensation for Broken Hill workmen suffering from mining-related illnesses. As a result, the following acts of Parliament were passed to provide compensation for Broken Hill miners suffering from mining related diseases. Measures enacted included:

- Workmen's Compensation (Broken Hill) 1920;
- Workmen's Compensation (Lead Poisoning) Broken Hill Act 1922 and;
- Workmen's Compensation (Lead Poisoning) Amendment Act 1924.

These enactments placed mining companies under a 'moral and financial obligation', and prompted them to take a much more cautious attitude towards the health of their employees and their working conditions together with greater awareness of industry's health problems. In 1922 the Bureau of Medical Inspection was created in Broken Hill. Financed by mining corporations, its role was to monitor the health of miners through medical examinations. It tested for 21 diseases, including lead poisoning and lesser diseases.³²

Conclusion

In the early 1890s the New South Wales town of Broken Hill experienced considerable industrial conflict involving mine management, miners and their unions. It was a

complex and turbulent period characterised by a major 18-week strike in 1892 (accompanied with violence) and the incarceration of some miners' leaders. There was inadequate housing, high levels of air pollution, a lack of pure drinking water and frequent mining fatalities and accidents as well as high labour turnover. Compounding the town's problems was the serious incidence of lead poisoning among some miners and local residents. In essence, the crisis surrounding the 1892 strike diverted some attention away from the proceedings of the Lead Poisoning Commission Inquiry at Broken Hill. Nevertheless, 'lead poisoning was a serious grievance for local miners during this period'.³³

Between 1891 and 1895 former coalminer John Henry Cann MLA (Sturt) played a crucial role in lobbying both inside and outside the New South Wales Parliament for the establishment of the Lead Poisoning Commission. He took personal responsibility for the eventual passage of the Lead Poisoning Bill between 1894-1895. Cann was able to take advantage of and exploit the prevailing political environment, as his embryonic party (Labor) held the 'balance of power in the Lower House'. From 1890, Government Chief Medical Officer Dr J. Archburton Thompson was instrumental (in a non-political sense) to the reform process in identifying and gathering evidence on the lead poisoning problem. As Board Chairman he carried a significant burden, especially when two Board members were absent for almost three months. For the Boards' hearings he skilfully collected a great deal of information on the health of the miners, both from local general practitioners and hospital doctors. It appeared that Dr Thompson viewed the reform of local mining conditions as a personal crusade.

On the 'political front' other Barrier District members of the Assembly (Richard Sleath- Wilcannia and Josiah Thomas - Alma) assisted Cann in organising support at the local level for the reform initiative, and in this they were robustly aided by the resources provided by the local branch of the Amalgamated Miners' Association. The local newspaper *The Barrier Miner* also contributed to the campaign for reform, when publishing articles based on staff interviews with a variety of sources, and when covering the progress of the Board's deliberations. In an editorial, it pronounced that that the 'reforms will be the means of saving many valuable lives in Broken Hill mines and preventing much suffering'.³⁴

The passage and introduction of the provisions of the Lead Poisoning Act in 1895 was a personal triumph for the former British coal miner John H. Cann and for the administrative efforts of Dr Ashburton Thompson.

Endnotes

¹ Geoffrey Blainey, *The Rise of Broken Hill*, Macmillan Australia, South Melbourne, 1968, pp. 86-88.

² Brian Kennedy, *Silver, Sin and Sixpenny Ale: Social History of Broken Hill*, Melbourne University Press, Melbourne, 1975, pp. 65-67; A.G. Cumpston, 'Health and Disease in the Broken Hill Mining Industry', in M. Radmanovich and J.T. Woodcock, *Broken Hill Mines 1968*, The Australasian Institute of Mining and Metallurgy, Monograph Series No. 3, Melbourne, 1968, pp. 537-551; R.H.B. Kearns, *Broken Hill: The Uncertain Years, Broken Hill*, Historical Society, Broken Hill, 1974, p. 8.

³ Kennedy, *Silver, Sin and Sixpenny Ale*, p. 65.

⁴ Alan Trengove, *What's Good for Australia: the Story of BHP*, Cassell Australia, North Melbourne, Vic., 1975, pp. 18-19.

⁵ New South Wales Legislative Council, 'Report of the Board appointed to inquire into the Prevalence and Prevention of Lead Poisoning at the Broken Hill Silver-Lead Mines', Government Printer, Sydney, 25 May 1893, p. 10 (hereafter Broken Hill Silver-Lead Mines Report); Blainey, *The Rise of Broken Hill*, p. 87.

⁶ Bede Nairn, *Civilising Capitalism: The Labor Movement in New South Wales 1870-1900*, ANU Press, Canberra, 1973, p. 27.

⁷ Brian Dickey, 'The Broken Hill Strike 1892' *Labor History*, no. 11, November 1966, pp. 40-53; Michael Hogan and Ken Turner, *The Peoples' Choice: Electoral Politics in Colonial New South Wales*, Federation Press, Annandale, NSW, 2007, pp. 352-353.

⁸ *Barrier Miner*, 8 October 1892; John Henry Cann had a long career in New South Wales state politics representing the Labor seats of Sturt and Broken Hill in the NSW Legislative Assembly from 1891 to 1916. Born in Devon, England, at the age of nine years he worked in the coalmines for 12 hours a day earning tenpence daily. When he was 27 years old he arrived in Australia and was employed as a coalminer in the Illawarra and later as a timberman at Broken Hill. He became President of the local branch of the Miners' Association and was prominent in the 1891 Maritime Strike. In 1891 he was elected to the New South Wales Parliament for the Broken Hill seat of Sturt. Cann held a number of important parliamentary and governmental offices, notably as Speaker, Acting Premier, Treasurer, Colonial Secretary, Secretary for Mines, and Minister for Mines. Retiring from Parliament in 1916 he then served as NSW Railway Commissioner for eight years. He died in Sydney at the age of 80 years, *Sydney Morning Herald*, 22 July 1940.

⁹ Kennedy, *Silver, Sin and Sixpenny Ale*, pp. 62-63; BM, 29 March and 25 July 1891.

¹⁰ *Barrier Miner*, 4 July 1891.

¹¹ Dr J. Archburton Thompson, Preliminary report to NSW Board of Health, 1891 in BM, 25 November 1891; Kennedy, *Silver, Sin and Sixpenny Ale*, pp. 62-63.

¹² Broken Hill Silver-Lead Mines Report, 1893, pp. 3-7.

¹³ *Ibid.*, pp. 4-5.

¹⁴ *Ibid.*, p. 3.

¹⁵ *Ibid.*, p. 13.

¹⁶ *Ibid.* and Appendix P, p. 118.

¹⁷ *Ibid.* and Appendix E, p. 84; *Newcastle Morning Herald*, 22 June 1893.

¹⁸ Broken Hill Silver-Lead Mines Report, pp. 61-63.

¹⁹ *The Worker* (Brisbane), 8 October 1892.

²⁰ *Ibid.*; Broken Hill Silver-Lead Mines Report 1893, p. 47.

²¹ Trengove, *What's Good for Broken Hill*, p. 50.

²² Broken Hill Silver-Lead Mines Report, p. 19.

²³ *Ibid.*, p. 28

²⁴ According To the research conducted by the Board it was found that smoke emissions (from the stacks) also contaminated other metallic and chemical substances. They were referred to as 'fume' and 'fume dust' produced by the smelting process. "Fume consisted of the metallic vapour produced when molten metal was in contact with a cold blast of air (at pressure). The following compounds were said to make-up the 'fume: i.e. lead, silver, copper oxides, chlorine, iodene (sic), as well as others." The Flue Dust 'consisted of particles of all that was introduced into the furnaces activated by the draught including coke, quartz, limestone, iron, lead, and silver and manganese ore'. Broken Hill Silver – Lead Mines Report, p. 14.

²⁵ *Ibid.*, pp. 14-18.

²⁶ *Ibid.*, pp. 28-29.

²⁷ *Ibid.*, pp. 24-27.

²⁸ *Barrier Miner*, 8 March 1894; 20 April, 15 May and 17 August 1895.

²⁹ Blainey, *Rise of Broken Hill*, p. 89; *Barrier Miner*, 20 February 1895.

³⁰ *The Register* (Adelaide), 30 June 1922.

³¹ New South Wales Parliament, 'Technical Commission of Inquiry' (Professor H.G. Chapman) Chairman', Two Reports (1919-1920), 'Industrial Diseases at Broken Hill', both cited in R. J. Solomon, *The Richest Lode: Broken Hill*, Hale and Iremonger, Marrickville, NSW, 1988, pp. 325-328.

³² *Ibid.*, pp. 326, 328.

³³ Comprehensively covered in: A. Trengove, 'The Story of Broken Hill: What's Good for BHP', pp. 38-47; A.G. Cumpston, 'Health and Disease in the Broken Hill Mining District', pp. 537-551; G. Blainey, 'The Rush that Never Ended – A History of Australian Mining', 4th edition 1993, pp. 139-154; B. Dickey, 'The Broken Hill Strike, 1892', *Labour History*, November 1966, pp. 50-53.

³⁴ *Barrier Miner*, 17 September 1895.