

Chapter six - Water for Company operations at Broken Hill

Introduction

An essential element for the mining and smelting operations of the Company was the necessity of securing an adequate supply of water. As has been demonstrated in Chapters 3 and 4 water was an integral component in the attempts by directors and senior managers to turn the silver and lead ore discovery into a profitable end product.

The choices available to directors and senior managers were impacted by such structural features as the geography of the site of mining and smelting operations and the climatic conditions which were a result of such location. An associated feature, allied to both the geographical location and the historical circumstances of the development of Australia generally, and the colony of New South Wales in particular, was the lack of any substantial physical infrastructure which could be used to supply the water necessary to sustain the people of the township of Broken Hill, let alone the mining and smelting operations of the Company. This lack of infrastructure meant that the State was in a position to enable or constrain the operations of the Company in terms of the choices available to the Company in securing a reliable water supply for mining and smelting operations. The State was able to impact upon choices by being in the position to provide the infrastructure required for the supply of water or to cede the provision of the necessary infrastructure to another organisation.

This chapter has a number of specific purposes, all related to the theory developed in Chapter 1.

First, the structural features which provided the context within which the Company had to operate in relation to obtaining water for mining and smelting operations is discussed.

Second, how these structural features either constrained or enabled the choices made by the directors and senior managers is considered.

Supply of water to the town of Broken Hill

In relation to the water supply to the township of Broken Hill, Solomon has noted that "...Broken Hill existed for almost 70 years before a permanent water supply was secured".¹ This lack of a permanent supply of water had the potential to cause significant difficulties for the Company as water was of great importance for the operations of the Company. Not only was it necessary to sustain the townspeople and thus provide the Company with a workforce, but it was also an integral part of the mining and smelting operations of the Company. Water was required to be converted into steam to run the various mine equipment (hoists, lifts etc) as well as being used in smelting operations (cooling the furnaces, for example). It is thus not surprising that the availability of water was a constant concern for the management of the Company from the time the Company commenced operations until the close of the period under study, 1915. Worth noting was that the Company was initially more concerned with water supplies for mining and smelting operations. The town supply issue was left mainly up to the townspeople and the colonial government of New South Wales. Part of the reason for such a stance being adopted by the Company was that none of the directors were personally affected by shortcomings of the town water supply (not long after the initial discoveries had been proved to be viable, they moved to either Adelaide or Broken Hill). Senior managers at the mine had their water provided for them either from Company sources or the Company paid for supplies of town water.

¹ Solomon, R.J., (1988), The richest lode: Broken Hill 1883-1988, Sydney, p. 34.

Perception of the problem and related issues

Prior to any choices being made (which includes not taking any action) there has to be a recognition by those with sufficient power that a potential opportunity or threat is posed to the activities of the organisation. Unless there is this recognition, then no decision making process can be initiated. While this may seem to be self evident, it is an important point to appreciate as it illuminates the role of individuals in the decision making process. Unless an individual perceives that a choice situation exists then it is somewhat doubtful if any choices will be made. Worth emphasising also is the necessity for someone with the requisite power to share/agree with such perception. Alternatively, the perceiving of the necessity to make (or not make) a choice can be located with an individual who does not have to rely on others in order for an issue to be placed on the agenda of the organisation. This latter circumstance applies in relation to the Company, as it is the managerial decision making of the directors and senior managers that is being discussed. These individuals were, by virtue of their positions, automatically able to have an issue placed on the agenda of the organisation. Two other issues shaped the choices available to directors and senior managers. The first was the nature of the product, which in this case, involved the transformation of the silver and lead ore into a marketable product. As was demonstrated in Chapters 3 and 4, the raw material consisted of silver and lead ore which had to undergo a number of processes in order to transform the ore into a marketable product. The nature of these processes required an adequate supply of water for mining and smelting operations. While there were a number of options available in terms of what actual processes were used, water was still an integral part of such processes. The second consisted on two related issues. The first part related

to the economics of various solutions which might be considered in terms of securing an adequate supply of water for mining and smelting operations. A more permanent water supply could have been provided by the Company if the directors and senior managers had taken advantage of the water available in the nearby Darling River. This option was not seriously considered until the Company had been operating for a number of years. The reasons for not doing so seem to revolve around the economics of constructing such a pipeline combined with the uncertainty of exactly how productive the mine would prove, and over what period of time.

Simply because silver and lead ore had been discovered did not automatically mean that the quantity and quality would prove to be economic as there was always the risk that the discovery would peter out at almost any time, irrespective of glowing reports from geologists. This uncertainty, which was something the directors and senior managers had to work with all the time, also had an impact upon which choices were made. In the case of an adequate supply of water, this uncertainty combined with the economic cost, meant longer term solutions were not considered viable. Even after the mines at Broken Hill had been operating for twenty years, directors and senior managers were loathe to spend Company money on a more permanent supply of water, preferring instead to cooperate with the government of New South Wales in supplying water to both the township of Broken Hill and the operations of the mining companies. This would both reduce the cost of supplying water while at the same time ensuring a more satisfactory solution for mining and smelting operations. These two issues, of economics and uncertainty, provided the background to the issue of securing an adequate supply of water for the mining and smelting operations of the Company.

Right from the time that the mineral leases were originally pegged in September, 1883 there was a shared perception by those involved that an adequate supply of water was essential for mining and smelting purposes. At the same time as the leases were being pegged out a block was also secured specifically for the purpose of constructing a dam (or tank, to use the terminology of the day).² On the 18 March, 1885, a meeting of shareholders of Broken Hill Mining Company resolved that “...three additional claims be taken out to secure a site for a [water] tank.”³ The perception of the importance of water to the operations of the Company was consistent theme for the period under study. For example, at the first meeting of shareholders of the Company on 15 December, 1885, the directors reported:

Your Directors are fully alive to the fact that proper arrangements for the adequate storage of water and its continuous supply, form the most serious and important feature in the development of this large property, and it is receiving correspondingly earnest attention.⁴

As well as the directors as a body perceiving this need, individuals also shared this perception. One individual, D. W. Harvey Patterson, who had been involved in the antecedent Broken Hill Mining Company, and would continue to have a long association with the Company, was writing to the general manager regarding the supply of water for operations at the mine. On 29 June, 1885 he wrote:

² Warren, J., (1902), *Reminiscences of Broken Hill*. Proceedings of the Australian Institute of Mining and Metallurgy, IX(2), p. 2.

³ Meeting of shareholders, 18/3/1885, BHP/JA18/1 (No. 3).

⁴ Reports and Statements of Account, 15/12/1885, BHPA/PE50/1, p. 1.

I am glad to hear of the supply Tank being full for any sake urge the directors to call for tenders to send [sink?] a 5 or 10,000 yard tank without delay.⁵

He again wrote on 6 July, 1885 “I trust you have done something in getting tenders for a big tank.”⁶ The editor of the local newspaper, the Silver Age also appreciated the significance of water to the operators of the Company. He noted in the issue of 28 April, 1886 that “...the most important event in connection with the Broken Hill mine to be chronicled in this issue is the discovery of water [in the mine].”⁷ Five years later the perception of the importance of water to the operations of the mine was still present when the general manager noted that “[e]ver since the opening of the Mine, the scarcity of this important element [water] has been a subject fraught with doubt and uncertainty, but, at the present, more than any time in the past, does it command serious attention.”⁸ The importance of an adequate supply of water was also significant for another reason, which, while linked to production at the mine, was not directly related to it. This other reason was the price of shares in the Company. According to one contemporary observer the difficulties in securing water supplies for the summer of 1890-91 resulted in there being a limitation of the weekly output from the mines, and this caused a corresponding drop in capital values “...amounting to £3,000,000 alone on the Proprietary stock.”⁹

Water was thus important both for operations at the mine and the pricing of Company shares and this perception was shared by directors and senior managers. The issue of

⁵ Patterson to Jamieson, 29/6/1885, BHPA/A/18/6. (Emphasis in the original). Jamieson was the first general manager of the Broken Hill Mining Company. Patterson was not, at this stage, a director of Broken Hill Mining Company. He became a director of the Company in August, 1885 on the floating of the Company. BHPA/A6/B2.

⁶ Patterson to Jamieson, 6/7/1885, BHPA/A/2C/6B-2.

⁷ Silver Age, 28/4/1886.

⁸ Reports and Statements of Account, half year ending 30/11/1890, BHPA/PE30/3, pp. 22-23.

⁹ Dixon, S., (1891), On a subterranean water supply for the Broken Hill mines, Transactions of the Royal Society of South Australia, 14/2 p. 200.

adequate supplies of water for operations at the mine was both a function of the nature of the product and the processes involved in transforming the silver and lead ore into a marketable product and the geographic location of the site of the ore discovery. These two features combined meant that there was a constant pre occupation with securing adequate water supplies.

Geography and history

The discovery and exploitation of the silver and lead ore deposits at Broken Hill were located in a specific geographical and historical context. As the figure five on page 176 indicates, Broken Hill was situated in the far west of the colony of New South Wales, an area far beyond any substantial infrastructure and, as a result of the climatic conditions resultant upon geographic location, an adequate supply of water was always going to be a problematic issue.

When mining first commenced in the Broken Hill district in the early 1880's, the area had already been occupied for some time by pastoralists who relied on natural sources of water (permanent waterholes, soakages) to supply the needs of their stock. Such sources would also have been supplemented with dams and tanks.¹⁰ Given the sparse nature of the population these sources, while not ideal, provided sufficient for pastoral uses in all except extreme drought. However, with the discovery of silver, first in the Silverton area, and then at Broken Hill, these sources quickly proved inadequate. For example, in 1884, a drought year, soakages in a creek adjacent to Silverton (which at

¹⁰ A "Special Correspondent", writing for a number of South Australian newspapers in 1888 observed that rainwater was mainly used for drinking purposes, but with the fumes from the smelters containing lead "...it is not altogether atractive" Special Correspondent, (1888), The Barrier silver and tin fields in 1888, Adelaide, p. 63.

that time had a population estimated at 1,745) dried up. The government eventually assisted the townspeople by constructing a large earth tank which supplemented those constructed by citizens for their own use.¹¹

Figure 5 Geographic Location of Broken Hill



As a result of the geographic location of the mine and associated operations, climatic conditions were not favourable to a process which was heavily reliant upon water to transform silver and lead ore into a marketable product. Yearly average rainfall was 9.04 inches but with evaporation averaging 88.85 inches per year no surplus ground water remained.¹² The only water supply of any permanency was the Darling River, some 60 miles to the east of Broken Hill. As the previous discussion indicates, the

¹¹ Hardy, B, (1968) Watercarts to pipeline: the history of the Broken Hill water supply, Sydney, p. 2.

uncertainty of the quantity and quality of the silver and lead ore deposit combined with the economic cost of constructing a pipe line to this source of permanent water was not initially considered by the directors and senior managers of the Company. There were a number of options that the directors and senior managers pursued, but which were also subjected to the same structural constraints that were responsible for the problem in the first place.

Options for securing water

The number of choices available to the directors and senior managers of the Company were limited by the nature of the resource they required. The only source of water was as rainfall. Steps could be taken to store any rain that fell in proximity to mining operations. As a long term measure, this strategy was fraught with a great deal of uncertainty as the amount of rain that fell in any one year was highly unpredictable. A second option was to locate water which had been stored naturally as a result of geological structures. This option included such features as subterranean water supplies, or rivers. The State also had a part to play in the attempts by the mining companies to secure a more reliable supply of water for mining and smelting operations at Broken Hill. The State had the necessary resources to provide a reliable water supply for Broken Hill. Alternatively, if the State chose not to provide the infrastructure itself, then the State was also in the position of providing the legitimacy for some other organisation to provide the requisite infrastructure. As the following discussion indicates all these options were pursued.

¹² Woodward, O.H., (1952), A review of the Broken Hill silver-lead-zinc industry, Melbourne, pp. 33-34.

Processes involved in securing water

In conjunction with building dams to store water in the early years of the mine unconventional methods of attempting to secure a water supply were also tried.

Rasp has pegged out a site for a well near the township, having employed Stewart with his divining rod.¹³

The directors reported to a meeting of shareholders on 15 December, 1885 that excavations were underway for a 10,000 cubic yard dam in order to provide water for smelters while the Main and No.4 shafts were being sunk as quickly as possible with a view to reaching water.¹⁴

At a meeting of the board on 24 December, 1885, directors were advised that "...big tank full, plenty of water for all requirements for nine months." At the same meeting, it was also resolved to call tenders for a second large tank of 15,000 cubic yards capacity.¹⁵

Overall, it seemed that the water supply for 1885 held out "...remarkably well..."¹⁶

These measures seemed to have provided a temporary solution to the problems of water supply, as there is little mention of water shortages for the following years of

¹³ Fawcett to Jamieson, 16/8/1885. BHPA/L.18/6. It is not known if this procedure worked.

¹⁴ Fawcett to Jamieson, 16/8/1885. BHPA/L.18/6, pp 1-2.

¹⁵ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 24/12/1885. BHPA/S1/1, pp. 65-66.

1886 and 1887.¹⁷ A rainfall table in Jaquet¹⁸ indicates that the annual rainfall for these years was 10.08 inches and 10.11 inches respectively. Given the limited scope of smelting operations at this time and the water supplied from the various dams and the mine, it seems likely that water supplies were not a problem. The smelting department, at that time, was using a 20,000 gallon tank and a 15,000 gallon tank for smelting purposes, while there were another two 20,000 gallon tanks being used for cooling purposes.¹⁹ A "Special Correspondent" writing in 1888, also noted that there had been "three good seasons" but went on to note that the "...water supply is a question of vital import."²⁰ As there was only a total rainfall of 3.26 inches for 1888, the concern of the "Special Correspondent" was understandable, especially as two inches of this rain fell in February, 1888.²¹

The Company had not yet reached the stage of self sufficiency of water supplies and operations (especially smelting) were effected by a shortage of useable water. In the chairman's address to the half yearly meeting of shareholders on 18 July, 1888 he advised:

In connection with concentration [that is the removal of excess of silica from the ore] the difficulty we face is that so far we have been unable to get any great amount of water for its purposes.²²

¹⁶ Annual Report of the Department of Mines for 1885, Sydney, 1886, p. 102.

¹⁷ The situation regarding the town in 1886 was somewhat different, as the Mining Warden at Silverton was "...strongly..." urging the necessity of sinking tanks as the town was "...badly supplied with water." Annual Report of the Department of Mines for 1886, Sydney, 1887, p. 101.

¹⁸ Jaquet, J.B., (1894), Geology of the Broken Hill Lode and Barrier Ranges mineral field, New South Wales, Sydney, p. 35.

¹⁹ Reports and Statements of Account, Half year ending 31/5/1887, BHPA/PE30/1, pp. 24-25.

²⁰ Special Correspondent, (1888), The Barrier silver and tin fields in 1888, Adelaide, p. 63.

²¹ Annual Report of the Department of Mines for 1888, Sydney, 1889, p. 121.

²² Report of Half Yearly Meeting of Shareholders, 18/7/88, BHPA/S3/1.

The limited water supply resulted in a number of furnaces being shut down during the latter half of the year, and it was not until September when a larger supply of water was received from the mine that six furnaces could again be placed into operation.²³

The uncertainty of water supplies prompted the Company to get involved in the formation of the Barrier Ranges and Broken Hill Water Supply Company and in having the necessary legislation introduced into the New South Wales Parliament by the Member for Albury, Mr. George Day.²⁴ This course of action had proven necessary as the State had refused to provide the infrastructure which would result in there being a reliable water supply for mining and smelting operations. The State chose not to use its own resources, instead authorising another organisation to provide the necessary infrastructure.

For the half year ending 31 May, 1889, the directors were able to report that "[a] plentiful rainfall has fortunately filled the Company's tanks, but in addition, a very full supply of water for all requirements, including what is used by the plant for dressing the ore, is being obtained in the mine."²⁵

In 1889 there was also a potential problem with the water blocks [blocks of land that had been leased in order to serve as sites for water tanks and dams] that had been pegged in 1888. De Courcay Browne, a land and mining title expert²⁶ advised the

²³ Reports and Statements of Account, half year ending 30/11/1888, BHPA/PE30/1, p. 26.

²⁴ Abbott and Allen, Solicitors to secretary, 25/10/1888, BHPA/A18/1(20).

²⁵ Reports and Statements of Account, half year ending 31 May, 1889, BHPA/PE30/2, p. 9.

²⁶ De Courcay Browne to Dickenson, 29/5/1890, BHPA/A18/1.

board that a "very serious difficulty has cropped up re Water Blocks of Proprietary Coy."²⁷

The difficulty to which De Courcey Browne referred was due to the way in which the water blocks were first amalgamated, and then alienated. The alienation had rendered the amalgamation invalid and thus subject to forfeiture as the requisite labour conditions were not being met. De Courcey Browne suggested that the water blocks be transferred to the Block 14 Company and then be subleased by the Company. The board agreed with this suggestion, and it is some measure of the importance attached to the water blocks by the Company that within three days of receiving the initial advice from De Courcey Browne the necessary legal documents had been prepared and executed.²⁸

However, the State actually did not do anything. Rather the State signified the institutional structures within which individuals made choices which further their own private interests, or the interests of others. For example, the Company was not solely relying on rainfall or the mine to provide sufficient water for the various mining and smelting operations. De Courcey Browne assisted the Company in having a water bill of its own passed by the New South Wales Parliament.²⁹ However, the passage of the water bill was not going to be easy. De Courcey Browne advised Knox (the secretary of the Company) that he had seen Abbott (a member of the New South Wales Parliament) about the water bill and Abbott wanted to know "...how many paid up

²⁷ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 7/1/1890, BHPA/S1/4, p. 177.

²⁸ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 7/1/1890, p. 177; 8/1/1890, p. 181, 9/1/1890, p. 183, 10/1/1890, p. 184, BHPA/S1/4.

²⁹ De Courcey Browne to Knox, 18/4/1890, BHPA/A18/1.

shares he was to get..." De Courcey Browne had advised Abbott that there would be none, only those that had been allocated to the Nolan's push.³⁰ On the 29 May, 1890, De Courcey Browne again wrote:

The Water Bill has I fear a troubled period ahead of it. It will, however, rise through the breakers OK. There is an organised opposition to it from a push in the House who want to be silenced with blackmail. They will not get it if I can help it.³¹

In May, 1890, an additional reservoir of 600,000 gallon capacity was being constructed, complementing a 3,500,000 gallon reservoir already completed.³²

The significance of water to the operations of the Company can be gathered from the general manager who noted in 1890 that "[e]ver since the opening of the Mine, the scarcity of this important element [water] has been a subject fraught with doubt and uncertainty, but, at the present, more than any time in the past, does it command serious attention." He went on to state that during the past six months, with the water supplied from its own dams, from the mine, and the mine of the British Company, normal operations had been possible. But with the hot weather and high evaporation rate, the water from the mine became heavily mineralised and soon became charged with soluble mineral salts which "...attacks the water jackets and tuyeres with destructive effects." In order to avoid damage to the furnaces, fresh water had, on a

³⁰ Nolan's were the promoters of an alternative water scheme. De Courcey Browne to Knox, 15/5/1890, BHPA/A18/1. He is referring to J.P. Abbott, the State Member for Wentworth.

³¹ De Courcey Browne to Dickenson, 29/5/1890, BHPA/A18/1.

³² Reports and Statements of Account, half year ending 31/5/1890, BHPA/PE30/2, p. 16.

weekly basis, to be pumped in to replace the highly mineralised water. As a consequence, at the commencement of summer, the fresh water reservoirs were nearly empty, with not more than six weeks supply on hand. He concluded:

The delay caused by the opposition offered in Parliament to the Stephen's Creek Water Bill is greatly to be regretted, for within the past six months hundreds of millions of gallons of water have passed down the creek, which might have been stored, and the scarcity, which now seems almost inevitable, not only for the mines, but for the community at large, altogether averted.³³

Even though there had been little rain, this did not prevent steps being taken by the Company to take advantage of any rain that fell. Water capacity of the Company had been doubled by the construction of a 43,000 cubic yard tank which would hold over 7,000,000 gallons. This would give the Company, with the existing tanks, a total water supply of 14,000,000 gallons. The general manager also reported that:

Watercourses have been constructed in different directions, and every care taken to lead all the water possible into these reservoirs.³⁴

As there appeared to be no immediate sign of any water bills being passed by the Parliament, the Company, in combination with Block 14, British Broken Hill, and Block 10 formed the Acacia Water Trust on 15 April, 1891, when, for an initial cost

³³ Reports and Statements of Account, half year ending 30/11/1890, BHPA/PE30/3, pp. 22-23.

³⁴ Reports and Statements of Account, half year ending 30/11/1890, BHPA/PE30/3, p. 29.

of £16,000, mining leases were purchased and water pipelines laid from these leases to the mining properties of the four mining companies.³⁵ Water from the Acacia Trust leases started flowing on 30 June, 1891.³⁶

According to one contemporary observer the difficulties in securing water supplies for the summer of 1890-91 resulted in there being a limitation of the weekly output from the mines, and this caused a corresponding drop in capital values "...amounting to £3,000,000 alone on the Proprietary stock."³⁷

As well as combining with other mining companies in actually supplying water, the Company was also using the Barrier Ranges Mining Companies Association as another vehicle to try and obtain a more permanent supply of water.³⁸ For example, at a meeting of the executive committee on 15 June, 1891, the secretary of the Association was asked to contact the Water Conservation Department of New South Wales for all borings and results within a 100 mile radius of the Barrier Ranges and other information that might be useful in locating underground sources of water.³⁹ At another meeting held on 29 June, 1891 it was decided to request the New South Wales Government for the use of a diamond drill for boring purposes and to also meet with one of the companies attempting to get a water bill through the New South Wales Parliament, the Broken Hill Water Supply Company. At the same meeting, a copy of Dixon's paper on the subterranean water supply was to be sent to each member of the

³⁵ Minutes of Meetings, Acacia Water Trust 15/4/1891, BHPA/S15/1.

³⁶ Minutes of Meetings, Acacia Water Trust 8/7/1891, BHPA/S15/1, p. 10.

³⁷ Dixon, S., (1891), On a subterranean water supply for the Broken Hill mines, Transactions of the Royal Society of South Australia, 14/2 p. 200.

³⁸ This Association was not formed specifically to consider the water question, but was rather a response to the increasing activity of unions and unionists from 1890 onwards.

committee.⁴⁰ Dixon was subsequently employed by the board at £2/2/0 per day, plus expenses. If water of a certain quality was found he would be paid a £1,000 bonus; if the water was taken to Broken Hill, he would receive an additional £4,000. While Dixon agreed to the terms, there is no record of him claiming either bonus on offer.⁴¹

In July, 1891 the Association decided to bore for water and asked the New South Wales Geologist for advice.⁴² However, the chairman of the Company advised a meeting of shareholders on 27 July that the boring scheme would not work and even if water was found (and there was a difference of opinion if it would be) it was questionable if the Company could take it as there was some doubt if the Company would be able to secure title to the land.⁴³ This did not mean that the Association was still not attempting to find water by boring. In August, 1891, the Executive Committee decided:

...that a deputation from this Association should wait upon Sir Henry Parkes at an early date to urge upon him the necessity of boring in the Menindie Basin.⁴⁴

³⁹ Minutes of Meetings, Barrier Ranges Mining Companies Association, 15/6/1891, BHPA/S14/3, pp. 21-22.

⁴⁰ Minutes of Executive Committee, Barrier Ranges Mining Companies Association, 29/6/1891, BHPA/S14/3, p. 25.

⁴¹ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 15/12/1891, pp. 337-338; 16/12/1891, p. 340, BHPA/S1/6.

⁴² Minutes of Barrier Ranges Mining Companies Association, 13/7/1891, BHPA/S14/3, p. 27.

⁴³ Minutes of meeting of shareholders, 27/7/1891, BHPA/S3/1.

⁴⁴ Minutes of Executive Committee, Barrier Ranges Mining Companies Association, 12/8/1891, BHPA/S14/3, p. 30.

The chairman of the board of directors continued to remind shareholders of the importance of water of the Company. In his address to the half yearly meeting of shareholders on 16 July, 1891 he commented:

I will now take up your time a little in dealing with general affairs, and under that heading comes the most important item of all, that of Water.⁴⁵

As the Company had done all it could do in terms of securing water from tanks, mines, and the Acacia Trust, more emphasis was placed on the Barrier Ranges Mining Companies Association in securing the necessary legislative approval for a water bill. As noted above, the Broken Hill and District Water Supply Company (Limited) was enabled on the 1 October, 1888 to build a pipeline from the Darling River, some 60 miles from Broken Hill. While the Company had initially supported the formation of this company, this was not now the case as the Barrier Ranges Mining Companies Association decided, on 17 September, 1891, to:

Write to the Minister of Mines (or the proper authority) opposing any renewal or extension of the Broken Hill and District Water Supply Act of 1888 as ...in the present applicants the interests of the mining industry would be sacrificed to private gain, and the Association promote a Bill upon the same subject upon lines which it was anticipated would secure the support of the Mines, the Municipality, and the existing Water Supply Co.

⁴⁵ Minutes of the half yearly meeting of shareholders, 16/7/1891, BHPA/S3/1.

At the same meeting, it was also decided that the Association:

1. confer with the Broken Hill Water Supply Company for the purpose of making a concerted opposition to any renewal or extension of the Water Supply Act of 1888.
2. should take steps to promote a Bill based on an amalgamation with the Broken Hill Water Supply Company and an extension of a pipeline to the Darling Waters.⁴⁶

The Barrier Ranges Mining Companies Association then intensified efforts to secure a satisfactory solution to the water supply problems by enlisting the support of J.P. Abbott in opposing the granting of an extension of time to the Broken Hill and District Water Supply Company Limited to construct a pipeline from the Darling River; by sending a solicitor to Sydney to take the necessary steps in opposing the extension;⁴⁷ by taking the necessary steps for a bill for an extensive water supply from the Darling;⁴⁸ meeting with the engineer of the Broken Hill Water Supply Company;⁴⁹ by ascertaining from the Broken Hill Water Supply Company what its terms would be for completing the Stephens Creek and Darling River Schemes if all opposition was withdrawn to its bill;⁵⁰ and by the Company proceeding with its own

⁴⁶ Minutes of meetings of the Barrier Ranges Mining Companies Association, 17/9/1891, BHPA/S14/3, pp. 34-35.

⁴⁷ Minutes of meetings of the Barrier Ranges Mining Companies Association, 8/10/1891, BHPA/S14/3, pp. 41-42.

⁴⁸ Minutes of meetings of the Barrier Ranges Mining Companies Association, 9/10/1891, BHPA/S14/3, p. 45.

⁴⁹ Minutes of meetings of the Barrier Ranges Mining Companies Association, 17/11/1891, BHPA/S14/3, pp. 49-50.

⁵⁰ Minutes of meetings of the Barrier Ranges Mining Companies Association, 1/12/1891, BHPA/S14/3, p. 63.

water bill.⁵¹ The Company also had a financial reason for securing cheaper and more reliable water supplies. Since the Company had been formed in 1885, and up until 31 May, 1891, a total of £7345/3/6 had been spent on the construction of water tanks.⁵² The lack of suitable water supplies also hindered expansion plans at the mine.

In January, 1892, the two groups, the Barrier Ranges Mining Companies Association and the Broken Hill Water Supply Company came to an agreement regarding the supply of water in the following terms:

- (a) To push and facilitate the issue of 100,000 shares at £1 each⁵³
- (b) To get all water in excess of existing sources from the water company.
- (c) To support the Water Company's Bill in Parliament.⁵⁴

This agreement was only reached after a number of proposals had been considered. In November, 1891, the delegates of the Barrier Mining Companies Association met to consider an offer from the Broken Hill Water Supply Company Limited in the following terms:

⁵¹ Minutes of meetings of the Barrier Ranges Mining Companies Association, 15/12/1891, BHPA/S14/3, p. 72, p. 76.

⁵² Statistics and working summaries, BHPA/A18/8.

⁵³ The Barrier Ranges Mining Companies Association were informed by their solicitors that none of the mining companies could hold share in any water company unless by special act of Parliament. Minutes of meetings of the Barrier Ranges Mining Companies Association, 24/11/1891, BHPA/S14/3, p. 60.

⁵⁴ Notes of a Conference between a sub-committee representing the Mining Companies Association and the directors of the Broken Hill Water Supply Limited, 5/1/1892, BHPA/S14/3, pp. 77-78.

1. Broken Hill Water Supply Company would build the scheme.
2. Broken Hill Water Supply Company would obtain an amending Bill to enable them to obtain water from the Darling River.
3. A new company would be formed to take over the assets of the old company.
4. The new company would have a capital base of £500,000, at £1 per share. The old company was to get 200,000 shares paid up to £1, while the mining companies would float 300,000 at 10/- per share.

The delegates decided that the proposal be referred to the sub committee of the Association that had been formed to consider the Darling River scheme.⁵⁵

The New South Wales Government surveyor had also recommended that artesian bores in connection with Dixon's scheme be proceeded with without delay.⁵⁶

Agreement was only reached after further negotiation. At a further meeting of the sub-committee an offer by the Broken Hill Water Supply Company was accepted except the clause relating to the guarantee as to the purchase of water.⁵⁷ However, at a subsequent meeting it was recommended that the Company proceed with its water bill, as the amendments required by the Broken Hill Water Supply Company completely altered the "...complexion of current negotiations..." and there could not be

⁵⁵ Minutes of the Barrier Ranges Mining Companies Association, 18/11/1891, BHPA/S14/3, pp. 51-53.

⁵⁶ Minutes of Delegates of the Barrier Ranges Mining Companies Association, 1/12/1891, BHPA/S14/3, p. 62. There is no record of this particular recommendation being adopted by the government.

⁵⁷ Minutes of Sub Committee, Barrier Ranges Mining Companies Association, 3/12/1891, BHPA/S14/3, p. 66. The actual offer is not detailed in the minutes.

any further delays.⁵⁸ Finally, following a number of meetings of the sub committee, the executive committee and the delegates of the Barrier Mining Companies Association, the agreement referred to above was finally reached.⁵⁹

The representatives of the Barrier Ranges Mining Companies Association had been under pressure to arrive at a satisfactory solution to the water supply problem as "...the decrease in water supply is becoming intensely serious..."⁶⁰ On 28 January, 1892, the chairman of the Company was able to advise the shareholders that there were currently three water bills before the New South Wales Parliament; one from the original promoters of the Darling River Scheme, seeking a two year extension to their original bill and wanting to charge for water at the rate of 15/- per thousand gallons. A second bill on behalf of the Broken Hill Water Supply Co (known as Stephens Creek Co) who would charge the rate of 5/- per thousand gallons of water and, finally, there was the bill being put forward by the Company on behalf of the Barrier Ranges Mining Companies Association. The board of the Company had come to an arrangement to withdraw their water bill and support the water bill being proposed by Broken Hill Water Supply Co.⁶¹ Given the legal advice that mining companies could not own shares in water companies, and the substantial difference between the rate being charged for water per thousand gallons, it is not surprising that the mining companies supported the Broken Hill Water Supply Company. Even though agreement had been reached with the Broken Hill Water Supply Company, the Barrier

⁵⁸ Minutes of sub committee, Barrier Ranges Mining Companies Association, 15/12/1891. BHPA/S14/3, p. 72. The minutes do not state what the amendments were.

⁵⁹ Minutes of Barrier Ranges Mining Companies Association, 5/1/1892, pp. 77-78; 7/1/1892, p. 79; 12/1/1892, pp. 83-84, BHPA/S14/3.

⁶⁰ Minutes of the meeting of the Executive Committee of the Barrier Ranges Mining Companies Association, 7/1/1892, BHPA/S14/3, p. 79.

⁶¹ Chairman's address to shareholders, minutes of half yearly general meeting, 28/1/1892, BHPA/S3/1.

Ranges Mining Companies Association was still pressing ahead with the Darling River Scheme.⁶²

The directors were also still willing to try unconventional methods of securing water. At a meeting on 26 May, 1892, the board subscribed £10 towards the cost (£100) of an attempt by D. L. Doolette to make "...artificial rain" with it being understood the Company was not responsible for any damage caused during the process. Others obviously were not of the same view as the board, as the cheque was returned to the Company on 14 June, 1892.⁶³

At the next half yearly meeting of shareholders, held on 27 July, 1892, the chairman reported in relation to water supply that "[t]his subject has given your Directors and officers great anxiety during the past half year. The late rainfall has relieved that anxiety to some extent, but we consider that to bring in water from the Darling will be the only permanent method of meeting the difficulty."⁶⁴

At the beginning of 1893, the chairman, in response to a question from a shareholder, was able to advise that "[a]s to the water question, we are in a better position at the present moment than we have ever been in the history of the Company."⁶⁵ The directors were, however, still conscious of the potential problems that could be caused

⁶² Minutes of Sub-Committee on Darling Scheme, 1/2/1892, BHPA/S14/3, p. 92.

⁶³ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 26/5/1892, pp. 20-21; 14/6/1892, p. 51, BHPA/S1/7.

⁶⁴ Chairman's address to shareholders, minutes of meeting of shareholders, 27/7/1892, BHPA/S3/1.

⁶⁵ Chairman's answer to a question, minutes of a meeting of shareholders, 25/1/1893, BHPA/S3/1. No reason was given for this situation.

by water shortages and that same year purchased five silver mine leases to use as a potential water supply source should another shortage occur.⁶⁶

In 1894 the "...late rains would make the Company more independent of outside sources",⁶⁷ while in 1895 the general manager had met with the Engineer of the Water Supply Company and both individuals agreed that the Water Supply Company would take over the outside water sources of the Company while the Company would take all their water from the Water Supply Company with a guaranteed amount to be taken each month.⁶⁸

It needs also to be remembered that not only was there not sufficient rain for Company operations, there was, on occasions too much rain, which also impacted upon different areas of the mine operations. In August, 1886, prior to the opening of the tramway from Cockburn to Broken Hill, heavy rain prevented No. 2 furnace from being put into blast. The rain also caused delays in the delivery of coke supplies.⁶⁹ Once the tramway was completed, there were still occasions when heavy rain washed away sections of the track. For example, in November 1895 heavy rains at Cockburn washed away a portion of the Silverton Tramway and traffic both to and from the mine had to be suspended.⁷⁰ The general manager was also "educating" the board of directors in relation to the supply of water, writing at length in December, 1895:⁷¹

⁶⁶ Minutes of meeting of shareholders, 27/7/ 893, BHPA/S3/1.

⁶⁷ Minutes of meeting of shareholders, 31/1/ 895, BHPA/S3/2.

⁶⁸ General manager to secretary, Letter book 29/10/1895, BHPA/M3/5, pp. 40-41. It appears that, as subsequent events will indicate, the board did not agree with the agreements proposed by the general manager and the Water Supply Company.

⁶⁹ Silver Age, 21/8/1886.

⁷⁰ General manager to secretary, Letterbook, 30/11/1895, BHPA/M3/5, p. 179.

⁷¹ General manager to secretary, Letterbook, 10/12/1895, BHPA/M3/5, p. 252.

...as the total rainfall of any one year is made up to a great extent of light showers at long intervals, which add nothing at all to the stocks of water in the dams, and besides a very heavy loss by evaporation and absorption takes place after the water has been received into the dams...

By this time the Company was taking water from five sources - their own dams (1,700,000 gallons per month), Acacia Water Trust (800,000 gallons per month), Cosgrove and Imperial mines (950,000 gallons per month), the mine itself (250,000 gallons per month) and the Water Supply Company (1,800,000 gallons per month). In total the Company was spending £642/18/7 per month.⁷²

An indication of the uses of water, in gallons per month, in the mining and smelting operations was as follows:⁷³

mining	850,000	quarrying	160,000
smelting	2,620,000	chloridizing	300,000
leaching	380,000	concentrating	700,000
electric light	300,000	machine shop	40,000
assay office	9,600	foundry	13,800
loco traction	82,000	horses	23,000
water A/C	35,600		

There does not appear to have been any problems with water supplies in 1896, with sufficient rain falling to provide for the needs of the mine.⁷⁴ For the first half of the following year, 1897:

⁷² General manager to secretary, Letterbook 10/12/1895, BHPA/M3/5, p. 256.

⁷³ General manager to secretary, Letterbook 10/12/1895, BHPA/M3/5, p. 257.

⁷⁴ General manager to acting secretary, 27/2/1896; p. 541; and 23/4/1896, p. 740, BHPA/M3/5.

...the water supply has also given us very little trouble. This half year we have passed through one of the driest periods ever known, as only 1½ inches of rain fell, but we have had ample water for our requirements.⁷⁵

The situation at Broken Hill appeared to have been the same in 1898,⁷⁶ although with the transfer of all smelting operations to Port Pirie, South Australia, concerns regarding the fresh water supply at this location emerged. The Company was able to erect a sea water condensing plant so that if the regular supplies of water failed, operations would still continue.⁷⁷

In his half yearly address to shareholders on the 27 January, 1899, the chairman advised in relation to the water supply:

The past six months, although the winter season, have been remarkably dry. The rainfall at Broken Hill was but three inches and consequently our dams have yielded only a small proportion of water required, but there has been an abundance of water available from the Stephens Creek and Acacia sources. At Port Pirie the tension in regard to water supply has been considerably reduced by further supplies being made available by the South Australian Government.⁷⁸

⁷⁵ Chairman's address to shareholders, 30/7/1897, BHPA/S3/2.

⁷⁶ Chairman's address to shareholders, 29/7/1898, BHPA/S3/2, Reports and Statements of Account, half year ending 30/11/1898, BHPA/PE30/5, p. 8.

⁷⁷ Chairman's address to shareholders, 29/7/1898, BHPA/S3/2.

⁷⁸ Chairman's address to shareholders, 27/1/1899, BHPA/S3/2.

The requirements for water required for the mining operations had decreased due to all smelting operations being transferred to Port Pirie. For example, in 1896, mine operations consumed 110,505,950 gallons of water at a cost of £11,434/8/0; in 1897, 124,140,000 gallons of water at a cost of £14,345/3/3, while the figures for 1898 were 81,961,750 gallons at a cost of £954/12/11.⁷⁹ Despite the early part of the year being very dry at Broken Hill, there was no problem in obtaining water needed for mining operations; however, "...the fresh water supply at Port Pirie continues to be of an unsatisfactory nature...The supply is much more certain, but the price is most excessive being fully four times what we expected to pay."⁸⁰ Given that 20,000 gallons of water per day was being used at Port Pirie in 1900,⁸¹ the concern of the general manager was understandable.

Charges for water at the Broken Hill mining operations was also causing concern for the board:

For some time past your directors have been concerned at the heavy charges for water, considering the immense amount consumed and the additional quantity required when the concentrating plant is in full working order.⁸²

The directors proposed securing a large area near Silverton as another source of water supplies, but when the Broken Hill Water Supply Company concluded a new five year

⁷⁹ General manager to secretary, Letterbook. 8/3/1899, BHPA/M3/6, pp. 708-709.

⁸⁰ Chairman's address to shareholders, minutes of meeting of shareholders, 28/7/1899, BHPA/S3/2.

⁸¹ Minutes of Meetings of Board of Directors, Broken Hill Proprietary Company Limited, 4/5/1900, BHPA/S1/13, p. 495.

⁸² Chairman's address to shareholders, 27/7/1900, BHPA/S3/2.

agreement with the Company, at reduced rates, the proposal was, not surprisingly, not proceeded with.⁸³

In 1903 the Company again suffered with problems to the water supply for the mines when during the first half of the year the water in Stephens' Creek was exhausted. On the 23 June the "...mine stopped for want of water - Stephens Creek supply gave out."⁸⁴ The difficulties this could have caused were averted by the Company being able to secure water from the Acacia Water Trust, together with a supply from old mines.⁸⁵ The general manager had also arranged with a local supplier of water to have first call on his supplies at 2/6 per 1,000 gallons. In return the general manager would sell to the water supplier coal within 1/- of the cost of the Company.⁸⁶

In 1907 the weekly consumption of water at the mine was 2,221,000 gallons, with supplies coming from Stephens Creek (1,490,000 gallons), Acacia Water Trust (360,000 gallons) and outside leases (371,000 gallons). No water was being used from underground sources at the mine, as the whole of this was being used in connection with containing a fire in the mine.⁸⁷ Port Pirie was using 21,360,522 gallons of water per annum for smelting operations.⁸⁸

In May, 1907, there must have been a shortage, or threat of a shortage, of water supplies at the mine as the general manager attempted to obtain water rights from

⁸³ Chairman's address to Shareholders, 27/7, 1900, BHPA/S3/2.

⁸⁴ Delprat, G.D., *Diary*, 23/6/1903, NLMS1630/15.

⁸⁵ Chairman's address to Shareholders, 31/7, 1903, BHPA/S3/2, pp. 85-86.

⁸⁶ Delprat, G. D., *Diary*, 16/6/1903, NLMS1630/15.

⁸⁷ Acting general manager to secretary, Letterbook, 8/4/1907, BHPA/M3/7, p. 47.

⁸⁸ Acting general manager to secretary, Letterbook, 2/5/1907, BHPA/M3/7, p. 140.

several mines at Broken Hill.⁸⁹ Even when the general manager was overseas, he was still concerned about water supplies. While visiting the United States of America, he wrote:

I have not heard from your side for some time - hope you have had plenty of rain, but feel uneasy about it - Hope I may be back in time to discuss new water scheme.⁹⁰

The Company finally abandoned the scheme to obtain water from the Darling River in August, 1907 as none of the other mining companies would cooperate with the Company and the scheme was too expensive for the Company to undertake on its own. Instead a scheme that was favoured by all was the Umberumberka scheme. When finished, water from this scheme would cost 2/6 per thousand gallons, instead of the prevailing rate of 5/- per gallon.⁹¹ Problems were also being caused by the hardness of the Stephens Creek water which resulted in considerable quantities of scale in the boilers. This necessitated the installation of a water softening plant together with arrangements being made to condense waste steam in case of a water shortage at Stephens Creek.⁹²

In early 1908 the board was still concerned about the water supply situation, reporting to a meeting of shareholders that:

⁸⁹ Acting general manager to secretary, Letterbook, 10/5/1907, p. 211; 31/5/1907, pp. 472-473, BHPA/M3/7.

⁹⁰ Delprat to Dickenson, 13/7/1907, BHPA/A40/15.

⁹¹ Half yearly accounts of the Broken Hill Proprietary Company Ltd. 30/8/1907, BHPA/PE30/9, p. 3.

⁹² Reports and statements of accounts, half year ending 30/11/1907, BHPA/PE30/9, p. 17.

The scheme for an improved water supply for Broken Hill still occupies our most serious attention.

Shareholders were advised that an amending Act, as proposed by the mining companies, had been passed by the New South Wales Parliament and a hydraulic engineer had been appointed and a site selected for a reservoir.⁹³ However, this scheme also appeared doomed to failure, as the Umberumberka Water Trust had been unable to raise the £250,000 necessary for the scheme. The mining companies could only provide £100,000 and the New South Wales Government refused to supply the additional £150,000.⁹⁴ The scheme was finally brought to fruition in October, 1914.⁹⁵

⁹³ Half yearly accounts of the Broken Hill Proprietary Company Ltd., 28/2/1908, BHPA/PE30/9, p. 4.

⁹⁴ Reports and Statements of account, half year ending 31/5/1908, BHPA/PE30/9, pp. 8-9.

⁹⁵ Hardy, B., (1968), Watercarts to pipelines The history of the Broken Hill Water Supply, Sydney, pp. 50-64.

Conclusion

The question of the supply of sufficient water for use in the operations of the Company was one that concerned the directors and senior managers right from the time the silver/lead ore was discovered in 1883 up until the end of 1914 when a more permanent supply of water for both township and mine was secured. At no time did the directors, senior managers or townspeople rely on environmental conditions for adequate supplies of water. Individuals utilised the various structures within which they were embedded in order to overcome structural constraints. The embeddedness of individuals within various structures (especially of an institutional nature) allowed these individuals to use the resources which were available to them as a result of such embeddedness. By using institutional resources available to them, individuals sought to overcome the constraints imposed by geographic location of the mine operations and township and the concomitant climatic conditions. Individuals, acting simply as individuals, would not have been as successful in securing the supply of water if they had not been embedded within broader institutional and social structures. By being able to call on the resources available in institutional contexts, individuals were able to achieve much more than they could have by acting simply as individuals. An important example of this was the ways in which the State impacted upon mining operations at Broken Hill in relation to the supply of a reliable water supply for mining and smelting operations. It was individuals, acting within the structures which constituted the State, who made choices, which in turn made it necessary for directors and senior managers of the Company to also make choices.

By being located within institutional contexts, and in such positions as they were (directors, senior managers, parliamentarians and so on) these individuals were able to use the resources of their institutions to both enable their own actions and to also constrain the actions of others, especially if these actions were interpreted as being against the best interests of the Company. For example, when the price of water being supplied to the Company reached a level which was considered by the directors to be too high, the directors had access to the necessary institutional resources to be able to convince the company supplying the water that unless a satisfactory arrangement could be entered into, then the Company would undertake to provide its own source of water. The threat was considered realistic by the directors of the water supply company as the directors of the Company had access to such resources that they would have been in a position to carry out their threat. For example, the State provided a set of institutional structures within which individuals acted. And while the individuals may have been part of a set of structures known as the State, the individuals had different intentions. Due to the legitimating nature of the State and the potential resources available to the State, the structures of the State provided an arena (or locale) where individuals could attempt to take purposive action which was of benefit either to the organisations they represented or for individual self interest. For almost the entire period of this study, the State was a key set of institutional structures which could either enable or constrain the choices of other individuals acting with the organisational structures of the mining companies. As the material in the foregoing chapter clearly demonstrates, water was a key resource need by the Company for mining and smelting operations. The State possessed the necessary power (economic and legal) to enable or constrain the choices of the mining companies. Economically the State could have provided the necessary resources to construct infrastructure for the supply of water. Legally the State could authorise a third party to supply water to the mining companies at Broken Hill.

Chapter seven - Transport and communications

Introduction

The purpose of this chapter is to examine the role of institutions in the overall development of the Company. By institutions is meant other organisations with which the Company had dealings and were important to the overall operations of the Company. The issue of the role of institutions has been previously touched on when discussing the choice to establish an iron and steel industry (Chapter five) and efforts by directors and senior managers to obtain an adequate supply of water for the operations of the Company at Broker Hill (Chapter six). This chapter, together with chapter eight, examines the role of institutions in the overall development of the Company. An important point to make at this juncture is that institutions did not make choices, instead providing a legitimating structure for choices which were made by individuals. The legitimating nature of the institutional structures served to enable and constrain the choices made by individuals, but did not determine such choices. For example the role of the institutions which comprise the State were usually very well defined and any individual who was found not to comply with such roles was open to sanction. Private sector institutions also operated in a similar fashion, but usually with less restrictive roles, or roles which could be relatively easily varied by, for example, modifying the Articles of Association of the company concerned.

As the following account demonstrates, using transport and communications as an example, institutions were an important aspect of the development of the Company. As will be shown, both transport and communications were integral to the operations of the Company and these services were provided to the Company by other institutions, either from the public or private sectors. Choices were still made by individuals embedded in the structures of institutions.

Almost from the formation of the Company there had been the necessity for the management to adopt an international perspective to their operations. While the mine was located in the far west of New South Wales, the products of the mine (silver/lead bullion, fine silver, lead, dore silver, matte copper) were predominantly sold overseas through the London metals market. But not only was the output of the mine destined for overseas markets, many of the supplies needed in mining operations had also to come from overseas (for example, timber, steam boilers, mine machinery, furnaces). Many of the key personnel of the mine were also employed from overseas (mining engineers, metallurgists, timber men). Without a well developed, and reasonably speedy structure of transport and communication, managing the Company would have been much more problematic than it already was.

As well as the international dimensions to the operations of the Company, there were also significant national dimensions. As already pointed out, the mine was located in the far west of New South Wales; yet the head office was located in Melbourne. The geographic location of the mine meant that supplies for the mine, and the products of the mine, had to be shipped via ports in South Australia. As the Company grew and operations expanded (for example, the establishment of a London board, manufacture

of coke at Bellambi on the south Coast of New South Wales, mining of iron ore at Iron Knob, South Australia) quick and efficient transport and communication structures became even more important.

The scope of the operations of the Company meant that it was necessary for effective transport and communications structures be in place. Given the basic physical nature of human bodies and the inherent constraints on mobility, transport and communication structures could assist in overcoming these constraints. As well as helping in overcoming human physical structural characteristics such communications infrastructure enabled and constrained the actions of social actors. For example, a reasonably well developed communication infrastructure enabled the directors to oversee the various operations of the Company from the comfort of the Head Office in Melbourne. International transactions of all kinds could be undertaken without leaving Australia. There were also constraints on action. Communications between the head office and various operations of the Company were not instantaneous. As communication systems developed, the time taken to receive messages, nationally and internationally, became less. The inherent constraints of communication systems also meant the board had to exercise great care in the recruitment of managerial staff. The managerial staff were located at Broken Hill and had to be trusted to manage the operations of the Company. A telephone system was established in Broken Hill in the early 1890's which also facilitated speedier communications. The Company was dependent for these services being provided by a number of institutions.

Telegraphic communication

Although there had been a mail service between London and the different colonies of Australia for some time, the communications structure which was of greatest benefit to the Company was the telegraphic system. Prior to this being connected mail took 60 days to reach Australia from London. After the link had been established this was reduced to 4 days.¹ The completion of the telegraph line from Darwin to Adelaide reduced this time even further. For the period of the study the mail systems both nationally and internationally improved in terms of delivery times, but at no stage did the mail systems approach the telegraph systems in terms of speed. Once international and national telegraphic systems were established, issues important to the Company could be dealt with more quickly, no matter the geographic origin of such issues. The development and extension of a telegraphic system meant that urgent matters could be dealt with almost immediately, and then supplemented (if necessary) with lengthy letters or reports.

At the time of the formation of the Company, the major cities of Australia were already in telegraphic communication with Europe and the United States of America, a link having been established in 1872.² However, while there may have been a telegraphic link to Europe and the United States of America, there was no telegraphic link to the silver field of western New South Wales until a telegraph station was

¹ Ahvenainen, J., (1986), *Telegraph trade and policy: the role of the international telegraphs in the years 1870-1914*, p. 507.

² Cannon, M., (1973), *Life in the country: Australia in the Victorian Age*, Vol.2, Melbourne, p. 212; Davidson, G., (1978), *The rise and fall of marvellous Melbourne*, Melbourne.

established at Silverton on 26 August, 1885.³ The opening of this line meant that South Australian, Victorian and Sydney business could be repeated through the Wentworth office (located on the New South Wales/Victorian border) and once other work was done there would then be three telegraph lines to depend upon.⁴ Until a similar facility was established at Broken Hill, it was necessary for managers of the Broken Hill operations to ride to Silverton to send a telegram and to collect any mail. Broken Hill was provided with an official post office on the 1 January, 1886, and a telegraph station, linking Broken Hill with the rest of New South Wales on 2 August, 1886.⁵ As an indication of the significance of a postal service to the silver fields at Broken Hill, in the first year of operation a total of 39,489 letters and 7,889 telegrams were despatched.⁶

A telegraph line from Silverton to the South Australian border was completed by 10 July, 1886 (Broken Hill had already been linked with Silverton). On the 7 December, 1886, both Broken Hill and Silverton were linked by a direct telegraph line to Adelaide.⁷

Even though telegraphic links had been made, this did not mean that a very efficient service was being provided. A "Special Correspondent" noted in 1888 of the inadequacy of both the postal and telegraphic services, claiming that "...a message

³ Australia Post, (1983), Broken Hill Post Office: Historical notes, Sydney, p. 2.

⁴ Silver Age, 29 August, 1885. (The "other work" referred to was the commencement of the Silverton to Menindie line.)

⁵ Silver Age, 6/1/1886, 4/8/1886.

⁶ Australia Post, Broken Hill Post Office: Historical notes, Sydney, 1983, p. 2.

⁷ Silver Age, 19/6/1886, 10/7/1886, 8/12/1886.

could be sent to Adelaide in less time by train than by telegraph."⁸ An added difficulty was that the geographic location of Broken Hill meant that there were effectively four time zones operating. There was the Department of Posts and Telegraph time; there was local time; there was the mean between Sydney and local time and, finally, Adelaide time. This resulted in there being three quarters to one hour differences between the various time zones.⁹

While the Company personnel made good use of the telegraphic facilities, they were also aware of the possibility of their telegrams being intercepted by others, or the information contained in telegrams being sold to competitors. Thus from the very early days of the Company, the more important telegrams were sent in code.¹⁰ An early, surviving example of one such telegram was one sent on 8 June, 1889 from Vivian, Younger and Bond, Metal Merchants, London, to W. Knox, the secretary of the Company, which read as follows:

To: Yaccawood

Melbourne.

SKINKEED PERMODESTA OMNIPARITY

translated as:

Present buying price per share is 76/3. Very small quantity of [?]

offering in the market.¹¹

⁸ Special Correspondent, (1888), The Barrier Silver and tin fields in 1888, Adelaide. p. 10; p. 20; p. 21.

⁹ Barrier Miner, 1/5/1889.

¹⁰ In a letter published in the Silver Age on 9 September, 1885, the writer warned that, due to the flimsy structure of the telegraph office, it was possible for those with a knowledge of morse code to "read" telegrams and then sell the information.

¹¹ Vivian, Younger and Bond to Knox, 8/6/1889, BHPA/A18/3.

Through the remainder of the period of the study, there are numerous examples of coded telegrams being used by all the various operations of the Company.¹² The sending of coded telegrams was not a practice restricted to the Company. Judging by an editorial in the Barrier Miner it was a common practice among mining companies.¹³

Introduction of the telephone

As with other elements that had an impact on the business of the Company, action was taken by the Company to improve communication systems, which included not only telegraphic systems, but also the introduction of the telephone. The secretary of the Company reported to a board Meeting on 1 April, 1890 that during a recent visit to Sydney he had two interviews with the postal department and arranged:

1. Increased telegraphing facilities, especially for Melbourne.
2. The immediate establishment of a phone exchange at Broken Hill, agreeing to a maximum guarantee of £350).
3. An Inspector would be sent to the field [Broken Hill] to check on alleged use of codes, and breaches of confidentiality.¹⁴

¹² See, for example, Knox to Melbourne, 13/8/1890, BHPA/M13; Letter to Dickenson, n.d., BHPA/A18/2; general manager to secretary, 13/4/1896, BHPA/M3/5, p. 694, general manager to secretary, 3/10/1899, BHPA/M3/6, p. 180, general manager to secretary, 31/5/1907, BHPA/M3/7, p. 469, Minutes of Meetings of Board of Directors, Broken Hill Proprietary Company Limited, 19/6/1908, BHPA/S1/18, p. 146.

¹³ Barrier Miner, 30 March, 1889. The editorial was complaining about cypher telegrams being charged at fifty per cent above the ordinary rate.

¹⁴ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 1/4/1890. BHPA/S1/4, p. 272.

The first small manual telephone exchange was opened at Broken Hill in January, 1891, with thirty subscribers, the Company being allocated telephone number 1.¹⁵

When the Company commenced quarrying operations at Iron Knob in South Australia (quarrying iron ore as a fluxing agent for the Port Pirie smelters) the South Australia Post Office was asked to construct a telegraph line from Port Lowly (the point on the South Australian coast from where the iron ore was shipped to Port Pirie) to Hummocky. The South Australian Government agreed to the request provided the Company would allow the public to use the Company telegraph line from Iron Knob to Hummocky Hill. The board agreed to this condition.¹⁶

Transport

Prior to the mine being developed at Broken Hill, Silverton was the transportation centre for the Barrier. Transport links were not, however, well developed. For example, to get to Adelaide, it was necessary to catch a Royal Mail coach as far as Terowie in South Australia, which then linked into the South Australian rail system. Alternatively, to get to or from Sydney meant using a coach from Silverton which connected with Cobb and Co. coaches at Wilcannia, then connecting with the rail infrastructure of New South Wales. An alternative that could be used to reach Melbourne was by coach from Silverton to Hay and Swan Hill railway stations.¹⁷

¹⁵ Australia Post, (1983), Broken Hill Post Office: Historical notes, Sydney, p.7; Solomon, R.J.,(1988), The richest lode: Broken Hill 1883-1988, Sydney, pp. 123-124.

¹⁶ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 19/6/1903, BHPA/S1/15, p. 369.

¹⁷ Advertisement for Royal Coaches, 13/9/1884; advertisements for McGowan Royal Mail Coaches and Burtons New Line coaches, 20/2/1884 Silver Age.

Coastal steamers also played a part. If a passenger wanted to travel from Sydney to Broken Hill, the quickest route was by coastal steamer from Sydney to Melbourne, then to Adelaide. It was then necessary to catch a train from Adelaide to Cockburn (on the South Australian/New South Wales border), and a stagecoach from Cockburn to Broken Hill. This trip was made easier when the Melbourne to Adelaide rail link was established in January, 1887.¹⁸ However, in terms of the operations of the mine, the geographic location of the mine in relation to South Australia made that the logical place from which to ship goods into and out of the mine.¹⁹ The board of directors then had the option of using Port Adelaide or Port Pirie as the transshipment port. Port Pirie was selected as many of the Port Adelaide wharves were privately owned, and it would thus be expensive to purchase waterfrontage.²⁰ Port Pirie was closer by rail to Broken Hill (255 miles as against 336 miles) and there was no necessity to tranship material at Terowie, as would have been the case if Port Adelaide was used, as a different gauge of railway line connected Port Adelaide with Terowie - from Broken Hill to Terowie the gauge was 3ft. 6 in; from Terowie to Adelaide it was 5ft 3in.²¹

When mining operations were first established at the Barrier Ranges silver field the geography of the field meant that transport both into and out of the field was a problem. Solomon describes three travel routes to Broken Hill in 1885. All three involved some degree of coach travel, with the route from Sydney via Adelaide involving steamship travel as well.²² This underdeveloped transport system was one

¹⁸ Carroll, B., (1976), Australia's railway days: Milestones in railway history, Melbourne, p. 16.

¹⁹ Annual Report of the Department of Mines for 1883, Sydney, 1884, p. 114.

²⁰ Bach, J., (1976), A maritime history of Australia, Melbourne, p. 272 and p. 274.

²¹ Reports and Statements of Account, Half year ending 30 November, 1888, BHPA/PE30/1, p. 8; Woodward, op. cit., p. 37.

²² Solomon, R. J. (1988), The richest lode: Broken Hill 1883-1988, Sydney, p. 47.

of the major factors in terms of the overall costs to the Company. Initially, transport infrastructure consisted of a variety of means of getting products to and from the silver fields. For example, when the Company arranged for the first smelting of the ore from its mine in 1885, "...the 46 tons [of ore] had to be carted by bullock dray for 250 miles, trained 150 miles to Adelaide, then by steamboat from Adelaide to Melbourne...".²³

While this was the case in 1885, the South Australian Government was not slow to recognise the advantages that geography had given the colony in relation to its distance from the Barrier Ranges silver field. On the 13 November, 1884, the South Australian Government passed an Act of Parliament, authorising the construction of a railway from Peterborough to Cockburn, which terminated at the New South Wales border, some 22 miles from Broken Hill.²⁴ Tenders for the construction of the line were called on 7 April, 1885.²⁵ This railway line was opened for traffic on the 14 June, 1887.²⁶ However, until the Peterborough to Cockburn line was completed, everything necessary for the mining operations had to be carried by bullock dray, or passenger coach. For example, coke for the smelters at Broken Hill came from Newcastle by sea to Adelaide; it was then taken by train to Terowie, and then by horse teams to Broken Hill.²⁷ In the early stages of the mining operation these transport difficulties caused almost as many problems as did the lack of a predictable supply of water.

²³ Jamieson to Dickenson, 15/3/1898, BHP.VA18/6.

²⁴ *Silver Age*, 22 November, 1884.

²⁵ South Australian Railways Contract No. 20/85, BHPA/A18/38, p. 63.

²⁶ Woodward, O.H., (1952), *A review of the silver/lead/zinc industry of Broken Hill*, Sydney, p. 37.

²⁷ Hore-Lacey, I. (1981), *Broken Hill to Mount Isa: the mining odyssey of W. H. Corbould*, Melbourne, p. 26.

The difficulties in obtaining adequate carriage from the end of the present railway line to the field have proved very great indeed.²⁸

Not only did the lack of a railway line cause problems in the carriage of the materials to and from the mine site, but it also added considerably to the costs of production. For example "[t]he cost of coke has been extremely heavy, in consequence of the high rates of land carriage..." but at least there was relief in sight as "...the South Australian line to the border of New South Wales will be completed this month, and its extension right up to Broken Hill is to be at once undertaken by the Silverton Tramway Company..."²⁹

The general manager was able to report in May, 1887 that although the "...[c]ost of mining and reducing has amounted to 78s. 6d. per ton for ore treated during the half year...with the near completion of railway communication with the seaboard, a very considerable reduction on these figures may be confidently looked for in the future."³⁰

The confidence of the general manager was not misplaced. When the rail link to which he referred was completed, coke which had cost £10/10/- per ton delivered to the mine now cost £5/5/- per ton, representing a saving of approximately £3,000/0/0 per week to the company.³¹

²⁸ Reports and Statements of Account, half year ending 30/6/1886, BHPA/PE30/1, p. 7.

²⁹ Reports and Statements of Account, half year ending 30/11/1886, BHPA/PE30/1, p. 9.

³⁰ Reports and Statements of Account, half year ending 31/5/1887, BHPA/PE30/1, p. 14.

³¹ Chairman's address to Shareholders, minutes of a meeting of shareholders, 18/1/1888, BHPA/S3/1.

Once the treated ore in the form of bullion was landed at Port Pirie it was loaded, first by lighter, then directly, for further refining in England or Europe. All the material for the mine (smelters, boilers, timber, coal, coke, general supplies) had to be landed at Port Pirie for transshipment to Broken Hill. Even this operation was not without difficulties. The wharf facilities used by the Company were leased from the South Australian railways and there arose a problem in interpreting the terms of the lease. The Commissioners of the South Australian Railways interpreted the terms of the lease as giving precedence to the loading and unloading of their ships over those of the Company. The directors of the Company solved the problem by agreeing to pay additional rental for exclusive use of the wharf.³² It is also worth noting that during the period covered by the study there were constant meetings involving either the Company, or the Barrier Ranges Mining Companies Association, and the South Australian Railways Commissioners regarding the rates that were being charged to transport mining material to and from the Barrier mines on the South Australian Railways system.³³ The South Australian Railways system was also used to transport police from New South Wales, and strike breakers from Sydney, Melbourne and Adelaide during the protracted strike of 1892. As has already been indicated, the South Australian Railways also had charge of shipping facilities being used by the Company at Port Pirie and also owned land near the site for the proposed refinery. This meant that the Company had extensive dealings with the Commissioners of the South Australian Railways, dealings which could be somewhat varied in nature. For example, in April, 1888, when the Company was investigating locating a refinery at

³² Chairman's address to Shareholders, minutes of a meeting of shareholders, 18/7/1889, BHPA/S3/1.

³³ See, for example, Minutes of Meetings (various) relating to Broken Hill, 3/11/1890, BHPA/S14/1, pp. 55-56; Minute Book, Barrier Ranges Mining Companies Association, 15/9/1891, BHPA/S14/3, p. 33.

Port Pirie, the general manager received a letter from the Commissioner of Railways that land the Company was interested in would be auctioned in the usual way, "...but would be done in such a way so as not to invite competition." Precisely how this would be done was not mentioned.³⁴

In July, 1889 the general manager wanted an addition in his half yearly report drawing attention to the "...undue use of the Company's wharf at Port Pirie by the South Australian Railway Commission." The board decided that it would be "...injudicious to publish an official complaint...but that pressure would be brought to bear by the directors to effect an alteration in the mode of using the wharf." The board meeting in July was advised that the problem had been solved. The railway would use Darling's wharf for their coal and the Company would pay the wharfage charge.³⁵

Another development which did not impact directly upon the operations of the mine but rather on its management was the connection of the Victorian and South Australian railways at Serviceton in January, 1887.³⁶ This meant that directors (and other officers of the Company) no longer had to take the longer sea route from Melbourne to Adelaide.

Transport of the products required for mining, and the products of mining was of such significance to the Company that the directors entered into two long term contracts.

The first was with the Silverton Tramway Company, for a period of 5 years from

³⁴ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 11/4/1888, BHPA/S1/3, p. 133.

³⁵ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 2/7/1889, pp. 541-542; 10/7/1889, p. 549, BHPA/S1/3.

³⁶ Carroll, B. (1976), Australia's railway days: Milestones in railway history, Melbourne, p. 38.

20 March, 1888, to carry all products at fixed prices for the term of the agreement. The second was with P & O Steam Navigation Company, for a period of 3 years from 16 July, 1889, to carry all the bullion and refined lead produced by the mine.³⁷ The board also signed an eight year agreement with both the South Australian Railways and Silverton Tramway Company to use the lines for carriage of material to and from the mine, although the Company did retain the right to send ores anywhere by using the Darling River.³⁸ This gave both the South Australian Railways and the Silverton Tramway Company protection against a possible competitor (either another colonial government or a private company) providing alternative rail links, for example, linking into the New South Wales or Victorian systems.

Once the transport infrastructure was in place, the major concern of the Company was with the freight rates charged by the South Australian Railways and the Silverton Tramway Company. For example, on the 3/11/1890 there was a conference of mining company representatives with the South Australian Railways regarding the rates of freight for all material coming to and from the Barrier.³⁹

Some indication of the scale of material transported to and from the mine at Broken Hill can be gained from Report of the general manager to the board of directors for the Half Yearly Meeting for the year ending 30 November, 1890 when it was pointed out that 190,000 superficial feet of timber "...has weekly to be lowered down the shafts..."

³⁷ Copies of agreements with Silverton Tramway Company and P & O Steam Navigation Company, BHPA/M8/13.

³⁸ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 22/5/1890, BHPA/S1/4, pp. 351-352.

³⁹ Minutes of meeting of Directors of Broken Hill Proprietary Company Limited and others, 3/11/1890, BHPA/S14/1, pp. 55-56.

Of course, the timber had first to be delivered to the mine. "To receive our daily consumption of coke, coal, timber and limestone...and to despatch our output of bullion, we have to handle, on an average, about 770 truck loads of material per week".⁴⁰

During 1891, the Barrier Ranges Mining Companies Association also met with both the South Australian Railway Commissioners and the Silverton Tramway Company in an effort to have freight rates reduced.⁴¹ This issue was again raised in 1895 but the board decided that it would be "...impolitic to approach the South Australian Railways at present in regard to a reduction in rates." No reason is provided for why it would be impolitic.⁴² It may have been due to Darling, a director, deciding to contest (and later winning) a seat in the lower house of the South Australian Parliament.⁴³

The general manager, writing in March, 1899, did not seem to be too concerned about being impolitic. He wrote to the secretary:

I have read the latest product on of the South Australian Railway
Commissioner on this subject...It is even more remarkable than some
others which we have had in the past.

⁴⁰ Reports and Statements of Account, Half year ending 30 November, 1890, BHPA/PE30/3, p. 21.

⁴¹ Minutes of meetings of the Barrier Ranges Mining Companies Association, 15/9/1891, p. 33; and 3/12/1891, p. 69; BHPA/S14/3.

⁴² Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 7/6/1895, BHPA/S1/10, p. 3.

⁴³ Trengove, A., (1975), Whats good for Australia: The story of BHP, Sydney, p. 59.

Each Mining Company being expected to make a monthly statement of the quantity of this timber used on the surface.

is simply untrue; no Mining Company except the Proprietary was expected nor asked to make a monthly statement until December last. The only difficulty in connection with the notice published in the Adelaide Gazette was that no one could understand exactly what the South Australian Railway Commissioner intended to be done. We have, however, been in the happy position of understanding what was wanted for many years past, so that no difficulty presented itself except that the S.A.R. Commissioner insisted on the signature on the Return being witnessed by a JP. We endeavour to keep JP's off the premises here as much as possible, but we did manage to comply even with this request of the SAR Commissioner, so that, so far as I am aware, we are now all in order and it would be a pity to throw aside the results of so much labour spent in determining the meaning of the SAR Commissioner's wishes as expressed in the Gazette notice. I notice too that the Commissioner now wishes to abandon the honour of receiving a return signed by anyone but a secretary, even when the signature has been fortified by a JP! as witness! On this point I would recommend the board to inform the SAR Commissioner to attend to his own business. To anyone who is in the unfortunate position of having to do business with the South Australian Railways, it is only too evident that there is ample scope for all his abilities.⁴⁴

⁴⁴ General manager to secretary, Letterbook. 14/3/1899, BHPA/M3/6, pp. 729-730.

If the secretary tabled the letter to a board meeting, there is no record of this having been done. Instead, the secretary advised a board meeting of 24 March, 1899 that he had interviewed the South Australian Railways Commissioner and there would be no change in procedure.⁴⁵

Finally, only one more piece of transport infrastructure was needed by the Company during the period of this study. This was the construction of a rail link between Hummocky Hill (present day Whyalla) and Iron Knob, which necessitated a Bill being considered and approved by the South Australian Parliament. A Private Act to construct a tramway from Hummocky Hill to Iron Knob was assented to on 5 December, 1900.⁴⁶

Silverton Tramway Company

Given the significance of transport costs to the overall operations of the Company (and in fact all the mines of the Barrier) it is worth examining, briefly, the Silverton Tramway Company and the role it played in the overall development of the Company.⁴⁷

⁴⁵ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 24/3/1899, BHPA/S1/13, p. 63.

⁴⁶ Private Act to construct a tramway..., BHPA/M8/49.

⁴⁷ The full history of the Silverton Tramway Company is yet to be written. The Minute Books of this company are held in Melbourne University Archives and examination of this material reveals that there were at least two companies interested in securing passage of the necessary legislation through the New South Wales Parliament and one of the directors of the Company W.P. McGregor, M.P. was given a number of shares for his assistance in the Silverton Tramway Company being given the necessary legislative approval for their proposed route.

As already pointed out, Broken Hill was situated in the far west of New South Wales and much closer to Adelaide in South Australia, and consequently closer to that state-provided transport infrastructure. Prior to the Silverton Tramway being constructed, the nearest point to the New South Wales Railways system was Nyngan, some 358 miles from Broken Hill - this meant there was still a considerable distance from Nyngan to Sydney - while the distance from Broken Hill to Adelaide was in total 253 miles. While there may have been political reasons to construct a line from Nyngan to Broken Hill, there were good economic reasons not to. There were also good economic and political reasons for not constructing a rail link from Broken Hill to the South Australian border, as this would divert all the rail traffic to the neighbouring colony of South Australia. The Government of New South Wales would have to meet the costs of such construction, maintenance, staffing and would gain very little economic benefit as this would all accrue to South Australia. There were also good political reasons not to construct such a line, as the Government could not be seen to be channelling trade deliberately to another colony.⁴⁸ This point seems to have been appreciated by the mining companies: as two mining managers, writing in 1892/3, observed:

It would have been unreasonable to expect the Government of New South Wales to construct a railway on the route of the Silverton Tramway which absolutely diverts the traffic away from their colony...⁴⁹

⁴⁸ Kennedy, B., (1980), Regionalism and nationalism: Broken Hill in the 1880's, Australian Economic History Review, XX/1, pp. 64-65.

⁴⁹ Jamieson, M.B. and Howell, J. (1892/93) Mining and ore treatment at Broken Hill, New South Wales, Minutes of proceedings of the Institution of Civil Engineers, p. 139.

In 1885 a deputation from Silverton had attempted to get the South Australian Government to construct a rail link from the South Australian border to Silverton as it was obvious the New South Wales government would not undertake such a project. However, the South Australian government advised the deputation that it did not intend to do this.⁵⁰

As the Governments of the two colonies South Australia and New South Wales had refused to build the rail link connecting Silverton to the South Australian rail system, the local member of the New South Wales Parliament W. J. Abbott, Minister for Mines, suggested that Silverton build its own rail link to the South Australian system.⁵¹ As a result of this advice, the Silverton Tramway Company was formed and a prospectus published on the 30 March, 1885. The provisional directors were W.P. McGregor, M.P., K. Brodribb, W.R. Wilson, J. Penrose, and J. S. Reid.⁵² With the exception of Penrose, all the other directors were either directors or shareholders in the Company.

By the time the line was completed, Silverton was declining in importance and Broken Hill assuming the premier position on the Barrier fields. The line was simply extended from Silverton to Broken Hill, with the first train arriving at Broken Hill on 25 November, 1887.⁵³ The line was officially opened at Broken Hill on 12 January, 1888.⁵⁴ As was the case with the South Australian Railways, the transport charges of

⁵⁰ Silver Age, 2/5/1885. It is somewhat doubtful if the Government of New South Wales would have permitted this to happen anyway.

⁵¹ Report in the Silver Age, 30/5/1885.

⁵² Silver Age, 30/5/1885.

⁵³ Carroll, B. (1976), Australia's railway days: Milestones in railway history, Melbourne, p. 47.

⁵⁴ Minutes of half year general meeting, Silverton Tramway Company, 29/2/1888, p. 102.

the Silverton Tramway Company were a matter of importance to the Company and even though long term contracts had been entered into, the Silverton Tramway board was asked on a number of occasions during the period of the study to reduce their freight rates.⁵⁵ A general dissatisfaction with the freight rates charged to the Barrier Companies would also lead to the Company obtaining, in 1889, details of the procedures necessary to construct a tram line from Cockburn (on the South Australian Border) to the mine at Broken Hill.⁵⁶ Obviously, the threat proved sufficient, as a number of cartage rates were reduced by Silverton Tramway as from 1 July, 1889.⁵⁷ A similar dispute regarding freight rates arose again with the Silverton Tramway Company late in 1903. The South Australian Government had reduced its rates, but the Silverton Tramway Company had declined. At a meeting of the board of the Company on 29 January, 1904 the secretary was instructed to call for tenders "...for the supply of rails & sleepers required, and generally instructed the Secretary in this matter."⁵⁸ The general manager had already started, on the 25 January, to peg claims for the rail line.⁵⁹ At a board meeting held on 5 February, attended also by the directors of the Silverton Tramway Company, these directors stated they "...were prepared to make a further reduction of 1d per ton on the rates previously proposed." After the representatives left the meeting, the secretary was "...instructed as to letter to be forwarded setting out terms proposed."⁶⁰ At a special meeting of the board on

⁵⁵ See, for example, Minute Book, Barrier Ranges Mining Companies Association, 3/12/1891, BHPA/S14/3, p. 69.

⁵⁶ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 10/4/1889, BHPA/S1/3, p. 465.

⁵⁷ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 2/7/1889, BHPA/S1/3, pp. 536-537.

⁵⁸ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 29/1/1904, BHPA/S1/15, p. 532.

⁵⁹ Delprat, G. D., Diary, 25/1/1904, NLMS1630/15.

⁶⁰ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 5/2/1904, BHPA/S1/15, p. 533.

8 February, 1904, and representatives of Silverton Tramway Company, the representatives of the Silverton Tramway Company essentially agreed with the rate that the Company had proposed, but added:

It is to be understood that any application by you for a lease for a tramway is withdrawn unconditionally.

The board responded that when the rate negotiations were satisfactorily resolved, then the Company would withdraw the applications which it had made for leases for railway purposes.⁶¹ The new rates were accepted by the Company board on 12 February, 1904, with a contract for seven years dating from 1 January, 1904. When the new agreement was signed, a notice of abandonment of application for [railway] leases was also signed.⁶²

Another problem between the Company (or, more properly, directors of the Company) and the Silverton Tramway Company was that the directors of the Company owned shares in both companies. This issue was raised by a number of shareholders during half yearly meetings of the Company. It also caused conflict between directors of the Company, and one director of the Company even considered resigning his place on the board of the Company. This would not be the only potential conflict of interest for the directors of the Company. Another was the Tarrawingee Flux and Tramway Company.

⁶¹ Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 8/2/1904, BHPA/S1/15, pp. 537-538.

⁶² Minutes of Meetings of Directors, Broken Hill Proprietary Company Limited, 12/2/1904, p. 541; 26/4/1904, p. 552, BHPA/S1/15.

Tarrawingee Flux and Tramway Company

One of the major materials used as a flux in the smelting of the ores was limestone. The general manager, in 1890, in a report to shareholders, highlighted the fact that the consumption of limestone amounted to approximately 1,850 tons per week. He stated that this figure would increase as the nature of the ores changed. Current supplies were being drawn from a number of sources. The limestone was found to be of a variable quality and a number of contracts had to be cancelled. After examining two local sites of limestone, and carrying out a number of different tests and financial projections, he recommended that the Company enter into a four year contract with the Tarrawingee Flux and Tramway Company.⁶³ The Tarrawingee Flux and Tramway Company had to secure an Act of Parliament granting it the right to construct a private tramway, as no tram line existed when the general manager put forward his recommendation.

At the ordinary meeting of shareholders held on 29 January, 1891, the directors of the Company recommended a four year contract be entered into with Tarrawingee Flux and Tramway Company, with a sliding scale per ton of limestone. One of the reasons given for the length of time of the contract was that although the company had secured passage of the necessary bill through Parliament to construct the tramway, the company wanted the assurance of a long term contract in order to justify the cost of building the tramway. The actions of the directors of the Company were questioned at an informal meeting of shareholders in Adelaide and as a result of legal advice the

⁶³ Reports and Statements of Account, half year ending 30 November, 1890, BHPA/PE30/3, pp. 25-28.

board of the Company had been advised that as several of the directors of the Company were shareholders in the Tarrawingee Flux and Tramway Company it would be illegal for them to complete the contract. The matter was referred to shareholders for decision.⁶⁴ Ultimately, the contract was entered into, and further discussion of this issue can be found in a later chapter of the thesis. It is an indication of the importance to the Company of transport links in terms of raw materials cost as it was estimated the contract with the Tarrawingee Flux and Tramway Company would save the Company approximately £30,000 per annum.⁶⁵

The foregoing discussion illustrates the importance to the Company of transport structures, especially rail, in the transport of products to and from the mine. Not only did the rail links save the Company money but it also meant that the transport structures were more reliable and less likely to be disrupted through bad weather.

Two other points need to be made. First, the Company also relied extensively on sea transport for transporting the products from the mine to national and international markets. Sea transport had to be used to get supplies of coke, coal, timber and machinery to Port Pirie for transshipment to the smelters and the mine. The Company had little control of sea transport rates as, in the early years of the Company, international shipping operated on the basis of rates agreed to by the shipping companies. Such price fixing arrangements did not last as in 1891 the Chairman was able to report:

⁶⁴ Minutes of half yearly meeting of shareholders, 29/1/1891, BHPA/S3/1.

⁶⁵ Minutes of half yearly meeting of shareholders, 29/1/1891, BHPA/S3/1.

The English shipping ring has been disturbed, and consequently the freight between England and here on coke has been reduced from 30 to 40 per cent.⁶⁶

The issue of sea transport has not been discussed in any detail, as by the time the Company commenced operations, sea transport links were not only well established, but also well understood by Australian businessmen as wool had been exported from Australia to London from the 1850's. Many of the directors of the Company were pastoralists who had experience with the wool industry, or merchants who understood shipping operations. There were the inevitable disputes with shipping companies (P & O; Adelaide Steamships) but these disputes were resolved along normal commercial lines, relying to the institutions, structures and processes which had already been well established.

The second point is, to some extent, more tenuous and difficult to substantiate from extant records. As the operations of the Company were so widespread, directors and senior managers had to undertake a significant amount of travelling. The diaries of G. D. Delprat, general manager from 1899 to after the period being studied, revealed that during train and steamer trips often he would be accompanied by all or some of the directors, or would meet other individuals who were influential in the various colonies. One specific encounter that has survived occurred on the 18 May, 1912 when Delprat recorded in his diary:

⁶⁶ Chairman's address to shareholders, minutes of a meeting of shareholders, 16/7/1891, BHPA/S3/1.

Travelled in train with Josiah Thomas (External Affairs), Hedden,
(Min of Mines, New South Wales.) Thomas in favour of our starting
steel works...all in favour of us doing the work.

Delprat was, of course, referring to the decision made by the Company in 1911 to investigate the production of iron and steel. The train (and steamer) trips were able to provide informal settings to discuss the proposed venture and ascertain the degree of political support that might be forthcoming. There is also recorded in Delprat's diaries a number of informal meetings between himself, and the directors of the Company who lived in Adelaide, specifically Larling and Muecke. Delprat would visit either, or both, of these directors on trips to Melbourne for board business, or Port Pirie on smelting issues.

Conclusion

The above chapter illustrates the way in which individuals embedded within institutional structures were able to draw on institutional resources in order to further the interests of the Company as perceived by directors and senior managers. The institutions did not make any choices merely providing the structure and legitimacy for individuals to make choices, even if the legitimacy of some individual choices were called into question. For example, in relation to both the provision of water supplies for the Company mining and smelting operations, and the transporting of materials to and from the mine at Broken Hill individuals were able to call upon institutional resources to which they had access by virtue of their position within the institution. In both cases the water supply company and the Silverton tramway company wanted to charge the Company rates which the directors considered to not be reasonable. In both cases the directors threatened to construct their own water supply system and transport system. The threat was successful as the directors had access to institutional resources to make good on their threats. The legitimacy of some individuals to make choices within institutional structures was also called into question when there was the perception that the same individuals located in two separate institutional structures were seen to further their own personal interests at the potential cost to the institutions they purported to represent.

The geographic location of the mining and smelting operations also impacted upon individuals. With a head office in Melbourne, agencies in Adelaide and Port Pirie, and mining operations at Broken Hill it was necessary for directors and senior

managers to commute from one location to another. In the course of such travel directors and senior managers would be 'confined' with each other for the duration of the trip. This provided opportunities to establish social relationships and discuss issues relating to the Company on a more informal basis. The various trips taken by directors and senior managers also provided the opportunity to meet other individuals who were important to the Company more in terms of their institutional connections than any individual attribute. The example of the general manager's discussion with Federal politicians during train trips is one way in which the method of transport impacted upon the operations of the Company.