

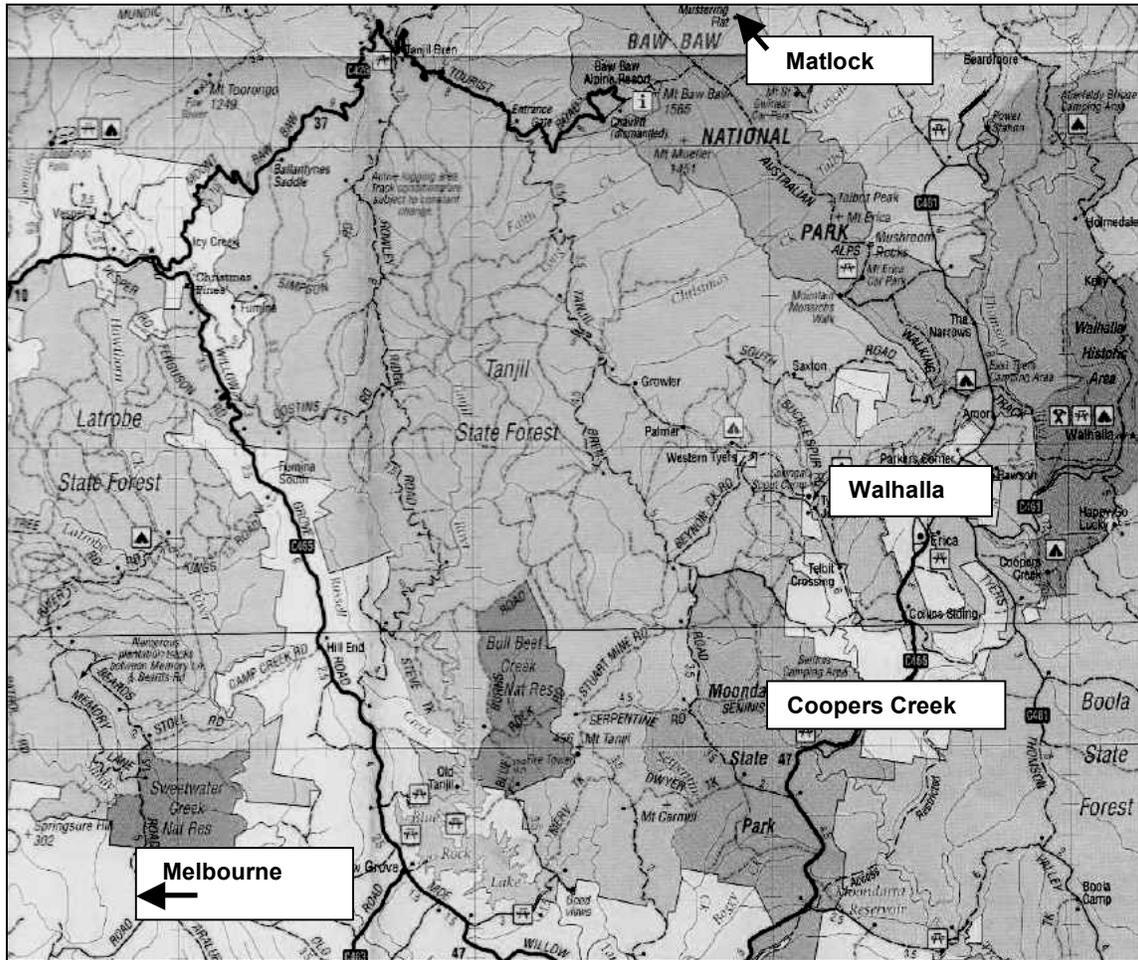
## **‘Not for Want of Trying’ The history of the Coopers Creek Copper Mine, Victoria**

By JIM ENEVER

The details of the discovery of Victoria’s first significant copper deposit near the junction of Coopers Creek with the Thomson River in Gippsland are open to debate.<sup>1</sup> What is clear is that the discovery occurred as a result of the intensive gold prospecting that was taking place in the area after the discovery of alluvial gold in 1862 at nearby Stringers Creek,<sup>2</sup> later to become known as Walhalla, home of the famous Long Tunnel Gold Mine [Fig. 1]. According to a report in the *Gippsland Times* in April 1865, the discovery of an outcrop of copper had been made on a steep hillside beside the Thomson River by ‘Snowy River Harry’s’ prospecting party of Henry Ireson, James Day and George Craig approximately twelve months earlier (putting it around April 1864)<sup>3</sup> but other retrospective accounts attribute different dates and names to the discovery.<sup>4</sup> The first contemporary account appears to be that given in the *Gippsland Times* of 4 November 1864, in which a description is given of a sample being sent to the Government Geologist and a report being received to the effect that the sample was native copper of high purity.<sup>5</sup> This account sparked a rush to register mineral leases in proximity to the original discovery claim, several such applications being advertised in the *Gippsland Times* during November and December 1864.

In February 1865, the *Gippsland Times* carried notice of an application for a mineral lease covering one square mile<sup>6</sup> on both sides of the Thomson River encompassing the discovery claim.<sup>7</sup> The Thomson River Copper Mining Company registered the application on 11 March 1865, the major shareholder and chairman being Henry Dendy. Other shareholders were William Morton, William Degraives, William King, Matthew Charnwood (like Dendy, all Melbourne establishment figures), William Pearson (a major Gippsland land owner), in addition to the discoverers, Ireson, Day and Craig, whose addresses were given as Thomson River. The nominal capital was £9,600 and Pearson was listed as legal manager.<sup>8</sup> After a number of delays, a 30-year lease was granted over 625 acres in April 1866, at a rental of £62.10.6 per year, plus two per cent royalty.<sup>9</sup>

**Figure 1:** Location of Coopers Creek relative to Walhalla.



Source: Melbourne’s Mountain Country, Herma Maps Pty Ltd. Scale 1200,000

Throughout 1865, the *Gippsland Times* carried promising reports of a high grade ore body, subsequently referred to as the No.1 ore body, up to 17 feet thick and with an average assay of 20 per cent based on tests conducted in Adelaide. In the opinion of the reporters, this would give ‘favourable advantage over South Australia where nine per cent can be made to pay’. Details of the initial operations conducted by the company are sketchy, the only tangible evidence of production being that of a miniature ‘copper pick’ weighing four and one half ounces, smelted from the ore by a Walhalla blacksmith named Hester, the first copper metal produced in Victoria.<sup>10</sup>

A special general meeting of the company was held on 26 April 1866 at which Pearson described a tunnel being driven into the hillside to intersect the lode where samples of oxide, carbonate and ‘sulphurite’ ore, as well as native copper, were obtained, ‘which

samples had been sent to Adelaide for assay and metallurgical testing, producing very encouraging results'.<sup>11</sup> Having worked the deposit for approximately 12 months, apparently demonstrating its value, and finally securing a lease, the company was happy to enter an agreement for activities to proceed from May 1866 under a tributing arrangement with the Gipps Land Copper Mining Tributers Company.<sup>12</sup>

### **Ambrose William Hallifax and the Tributers Company**

Ambrose Hallifax arrived in South Australia in the late 1840s. By 1849 he was in Kapunda where he married,<sup>13</sup> and in 1851 he was recorded as being the captain of the Great Kapunda mine, although there is little evidence of his impact on affairs in that role.<sup>14</sup> With the exodus of miners to the Victorian goldfields in late 1851 and 1852, operations at Kapunda came to an effective standstill<sup>15</sup> and Hallifax left Kapunda to spend two years or so around Adelaide before heading for Victoria.<sup>16</sup> Apparently seeking a new career path, he joined the Victorian public service, eventually becoming Post Master at a succession of Victorian country towns up to 1863.<sup>17</sup> In 1864, Hallifax became a minor shareholder in the Civil Service Gold Mining Company (Registered), a venture involving 123 small, mainly civil servant, shareholders.<sup>18</sup> According to its articles, the company was formed to work a gold mining lease at Matlock, high in the Victorian Alps and only about 25 miles as the crow flies from Coopers Creek. There is no evidence of Hallifax having an active role in the affairs of the company, but his involvement and the geography placed him close to the scene of the action when the discovery of copper was made and activities began at Coopers Creek in 1865.

The Gipps Land Copper Mining Tributers Company came into existence formally in May 1866, with Hallifax as one of 14 shareholders,<sup>19</sup> while his copper mining background in South Australia presumably made him the logical choice as first mining manager of the company. The list of shareholders does not suggest any overlap with the Civil Service Gold Mining Company, and the relatively small level of capitalisation (£3,300) was consistent with shareholders of limited means. Despite the limited capital resources, Hallifax embarked on an ambitious plan. A newspaper article in June 1866 described his intention of transporting up to 1,000 tons of high-grade ore to port per month by employing a fleet of bullock drays.<sup>20</sup> In this he was apparently aiming to follow the South Australian model,

where ore averaging around 22 to 23 per cent copper was profitably transported from Burra Burra to Port Adelaide between 1845 and 1861, mainly by contract bullock trains, at an average rate of around six pence per ton mile, or £2 10s per ton for the 100 mile trip.<sup>21</sup> In September 1867, an article in the *Gippsland Guardian* offered the opinion that transport from Coopers Creek to Port Albert, a distance of some 45 mainly mountainous miles as the crow flies, might soon be reduced to £3 per ton.<sup>22</sup> Although this suggests a potentially viable situation, given comparable ore grades and operating costs, transport of un-processed ore never proved to be a sustainable enterprise at Coopers Creek.

On 31 July 1866, Hallifax reported on the activities of the company.<sup>23</sup> By the time of this report approximately 150 tons of ore had been raised and the first ton of ore sold in Adelaide, returning an assay of 18 per cent. Hallifax was at pains in his report to stress that his intention in future was to send off parcels of ore representative of the higher grade material available, and not to selectively send only the best ore. After completion of facilities for dressing of the ore, Hallifax felt that the grade of the material being shipped could be increased by five per cent. At this time no firm plans were in hand for the erection of on-site smelting works to treat the poorer ores that Hallifax felt could average around 14 per cent, although the prospect of on site smelting had previously been raised. Against this generally optimistic view, comments regarding the inclement weather and the cost of transport were a portent of things to come.

It is not clear how things progressed during August and September, but by October 1866, the directors of the company made a decision to dispense with Hallifax's services as mine manager and to replace him with another South Australian, Captain Osborne. A newspaper article written by the correspondent for the *Gippsland Guardian* after a visit to the mine summed up Hallifax's tenure thus:

In April last the claim was let on tribute, under the management of a Mr Hallifax who professed considerable practical knowledge of copper mining supposed to have been acquired at some of the celebrated Adelaide mines. Whatever might have been this theoretical copper miner, his management did not suit the views of the directors. Mr Hallifax was removed from the management and replaced by Captain Osborne on the 24<sup>th</sup> of October last.<sup>24</sup>

With this short epitaph, Ambrose Hallifax effectively disappears from the active history of Coopers Creek.

## **Captain Osborne**

Apart from the fact that he had sometime been in South Australia, little emerges about Osborne's background or his stay in Coopers Creek in contemporary records.<sup>25</sup> Osborne being a relatively common Cornish name, it is difficult to be definite regarding the personal history of Captain Osborne, although circumstantial evidence suggests it likely that he was the Samuel Osborne who arrived in South Australia from Cornwall in 1849 where he was appointed as a 'Captain Dresser of Ores' at the Burra Burra Mine.<sup>26</sup> Like many others, Samuel Osborne apparently left Burra Burra for Victoria in the early days of the gold rush,<sup>27</sup> and there is a record of a Samuel Osborne (miner) being married in Ballarat in 1858.<sup>28</sup> At this time he was resident in Mount Pleasant, an area noted for its Cornish settlers and was still listed in the Ballarat Postal Directory for 1862, although notably absent from the 1866/67 Directory.<sup>29</sup> This is consistent with him being away from Ballarat by 1866/67, the period of Captain Osborne's involvement at Coopers Creek. Samuel Osborne's death certificate dated 1896, lists him as a mine manager living in Ballarat East.<sup>30</sup>

Judging from limited accounts in the Gippsland press, Captain Osborne appears to have had a honeymoon period at Coopers Creek during the latter part of 1866 and early 1867. An article in the *Gippsland Guardian* in February 1867 described the apparent richness of the ore body and the prospects for establishing a smelting operation, and went on to say:

Since his [Osborne's] arrival the mine has progressed with almost incredible success. A quantity of copper ore has been forwarded to Adelaide at considerable expense, and after being smelted it was found to yield a handsome paying percentage.<sup>31</sup>

A letter in the *Woods Point Leader* of around the same time describes the excitement being created on the Melbourne share market by the activities at Coopers Creek, where plans were progressing to start construction of smelters.<sup>32</sup> Highlighting the euphoria of the times was the statement that:

We shall expect to see some hundreds of men employed at the mine in the course of a few months; and should the celebrated Burra Burra Mine in South Australia be closed, as is anticipated, there will be no lack of good practical miners to carry on the works at the Thomson River.<sup>33</sup>

Despite all this optimism, the Mine Surveyor's report for March 1867 more realistically stated that 'The tributors have been talking of erecting two smelting furnaces for the last three months; at present there is very little work being done'.<sup>34</sup>

By May 1867, Captain Osborne had resigned and left the district. There is no insight into the reasons for this in the contemporary coverage of events, but it is clear from the accounts of the company that £1,559 had been expended on salaries for Hallifax and Osborne from a total yearly operating expenditure of £2,574 by the end of the first year's operations to March 1867.<sup>35</sup> This would appear a high price to pay for the introduction of instant copper mining expertise in light of the £8 a month salary paid to Samuel Osborne when he started at Burra Burra some 15 years previously.<sup>36</sup>

### **Frederick Richards and a new start**

Until March 1867, only £139 had been realised from the sale of copper ore, and the original capital had been essentially exhausted.<sup>37</sup> From this time, emphasis moved toward on-site processing. At an extraordinary meeting on 11 March 1867, the Tributer Company raised additional capital by issuing further shares to existing shareholders,<sup>38</sup> and in May 1867, new company management appointed Frederick Richards as the mine manager.<sup>39</sup>

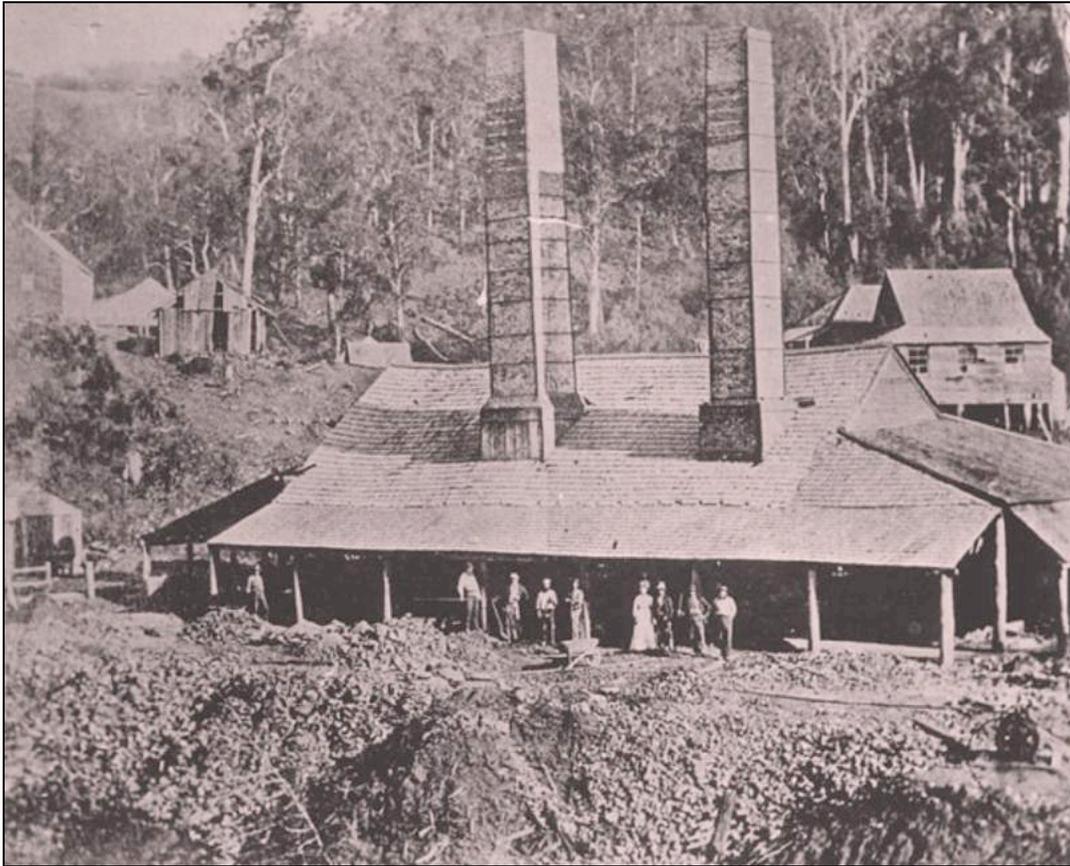
The young and formally trained Richards brought a different style of management. Arriving in Melbourne directly from the United Kingdom in April 1867, he was quickly at work at Coopers Creek.<sup>40</sup> It is not clear whether he was recruited in the UK or if his arrival at this time was coincidental, but with experience in some notable UK copper mines, Richards was thought to be well suited to the position by the company directors.

Richards's penchant for report writing ensured a steady flow of information on activities, and from May 1867 his progress reports appeared regularly in *Dickers Mining Record*,<sup>41</sup> highlighting the fact that development work in the mine confirmed the existence of a very satisfactory ore body in excess of 30 feet in width and of appreciable length along strike. Stopping operations commenced in September 1867. Throughout the second half of 1867, various items of infrastructure were completed to allow the ore to be spalled, calcined and transported from the mine on the eastern bank of the Thomson River to the chosen smelter site on the western bank where two reverberatory furnaces were constructed [Figs 2 & 3]. Using the traditional 'Welsh Process', the first parcel of Victorian copper regulus,



debauching into the Thomson Valley lies the rapidly increasing township of Coopers Creek, comprising a public house (kept by Mr Joseph Coates) ... two general stores - Messers Williams, Young and Day's, and Messers Harris and Feast's, and the usual proportion of the private dwellings and tradesmen's shops incidental to settlements of such a character and extent.

**Figure 3:** *Smelters, circa 1870.*



Source: Courtesy Walhalla Historical Society.

With regard to the mine, the article stated:

There are two tunnels, upper and lower. The lode in the upper tunnel is from 12 to 20feet wide ... A shoot, 180 feet in length, conveys the ore from the mouth of the upper tunnel down to the upper tramway, along which, for a distance of over 1100 feet, the ore is further conveyed, and is then passed down another shoot, 300 feet in length, connecting the upper tramway and the lower tramway ... The lower tramway passes over the bridge to the furnace, and is almost on a level with the site of the furnace, to which the ore is then conveyed.

The smelting process was also described:

The ores are various, comprising sulphurets, carbonates and black, red and grey oxides; the sulphurets and black oxides predominating. Prior to the transit of the ore from the mine to the furnace, the sulphurets are subjected to the action of fire at the mouth of the tunnel, to remove the sulphur; and the other ores are dressed by screening etc to detach and separate the loose earth, mullock etc. On their arrival at the furnace, all ores are placed in the furnace together, but all in certain fixed relative proportions; the process of reducing each class of ore being, however, similar in every case. The "slag" ... is "drawn off" every six hours; and the "regulus" ... is tapped off, at a different aperture, every 24 hours. The "regulus" contains 50 or 60 per cent of pure copper; while the bulk of the ores, immediately before being placed in the furnace, contain on average about 10 or 15 per cent of pure copper.<sup>43</sup>

At the time of the *Gippsland Guardian's* visit to Coopers Creek, Richards appears to have made a very favourable impact upon the reporter:

We were introduced to the able and courteous manager, Mr Richards, under whose auspices and care the interests of Victoria, in her copper-producing department, are not likely to suffer injury.<sup>44</sup>

The future, however, was to be far from rosy.

### **William Thomas and the Smelters**

At the time of Richards's appointment, the Tributer Company also engaged Mr William Thomas, from Adelaide, as superintendent for the 'erection of the furnaces and the smelting operations'.<sup>45</sup> From 1845, attempts had been made in South Australia to smelt copper ores using native timber, rather than coal, as the fuel source<sup>46</sup> and in 1848, Mauris and John Thomas had been among the first to successfully perfect this process at their Bremer Works near Callington in South Australia.<sup>47</sup> There is no clear evidence that William Thomas was directly related to the brothers, but it was their pioneering technology for the use of local timber as fuel that he brought to Coopers Creek. The area around Coopers Creek abounds in fine timber, but unlike the dry South Australian environment, Coopers Creek lies in a mountainous region with high annual precipitation.

From the commencement of smelting operations in mid 1867, the adverse impact of the wet weather common in the area was commented upon:

There is a shed at the mine, but I must inform you that it has not contained nearly the quantity of ore that has been prepared for so long ... but the copper ores, sulphurets, and some which has been under the shed, when 11b of it was dried lost

(2.75) ounces, so that you may imagine how much extra fire and time will be occupied to bring this in a fair way of working after being put into the furnace. Another thing is the wood. It has been cut for some time and stacked; but when exposed to constant rain, as we have had here, there is nothing to prevent its getting wet.<sup>48</sup>

This situation does not appear to have improved throughout 1867 and into 1868. An article in the *Gippsland Guardian* in March 1868 describes an ‘immense stock of a thousand tons’ of firewood being accumulated, presumably in the open [Fig. 4].<sup>49</sup>

**Figure 4:** *Firewood cutting near Walhalla, circa 1870.*



Source: Courtesy Walhalla Historical Society.

As activities began to escalate, other problems emerged. The high cost of the materials required for construction of the furnaces, particularly fire bricks, was commented upon in several of Richards’s reports, although he hoped that this expense could be avoided in future by manufacturing bricks on site (a deposit of fire clay had by this time been discovered nearby). Even though the smelting technology being employed was very conventional and well established, reports described recurring problems interrupting smelting operations, mainly related to the materials used in furnace construction.<sup>50</sup> A particular problem was the inability to obtain high quality silica sand for use as ‘furnace bottoms’, a problem that was exacerbated when roasting of regulus to rough copper began

in late 1867.<sup>51</sup> Despite continuation of these problems at Coopers Creek, that also dogged future attempts to exploit the No. 1 ore body, copper smelting had been established in Victoria for the first time.

### **Tough times: the demise of the Tributer Company**

By early 1868, problems were compounding for the Tributer Company. In December 1867 an application was made for a mineral lease adjacent to the Thomson River Copper Mining Company's property.<sup>52</sup> In January 1868, Richards reported finding continuation of the lode on the new lease area, with a single assay returning an incredible 94 per cent copper.<sup>53</sup> At a half-yearly meeting of the Thomson River Company held in early January 1868, continuation of the tributing arrangement had been considered against an obvious background of dissatisfaction with progress in smelting operations.<sup>54</sup> The prospect of the Tributer Company working the new area in its own right further raised the ire of the Thomson River Company, although terms for continuation of the arrangement were finally agreed in February 1868. This resulted in a five-year period of renewal being offset against an undertaking on behalf of the tributers to erect two more furnaces within 18 months, and to exclusively smelt ore from the Thomson River Company's property.<sup>55</sup>

Despite this resolution and broad optimism, by April 1868 the Tributer Company found itself in trouble, several accounts appearing in the *Gippsland Guardian* of cases heard in the local Warden's Court involving disputes between the company and contractors.<sup>56</sup> An article in the *Gippsland Times* summed up the situation:

It appears that the tributers were sorely pressed latterly by their creditors ... The workmen are said to have agreed to accept 10s in the pound, being all that the working company can afford to pay.<sup>57</sup>

The annual report of the Victorian Mines Department for 1868 records no production after May 1868, while an account of a general meeting of the company held in July 1868 commented that the only source of income for some time had been from calls on shares.<sup>58</sup> By September 1868, the Tributer Company had decided to suspend all operations pending re-negotiation of the tributing arrangement and re-financing,<sup>59</sup> but by October 1868, a special general meeting was scheduled with a view to 'dissolving the company, and winding up its affairs'.<sup>60</sup>

While the press emphasised that the property still held promise, their focus fell on the Tributer Company's financial problems. As reported in the *Gippsland Times*:

It may appear singular, but it is nevertheless true, that the present crisis is the principal cause of the failure of the Thomson River [Gipps Land] Copper Mining Tributer's Company. We are informed that a large section of the shareholders are Civil servants, and not having received any money from Government for a lengthy period, they have been unable to meet their calls.<sup>61</sup>

True or not, by the end of 1868 the Tributer Company were no longer in business. At an extraordinary general meeting held at the end of October 1868 to wind up the company, it was reported that outstanding liabilities were about the same as the realisable value of assets. It was further reported that an offer had been made to the Thomson River Copper Mining Company for it to purchase the on-site assets. The Thomson River Company declined this offer, and announced that they intended to take back control of the lease by the end of the year.<sup>62</sup> In December 1868, the Thomson River Copper Mining Company applied officially to the Victorian Mines Department to suspend operations on Lease 149.<sup>63</sup>

The Postal Directory lists Frederick Richards as still being in the area until the early 1870s, though this is doubtful since there is no evidence of him having any further input into events at Coopers Creek after the demise of the Tributer Company.

### **The in-between years**

Throughout 1869 and 1870, there was a succession of interactions between the Thomson River Company and the Victorian Mines Department regarding the lack of activity occurring on the lease.<sup>64</sup> The annual reports of the Mines Department for this period show no production occurred. By May 1871, another syndicate at a Sheriff's sale had purchased the property of the Tributers Company, and by April 1872 the same syndicate had acquired the Thomson River Company's interest in the lease.<sup>65</sup> Throughout 1871 and 1872, this syndicate, locally referred to as the 'Welshmen', was busy 'smelting the refuse from the various smeltings performed by the [previous] company'.<sup>66</sup> These operations were conducted using the original Tributers Company plant. An advertisement in the *Walhalla Chronicle* in December 1871 over the name of the manager for the syndicate, David Evans, asked for tenders for the supply and delivery of 500 tons of firewood.<sup>67</sup> The advertisement

was very specific about what was required, asking for '5 feet lengths, from 3 to 15 inches thick ... Good sound stringy bark, iron bark or white gum'. Perhaps this new syndicate were more knowledgeable than the previous one regarding how to smelt successfully in this environment. Certainly, the Mine Surveyor's reports throughout late 1871 and 1872 reflected this thought, going so far as to say:

The first discharge from the furnace has been satisfactory in result, and proves that the smelting operations previously carried on were ineffective; the regulus obtained ... is estimated to contain 80 per cent copper; this will be again smelted, and the pure metal produced on the ground.<sup>68</sup>

This report was, however, suspect, for writing about this period some years later, Henry Rosales was of the opinion that only 21 tons of copper had been produced in total, returning 'no profit after all costs had been discharged'.<sup>69</sup>

The years 1873 and 1874 saw a number of manoeuvres taking place over ownership of the title to the lease and liability for the maintenance of the associated labour covenant.<sup>70</sup> The size of the lease, the consequent rent due, and the obligation to pay royalties on production were also issues consuming more energy than that devoted to getting on with the job.<sup>71</sup> Finally, in July 1874, the title was transferred to the newly formed Walhalla Copper Mining Company Ltd.<sup>72</sup>

### **The Walhalla Copper Mining Company**

The Walhalla Copper Mining Company was formed in June 1874 and registered the same month,<sup>73</sup> the nominal capital being set at £30,000, comprising 30,000 shares at £1 each. At the inaugural meeting, Frederick Tricks was elected as manager of the company, which was to be based in Walhalla, as the majority of shareholders were residents of that area. Many of them were also prominent Walhalla mining personalities, with Tricks being a respected local share broker and legal manager. In the opinion of the Mine Surveyor:

The company is a very good one, so there is every probability of the lode being properly tested; and, according to the opinions of several gentlemen well acquainted with copper, there is very little doubt that this mine, with proper management, will be highly remunerative.<sup>74</sup>

The company immediately set about driving a new tunnel into the steep hillside, 100 feet below the lowest previous workings, to intersect the lode and prove it at depth.<sup>75</sup> Frequent accounts in the local press describe the contractors making slow progress in the face of hard rock conditions.<sup>76</sup> Finally, in June 1875, the lode was reached, revealing a vein of ‘yellow ore’ (sulphide ore) approximately 2 feet thick. Continued driving beyond this did not reveal any more intersections. Throughout the second half of 1875 and into early 1876, reports in the press and by the Mine Surveyor described contractors driving tunnels along the strike of the lode, and excavating rises to connect with the earlier workings so as to provide a ventilation circuit. As the ore body was progressively explored by this process, it became apparent that the lode was increasing in thickness to the south of the original point of intersection and assays of up to 20 per cent copper were frequently reported. At the same time as this was taking place, various items of new infrastructure were being completed to facilitate commencement of full scale production. While all this was happening, the company was preoccupied with disputes arising with the Victorian Mines Department over residual royalty liabilities left over from the previous operators. This situation was resolved when the company surrendered Lease 149 and took up a new lease (No. 426) covering the same area in June 1876.<sup>77</sup>

In March 1876, the Mine Surveyor reported that the Walhalla Company was making plans to re-commence smelting operations<sup>78</sup> and in May 1876, it was announced that ‘Mr Reeves Davies [another South Australian] has been engaged to erect new furnaces and take charge of the smelting works’.<sup>79</sup> By June 1876, bricks were being manufactured on site and contracts were being let once again for the supply of firewood. Throughout the second half of that year, reports described the old smelters being dismantled and new smelters being erected on the same site, while in December, the Mine Surveyor reported that the company was erecting a new bridge across the Thomson River to improve access to the smelters from the mine site.<sup>80</sup>

In early 1877, smelting operations began again using basically the same technology (production of regulus in reverberatory furnaces followed by further roasting in the same furnaces to produce coarse copper) as the original attempts ten years earlier.<sup>81</sup> At this time the ore was being calcined in the open near the mine prior to being transported to the smelter site, while in June 1877, the Mine Surveyor reported that 51 tons of cake copper

had been produced to date.<sup>82</sup> By September 1877, however, smelting had been suspended, 'owing to their having run short of fuel, and pending arrangements for a less costly mode of transit'.<sup>83</sup> Despite such setbacks, reports in the press and by the Mine Surveyor throughout 1877 and the first half of 1878 were very optimistic, describing new discoveries of rich ore shoots, promising outcomes from stoping operations, and generally satisfactory smelting activities producing saleable products.

In March 1878, it was announced that the company had secured the services of Captain Robert Sanders, past superintendent of the Burra Burra Mine, to report on its activities.<sup>84</sup> After reporting as requested, the company negotiated to engage him as works superintendent, a position he took up later in 1878, thus continuing the South Australian connection with Coopers Creek.<sup>85</sup>

### **Captain Sanders: success at last?**

For the first four years of the life of the Walhalla Company the people responsible for operational management at Coopers Creek were largely inconspicuous but with the arrival of Sanders, this was about to change. Ian Auhl's account of the 'Monster Mine' provides a number of glimpses into Sander's attributes and faults as a mine manager.<sup>86</sup> Arriving in Adelaide directly from the UK in 1873 after serving as manager of the Foxdale Mines on the Isle of Man, Sanders was appointed superintendent of the South Australian Mining Association's Burra Burra mine. Although he brought undoubted expertise to the job, in Auhl's view his reports to the directors were 'unfailingly optimistic' and generally what the directors wanted to hear, elicited perhaps by the unrealistic report he issued to the Burra directors in the month the 'Monster Mine' was closed in 1877:

I beg to state that the ground opened out in depth during the last half-year has fully confirmed my previous good opinion of the ultimate success of the Mine, when developed to a reasonable depth.<sup>87</sup>

Characteristically, Sanders brought his optimistic view of the world to Coopers Creek when he arrived in August 1878.<sup>88</sup>

Despite his relatively advanced age (Sanders was nearly 60 at the time of his arrival in Coopers Creek) he took up the challenge with vigour.<sup>89</sup> Throughout the rest of 1878, frequent reports by Sanders in the press described activities within the mine, the

construction of new infrastructure and progress with smelting. In his half yearly report to December 1878, Sanders summed up this activity: highlighted was additional development work in search of new ore reserves; stopping to produce 554 tons of ore at an average grade of nine-and-one-half per cent; construction of three calcining kilns to replace the previous practice of heap burning in the open; modifications to one smelting furnace to improve efficiency by 20 per cent; construction of two additional larger furnaces, and; completion of preparations for the installation of a mechanised crushing plant purchased from South Australia by Sanders to supersede the manual spalling of earlier times.<sup>90</sup> All of this activity was wrapped up in Sander's usual optimistic packaging:

In conclusion, I beg most respectfully to state that, although our exploratory works, so far, have not resulted in any discovery of value, I have still the same favourable opinion of the future prospects of the mine, and would strongly advise you to continue your researches.<sup>91</sup>

All indicators appeared to support the idea that Coopers Creek was about to enter its 'golden age'.

In February 1879, a great celebration was held at Coopers Creek to mark the inauguration of the new ore crushing plant that Sanders had acquired:

The baptism and starting of the new ore-reducing machinery of the principal copper mine in the colony, namely – the Walhalla Copper Mining Co., Coopers Creek took place on Thursday last. The day was observed as a half-holiday in Walhalla by the banks and business places. The weather during the afternoon was all that could be desired, and the site of the company's operations on the banks of the Thomson River presented a gay and animated appearance. At 2.30 pm, Mrs Ramsay Thomson gave life to the machinery, with the mystic assistance of a bottle of champagne.<sup>92</sup>

By this stage, there were reported to be 70 men working at the mine, and around 200 souls living at the settlement, which by this time boasted a school and post office in addition to its previous establishments.<sup>93</sup>

Sander's regular reports continued throughout the first half of 1879, generally describing the operations as proceeding well, albeit with the now familiar rider that the use of wet firewood was making the smelting operations difficult, to the extent that smelting in two of the furnaces had to be discontinued until the onset of finer weather and the services of several men dispensed with.<sup>94</sup> In the half-yearly report of the company to the end of June

1879, the directors reported to shareholders that the financial position overall was precarious, necessitating that arrangements be made with the company's bankers to pay off accrued debt. In Sander's accompanying report, however, he was able to claim that a net operating profit had been achieved for the preceding six months, thanks to the improvements that had been made.

True to his form as an eternal optimist, Sanders concluded this half report that:

... I beg to state that the past four month's working cannot but be satisfactory to all parties concerned, and that I have still the same confidence in the ultimate success of the undertaking.<sup>95</sup>

On 23 July 1879, Sanders died at Coopers Creek of an intestinal obstruction, and was buried in the Walhalla cemetery.<sup>96</sup>

### **End Game**

After the death of Sanders, Frederick Tricks took over the additional role of acting operations manager but despite being able to claim another operating profit for the preceding six months, he introduced a more cautious note (though spiced with some optimism) when he concluded his half yearly report to December 1879:

... I would remind you that your mine requires developing, as the reserves of ore, so far opened up, are limited; and that comparatively speaking, little exploration has been attempted, whilst the prospects of further discoveries being made are most encouraging.<sup>97</sup>

In truth, the prospects for being able to increase reserves substantially were very low. Despite a report by the Mine Surveyor in March 1880 of a 'valuable new block of ore' being discovered, reports later that year were generally of deteriorating ore quality and quantity,<sup>98</sup> and although copper production was being maintained, the general mood became sombre. In September 1880, the Mine Surveyor reported that the ore shoot worked for the previous five years was nearing exhaustion, and no new shoots had been discovered.<sup>99</sup> In a later summary of activities, W.M. Baragwanath of the Victorian Geological Survey attributes to Tricks a description of the efforts made in 1880 to trace a possible continuation of the ore body in a southerly direction beyond the point where it had

been ‘cut off’ by a fault or ‘ledge’.<sup>100</sup> These efforts, as was also the case to find a northern continuation of the ore body, proved unsuccessful and were soon discontinued.

When it came, the end for the Walhalla Copper Mining Company Ltd was more of a whimper than a bang. In winter 1880, the directors proposed that operations be suspended until summer owing to the impassable state of the roads and the complete inability to get suitable firewood.<sup>101</sup> At a special general meeting of shareholders held in June 1880, discontent was aired about the impost of another call, even though the bank overdraft had been paid off.<sup>102</sup> Anger was expressed at unfulfilled promises made by the directors that dividends would flow once the overdraft had been discharged. In December 1880, the *Walhalla Chronicle* carried a notice that shares forfeited due to a failure to meet a call would be sold by public auction,<sup>103</sup> and this was almost the last contemporary comment regarding the fate of the Walhalla Company. In Baragwanath’s hindsight account, there is a brief comment that ‘in 1881 the shoot of ore that was opened up having been worked out, the mine closed down, and little has been done since’.<sup>104</sup> Also in 1881, Tricks floated the Victoria Copper Mining Company NL and attempted a short-lived effort to continue activities, but in effect, by 1881 the No.1 ore body had been worked out and the rich ore exhausted.

### **The Wash-up**

Over the 15 years from 1865 to 1880, approximately 800 tons of smelted copper in various forms was recovered from the No.1 ore body, the vast majority of it during the time of the Walhalla Copper Mining Company.<sup>105</sup> Over this time the average grade of the ore was around nine to ten per cent. It is clear from the records of the various operators that after allowing for recovery of capital expenditure, at no time during this period was an overall profit returned. In the case of the Walhalla Company, this is evident from a statement made to the Government by the toward the end of its life:

The company commenced work in September, 1874, and have expended since that time £35,127, comprising £17,627 net amount realised by sales of copper. The number of men who have found employment in connection with the works has averaged 85 per week. Although 357 tons of rough copper has been sent to the market, no profits have as yet been divided amongst the proprietors.<sup>106</sup>

**Figure 5:** *Packhorse transport in the Walhalla area, circa 1870s.*



Source: Walhalla Historical Society.

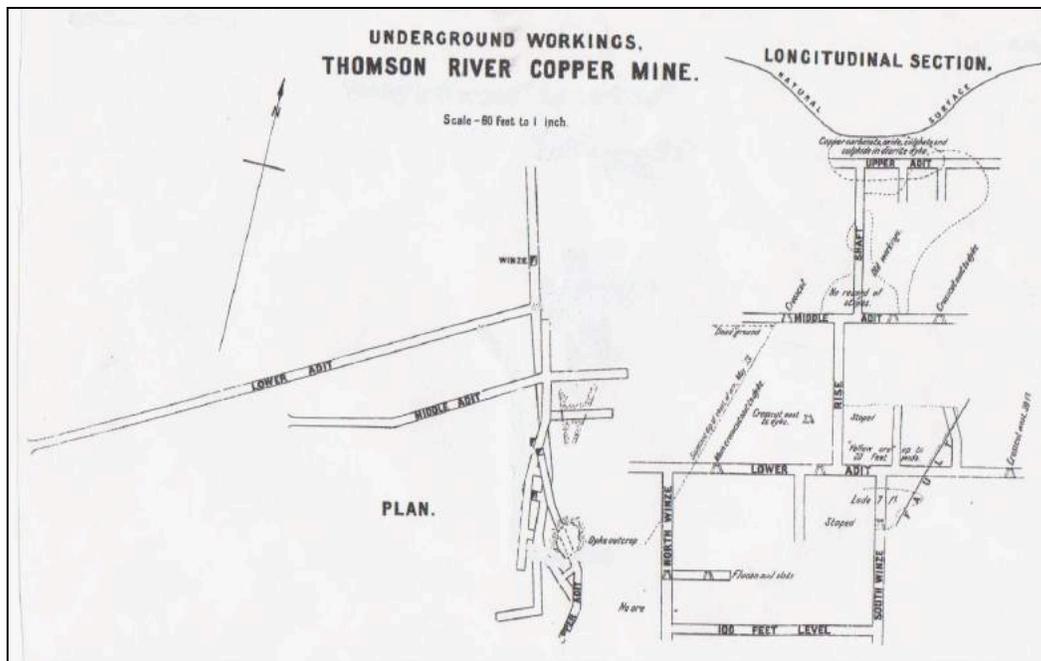
By comparison with other copper mining activities around Australia at the time, the average grade of the No.1 ore body over its life should have supported a viable operation. This points to the recurring inability to amortize capital, with this being directly related to the failure to generate cash flow over a long enough period, this being dictated by the relatively small size of the No.1 ore body. The need to overcome ‘teething’ problems aside, two underlying factors appear to have made Coopers Creek different from other contemporary operations in Australia. The frequent references to the adverse impact of wet firewood on smelting operations highlight this issue as a prime concern. In his half yearly report to June 1879, Sanders concluded from analysis that the use of wet firewood was adding around 33 per cent to the total production cost, a margin representing the difference between operating profit and loss at this time.<sup>107</sup> Unfortunately none of the operators appear to have been able to provide undercover storage sufficient to cope with the volume of wood required. The other persistent issue arising from contemporary accounts was the extraordinary difficulty of transporting materials in and product out from Coopers Creek

during the period that the No.1 ore body was being exploited. This was not only reflected in high costs – for example, transported fire bricks costing two shillings and six pence each - but also in the physical challenges:

The copper, as produced, had to be packed for 2 or 3 miles up a steep track [Fig. 5], there loaded into wagons, and taken either to Sale or port Albert, to be shipped to Melbourne.<sup>108</sup>

The failure to overcome these dual problems during the life of the No.1 ore body [Fig. 6] inevitably led to the disappointing outcomes experienced by shareholders. By the time that the Walhalla railway was eventually providing reasonable access to Coopers Creek in the early twentieth century, and coal could be imported as fuel, the days of the high-grade ore of the No.1 ore body were long past.

**Figure 6:** *Approximate extent of workings in No1 ore body.*



Source: W.M. Baragwanath, 'The Walhalla or Thompson River Copper Mine', *Geological Survey of Victoria, Bulletin no. 20*, 1906.

### The Later Years

During the 1880s and 1890s, a number of short-lived attempts were made to resume work at Coopers Creek. According to Baragwanath, most effort was devoted to exploring the dyke adjacent to the No.1 ore body that had been discovered to contain traces of lower

grade mineralisation during the mining activities of the Walhalla Copper Mining Company. In April 1898, the *Australian Mining Standard* announced the discovery of an ore body of disseminated mineralisation in the dyke, subsequently referred to as the No.2 ore body.<sup>109</sup> Walhalla Copper Mines NL was registered in 1899, and Coopers Creek Mining Company (Copper) in 1901, to work the No.2 ore body, but there is no record of the results of these short-lived activities. In 1907, the Thomson River Copper and Platinum Syndicate further explored the No.2 ore body by underground diamond drilling, partly supported by a government grant, with assays of the core revealing up to five per cent copper, and small quantities of gold, silver, platinum and palladium.<sup>110</sup> Despite the considerably lower copper grade, the results of this exploration program were sufficiently encouraging to suggest that exploitation of the No.2 ore body could be profitable.

The Gippsland Copper and Platinum Mining and Smelting Co. began operations in 1910 by initially re-processing the old waste heaps. In 1911, the company was re-registered as the Gippsland Copper, Platinum and Gold Mining and Smelting Company NL. In 1910 and 1911, the company opened up the No.2 ore body, erected a modern coke fired blast furnace, and constructed a tramway to link with the recently completed Moe to Walhalla railway at a siding named Platina in recognition of the discovery of Platinum. The company took over the nearby Happy go Lucky gold mine to provide the acidic (quartz rich) flux to balance the basic dyke ore during smelting. Consequently, during 1911, some 1,116 tons of ore was smelted for 91 tons of copper matte containing 36 tons of copper, 653 ounces of silver, 55 ounces of gold, and 184 ounces of platinum group metals. The matte was sent to Germany to separate the products, but yielded a return of only £45 above the cost of treatment,<sup>111</sup> leading to an attempt being made in 1912 to reduce costs before further smelting was undertaken. Modifications were made to the plant and considerable investment made to unsuccessfully open up iron ore deposits elsewhere in Gippsland to provide a source of the flux required for smelting.<sup>112</sup> Eventually, a suitable flux source (residual pyrite from the superphosphate works in Melbourne) was secured and trial smelt runs conducted, the results of which suggested that smelting could resume at a profit.<sup>113</sup> After some delays, smelting was resumed in 1913, with 1,291 tons of ore smelted for 127 tons of matte containing 36 tons of copper, 519 ounces of silver, 44 ounces of gold and 127 ounces of platinum group metals, still insufficient to make the operation profitable.<sup>114</sup> After

failure to gain Government assistance to keep going, operations were suspended and the plant sold in 1919. This was the last attempt to work the No.2 ore body for nearly 50 years.

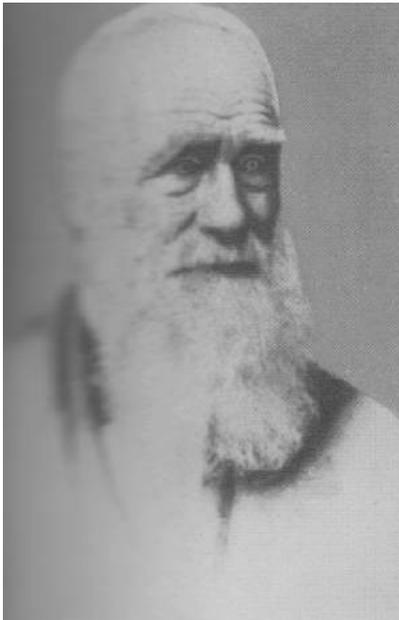
In the 1920s and 1930s, a limestone quarrying and burning industry was established at Coopers Creek.<sup>115</sup> Meanwhile, occasional reports indicated continuing interest in the copper prospects. Eventually, in 1962, a local syndicate was formed to clean out the old workings<sup>116</sup> and in 1967, Coopers Creek Mining and Exploration was formed.<sup>117</sup> An exploration program involving geophysical surveys and further diamond drilling revealed the prospect of a worthwhile ore body existing below the old workings,<sup>118</sup> so a decision was made to re-start operations. A small water jacketed blast furnace was erected on the east bank of the river near to the mine in 1969, and limited smelting conducted from 1969 to 1971 to produce copper matte, which was sent overseas for further processing.<sup>119</sup> Initial teething problems with the furnace were overcome, and smelting conducted successfully, albeit with minimal production.<sup>120</sup> Operations were terminated for the last time in 1971 due to rising costs and a drop in commodity prices.

### **Epilogue**

Two aspects of interest in relation to the activities at Coopers Creek in the early years were the reliance on the importation of copper mining expertise from South Australia, and the willingness to continue to invest in what could best be described as a marginal proposition. The first of these reflects the reputation that South Australia had achieved from the 1840s as the cradle of base metal mining in Australia, particularly copper mining. Although by the 1860s Victoria was quickly acquiring skills in the mining of gold in quartz reefs, and the associated processing, examples of base metal mining were few and far between. In this context, it would have appeared logical to bring to bear what appeared to be the best available expertise at the time, for better or for worse, and many of the public reports of this time stress the perceived importance of Coopers Creek to the economy of the Colony. When further significant discoveries of copper did not eventuate in Victoria over the years following the discovery at Coopers Creek, some investors apparently felt the importance of keeping this fledgling industry alive. Mixed with the spirit of adventure generated by the gold era, such ultraism might account for the almost reckless investments of some individuals.

The latter point is well exemplified by the case of Henry Dendy [Fig. 7A], the first chairman of, and a major investor in the Thomson River Copper Mining Company. At one time Dendy was one of the wealthiest men in Melbourne, being the pioneer of the salubrious suburb of Brighton. From the early 1860s, Dendy was drawn to investment in various mining enterprises in the Walhalla area, progressively selling up his assets to fund his habit.<sup>121</sup> It's not clear exactly the extent or nature of Dendy's investments in Coopers Creek, but it is claimed that it was these that ultimately left him destitute.<sup>122</sup> For the last years of his life Dendy lived as a recluse in a bush hut near Walhalla, until his death in 1881, the same year as the No.1 ore body was worked out.

**Figure 7A:** *Henry Dendy, circa 1875.*



**Figure 7B:** *Grave of Henry Dendy Snr and Henry Dendy Jnr. in Walhalla Cemetery.*



Source 7A: Weston Bate, *A History of Brighton*, Melbourne University Press, 1962.

Source 7B: Author's photograph.

In contrast to Dendy, William Pearson, a fellow initial shareholder in the Thomson River Copper Mining Company and the first mine manager, went on to make a fortune from gold mining investments in the Walhalla region.<sup>123</sup> Such is the fate of the mining investor to this day.

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## Endnotes

<sup>1</sup> Current spelling of Thomson used throughout.

<sup>2</sup> J. Flett, *The history of gold discovery in Victoria*, The Hawthorn Press, Melbourne, 1970, p. 139.

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- <sup>3</sup> *Gippsland Times*, 29 April 1865.
- <sup>4</sup> See for example, Raymond Paull, *Old Walhalla, Portrait of a Gold Town*, Melbourne University Press, Melbourne, 1963, p. 132.
- <sup>5</sup> *Gippsland Times*, 4 November 1864.
- <sup>6</sup> Units used in this paper: 1 (long) ton = 1.01605 tonnes; 1 pound = 0.4536 kg; 1 troy ounce (the standard measure of gold) = 20 dwt = 31.10348 g; 1 inch = 25.4 mm; 1 foot = 0.305 m; 1 mile = 1.609 km; 1 square mile = 259 hectares or 2.59 sq km; 1 acre = 0.405 hectares.
- <sup>7</sup> *Gippsland Times*, 18 February 1865.
- <sup>8</sup> *Victorian Government Gazette*, January-June 1865, Victorian Government Printer, Melbourne, 1865.
- <sup>9</sup> Details of Mining Lease 149, Victorian Public records Office [hereafter VPRS] 395, Public Records Office of Victoria [hereafter PROV].
- <sup>10</sup> *Gippsland Times*, 29 April 1865.
- <sup>11</sup> *Dickers Mining Record*, 1 May 1866.
- <sup>12</sup> *Ibid.*; Details of Mining Lease 149, VPRS 395, PROV.
- <sup>13</sup> Record of marriage of Ambrose Hallifax, South Australian Register of Births, Deaths and Marriages, 1849.
- <sup>14</sup> *The Adelaide Register*, 3 July 1851.
- <sup>15</sup> Rob Charlton, *The History of Kapunda*, The Hawthorn Press, Melbourne, 1971, p. 109.
- <sup>16</sup> Record of birth of a child to Ambrose Hallifax, S. Australian Register of Births, Deaths and Marriages, 1853; Record of birth of a child to Ambrose Hallifax, Vict. Register of Births, Deaths and Marriages, 1855.
- <sup>17</sup> J. Waghorne, *Postal and Telegraph Staff in Victoria, 1839 – 1901*, Published by the Author, 1989.
- <sup>18</sup> *Victorian Government Gazette*, December 1864, Victorian Government Printer, Melbourne 1864.
- <sup>19</sup> *Ibid.*, May 1866.
- <sup>20</sup> *Dickers Mining Record*, 26 June 1866.
- <sup>21</sup> Mel Davies, 'Bullocks and Rail, The South Australian Mining Association, 1845-70', *Australian Economic History Review*, vol. XVII, no. 2, September 1977, p. 151.
- <sup>22</sup> *Gippsland Guardian*, 19 September 1867.
- <sup>23</sup> *Gippsland Chronicle*, 15 August 1866.
- <sup>24</sup> *Gippsland Guardian*, 20 February 1867.
- <sup>25</sup> An article in the *Gippsland Guardian* dated 12 June 1867 describes a South Australian copper miner travelling to Coopers Creek to seek employment from Captain Osborne, whom he claimed would know him from South Australia.
- <sup>26</sup> Minutes of Directors Meetings South Australian Mining Association, 26 January 1849, BRG 22/957, State Library of South Australia [hereafter SLSA].
- <sup>27</sup> Resignation of Samuel Osborne, South Australian Mining Association, 19 December 1851, General Correspondence file BRG 22/5/1/1465, SLSA; *E Gold – A Nation's Heritage, Electronic Encyclopedia of Gold in Australia*, <http://www.egold.net.au>
- <sup>28</sup> Record of marriage of Samuel Osborne, Victorian Register of Births, Deaths and Marriages, 1858.
- <sup>29</sup> Ballarat and District Postal Directories for 1862 and 1866/67.
- <sup>30</sup> Record of death of Samuel Osborne, Victorian Register of Births, Deaths and Marriages, 1896.
- <sup>31</sup> *Gippsland Guardian*, 20 February 1867.
- <sup>32</sup> Quoted in the *Gippsland Guardian*, 20 February 1867.
- <sup>33</sup> *Ibid.*
- <sup>34</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Subdivision, March 1867*, Victorian Government Printer, Melbourne, 1867.
- <sup>35</sup> *Annual report of the Gipps Land Copper Mining Tributers Company*, re-published in *Dickers Mining Record*, 26 July 1867.
- <sup>36</sup> Letters to South Australian Mining Association Mine Officials, no. 4, 25 January 1849, p. 243, BRG 22/961, SLSA.
- <sup>37</sup> *Annual report of the Gipps Land Copper Mining Tributers Company*, re-published in *Dickers Mining Record*, 26 July 1867; Details of Mining Lease 149, VPRS 395, PROV.
- <sup>38</sup> *Annual Report of the Gipps Land Copper Mining Tributers Company*, re-published in *Dickers Mining Record*, 26 July 1867.
- <sup>39</sup> *Ibid.*
- <sup>40</sup> *Ibid.*, Register of Unassisted Inward Passengers to Victoria from British, Foreign and NZ Ports, 1852-1923, VPRS 947, PROV.

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- <sup>41</sup> *Dickers Mining Record*, 27 May 1867, 11 June 1867, 14 September 1867, 20 December 1867, 20 January 1868, 18 February 1868.
- <sup>42</sup> See for example, J Percy, *Metallurgy, the art of extracting metals from their ores, and adapting them to various purposes of manufacture: Fuel, fire clays, copper, zinc, brass etc*, John Murray, London, 1861; *Dickers Mining Record*, 28 November 1867.
- <sup>43</sup> *Gippsland Guardian*, 2 September 1867
- <sup>44</sup> *Ibid.*
- <sup>45</sup> *Annual report of the Gipps Land Copper Mining Tributers Company*, re-published in *Dickers Mining Record*, 26 July 1867.
- <sup>46</sup> Mel Davies, 'Taking Coals from Newcastle – Smelting Location and Fuel Costs at Kooringa South Australia', *Journal of Australasian Mining History*, vol. 3, September 2005, p. 34.
- <sup>47</sup> Fred Thomas, 'Establishing Copper Smelting in Australia', *Royal Historical Society of Queensland Journal*, Vol. XV, no. 7, 1994, p. 313; *The Adelaide Observer*, 7 July 1849.
- <sup>48</sup> From a report by Richards, *Dickers Mining Record*, 14 September 1867.
- <sup>49</sup> *Gippsland Guardian*, 31 March 1868.
- <sup>50</sup> For example, article in *Gippsland Guardian*, 31 March 1868, describing smelting being suspended for repairs and improvements to be made to the furnaces.
- <sup>51</sup> *Dickers Mining Record*, 20 January 1868.
- <sup>52</sup> Details of Mining Lease 188, VPRS 395, PROV.
- <sup>53</sup> *Dickers Mining Record*, 20 January 1868.
- <sup>54</sup> *Ibid.*, 14 January 1868.
- <sup>55</sup> *Ibid.*, 18 February 1868.
- <sup>56</sup> *Gippsland Guardian*, 7 April 1868.
- <sup>57</sup> *Gippsland Times*, 25 April 1868.
- <sup>58</sup> *Ibid.*, 6 August 1868.
- <sup>59</sup> *Dickers Mining Record*, 7 September 1868.
- <sup>60</sup> *Gippsland Guardian*, 1 October 1868.
- <sup>61</sup> *Gippsland Times*, 25 April 1868.
- <sup>62</sup> *Ibid.*, 27 October 1868.
- <sup>63</sup> Details of Mining Lease 149, VPRS 395, PROV.
- <sup>64</sup> *Ibid.*
- <sup>65</sup> *Ibid.*
- <sup>66</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, December 1871*, Victorian Government Printer, Melbourne, 1871.
- <sup>67</sup> *Walhalla Chronicle*, 23 December 1871.
- <sup>68</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, December 1871*.
- <sup>69</sup> Henry Rosales, 'Copper Mines, Coopers Creek Gippsland', in *Geological Survey of Victoria, Progress Report no 6*, 1879.
- <sup>70</sup> Details of Mining Lease 149, VPRS 395, PROV.
- <sup>71</sup> *Ibid.*
- <sup>72</sup> *Ibid.*
- <sup>73</sup> *Walhalla Chronicle*, 13 June 1874.
- <sup>74</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, June 1874*, Victorian Government Printer, Melbourne, 1874.
- <sup>75</sup> *Ibid.*, December 1874.
- <sup>76</sup> For example, *Gippsland Times*, 8 December 1874.
- <sup>77</sup> Details of Mining Lease 149, VPRS 395, PROV.
- <sup>78</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, March 1876*, Victorian Government Printer, Melbourne, 1876.
- <sup>79</sup> *Gippsland Times*, 18 May 1876.
- <sup>80</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, December 1876*, Victorian Government Printer, Melbourne, 1876.
- <sup>81</sup> *Ibid.*, March 1877; Rosales, 'Copper Mines, Coopers Creek Gippsland'.
- <sup>82</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, June 1877*, Victorian Government Printer, Melbourne, 1877.

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- <sup>83</sup> *Ibid.*, September 1877.
- <sup>84</sup> *Gippsland Times*, 20 March 1878.
- <sup>85</sup> *Half Yearly Report of the Walhalla Copper Mining Company*, Published by the *Walhalla Chronicle*, December 1878.
- <sup>86</sup> Ian Auhl, *The story of the 'Monster Mine', The Burra Burra Mine and its Townships 1845-1877*, Investigator Press, Burra Burra, 1986.
- <sup>87</sup> *Ibid.*, p. 371.
- <sup>88</sup> *Walhalla Chronicle*, 17 August 1878.
- <sup>89</sup> Record of death of Robert Sanders, Victorian Register of Births, Deaths and Marriages, 1879.
- <sup>90</sup> *Half Yearly Report of the Walhalla Copper Mining Company*, Published by the *Walhalla Chronicle*, December 1878.
- <sup>91</sup> *Ibid.*
- <sup>92</sup> *Gippsland Times*, 17 February 1879, quoting the *Walhalla Chronicle*.
- <sup>93</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, March 1879*, Victorian Government Printer, Melbourne, 1879.
- <sup>94</sup> *Ibid.*, June 1879.
- <sup>95</sup> *Walhalla Chronicle*, 12 July 1879.
- <sup>96</sup> Record of death of Robert Sanders, Victorian Register of Births, Deaths and Marriages, 1879.
- <sup>97</sup> *Half Yearly Report of the Walhalla Copper Mining Company*, Published by the *Walhalla Chronicle*, December 1879.
- <sup>98</sup> See for example, *Walhalla Chronicle*, 13 March 1880 and 27 March 1880.
- <sup>99</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, September 1880*, Victorian Government Printer, Melbourne, 1880.
- <sup>100</sup> W.M. Baragwanath, 'The Walhalla or Thompson River Copper Mine', *Geological Survey of Victoria Bulletin no. 20*, 1906.
- <sup>101</sup> *Quarterly reports of the Mining Surveyors and Registrars, Stringers Creek Division, June 1880*, Victorian Government Printer, Melbourne, 1880.
- <sup>102</sup> *Gippsland Times*, 30 June 1880.
- <sup>103</sup> *Walhalla Chronicle*, 25 December 1880.
- <sup>104</sup> Baragwanath, 'The Walhalla or Thompson River Copper Mine'.
- <sup>105</sup> *Ibid.*; Rosales, 'Copper Mines, Coopers Creek Gippsland'.
- <sup>106</sup> *Ovens and Murray Advertiser*, 13 September 1879.
- <sup>107</sup> *Walhalla Chronicle*, 12 July 1879.
- <sup>108</sup> Baragwanath, 'The Walhalla or Thompson River Copper Mine'.
- <sup>109</sup> *Australian Mining Standard*, 28 April 1898.
- <sup>110</sup> P.L. Kenny, 'Thompson River Copper Mine', *Geological Survey of Victoria Unpublished Report 1942/28*, 1942.
- <sup>111</sup> *Ibid.*
- <sup>112</sup> *Annual Report of the Gippsland Copper, Platinum and Gold Mining and Smelting Co.*, Publisher Unknown, 1912.
- <sup>113</sup> *Ibid.*
- <sup>114</sup> *Annual Report of the Victorian Mines Department*, Victorian Government Printer, Melbourne, 1913.
- <sup>115</sup> Diane Grollo, *Coopers Creek Gippsland, The Trevisani*, MURE, 2004.
- <sup>116</sup> Sharyn Jackson, *The Golden Era of Coopers Creek*, Gippsland Institute of Advanced Education, 1986.
- <sup>117</sup> *Ibid.*
- <sup>118</sup> K.G. Bowen, 'Report on the Coopers Creek Copper Mine', *Unpublished Consultants Report to Coopers Creek Mining and Exploration*, 1969.
- <sup>119</sup> *Taralgon Express*, 12 May 1971.
- <sup>120</sup> *Annual Reports of the Victorian Mines Department*, Victorian Government Printer, Melbourne, 1969 and 1970.
- <sup>121</sup> Weston Bate, *A History of Brighton*, Melbourne University Press, 1962, pp. 68-69.
- <sup>122</sup> *Ibid.*
- <sup>123</sup> *Ibid.*