

# Tasmania's Mount Bischoff tin mine: Dolcoath of the Antipodes?

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## Abstract

Tasmania's Mount Bischoff tin mine was discovered by prospector James 'Philosopher' Smith in 1871. Recently it was reopened by Bluestone Mines Tasmania. The mine has now operated in three centuries, perhaps confirming early predictions that it would emulate the longevity of contemporary Cornish mines like the Dolcoath. Cornish mines and Cornishmen were the guiding lights through the infancy of Tasmanian tin mining. Yet the Mount Bischoff tin mine became a battleground between German and Cornish mining cultures, even as huge dividends were paid. The German-born mine manager 1875-1907, Ferd Kayser, who deplored what he saw as antiquated Cornish mining methods, used comparisons with the Dolcoath mine to prove his own efficiency. Such comparisons were nonsense, however, since Mount Bischoff then exploited great natural advantages which the Dolcoath could not. Cornish tin dressers who collected ore from the Waratah River after it had escaped from the Mount Bischoff Company's dressing sheds also cast doubts upon Kayser's performance.

Kayser nevertheless shared the expectation that the Mount Bischoff mine would 'live down' like a Cornish lode mine, and this bred the complacency that prematurely closed an apparently exhausted mine in 1947. Insufficient underground exploration was done, with profits being paid out as dividends. Does the present open-cut operation on the old lower workings of Mount Bischoff confirm the old Mount Bischoff Company's profligacy? The Mount Bischoff tin mine, at Waratah, Tasmania, discovered by prospector James 'Philosopher' Smith in 1871, was recently reopened by Bluestone Mines Tasmania Pty Ltd. The mine has now operated in three separate centuries, perhaps confirming early predictions that it would emulate the longevity of contemporary Cornish mines like the Dolcoath. Dolcoath was considered the benchmark when, in the

late 1870s and 1880s, Mount Bischoff was described as the world's greatest tin mine. Yet, even as it paid huge dividends, the Mount Bischoff mining field was a battleground between German and Cornish mining cultures. The Mount Bischoff Tin Mining Company's Clausthal-born mine manager 1875-1907, HWF 'Ferd' Kayser, who deplored what he saw as antiquated Cornish mining methods, used comparisons with Cornish mines to highlight his own efficiency. Such comparisons were nonsense, however, since Mount Bischoff then exploited almost unique natural advantages. Cornish tin dressers who retrieved ore from the Waratah River after it had escaped from the Mount Bischoff Company's dressing sheds also cast doubts upon Kayser's performance.

Kayser's drive, technical skill and innovation were vital to Mount Bischoff's success. He nevertheless shared the expectation that the mine would 'live down' like a Cornish lode mine, and this bred the complacency that prematurely closed an apparently exhausted operation in 1947. Shareholders grew accustomed to huge dividends that reflected skimping on crucial exploration and maintenance work. Pyritic ore was discarded rather than treated, while no attempt was made to mix poorer ore with the rich.<sup>1</sup>

While the present open-cut operation on the old lower workings appears finite, the potential for new exploration to confirm the old Mount Bischoff Company's profligacy remains. Mount Bischoff may yet prove to 'live down' like the Dolcoath mine. The so-called 'cradle of Tasmanian mining' has already earned a reprieve from the grave predicted for it 62 years ago, increasing production through the 2008-09 Global Financial Recession.<sup>2</sup>

## Island of despair

Penal Van Diemen's Land cast a long shadow over post-transportation Tasmania. Despite adopting its new identity in 1855, Tasmania did not thrive as a 'free' society. Unlike New South Wales, Victoria, Queensland and Western Australia, it was not invigorated by 19th-century gold rushes. The island colony remains the odd one out when it is considered that, even though South Australia had no gold, from the 1840s it did have a valuable mining industry, its Burra, Moonta and Wallaroo copper mines paying millions of pounds in dividends.<sup>3</sup>

Tasmania, on the other hand, went 70 years without significant economic stimulus. In the 1850s and 1860s especially, after losing Britain's maintenance payment

1. For the Mount Bischoff Company's neglectful attitude to mixing ore, see, for example, Henry Ritchie to James Smith 4 July 1884, no.193A, NS234/3/13 (Archives Office of Tasmania, Hobart).

2. See, for example, 'Decision to Close Bischoff Sounds Deathknell of Waratah', Advocate 14 August 1947, p.1.

3. See RG Dunlop, 'Economic Importance of Moonta to South Australia', Proceedings of History of Moonta Seminar, Moonta, 1970, pp.28—9.

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**Figure 1:** North-western Tasmania. The only settlements existing at the time of Smith's discovery of tin at Mount Bischoff were Emu Bay and Stanley. The Van Diemen's Land Company ('VDL Co' on this map), a British concern formed to grow fine wool for the home market, was the pioneer European settler. (Map by Glyn Roberts)

for transported convicts, it experienced great financial stringency and a steady stream of defectors to mainland Australia. Tasmania remained in an economic slump in 1870, when the colony's total exports were worth barely one-third of their 1853 value. The timber industry had collapsed. Blight, rust, mainland tariffs, competition and ruinous cropping practices had decimated agricultural exports.<sup>4</sup> Some believed that the colony's only chance of survival was annexation by Victoria, which would beat the tariff problem.<sup>5</sup> Without an influx of new blood, the stagnant colony that had received almost 40% of Australia's imported felons dwelled on the shame of its convictism long after the fact.<sup>6</sup>

### The Philosopher's stone

Even the man who helped stimulate Tasmania appears to have been spurred into action by the stigma of having ex-convict parents. Prospector James 'Philosopher' Smith set out to prove his own worth by making a great mineral discovery that would benefit Tasmania, vowing to



**Figure 2:** James 'Philosopher' Smith, wife Mary Jane, and eldest children Annie and Leslie, at home, 1877 or 1878 (Photo by Peter Laurie Reid courtesy of Charles Smith)

search until 'death or victory should settle the question.'<sup>7</sup> His discovery of tin lodes at Mount Bischoff, about 80 kilometres south-west of Emu Bay (later Burnie), in 1871 can therefore be seen as a powerful symbol of liberation from both economic and social pressures. Smith proved his own worth to himself, improved his financial and social status, effectively making himself a gentleman, and he sparked a mineral boom that brought Tasmania prosperity, self-assurance and a broader economic base.

Smith's discovery was the culmination of two decades of often solitary prospecting and self-education in geology. Few had the stomach, the stamina or the bushmanship for the cold, ruggedness and matted vegetation of western Tasmania. The tradition of prospecting is more closely aligned to exploration than to mining, and Smith's extraordinary feat excited comparison to contemporary African explorers David Livingstone and Henry Stanley.<sup>8</sup> A legend grew that he walked for days literally on the west coast 'wilderness'. This referred to the unnerving experience of many bushmen of finding they were walking way above the forest floor on a platform of the notorious native 'horizontal scrub' (*Anodopetalum biglandulosum*), a rainforest tree that forms layer upon layer of almost impenetrable horizontal tangles.<sup>9</sup>

4. HJW Stokes, *North-West Tasmania 1858—1910: the Establishment of an Agricultural Community*, PhD thesis, Australian National University, Canberra, 1969, pp.68—70.

5. For a summary of Tasmania's economic woes, see WA Townsley, 'Tasmania and the Great Economic Depression 1858-1872', *Papers and Proceedings of the Tasmanian Historical Research Association*, vol.4, no.2, July 1955, pp.35-46.

6. For the stigma of convictism in Tasmania, see Henry Reynolds, 'That Hated Stain': The Aftermath of Transportation in Tasmania', *Historical Studies Australia and New Zealand*, vol.14, no.53, October 1969, pp.19-31.

7. Smith probably spoke these words to Reverend William Law. They featured in the speech written by the Smith Testimonial Committee and spoken by Governor Weld ('Discovery of Tasmania: Presentation to Mr James Smith', *Examiner* 9 December 1878).

8. See, for example, 'The Vagabond' (John Stanley James), 'Mount Bischoff', *Age* 27 October 1894, p.11.

9. For the legend of horizontal scrub, see Nic Haygarth, 'A Walk on the Wilderness: The legend of "horizontal" travel', *Papers and Proceedings of the Tasmanian Historical Research Association*, vol.51, no.2, June 2004, pp.106-11.

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### Significance of the 'Mountain of Tin'

The economic good times sparked by Mount Bischoff put meals on tables, rails on wasteland and social justice on the hustings. The Mount Bischoff Company paid dividends of more than £2.5 million, being one of the most profitable 19th-century Australian base metal mines. By the late 1870s, when the Brown Face was being opened up, Mount Bischoff was described as the world's greatest tin mine and Tasmania's economic saviour. Mount Bischoff also opened a window on the western Tasmanian 'wilderness'. The great tin mine was the subject of railway tours which indulged technological wonder and sublime nature simultaneously. Thrilling summit views and paths into the 'primeval' were features of a visit to Waratah.<sup>10</sup>

Innovative methods and technology were needed to produce tin ore in this remote location. No Australian mine made better use of available water power for dressing ore and driving machinery. These measures made the production cycle very economical once the problems of transport and smelting had been solved. At one stage the Mount Bischoff Company had seven waterwheels utilising the same body of water, the Waratah Falls. In 1883 the company generated lighting for its mill from the falls, reputedly the first Australian industrial plant lit by electric light.<sup>11</sup> In 1907 it opened its hydro-electric station which powered the mine, and later the town of Waratah.<sup>12</sup> It was the first Tasmanian mine to operate its own power station, years before the development of Tasmania's hydro-electric power grid. A system of reservoirs, water races and flumes was built to accommodate the mine's need of water. In Launceston, the company's smelter established the model of an interstate and international smelting trade which the likes of Nyrstar's Hobart zinc smelter and Rio Tinto's Bell Bay aluminium smelter have followed.<sup>13</sup>

Bischoff was not a particularly enlightened employer. Nor was it the rock of Tasmanian mining unionism, which remained weak until the first decade of the 20th century.<sup>14</sup> Despite strikes for shorter working hours in 1876 and better wages in 1878, the company must take some credit for maintaining industrial harmony throughout its peak period. The Mount Bischoff Company's reputation for poor pay and conditions was maintained until a general 6d per day increase, the first in three decades, was granted



**Figure 3:** Mount Bischoff Company mine manager 1875-1907, HWF 'Ferd' Kayser (from the *Australian Mining Standard*, 1898)



**Figure 4:** Tin ingots being weighed at the Mount Bischoff Company smelter, Launceston, Tasmania (Courtesy of the Queen Victoria Museum and Art Gallery, Launceston)

in 1911.<sup>15</sup> Tasmania's oppressive Masters and Servants Act (1856), under the terms of which the Mount Bischoff Company engaged staff, must have intimidated employees — as did its autocratic mine manager, Ferd Kayser.

10. See, for example, 'One of the Party', 'To Bischoff and Back by Rail', *Mercury* 4 April 1893, p.3.  
11. See minutes of directors' meetings for 1883, NS911/3 (Archives Office of Tasmania, Hobart).  
12. For the electric power scheme, see 'Mount Bischoff TM Co', *Examiner* 25 July 1907 p.2.  
13. See Comalco Bell Bay: 50 Years of Aluminium Production in Tasmania, Comalco Aluminium (Bell Bay) Ltd, 2005.  
14. Meeting of Mount Bischoff Tin Mining Company directors 15 June 1876, NS911/1 (Archives Office of Tasmania, Hobart); William Dell, 'The Mount Bischoff Strike', *Cornwall Chronicle* 10 July 1876; 'The Mount Bischoff Strike', *Examiner* 25 May 1878; 'Poor Miner', 'Mount Bischoff Strike', *Examiner* 3 June 1878, p.3; meetings of Mount Bischoff Tin Mining Company directors 23 and 25 May 1878, NS911/1 (Archives Office of Tasmania, Hobart)  
15. Meeting of Mount Bischoff Tin Mining Company directors 24 January 1911, NS911/14 (Archives Office of Tasmania, Hobart); 'Farewell to Bischoff', *Advocate* 1 November 1919, p.2

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### Skyrocketing profits

The Mount Bischoff tin deposits occur in a dolomite structure in which Devonian-era porphyry dykes have intruded into late Precambrian rock.<sup>16</sup> For decades geologists debated origins of the deposits and the correct terminology for them: were they lodes, stockwerks, veins or dykes?<sup>17</sup> One thing that for sure was that immensely rich cassiterite could be extracted from the surface. In the early days, tin nuggets weighing as much as 260 kilos each were plucked from the Mount Bischoff Company and adjoining Walker and Beecraft leases. When these nuggets were exhausted, blasting was used to expose pockets of ore. On the benches, biceps streaked the colour of iron rust swung picks and shovelled wash-dirt into skips. Some precipitous mining faces were chipped away by men suspended precariously from the top by ropes, abseilers without today's safety harnesses.

After years of battling to establish an isolated mine, the Mount Bischoff Company thrived during the 1880s. The immensely rich Brown Face deposit ensured that shares once worth £3 plateaued above £50. Profits brooked no argument, silencing the company's many critics. At the Waratah Falls, the stunning blows of stampers were backbeaten by the hydraulic whirrs and whooshes of Kayser's automatic ore dressing machinery.

An inverse relationship existed between sluice-boxes and stampers. Sluicing was obviated as the alluvial deposits were reduced. Milling capacity was increased to accommodate the harder rock being mined until, in 1893, when sluice-boxes were discarded altogether, 75 stampers were in use.<sup>18</sup> Kayser vastly increased water storage to avert stoppages during the dry summer.

The beauty and the tragedy of the Mount Bischoff mine was that it was so rich that, no matter how inefficiently it was run, it would seem to be profiting. In 1876 James Smith had predicted that the mine would probably be worked for centuries.<sup>19</sup> This is effectively a Cornishman talking. Smith's model for Bischoff's longevity was most likely the Dolcoath lode tin mine in Cornwall which had

then been producing tin for more than a century, and copper long before that. Expectations of Bischoff 'living down' like a Cornish lode mine bred complacency, underground exploration being largely neglected until the surface deposits dwindled.

Mine manager Ferd Kayser read from the same script. In 1894, for example, he predicted that Mount Bischoff 'will not be a quarter worked out when our grandchildren are drawing dividends.'<sup>20</sup> Kayser was not a subscriber to Cornish mining methods, however. A graduate of the Clausthal Academy of Mines in modern-day Germany's Harz Mountains, he had arrived in South Australia during the twilight years of the Burra copper mine, which the 'Cousin Jacks' were then abandoning for the Victorian goldfields. In the next decade, Henry Hancock would revolutionise ore dressing at Burra's successor, Moonta, but at this time, hand-jiggers, which were hand-held sieves used to size the ore, were used.<sup>21</sup> To many, Cornwall was a byword for simplicity, economy and improvisation. To champions of technology like Kayser, on the other hand, Cornwall, the so-called 'cradle of the Industrial Revolution', was a 'Luddite'. Antiquated Cornish mining methods were his favourite hobbyhorse.<sup>22</sup>

### 'Shearing' the Waratah River

This made for interesting times when, in 1880, Kayser unveiled his state-of-the-art 'Queen of the Mount' battery and patented ore dressing appliances at the Waratah Falls. Such was the loss of metallic tin tailings from these, from previous dressing operations and from sluice-boxes on Mount Bischoff that a new industry was born. Managers of smaller mining companies realised that the richest material on their leases was flowing through them in the waters of the Waratah River. They set up small plants to impound these river-borne Mount Bischoff Company tailings, concentrate them in buddles, grind the concentrate in Chilian mills and then upgrade it.

The East Bischoff Company, Phoenix Alluvial Company, Bischoff Alluvial Company and Mount Bischoff Tin Streaming Company, operated in this manner.<sup>23</sup> By the

15. Meeting of Mount Bischoff Tin Mining Company directors 24 January 1911, NS911/14 (Archives Office of Tasmania, Hobart); 'Farewell to Bischoff', *Advocate* 1 November 1919, p.2

16. Scott Halley and John L Walshe, 'A Re-examination of the Mount Bischoff Cassiterite Sulfide Skarn, Western Tasmania', *Economic Geology*, vol.90, no.6, October 1995, pp.1676-93

17. For an early geological assessment of Mount Bischoff, see Ferd Kayser, 'Mount Bischoff', *Minutes of Proceedings of the Australasian Association for the Advancement of Science*, vol. IV, 1892, pp.342-59.

18. CW Gudgeon, 'The Famous Mount Bischoff Tin Mine', *Chemical Engineering and Mining Review*, 1 October 1923, p.7

19. James Smith to Charles Sprent 24 July 1876, no.202, NS234/2/3 (Archives Office of Tasmania, Hobart)

20. 'The Vagabond', *Mount Bischoff*, p.11

21. Ferd Kayser, 'Early History of Colonial Mining in Connection with "Is Scientific Management a Success?"', pp.2-3, microfiche held in the Newspaper Room of the National Library, Canberra

22. See, for example, Kayser's opinion of Cornishman Stephen Eddy's ore dressing, in Ferd Kayser, *Mount Bischoff*, p.346.

23. For the East Bischoff Company, see 'Waratah', *Examiner* 12 December 1879; *Mount Bischoff*, *Devon Herald* (Latrobe, Tasmania) 10 January 1880; James Hancock to James Smith 15 June 1881, NS234/3/10 (Archives Office of Tasmania, Hobart); *Minutes of meeting of directors of Mount Bischoff Tin Mining Company* 5 October 1882, p.281, NS911/3 (Archives Office of Tasmania, Hobart). For the Bischoff Alluvial and the Phoenix Alluvial, see register of shareholders for Bischoff Alluvial/Phoenix Alluvial, file NS1012/23 J178/2; Phoenix Alluvial Mining Co; file NS1012/25 J178/1 (Archives Office of Tasmania, Hobart); and 'Phoenix Alluvial TM Co', *Tasmanian Mail* 1 September 1883, p.27. For the Bischoff Tin Steaming Company, see *Mount Bischoff*, *Tasmanian Mail* 30 July 1881, p.9 and *Mount Bischoff*, *Tasmanian Mail* 19 June 1886, p.20.

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late 1870s tin threatened to depose wool as Tasmania's most valuable export — which may explain these companies' local names, the 'Catch 'Em by the Wool', 'Hold 'Em', 'Shave 'Em' and 'Shear 'Em' respectively. The Waratah Alluvial ('Catch 'Em by the Wool no.2') had a similar plant on a tributary of the Waratah River which contained Mount Bischoff Company sluice-box tailings.<sup>24</sup> Cornish emigrants, including former Helston miner Richard Mitchell, and one-time St Just residents William White and WH Wesley, operated several of these plants.<sup>25</sup> Wesley proved a particular nuisance to Kayser by introducing his own patented ore dressing appliance, which Kayser's detractors held up as superior to his own.

After ridiculing the small companies that reworked Mount Bischoff Co tailings, in the 1880s Kayser set up his own Ringtail plant and an additional 'Catch 'Em' plant on the Waratah River to perform the same function.<sup>26</sup> The establishment of these recovery plants beggars the question: Why did the Mount Bischoff Company not instead adjust their main concentrating plant to accommodate the harder rock now being treated, thereby reducing the loss of tin into the river?



**Figure 5:** Cornish tin dresser and mine manager WH Wesley (from the *Australian Mining Standard*, 1898)



**Figure 6:** The Mount Bischoff Company's Ringtail Sheds on the Waratah River, about 1907. (Photo by Stephen Hooker courtesy Archives Office of Tasmania, Hobart)

## Bischoff versus Dolcoath

Comparisons between Mount Bischoff and other mines are difficult to draw because of the almost unique nature of Bischoff's mineral deposits. Yet Kayser and his supporters posed such comparisons in an effort to counteract what they saw as a Cornish attack.<sup>27</sup> The Dolcoath mine, then considered the greatest and most progressive Cornish tin mine, and almost certainly the model for expectations of Mount Bischoff's longevity, came in for particular attention. At first glance, long-term production figures make Mount Bischoff look much more successful than Dolcoath. From 1746 to 1919 the Dolcoath mine produced tin, copper and other ores to the value of more than £10,000,000, paying dividends of more than £1,300,000 on paid-up capital of more than £300,000. Mount Bischoff produced tin ore to the value of more than £6,000,000, distributing more than £2,500,000 to shareholders on a paid-up capital of only £30,000.

As a statement of efficiency, however, such comparisons were of limited value, since the Cornish mines lacked Mount Bischoff's easily worked surface deposits, and its water supply used for both motive power and ore dressing. The Cornish mines also had far more extensive underground workings. So of course Cornish production costs were higher. To further complicate matters, wages were much lower in Cornwall than in Tasmania. It is important to bear in mind also that cheap management is not necessarily advantageous to the mine, especially as was the case in Kayser's later years, when it meant failure to explore the mine's potential.

24. For the Waratah Alluvial Company, see Richard Mitchell to James Smith 29 September 1883, no.286, NS234/3/12; and William White to James Smith 14 January 1887, no.13, NS234/3/15 (Archives Office of Tasmania, Hobart).

25. For White, see Stephen Eddy to James Smith 24 March 1874, NS234/3/3 (Archives Office of Tasmania, Hobart). For Wesley, see 'Tasmania and its Mineral Wealth', special edition of the *Australian Mining Standard* 1 July 1898, pp.47-48.

26. For the Mount Bischoff Company's Ringtail and 'Catch 'Em' plants, see HK Wellington, 'Metallurgical History', in DI Groves, EL Martin, H Murchie and HK Wellington, *A Century of Tin Mining at Mount Bischoff, 1871-1971*, Geological Survey Bulletin no.54, Hobart, 1972, pp.71-90.

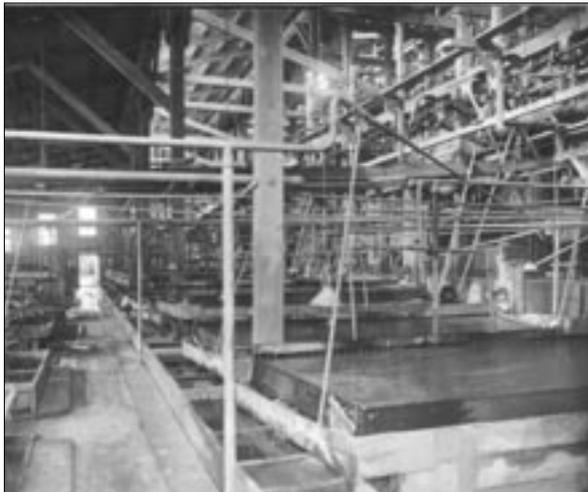
27. See, for example, 'Porphyry', 'Mechanical Appliances for Dressing Ores', *Mercury* 21 June 1881, or Mount Bischoff Tin Mining Company half yearly meeting report July 1894, *Examiner* 1 August 1894, p.8.

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Production figures in the years 1884-88, which represented the peak of the Mount Bischoff mine, were similar. Mount Bischoff raised 10,553 tons of ore during this period, compared to 12,421 tons for the Dolcoath. Mount Bischoff, however, soon outstripped the Cornish mine. In the 42 years up until 1895, the Dolcoath raised 59,000 tons of tin and paid £580,000 in dividends. The Mount Bischoff mine reached the same production figure in 1901 after 28 years, having paid £1,742,000 in dividends.<sup>28</sup>

Kayser's ore dressing equipment was another point of comparison. In 1881 the Dolcoath employed 500 people, more than the entire Mount Bischoff workforce, at its battery and dressing sheds alone, producing 150 tons of clean ore per month. At Mount Bischoff 40 dressing shed personnel produced 233 tons per month. While this suggests that Kayser's ore dressing appliances were far more efficient, it must be borne in mind that the number of personnel varied according to the richness of the ore and that, as mentioned previously, labour was much cheaper in Cornwall than in Tasmania. Perhaps a stronger imperative for mechanisation existed in Tasmania.<sup>29</sup>



**Figure 7:** *Shaking tables, Mount Bischoff Company plant, Waratah Falls, Waratah, Tasmania*  
(Photo by JH Robinson courtesy of Nancy Gillard)

The Mount Bischoff Company never engendered the same sense of community or entitlement to a job that Tasmania's greatest mining success, the Mount Lyell Mining and Railway Company, managed in more isolated Queenstown, where a welfare policy was essential to

maintaining good staff and industrial harmony. Quite understandably, Mount Bischoff Company shareholders and directors demanded a streamlined workforce. Whether efficiency or dividends are the arbiters of Mount Bischoff's social benefit to the mining-reliant community of Waratah and Tasmania's West Coast populace generally is another question.

## Pyritic ore and complacency

By the 1890s complacency ruled Mount Bischoff. Profits were paid out as dividends, with little money being set aside for maintenance and exploratory work that should have ensured the mine's future. Wellington has pointed out that from 1885 to 1922 production of tin ore at the mine dropped, on average, by 48 tons per year.<sup>30</sup> This is not surprising, given that between 1891 and 1921 the percentage of cassiterite in processed Mount Bischoff Company ore dropped from 3% to 0.3%.<sup>31</sup> The height of the directors' complacency was allowing Kayser to retain his position after he moved from Waratah to Launceston, more than 200 kilometres away, in 1898, and while he simultaneously managed the Briseis mine at Derby, a dereliction of duty and conflict of interest that would not have been tolerated from any other officer in the company's employ.<sup>32</sup> While the Mount Bischoff mine slumped in the last years of Kayser's general management, the Briseis mine he had helped relaunch took over as Tasmania's leading tin mine.<sup>33</sup>

Tasmania's greatest mineral producer, the Mount Lyell Mining and Railway Company, manufactured sulphuric acid and superphosphate from its high-grade pyritic copper ore.<sup>34</sup> Presumably the Mount Bischoff Company's arsenical pyritic ore was of too low a grade for profitable re-processing.

After a failed attempt to calcine pyritic ore in 1891, the directors seem to have resigned themselves to a declining resource, changing from primarily an ore producer to a substantial ore buyer, in order to arrest the company's dipping balance sheet. During the company's first decade the vast majority of ore smelted came from its own mine. In the half year ending December 31st 1886, 1,531 tons of Mount Bischoff Company tin ore were smelted, as opposed to 89 tons from other tin mines. In 1894 the company smelted almost as much bought ore (1,016

28. Mount Bischoff Company half-yearly reports; Allen Buckley, *The Story of Mining in Cornwall: A World of Payable Ground*, Cornwall Editions, Fowey, 2005, p.153

29. Kayser quoted the Dolcoath figures from the *Mining Journal* 19 November 1881 at the following January half-yearly meeting of the Mount Bischoff Tin Mining Company (Examiner 2 February 1882). These were quoted again along with Mount Bischoff Company figures in 'Tin Mining at Mount Bischoff', *Australasian* 13 May 1882.

30. HK Wellington, 'Mount Bischoff Company Tin Smelter', in DI Groves et al, *A Century of Tin Mining at Mount Bischoff 1871-1971*, pp.86-87

31. 'Treatment of Mount Bischoff Tin Ore', *Chemical Engineering and Mining Review* 11 June 1945, p.287

32. Kayser was general mine manager at the Briseis 1900-02. See John Beswick, *Brothers Home: the Story of Derby Tasmania*, Gravelly Beach, Tasmania, 2003, pp.106 and 123.

33. John Beswick, *Brothers Home: the Story of Derby Tasmania*, p.125

34. Lou Rae, *The Lost Province: Exploration, Isolation, Innovation and Domination in the Mount Lyell Region 1859-1935*, PhD thesis (School of History and Classics, University of Tasmania), Hobart, 2005, p.113

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tons) as it produced (1,072 tons).<sup>35</sup> Although Bischoff never missed a quarterly dividend payment from 1878 to 1907, its decline was in train by the mid 1890s.



**Figure 8:** Mount Bischoff was known as the 'Mountain of Tin', hence this triumphal tin pyramid which represented it at the International Exhibition in Launceston, Tasmania, in 1891-92. (Photo by RJ Nicholas courtesy of the Queen Victoria Museum and Art Gallery, Launceston)

## Belated reform

In the early 20th century the White Face of the Mount Bischoff tin mine — the first mining face worked — was known as 'The Bank', because when ore production for the month was below target, the miners would 'rob' it to make up the difference.<sup>36</sup> Happily, no institutional borrowing was needed to fund electrification of the mine in 1907 and the installation of a new 40-head crushing plant adapted to the harder rock which now defeated Kayser's old 'Queen of the Mount'.<sup>37</sup> Under the management of John Millen, the Mount Bischoff operation was modernised and streamlined.

Eventually even the ever-reliable White Face faltered. Hoping to replenish its resource, the company bought up many small claims around Mount Bischoff, only to face the same problem of dealing with arsenical pyrites. Finally, in 1921, as the North Bischoff Valley was explored, and after flotation had been found wanting, a calciner was established to roast the pyritic content out of the tin ore.<sup>38</sup> The most valid comparison now between Bischoff and Dolcoath concerned their declining fortunes. By World

War I only 13% of ore smelted by the Mount Bischoff Company was from its own property, the company becoming increasingly dependent on ore buying.<sup>39</sup> In



**Figure 9:** The White Face of Mount Bischoff, 1921, with workers on the higher bench and management on the lower! (Photo by JH Robinson courtesy of Nancy Gillard)

1921 increasing costs, compounded by shorter working hours and the low price of tin, closed the Mount Bischoff mine with 75 of the 100-man workforce being laid off.<sup>40</sup> The Mount Bischoff Extended mine had closed a few months earlier, meaning that for the first time in its history of nearly half a century no corporate mining took place at Waratah.<sup>41</sup> Work eventually resumed, but mining remained at an ebb in Tasmania.

In 1928 the Mount Bischoff Company installed a Thompson and Company centrifugal dredge on a floating pontoon to exploit the alluvial tin in the North Bischoff Valley.<sup>42</sup> A village was created for the workers in the North Bischoff Valley, separated from the town of Waratah by the bulk of Mount Bischoff. Since the mine's Main Adit penetrated the mountain from south to north, this became a public conduit between the two centres, North Bischoff Valley children equipping themselves with candles for their journey to and from school in Waratah. The dredge broke down frequently, and operations ceased in October 1929 when tin prices slumped to their lowest point in three decades. The Launceston smelter closed simultaneously. Never again would the Mount Bischoff Company work its own mine.

35. 'The Mount Bischoff Tin Mining Company Registered', Examiner 29 January 1887; 'Mining Meetings: Mount Bischoff TM Company', Examiner 1 August 1894, p.8

36. 'Bischoff Mine': 1962 interview with AD Mackay, former Mount Bischoff Company assayer, held by State Library of Tasmania, Launceston

37. For the 40-head mill, see 'Mount Bischoff Tin Mine: Half-Yearly Reports', Examiner 5 August 1911, p.9.

38. See 'Mount Bischoff Calciner: Alleged Fumes Damage', Advocate 21 November 1921.

39. HK Wellington, 'Mount Bischoff Company Tin Smelter', in DI Groves et al, A Century of Tin Mining at Mount Bischoff 1871-1971, p.151

40. 'Mining Depression: Gospel of Work', Advocate 10 October 1921, p.2

41. 'Mount Bischoff Mine: Closing To-Day [sic]', Advocate 5 October 1921, p.2

## Mining Perspectives

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**Figure 10:** The Mount Bischoff Company's centrifugal dredge operating in the North Bischoff Valley, 1928. A high-pressure hose washed alluvium into a sump. Suction pumps on the dredge deposited tin ore in sluice-boxes. (Photo by RE Smith photo courtesy of Charles Smith)



**Figure 11:** Back to the future. The plodding of a draught horse as it returns empty ore skips to Mount Bischoff, probably during the 1930s or 1940s, represents a reversion to 1870s technology. For many prosperous decades, the iron rails had shone with well-oiled steam and later electric locomotive traffic. Now, however, Mount Bischoff was a marginal tribute operation. (Photo by JH Robinson courtesy of Nancy Gillard)

### Decline and silence

Mount Bischoff's industrial heritage is a hotch-potch of technologies. On the brink of the Waratah River gorge, rusted stamper rods tilt at the sky like the work of that mad church organist, Hammer Horror's Doctor Phibes. Many shafts and even 'glory holes' by which tributers burrowed into pockets of ore have been capped in recent years as a safety measure. Happily, just as many treasures, including an octagonally-timbered ventilation shaft, and a low stope sloping at <sup>42</sup> degrees from the surface, remain to astonish the future visitor.

Mount Bischoff's tribute period from 1929 to 1942 accounts for some of these diggings. The expense of carting ore (especially from the North Bischoff Valley) to the mill at the Waratah Falls was mitigated by erecting a small auxiliary mill on site for each of the four tribute parties. In 1935 the Mount Bischoff Company acquired and developed nearby tin sections previously worked by the Mount Cleveland Company, but could not make them pay. Seven years later, World War II trade restrictions again made work unprofitable. It took federal and state intervention to reopen the mine — ostensibly for strategic metal production. The real goal was to ensure Waratah's survival. After the Mount Bischoff Company was wound up in 1947, small leaseholders continued to eke out an existence from the degraded 'mountain of tin'.

Old miners at the bar of the Bischoff Hotel learned to size up strangers as they entered, invariably seeking local knowledge. For several decades, geologists from the likes of Aberfoyle, Broken Hill South, Mount Costigan Mines,

Comstaff Pty Ltd and Metals Exploration Ltd brandished Bischoff core samples and pondered fluctuating tin prices.<sup>43</sup> Efforts to locate further mineralised dolomite ore zones were eventually concentrated on the mine's lower slopes which had been attacked by tributers — the Gossan and White Faces and Allens Workings.<sup>44</sup>



**Figure 12:** George Machen working a sluice in the North Bischoff Valley, 1969. Many small mining operations of this kind followed the winding-up of the Mount Bischoff Company in 1947. (Photo courtesy of Neil Machen)

42. 'Mount Bischoff: Important Developments: Pontoon Floated: Encouraging Outlook', Advocate 4 September 1928; for Thompson Brothers, see Gilbert M Ralph, 'Gold Dredging in Central Victoria', Proceedings of the Australian Mining History Association Conferences 1997-2000 (eds. Patrick Bertola and Karen Miller), AMHA, 2001, p.99

43. See, for example, AAC (Bert) Mason, No Two the Same: An Autobiographical Social and Mining History 1914-1992 on the Life and Times of a Mining Engineer, Australasian Institute of Mining and Metallurgy, Parkville, Victoria, 1994, pp.602-04.

44. Margery Godfrey, Waratah: Pioneer of the West, Municipality of Waratah, 1984, pp.115-16

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### Remediation

Some of the environmental impacts of mining at Mount Bischoff are more obvious than others. The removal of more than 5.5 million tons of earth reshaped the Mount Bischoff skyline. The entire wall of rock known as the Brown Face — the heart of the Mount Bischoff Company operation — was quarried away, until finally the ore body was pursued down into the side of the mountain in an open cut known locally as 'The Pound'. Now 'The Pound' has been filled with waste rock dump as a measure to counteract acid drainage.

While Mount Bischoff Company smelter fumes were received with little complaint in industrial Launceston for 55 years, the Arthur River, one of Tasmania's last wild rivers, has sustained far more and longer-lasting ecological damage from Mount Bischoff tin production.<sup>45</sup> This has been belied, however, by the Arthur's isolation and the only recent recognition of the problem of acid drainage. Monitoring of giant freshwater lobster in the Arthur in 2001 revealed a 'dead zone' downstream of Mount Bischoff for at least 20 kilometres, in which none of these invertebrates were found.<sup>46</sup> The Mount Bischoff Rehabilitation Program developed by Mineral Resources Tasmania and funded by River Work, a National Heritage Trust program, took steps to remediate Mount Bischoff mine discharges into the Arthur and Waratah River systems. These efforts have been extended in the terms of the present Mount Bischoff mine leasehold.

### Limited revival

The pulse of Tasmania's first industrial heavyweight — the Mount Bischoff Company — has relaxed into a more meditative role. A water race that drove the company's stampers and the rail formation that fed its distant tin smelter now provide hazards and fairways for patrons of Waratah's Mountain Vista Golf Course. Yet blasts on the 'Mount' shake the century-old Bischoff Hotel once again. Although it is unlikely to shake the mining world again, Mount Bischoff may, as originally predicted, 'live down' like the Dolcoath mine. China's economic revolution, not England's Industrial Revolution, drives today's Mount Bischoff open pit development. The Asian powerhouse is even set to take a 50% stake in the mine. In July 2009 Yunnan Tin Group Company Ltd agreed to a joint venture with Metals X subsidiary Bluestone in the company's Tasmanian tin assets. Bluestone bought the retention licence for Mount Bischoff in 2005, after the former owner had estimated a



**Figure 13:** Acid drainage from the Bischoff Extended mine into Tinstone Creek, tributary of the Arthur River, Tasmania, 1996 (Photo by Nic Haygarth)



**Figure 14:** Old workings are obliterated by Bluestone's open pit development, Mount Bischoff mine, Tasmania, March 2009 (Photo by John Watts)

resource of 778,000 tonnes of ore averaging 1.17% tin — a higher assay than the Mount Bischoff Company averaged during the 20th century. The idea was to use the projected three-year Bischoff resource to keep the Renison mine tin concentrator, 80 kilometres away, running at full capacity, Bischoff supplying one-third of the feed. Ore is trucked to Renison, with no processing taking place at Mount Bischoff itself.<sup>47</sup>

During the second quarter of 2009, Mount Bischoff upgraded to a seven-day-per-week operation. Production for the quarter thus exceeded expectations, as did the ore quality, tin content increasing by 12% on the previous quarter. At June 2009 the Mount Bischoff ore reserve was estimated as 2,728 tonnes of tin metal.<sup>48</sup> While this is not a massive resource, further discoveries at depth are possible. Ironically, the present open pit occupies the site of the original mining camp at the head of Tinstone Creek, where the half-starved Smith climbed, panning an eye-popping half a pound of tin to the dish, in 1871. Any major discovery of that richness would certainly strengthen Sino-Australian ties today!

45. For acid drainage see Shivaraj Gurung, *Tasmanian Acid Drainage Reconnaissance: Acid Drainage from Abandoned Mines in Tasmania*, Tasmanian Geological Survey Record 2001/5, Mineral Resources Tasmania, Hobart, 2001; Graham Green, *North-West Rivers Environmental Review: A Review of Tasmanian Environmental Quality Data to 2001*, Supervising Scientist Report 167; and Pitt & Sherry, *Mount Bischoff Acid Mine Drainage Investigations Final Report*, Hobart, 2003.

46. T Walsh; cited by Graham Green, *North-West Rivers Environmental Review*, p.30

47. John Miedecke & Partners Pty Ltd, *Mount Bischoff Tin Mine Reopening: Development Proposal and Environmental Management Plan*, 2006

48. Metals X Quarterly Report, June 2009, [metalsx.com.au](http://metalsx.com.au)