

# Calcifer – the First Copper Smelter on the Chillagoe Copperfield

RUTH S. KERR

*The Calcifer site illustrates the itinerant nature of the North Queensland mining industry. The region's first copper smelter bears no outward sign of its original metallurgical and commercial purposes. The permanent way of the tramway can be easily traced as it was used for ore transport until the closure of the Chillagoe smelters in 1914. Nevertheless the integrity of the site is discernible from the shallow foundations and the inter-relationship of the buildings, tramway and town.*

## INTRODUCTION

The Chillagoe smelters were one of the largest metallurgical developments in Queensland prior to World War I. Half a million pounds were spent on construction of the railway and smelters when only £505 685 worth of ore reserves could be confirmed. Up to World War I, 609 600 tonnes of ore were smelted from the Chillagoe and Etheridge fields for the production of 23 644 tonnes of copper, 32 266 tonnes of lead, 135 139 110 grams of silver and 899 132 grams of gold. The geology of the fickle North Queensland veins of rich raw metal and superficial fissures, along with transport costs for hauling both ore and coke vast distances along the Chillagoe and Etheridge railways, devastated the company's finances. Investors lost £5 200 000 and never received any dividends.<sup>1</sup>

The name, Calcifer, probably first spelt 'Calcufer', is a combination of the Latin names for limestone, copper and iron. It was coined when John Moffat erected the first copper smelters on the Chillagoe field in July 1894. Situated 13 kilometres east of Chillagoe station homestead, Calcifer was the first town on the Chillagoe field, 200 kilometres west of Cairns by rail (Fig. 1).

The mining industry has always been seen as a key development industry for the Australian economy. In Queensland it was the reason for the extensive population increase in the state, especially in central and northern Queensland, attracting miners and tradesmen from the southern mining fields, particularly Broken Hill. Immigration from the British coalfields supplied the underground engine drivers and surface tradesmen. Their eagerness to succeed provided the impetus for new towns and extended administrative requirements and the railway system. Townsville, Cairns and Cooktown boomed because of decisions to build railways from the coast to the mining fields at Charters Towers, Herberton and Maytown. Mining was always seen as the salvation of the economy and administrative practice was tailored to cause as little economic intrusion as possible. In the 40 years to 1900 when the population of Queensland grew from 25 000 to 500 000, the gold and mineral production reached £1 271 544 and the *Mining Act 1898* codified the industry's royalties and land tenure mechanisms.

Frontier mining camps were fostered principally by the anonymous individual prospector, grub-staked by storekeepers. In this milieu mining camps were a rich and raw social fabric.

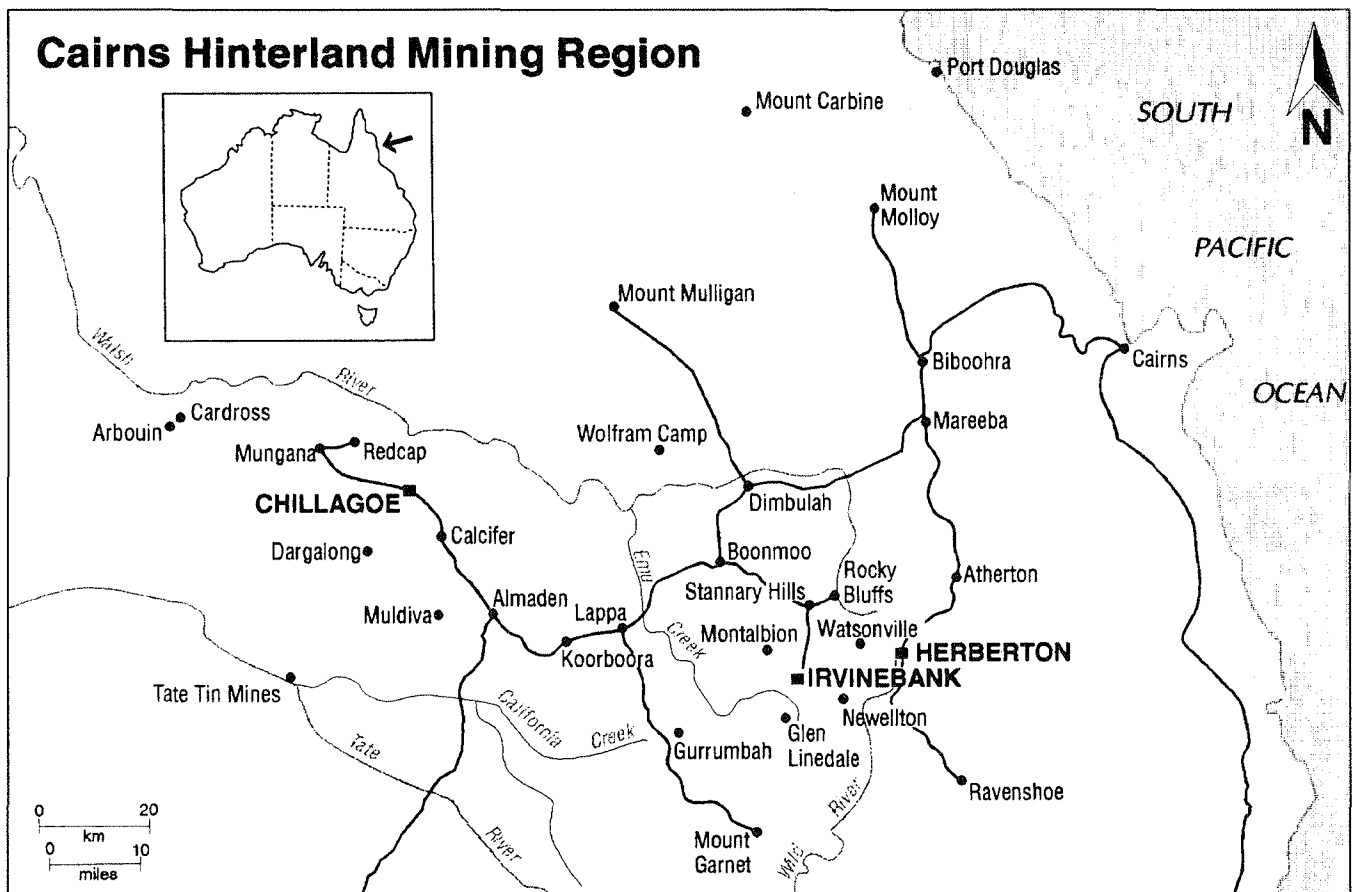


Fig. 1: Location of Calcifer and Chillagoe.

The industry brought all cultures together – European and Asian – a male coterie of alluvial and hard rock miners, entrepreneurs, promoters, sharebrokers and British investors, speculators who mined the markets, engineers, assayers, smelters, teamsters, charcoal burners, metallurgists, engine drivers, mine managers, timbermen, construction workers, and a few wives and children. Their enterprise attracted a host of hoteliers and storekeepers, who, respectively, relieved the miner of his earnings and provided a sense of stable society around the mine, a situation common to the industry throughout the nation.

Only one company, the Irvinebank Mining Company, a private company, managed by a shrewd Scot, John Moffat, was successful in North Queensland through monopolistic control of leases and local batteries. John Moffat's empire spanned the Cairns hinterland and sponsored and financed mines, towns, railways, and social infrastructure of the region from 1880 to 1918.

## INITIAL EUROPEAN SETTLEMENT

William Atherton took up Chillagoe station on the lower Walsh River in 1887 on behalf of his brother, John, who applied formally for the land in April 1888.<sup>2</sup> The boom in copper prices stimulated interest in exploring for copper there. Samuel Delaney and Charles Garbutt had been prospecting before John Moffat of Irvinebank sent his managers, Anthony Linedale and Peter Moffat in June – July 1887.<sup>3</sup> The Boomerang mine was taken up by Michael Byrnes of Byrnes Brothers, butchers, and registered at Thornborough on 17 July 1888 as a 16.2 hectare Prospecting Protection Area.<sup>4</sup> It was soon transferred to Melbourne mining investors, H. Gore and M. Morrey, and miners, John James and party, on 15 August 1888.<sup>5</sup> The area was forfeited at the Herberton Mineral Lands Commissioner's Court on 31 July 1889 for non-fulfilment of labour conditions.<sup>6</sup> Moffat did not obtain control of it until early 1890 amid rumours that smelting works would be erected.<sup>7</sup> The Boomerang was known as a big lode with 4 064 tonnes of ore estimated to yield 1 016 tonnes of copper. There was a 10.6 metre drive and 4.3 metre winze.<sup>8</sup> When company promotion failed to entice South Australian copper and Broken Hill magnates in 1891, Moffat only did limited exploration work on the Boomerang through the subsequent depression.<sup>9</sup>

Moffat's intention to erect a smelter on the Chillagoe field to treat ore from the Boomerang, Griffith and nearby mines became public in May 1894.<sup>10</sup> His aim was to foster further exploration with a view to attracting more capital to the field.<sup>11</sup> The operation of a new smelter would symbolize a new permanency on the northern fields, persuading miners and smelter workers to bring their wives and families to the new frontier towns. The Calcifer smelter commenced in August 1894.

Moffat erected a second smelter at Girofla to the west in 1896, so controlling the field in readiness for a central smelter. The second discovery of the Chillagoe field occurred that year when Moffat hosted the visit of three speculative investors – Malcolm McEacharn, Charles W. Chapman, and James Smith Reid – representing Melbourne's Collins House Group and Broken Hill Company capital. A huge smelter and railway development resulted from their enthusiasm. The vehicle for floating the Chillagoe leases was the Chillagoe Proprietary Company which acquired Moffat's leases under an agreement signed on 29 October 1897 and the company then negotiated the passage of *The Mareeba to Chillagoe Railway Act* in November 1897. The Chillagoe Railway and Mines Limited was formed on 16 June 1898 to finance the construction of the railway and smelters, which were opened in 1901. This construction phase brought a wave of population to the region, opening new towns – Chillagoe, Mungana, Calcifer – and mining and construction camps at Redcap, Zillmanton, Ruddygore, Ti Tree, and Otho (Fig. 2).

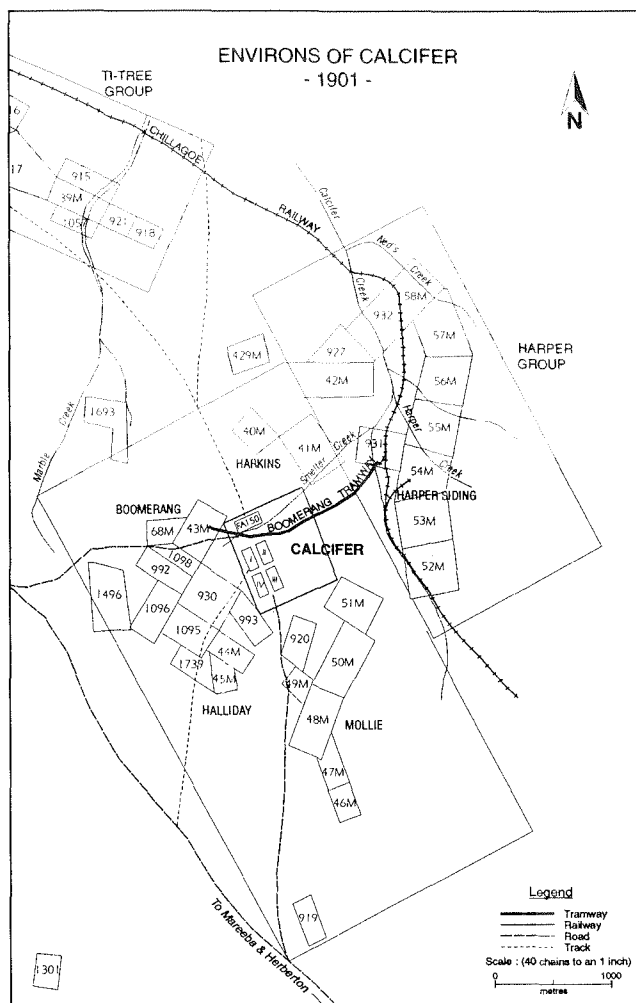


Fig. 2: The Chillagoe field, 1901.

## OPERATION OF THE SMELTERS

The Calcifer smelter project was piecemeal and tentative, using primitive machinery. Moffat purchased the smelting plant of the defunct Melbourne company, Silver Mining and Smelting Syndicate, at Newellton on the Dry River south of Herberton.<sup>12</sup> It was advertised in February 1894 as comprising: a 20.3 tonne water jacket furnace,<sup>13</sup> one Baker blower, a stonebreaker (2.7 metres by 1.5 metres), a six horse power vertical boiler, a multi-tubular boiler (4.3 metres by 0.9 metres) with complete connections, and a small Blake's pump.<sup>14</sup> Moffat added other necessary machinery to construct a cupola or blast furnace type smelter on Furnace Area 150, so the equipment hauled to Calcifer from Newellton and Irvinebank comprised two steam engines (12 horse power), one stonebreaker, one jigger, one iron cupola furnace, one fan blast and two saw benches, valued at a total of £2 000.<sup>15</sup> Flooded roads south of Irvinebank meant that the carrier, White, had to haul boilers, furnace plates and pipes 64.5 kilometres further.<sup>16</sup>

Calcifer was Moffat's first copper smelter, and was the only treatment works he ever erected without a dam, as Smelter Creek was fed by a spring in the limestone country. Smelting commenced in August 1894 and in the first five months 203 tonnes of copper metal were produced, even though the works had to stop temporarily because of bushfires and lack of feed for the teams.<sup>17</sup> A third of production costs went on transport to Cairns – £2 000 in the first five months.<sup>18</sup> The dry season and the high cost of carriage to Mareeba (£12 per ton) forced the smelter to close temporarily every year.<sup>19</sup> Sixteen to 20 per cent copper from surface shows warranted perseverance so Moffat installed four more pumps,

another stonebreaker and a jigger in 1895.<sup>20</sup> Blast furnaces were ungainly in their height, and operated at dangerously hot temperatures, often cracking and almost melting the bricks.<sup>21</sup> The smelter generally ran roughly in 1895, producing rich slag, yielding 279 tonnes of copper, valued at £9 625.<sup>22</sup> In the first two and a half years the Calcifer smelter treated 4 183 tonnes of copper ore yielding 831 tonnes of copper matte valued at £29 795 (Table 1). In addition, transport costs swallowed one third of the income, and ticks and bushfires ravaged the bullocks and their feed.<sup>23</sup>

Table 1. Calcifer Smelter production in tonnes.

YEAR	ORE	COPPER	VALUE (£)
1894	1 281	215	7 000
1895	1 401	279	9 625
1896	1 500	333	13 160
1897	1 664	149	7 650
TOTAL	5 846	976	37 435

Combined with the smelter operation was a tramway operation. The Boomerang Tramway (two feet – 610mm gauge) of two kilometres was laid down from Boomerang mine to Harper's Siding on the main Chillagoe railway in 1901. It enabled cheap supply of ore to the Chillagoe smelters and meant the closing down of the Calcifer smelters.<sup>24</sup> The Boomerang tramway was one of the three narrow gauge tramways (Redcap, Mount Lucy, Hobson and Boomerang) and the many sidings (Otho, Ti-Tree, Harper's, Ruddygore, Smelters, Zillmanton, Griffiths) along the main Chillagoe railway which the company built in 1901–1902 to service its mines and to obtain flux.<sup>25</sup> The Chillagoe Railway and Mines Company Pty Ltd paid rates on the Boomerang tramway, ML1854, to the Walsh Divisional Board at Irvinebank and also applied in June 1902 for a Water Right for this and other tramway leases.<sup>26</sup> Substantial ore bins were constructed at the end of the Boomerang Tramway for transshipping to wagons on Harper's Siding.<sup>27</sup> The Boomerang tramway was also used for the transport of ironstone flux in to the smelters. A branch of the tramway was constructed to the Calcifer slag dump in 1908 to remove slag to Chillagoe smelters for treatment of the residues in the new Huntingdon-Herberlin plant.<sup>28</sup> As the slag was quickly removed from the Calcifer smelters and the low grade ore was worked out of the Boomerang mine the tramway was abandoned after the closure of the Chillagoe smelters in 1914.

## ESTABLISHMENT OF THE TOWN

The fumes of Moffat's first copper smelter symbolised the promise of permanency for the field. The Calcifer mining camp spread out on the flat below Boomerang mine beside an oasis of spring water (Fig. 3). The number of miners, smelters, tradesmen, publicans and storekeepers totalled 40, accompanied by 45 women and children from New South Wales mining fields,<sup>29</sup> along with 20 Chinese "Johns" supplying green vegetables.<sup>30</sup> Hans Halkier came from Muldiva to open the first store in 1894, and he and Sterling Bradby operated dairies in 1895 and George Long and Edward Joseph Malone were the two resident carriers. Oscar Marchant operated a cordial factory and William Atherton the butcher shop. By 1898 the vibrant town of Calcifer comprised five hotels – Charles McCarthy's Star (originally Owen Mitchell's), George Richardson's Chillagoe (opened by John Leahy), Edward Torpy's Calcifer, Edward Ryan's Traveller's Rest and Charles John Wickie's hotel; stores run by Jack and Newell, Solomon and Company of Adelaide, Thomas Templeton and John Guthrie, and Hans Halkier; and the Bank of Australasia.<sup>31</sup>

The mining community quickly organised sporting activities. William Clifford, E. & W. Atherton, W. Arbouin, T. Stewart, S. Bennett, J. McCarthy and E. Thomas all entered horses at the first race meeting in 1894. Thomas Harper, J. Lesina, the three Murrane brothers, C. Andrews, T. Besant, C. Pullen, J. Langton, H. Finn, C. Pullen and J. Hennessy formed the cricket team which played Girofla in 1896.

The Chillagoe General Hospital was opened in 1899 at a cost of £180 in a floored military tent (9.4 x 4.9 metres). The residents and the Chillagoe Company contributed equally to its cost. The hospital was floored and set on a timber frame 0.6 metres above the ground. Dr A.W. Brownrigg was in charge.<sup>32</sup>

The school committee comprising William Smith, George Richardson, W. Elmos, J. Gordon, Charles McCarthy and W. Clealand with Oscar Marchant, hotelier as secretary, applied for a school on 12 June 1899. The Chillagoe Company supplied the material at cost and the committee paid £23 in labour costs for the school which was 8 metres long by 6.4 metres wide including a teacher's room and two verandahs plus tank and £27 worth of furniture.

There were only two teachers. Joseph Krause of Mount Cotton opened Calcifer school on 12 March 1900 with an



Fig. 3: Calcifer town and smelters, 1900 (APO-7, Chillagoe Mines Ltd Views).



machinery was removed progressively by the Chillagoe Company for use at their central smelters, and the bricks were reused by miners over succeeding decades. Part of a boiler remains in the creek, and it possibly dates from the 1937 mining efforts when scratchers worked over the Boomerang, Harper and Christmas Gift mines intermittently.<sup>37</sup> To the discerning eye the outside post holes of the smelter shed are still visible along with the flat stony ore dump on the northern side of the building. There are also the foundations of a creek crossing to the Calcifer town side to the Boomerang Tramway. Nothing remains of the slag dump. About halfway between the smelters and the Boomerang mine are three sides of a small brick and stone building, possibly an assay office or magazine. Brick or stone buildings are rare in North Queensland, and this one and the remains of a stone building at the far end of the main street of Calcifer complement the smelter site, the first on the Chillagoe field (Fig. 8).

## NOTES

- 1 For a detailed overview of the Chillagoe smelters history see Bell 1993.
- 2 Queensland. Public Lands Department. Cook District. Run Application Register, LAN/N39, ff.88-94, Queensland State Archives (hereinafter QSA).
- 3 *Australian Mining Standard* 12 November 1890 p.14.
- 4 Mining Warden, Herberton, Register of Prospecting Protection Areas, Mining Warden's Office (MWO) 12B/45 No.16, QSA.
- 5 Mining Warden, Herberton, Register of Prospecting Protection Areas, MWO 12B/45 No.16, QSA.



Fig. 7: The remains of a boiler, Calcifer Creek (J. and R. Kerr, 1974).



Fig. 8: Stone building in the town of Calcifer (J. and R. Kerr, 1974).

- 6 Mining Warden, Herberton, Minutes of Mining Warden's Court, MWO 12B/15, QSA.
- 7 *Herberton Advertiser* 28 February 1890.
- 8 *Herberton Advertiser* 6 December 1889.
- 9 Queensland. Department of Mines, Annual Report (hereinafter MR) 1893 p.93.
- 10 *Cairns Argus* 2 May 1894; *Wild River Times* 3 May 1894; *North Queensland Herald* 15 August 1894 p.12.
- 11 For a detailed overview of the mining history of the Chillagoe field see Kennedy 1982:217-274, Kerr 1979, Chapters 3 and 5; and Kerr 1992:1-3,14-15,27-28.
- 12 *Queenslander* 9 June 1894 p.106 c.1; MR 1894 p.103.
- 13 The water jacket furnace was a Pacific type imported from San Francisco and erected in 1883 under the supervision of an expert brought from the United States. It required coke and large quantities of flux, and did not operate efficiently. It operated intermittently in succeeding years but the company was obliged to reconstruct and erect a reverberatory furnace. (*Queenslander* 18 November 1882 p.713 c.4 - p.714 c.1, 6 October 1883 p.571 c.3, 22 December 1883 p.1009 c.3, 28 June 1884 p.1026 c.1, and 21 February 1885 p.305 c.4; MR 1883 pp.11,49 and 1885 p.50).
- 14 *Wild River Times* 22 February 1894.
- 15 MR 1894 p.103 and MR 1896 pp.106,107.
- 16 *Wild River Times* 31 May 1894; A northerner writing in the *North Queensland Register* 'Campfire Column' on 19 February 1949 p.29 c.3 said that he thought the carriers were Jack Tunnie and Tom Hooper and that Moffat presented them each with a gold watch in thanks.
- 17 MR 1894 p.103.
- 18 MWO 12B/56, QSA.
- 19 *Wild River Times* 21 June 1898; *Cairns Argus* 9 December 1899.
- 20 MWO 12B/56, QSA; MR 1895 p.127.
- 21 These problems are explained in Bell and McCarthy 1994.
- 22 *Wild River Times* 9 January 1896; MWO 12B/56, QSA; MR 1895 p.127.
- 23 Mining Warden, Herberton, Register of Returns of Production, MWO 12B/56, QSA.
- 24 MR 1902 p.68; *Queensland Mines and Works Gazette* 19 September 1901 pp.9-10; It was most likely horsedrawn as there is no evidence or indication that any narrow gauge locomotives were ever taken to the Chillagoe field.
- 25 MR 1902 p.68.
- 26 *Wild River Times* 20 June 1902 and 18 September 1902.
- 27 *Queensland Government Mining Journal* (QGMJ) April 1903 and *Queenslander* 4 July 1903.
- 28 MR 1908 p.73.
- 29 *Wild River Times* 21 June 1894.
- 30 *Wild River Times* 21 June 1894; MR 1894 p.104.
- 31 *Wild River Times* 21 June 1898; *Willmetts North Queensland Almanac, Directory and Mines, Settlers and Planters' Companion* for 1898.
- 32 *Wild River Times* 12 July 1899 and 25 October 1899.
- 33 Calcifer School File, EDU/Z460, QSA; See also Kerr 1975/76 and 1984.
- 34 MR 1909 p.39.
- 35 QGMJ June, July, September, October, December 1912; *Cairns Post* 18 June 1912 quoting *Chillagoe Standard* 14 June 1912.
- 36 QGMJ January 1914 p.35.
- 37 MR 1937 p.52.

## BIBLIOGRAPHY

- BELL, P. 1993. 'History of the Chillagoe smelters', in Allom Lovell Marquis-Kyle, Architects, and Austral Archaeology, *Chillagoe Smelter Conservation Plan*, unpublished report for the Queensland Department of Environment and Heritage.
- BELL, P. AND J. McCARTHY, 1994. 'A detailed analysis of the evolution of early copper smelting technology in Australia', paper presented at the Third International Mining History Conference at the Colorado School of Mines, Golden, Colorado, 6 June 1994.
- KENNEDY, K. H., 1982. 'J.S. Reid and the Chillagoe Company', *Readings in North Queensland Mining History*, James Cook University of North Queensland, Townsville. vol.2, pp.217-274.
- KERR, R. S. 1975/76 'James Adam: Teacher and scholar', *Royal Historical Society of Queensland Journal*, vol.X(1):72-90.
- KERR, R. S. 1979. *John Moffat's Empire: a Mining History of the Cairns Hinterland 1880-1918*, J.D. & R.S. Kerr, St Lucia.
- KERR, R. S. 1984. 'Calcifer and its school 1894-1908', *Cairns Historical Society Bulletin* no.295.
- KERR, R. S. 1992. *Chillagoe: Copper, Cattle and Caves: an Historical Guide*, J.D. & R.S. Kerr, St Lucia. 2nd ed.

## Periodicals

- Australian Mining Standard*  
*Cairns Argus*  
*Herberton Advertiser*  
*North Queensland Herald*  
*Queensland Department of Mines Annual Report*  
*Queensland Mines & Works Gazette*  
*Queensland Government Mining Journal*  
*Queenslander*  
*Wild River Times*  
*Willmetts North Queensland Almanac, Directory and Mines, Settlers and Planter's Companion*