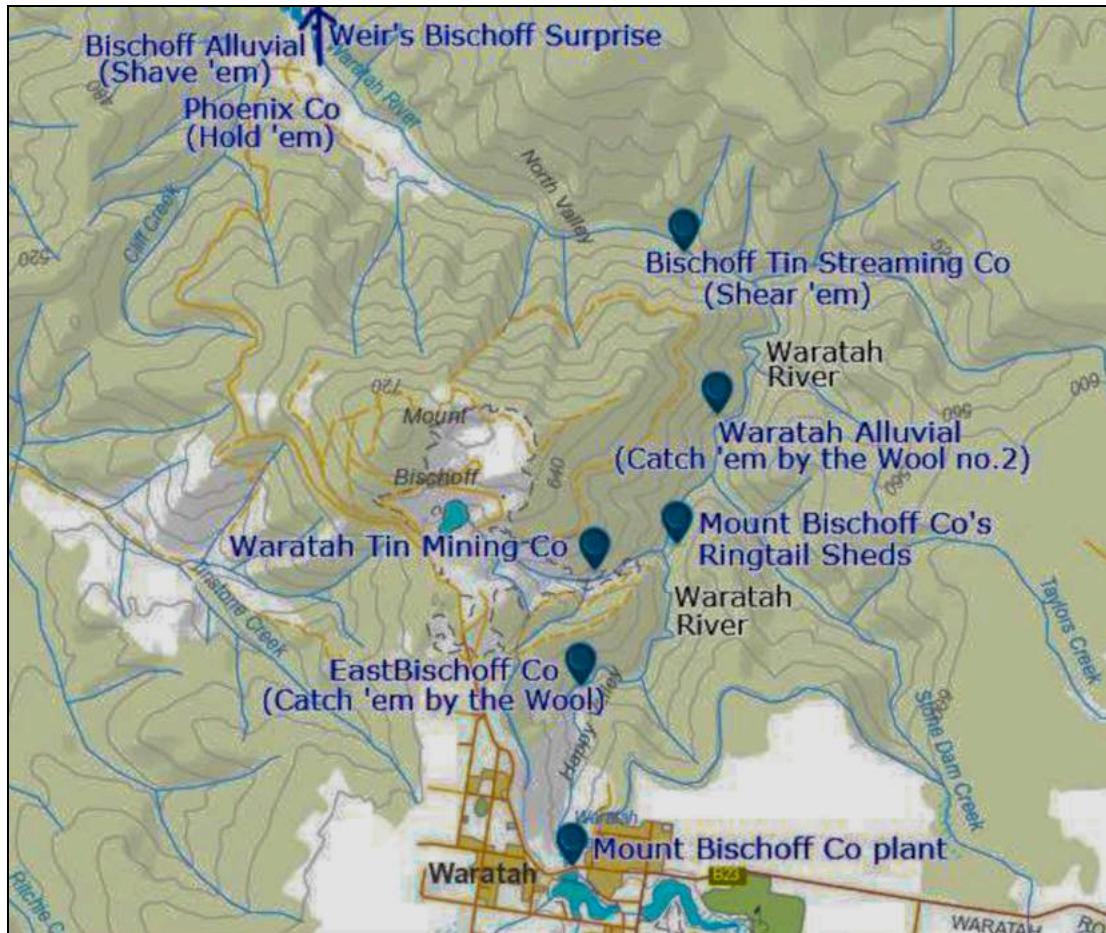


## **Shearing the Waratah: “Cornish” tin recovery on the Arthur River system, Tasmania, 1878–1903**

By NIC HAYGARTH  
*University of Tasmania*

**T**ourist guff about Tasmania’s Arthur River insists that it is ‘wild’, having never been ‘farmed, logged, mined or dammed’.<sup>1</sup> The Arthur’s forested lower reaches, which are cruised by tourist vessels give the appearance of being in a natural state, with abundant native bird and animal life. Stands of miraculously preserved ancient rainforest near its middle reaches host guided bushwalking experiences. This is the so-called Tarkine Wilderness.

**Map 1:** *Mount Bischoff and the Waratah River, showing the position of rival companies*



Source: Courtesy of Department of Primary Industries, Parks, Water & Environment, Tasmania.

Other parts of the Arthur River system are more like an industrial wilderness. The tiny stream begins its passage to the Southern Ocean by trickling out of the Magnet silver-lead mine’s no. 1 dam, then receives Magnet Creek, half of which spews, stinking of sulphur, from the Magnet mine’s South Adit, plus the alarmingly yellow Tinstone

Creek, which drains the Bischoff Extended tin workings. Further downstream, the Arthur receives the Waratah River, which in 1910 was declared a 'sludge channel', effectively abrogating the Mount Bischoff Tin Mining Company (Mount Bischoff Co.) of responsibility for its various water-borne discharges.<sup>2</sup> Before remediation was undertaken by Mineral Resources Tasmania, Mount Bischoff drainage water was declared toxic enough to kill wildlife, and a 20-kilometre-long 'dead zone' on the river's upper reaches was uninhabited by the giant freshwater lobster.<sup>3</sup> Below the Hellyer River confluence, where a small gold rush played out in 1872, is the Blue Peak area where in the 1860s the gold prospector Skelton Emmett pursued his plan to burn out the entire western half of the island.<sup>4</sup> The Arthur also receives muted toxic contributions from the Frankland River, courtesy of the Balfour group of copper mines, on its seaward journey. Then there is the tin. So much tin has found its way into the Arthur River that in the 1970s the idea was entertained of dredging not just the river but coastal deposits outside the river mouth.<sup>5</sup>

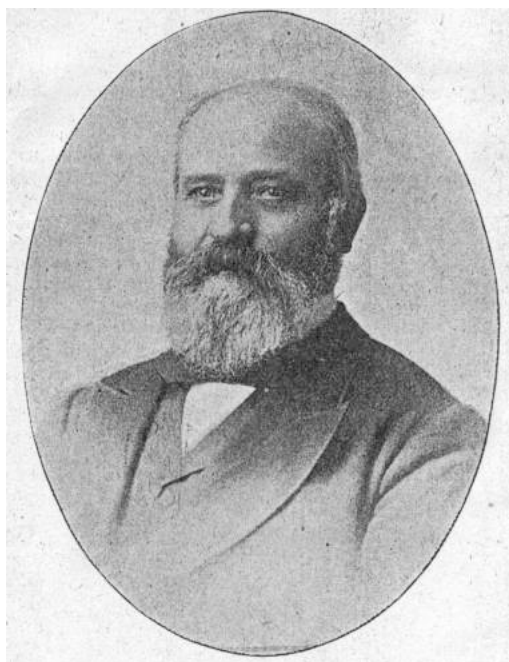
Industrial damage was apparent by 1874, within two years of the commencement of mining at Mount Bischoff. At that time, tin fragments could be panned in the Arthur many kilometres downstream.<sup>6</sup> At their confluence, the turbid waters of the middle Arthur River were easily distinguishable from the clear waters of its major tributary, the Hellyer River, a few years later. This sediment would have represented not just the carriage of Mount Bischoff mill tailings by water, but siltation caused by other mining techniques. It has been estimated that the Mount Bischoff Co. dressing sheds alone lost 22,000 tons of metallic tin into the Arthur River system up to 1907 (30,000 tons by 1928)—in addition to which were small contributions made by the plants of the Stanhope and Don Companies, and the sluice box tailings lost by other companies in their tailraces at Mount Bischoff.<sup>7</sup>

Why was so much mined tin ore lost during processing? The cassiterite was associated with clay and other minerals of similar specific gravities, requiring careful separation. Metallurgy of tin had been studied for centuries in mining centres like Cornwall, but even the Cornish 'Cousin Jacks'—men who were said to have 'mining in their blood'—to whom many Tasmanians turned to in the infancy of their metal mining industry found processing the Mount Bischoff ore difficult. Philip Payton and Ronald M. James have discussed how emigrant Cornish miners 'asserted an innate superiority as hard-rock miners', exploiting their Cornish ethnicity as an economic strategy.<sup>8</sup> After all, many Cornish tin dressers or 'practical miners' were born into mining families and started their mining careers as children, learning their craft on the job, without a formal mining education.<sup>9</sup> Certainly the late-nineteenth-century Cornish tin dressers at Mount Bischoff were a distinct class of miner, proud of their ethnicity, enterprising, improvisational, often outspoken, whose lack of schooling was no barrier to expressing themselves in the press.

By contrast, in Germany the traditional system of learning how to mine on the job had given way, as in America, to a formal education system. As the result of reform of its university system in the 1810s, during the first half of the nineteenth century Germany produced more university graduates than England and gave them more specialised training.<sup>10</sup> From that system came Ferd Kayser (1833–1919) [Fig. 1], the

Mount Bischoff Co. mine manager 1875–98 and general manager 1898–1907, a man who did not subscribe to the Cornish mining tradition. A graduate of the Clausthal Academy of Mines in modern-day Germany's Harz Mountains, he had arrived in South Australia at a time when the 'Cousin Jacks' were abandoning its mines 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>11</sup> To many, Cornwall was a byword for simplicity, economy and improvisation. However, to Kayser, a champion of technology, Cornwall, the so-called 'cradle of the Industrial Revolution', was a 'Luddite'. Antiquated Cornish mining methods were his favourite hobbyhorse. One of his first actions on taking over the management was to sack the Mount Bischoff Co's Cornish ore dresser Stephen Eddy, whose improvised appliances, he said, included 'the hand-jigger and all the old primitive appliances his great grandfather used'.<sup>12</sup>

**Figure 1:** *Mount Bischoff Co. mine manager 1875-98, general manager 1898-1907, Ferd Kayser.*



Source: *Australian Mining Standard*, 1898.

This made for interesting times when in 1879, after several Cornish tin dressers had taken up residence on lesser claims at Mount Bischoff, Kayser faced a shareholder revolt against his management.<sup>13</sup> Suddenly, his own ore dressing appliances were under attack. Until 1893 the Mount Bischoff Co. sluiced all its tin ore on the mountain before railing it to the plant at the Waratah Falls for crushing and further treatment. Such was the loss of metallic tin tailings from both the sluice boxes and the dressing sheds that a new industry had already been born. Managers of smaller mining companies were 'lifting the crumbs from the rich man's table', that is, they had realised that the richest material on their leases was not lode tin or alluvial tin but escaped Mount Bischoff Co. ore.<sup>14</sup> The first to recognise this was the Waratah Tin Mining Company (Waratah Tin Co.).

Tailings from the Mount Bischoff Co's sluice boxes emptied into a creek running through the Waratah Tin Co. property into the Waratah River. In about 1878 that company's Cornish tin dresser, Richard Mitchell, switched from working its tin lode to extracting ore from the creek.<sup>15</sup>

The other companies that took their lead from the Waratah Tin Co., extracted escaped ore from the Waratah River downstream of the Mount Bischoff Co. plant. The East Bischoff Company, Bischoff Tin Streaming Company, Bischoff Alluvial Tin

Mining Company/Phoenix Alluvial Company and Waratah Alluvial Company all operated in this manner.<sup>16</sup>

**Figure 2:** *Veteran Cornish miner Anthony Roberts (right) with his team packing out ore from the Weir's Bischoff Surprise mine.*



Source: Courtesy of Colin Roberts.

By the 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', 'Shear 'em', 'Shave 'em', 'Hold 'em' and the 'Catch 'em by the Wool no. 2' respectively. Cornish emigrants, including former Helston miner Richard Mitchell, one-time St. Just resident William White, Marazion-born A.S.R. Osborne and Truro-born Anthony Roberts [Fig. 2], were the main operators of these plants. The basic technique was to impound the tailings in dams, use buddles to separate the cassiterite, grind the concentrate in Chilian mills and upgrade it on round tables. At least one plant also employed the horse-powered jigger or separator patented by another Cornish miner, W.H. Wesley, which Kayser's detractors held up as superior to his own appliances.<sup>17</sup> Kayser hit back as early as May 1879, telling his directors:

Waratah [Tin Co.] clear up tailings sent down in Crosby's [Kayser's predecessor's] time. East Bischoff has hardly got two tons of very inferior ore for the whole time at work. Wesley's patent jigger is a big humbug.<sup>18</sup>

Yet after denouncing the small companies that reworked Mount Bischoff Co. tailings, in the 1880s Kayser established two tin recovery plants of his own, the Ringtail Sheds and the 'Catch 'em' plant, to perform the same function.<sup>19</sup> Even then, some of the men working below these plants on the river continued to make a living, in what could be seen as vindication of the economical Cornish miner. The final showdown between Kayser's German technology and old-fashioned Cornish nous was a Supreme Court trial

in 1903 in which the protagonists went head to head, spruiking their own success and denigrating their rivals. Ultimately, while the animosity between mining managers at Mount Bischoff can be seen as a collision of competing brands, the Cornish miner and the professional, at ground level it was simply a scrap between competing individuals to make a living.

### **East Bischoff ('Catch 'em By the Wool') 1879–82**

This company, which began in early 1879, using Wesley's patented jigger, enjoyed the highest position on the river, with first pick of the Mount Bischoff Co's lost tin. Its first manager was Richard Mitchell (1852–1909), who was born in Truro, Cornwall.<sup>20</sup> The 1871 census recorded his family as miners living at Helston, near the south-western tip of Cornwall. By the time Mitchell and his new wife Lydia left Britain in 1875 he had gained local experience in tin mining and in the calcining process in Wales. Mitchell recalled that 'as a wee laddie in the tin dressing sheds at home, I had to earn my dinner before I ate it'.<sup>21</sup> Having spent little time at school, he was illiterate, signing his marriage certificate with an X, and employing an assistant to write his reports as a mining manager.<sup>22</sup> Mitchell claimed to have brought a battery and jiggers to the Cadia mine near Orange, New South Wales, but by late 1875 he was in Tasmania. His introduction to Mount Bischoff appears to have been carting tin from the mine by bullock team to the port of Emu Bay (later Burnie) in the period November 1875 to March 1876, the early days of the mine before it was served by a tram and later rail.<sup>23</sup>

Mitchell once claimed to have won 300 or 400 tons of ore out of the Waratah River, obtaining five or six tons per week and employing fourteen boys while working various claims.<sup>24</sup> He was a champion of Borlase's patented buddle. His experience at Mount Bischoff seems to have been a bitter one. There was no love lost between Mitchell and other British miners at Mount Bischoff, including fellow Cornishman William White and Devon-born James Hancock.<sup>25</sup> Even though he asserted his Cornish ethnicity, Mitchell seems to have regarded all other tin dressers as rivals, regardless of their origin, as he indicated to James Smith:

Several persons have written to me lately for information about tin dressing. I'm sorry to say that I've given too much information even to my own countrymen, and I feed strangers a great deal better, but I don't mean to do so again as long as I'm in Tasmania. Even in Cornwall tho [sic] a man be a miner he's not reckoned a tin dresser, but I'm of opinion a great many of them come to Tasmania to learn that.<sup>26</sup>

Succeeding Mitchell at the East Bischoff was another well known mine manager, Abraham Shortland Rawlings (A.S.R.) Osborne (1836–1919), the son of a copper miner, and born at Marazion, Cornwall.<sup>27</sup> Through his mining activities all over the Australian colonies, Osborne became the best known of all the Waratah River men. In 1862 he had taken up a three-year appointment at Moonta, South Australia, and he was later involved with the Peak Downs copper mine, central Queensland, and the Great Australia mine on the Cloncurry field. Other engagements in New South Wales and Queensland prior to arriving in Tasmania included managing the Mount Perry copper

mine inland from Bundaberg.<sup>28</sup> His days in Tasmania were turbulent, partly because of his outspokenness. He was convinced of the superiority of Cornish tin dressers, and attacked what he saw as Ferd Kayser's laborious mining methods:

Two or three weeks since I saw four or five men with buckets bailing water from the dam into the fluming for the sluice boxes. The extensive and clever experience of the mining manager did not admit of his seeing that a Californian pump with one man would raise more water by 50% than four with buckets ... I have seen ten men with wheel-barrows removing wash-dirt no more than fifteen yards distant and tipping it down a precipice thirty feet, to be again filled into wheel-barrows and delivered to the sluices. I see too every day from fifteen to twenty men cleaning out, and enlarging dams with wheel-barrows—and at another dam six ... men with a windlass removing sludge while as many others use barrows ... I have also seen from twelve to fourteen men attending the trucks on the Brown Face—when two lively horses—not animals too fat to crawl—would do the same work; and yet this is deemed superior management.<sup>29</sup>

Osborne was quick to take offence when Cornishmen were criticised, perhaps because it damaged his brand, the superior Cornish miner. In 1882 an anonymous newspaper writer credited success at Mount Bischoff to German technology, and failure to Cornish, mischievously claiming that Stephen Eddy's 'primitive' ore dressing during the Crosby regime that preceded Kayser's had cost £23 per ton.<sup>30</sup> Osborne attributed the article to 'Kaisers [sic] intimate friend', district surveyor Charles Sprent, who, he claimed, 'abominates the Cornish as much as the German [Kayser does]'.<sup>31</sup> It is not surprising that at Mount Bischoff Kayser found allies in fellow professionals Sprent (1849–87) and William Dick (1838–1920), the Scottish-born mining engineer who managed the North Bischoff mine, rather than in the informally educated mine managers who threatened his position.<sup>32</sup> It is also interesting to note that, in keeping with Mitchell, Osborne claimed that Cornishmen, not Kayser, drove him out of Mount Bischoff.<sup>33</sup>

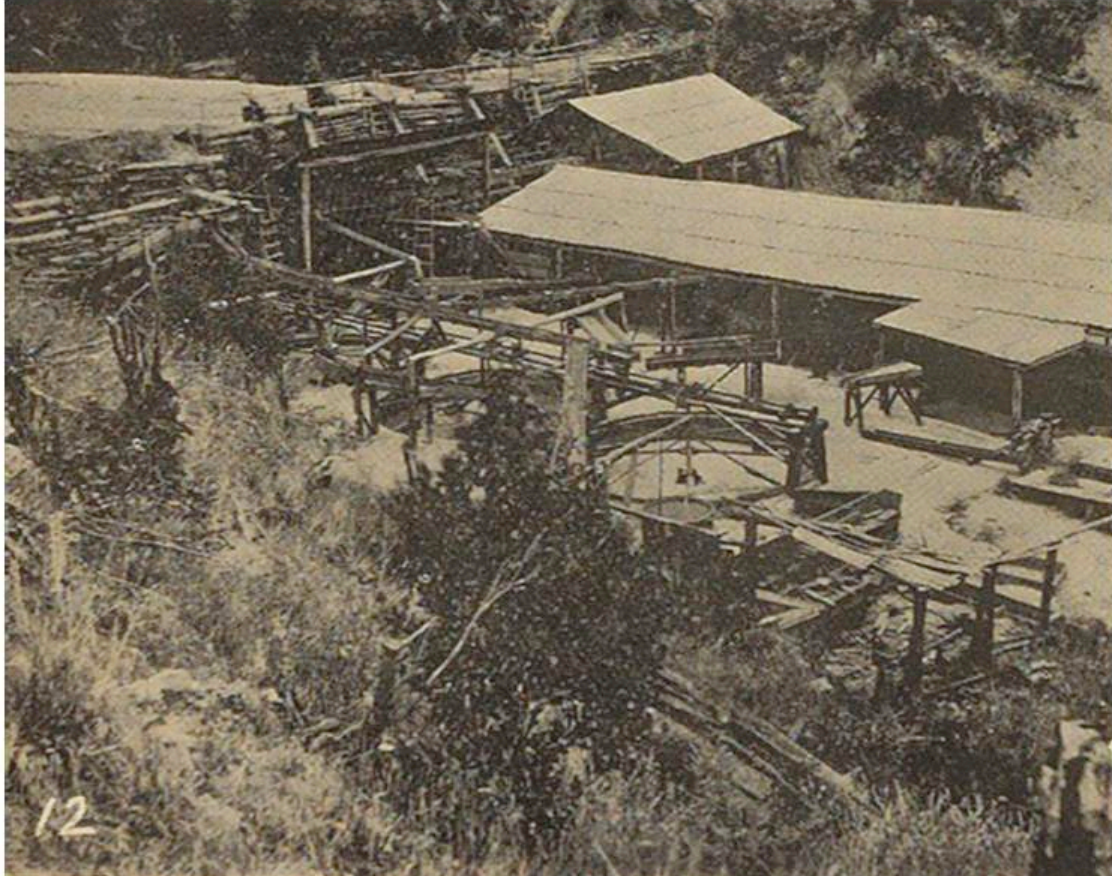
Other East Bischoff managers included James Grant and William White. In 1882 White advised the company to sink on a lode identified on its property, and also reported that 'the sand and slimes flowing down the creek would pay well in England, and it is my opinion they ought to leave a profit on being treated in Tasmania'. The shareholders declined to spend the capital, voting instead to wind up their company.<sup>34</sup> The Mount Bischoff Co. then bought the lease for £250.<sup>35</sup>

### **Bischoff Tin Streaming Company ('Shear 'em') 1880–81, 1885–98**

This company started in about July 1880, originally being managed by Henry Thomas, but collapsed within a year.<sup>36</sup> In 1885 it was revived by W. and T. Mitchell (possibly members of Richard Mitchell's family), who sold it to another Cornishman, Wendron-born Anthony Roberts (1849–1924), in the following year.<sup>37</sup> The son of tin miner Thomas Roberts, he had arrived in Tasmania by 1881, when he was manager of the Great Consols tin mine in north-eastern Tasmania.<sup>38</sup> In 1887 Roberts was said to be paying the lessees a 16.5 per cent royalty and operating with 'no machinery whatever but one little water wheel 3 feet diameter and 6 inch breast. He is working in the crudest way imaginable and doing well'.<sup>39</sup> Roberts appears to have worked this claim until it

was burnt out in 1898, at a loss of perhaps £500, driving him into insolvency.<sup>40</sup> He returned to work Weirs Bischoff Surprise, an open cut tin mine in the North Bischoff Valley.

**Figure 3:** *The Waratah Alluvial claim on the Waratah River.*



Source: *The Weekly Courier*, 2 May 1903.

### **Bischoff Alluvial Tin Mining Company ('Shave 'em')/Phoenix Alluvial Mining Co. ('Hold 'em') 1880–92**

The Bischoff Alluvial was registered in Hobart in 1880 to work Butler and Smart's 80-acre section. In 1881, in which year Mrs Trevennon, wife of the mine manager, smashed a bottle of champagne over the company's hopper to christen it, A.P. Miller's 80-acre section was added to the property.<sup>41</sup> There were six calls on shares up to 30 June 1882.

In October 1882 the Phoenix Co. bought the property, stock, bags, tools and liabilities.<sup>42</sup> Given that the company's dam was washed away by flood in 1883, when it was installing machinery, it is not surprising that two further calls on shares followed in that year, with another in May 1884.<sup>43</sup> The mine manager from 1883–85 was Cornishman William White (1839–95). Born at St Just, as a miner's son, he was a tin dresser by the age of eleven.<sup>44</sup> As a young man he was a 'captain' in the St. Just Amalgamated mines, where he was later manager. In 1865 he won the Queen's Prize for mining, and in about 1871 he came out to New South Wales as manager of the Carrangara copper mine. Subsequent engagements took him to Bathurst and Sydney.<sup>45</sup>

His first contact with Mount Bischoff was probably providing a letter of introduction for Stephen Eddy, the first tin dresser employed by the Mount Bischoff Company, in 1874.<sup>46</sup> Mitchell claimed that White installed his own modified buddles, jiggers and a classifier that was ‘no novelty in Cornwall for the last century’, before adopting Borlase buddles. He dismissed White’s plant as being like ‘a beehive’, with two men and a dozen boys employed.<sup>47</sup>

If Mitchell’s enmity was not enough, during his time at Mount Bischoff, managing several claims, White became one of Ferd Kayser’s greatest antagonists. In 1884 Kayser was contracted to report on the Anchor tin mine in north-eastern Tasmania, the processing plant of which White had previously reviewed. Not surprisingly, the patenter of the Mount Bischoff Co’s dressing appliances declared the Anchor’s ore dressing machinery defective, requiring too much motive power, the plant being the most expensive he had seen in the colonies.<sup>48</sup> Kayser was even less impressed when, in the following year, the management of the Anchor decided to test his qualification to judge them, by sampling tailings that had passed through the Mount Bischoff Co’s own ore dressing machinery. White was alleged to have supplied the samples, which led Kayser to describe him publicly as a ‘skunk’ and to suggest that he had salted the tailings.<sup>49</sup>

Anthony Roberts appears to have succeeded White at the Phoenix, winning 11 tons 17 cwt. in 1891.<sup>50</sup> However, in December 1892 the plant was destroyed by fire, at a loss of £60 or £70, foul play being alleged.<sup>51</sup> It later reopened intermittently.

### **Waratah Alluvial (‘Catch ‘em By the Wool no. 2’) 1881–1905**

The most successful and long-lasting of the independent tin recovery operations was formed in 1881 as an off-shoot of the Highwood Hill Prospecting Association, established by James Smith, James Norton Smith of the Van Diemen’s Land Company and their business associates. In its early years it was both a lode mine and a tin recovery operation. Richard Mitchell, the original mining manager, installed Borlase buddles and reported good progress after the Mount Bischoff Co’s Ringtail Sheds [Fig. 4] started, but when he resigned in mid-1885 the company was not paying working expenses and getting into debt.<sup>52</sup> William White took over in 1886. ‘The Bischoff Co. have built one dam and have nearly finished the second’, he wrote,

and I hear they are going to build a great many more. There is very little coming down now but if they do not make it any poorer than at present I will be able to make a living out of it.<sup>53</sup>

In 1886 the Waratah Alluvial still recovered £2000-worth of tin at a working cost of about £600, or a profit of about £27 per week.<sup>54</sup> White fell into dispute with the company and left soon after. No dividend was paid until January 1890, under the fourth mining manager, James Eba Stevens. Three more dividends followed at regular intervals, but by 1893 the Mount Bischoff Co’s extra pulverisers and new recovery plants, which were also placed higher up the river, further reduced the grade of ore that the Waratah Alluvial recovered.<sup>55</sup> Inevitably, in the years 1897–98 Anthony Roberts had his turn at operating the Waratah Alluvial, claiming that during this time



he returned 30 tons of tin assaying a respectable 61.2 per cent.<sup>56</sup> Thomas Stephens and Nicholas Treweek also managed this claim, the latter working with his sons, producing 12.5 tons of tin in 1901.<sup>57</sup> However, the Waratah Alluvial achieved notoriety in 1903 with the Mount Bischoff Co. tin theft case (dealt with later in this text) and appears to have shut down permanently two years later.

**Figure 4:** *The Mount Bischoff Co's Ringtail Sheds, below the Ringtail Falls, Waratah River.*



Source: Stephen Hooker photo courtesy of Tasmanian Archive and Heritage Office, Hobart.

### **The Mount Bischoff Co's Ringtail Sheds 1883–1909**

After deriding the small companies that recovered lost Mount Bischoff Co. ore, in 1883 Kayser set up his own recovery plant known as the Ringtail Sheds. These were on the old Waratah Tin Co. lease and emulated that company by collecting ore lost from the sluice boxes on Mount Bischoff. However, their position on the Waratah River at the base of the Ringtail Falls also allowed the Ringtail Sheds to collect ore lost into the river from the Mount Bischoff Co. plant.<sup>58</sup>

W.H. Wesley's horse-powered machine and Anthony Roberts' 'primitive' plant aside, Kayser's recovery method seems to have differed little from those of his rivals: river-borne tailings were collected in a dam, buddled, crushed in Chilian mills, upgraded on round tables and kieved.<sup>59</sup> In reality, tin dressers adopted the best technology that was available to them, regardless of its provenance. The cornerstone of tin ore dressing at the time was the Cornish rotating buddle, as remodelled in Germany and later again in Cornwall. Kayser's ore dressing appliances at the Waratah Falls carried an international flavour, including slight variations on Munday's (Cornish)

buddles, Carpenter's (Cornish) jigger, along with Georg Ulrich's (German) triangular troughs.<sup>60</sup>

Having commissioned the Ringtail plant, Kayser then sold it to the press, not as proof of dressing shed failure but as a necessary part of the concentration of stanniferous clay, which could only be effectively treated by rolling it into slimes in the journey down the riverbed.<sup>61</sup> Well-graded access tracks to the Ringtail Sheds were constructed from both sides of the Waratah River, the track on the western side being used to pack the ore out from the sheds.<sup>62</sup> These formed a loop by meeting at a footbridge across the river just above Ringtail Falls, the site of the sheds. Both waterfall and sheds attracted recreational foot traffic:

Passing along the narrow footpath down the valley we arrive at the Ringtail Shed and are met by our old friend, Harry Fookes, the manager, who courteously shows us round, and explains the working of the different labour saving machines, whose motive power is water ... heaps of curious looking dark dirt are noticed, and on inquiry are informed it is waiting to be shipped to the smelting works. At this point the bed of the river is quite dry, and the water has been turned into a race, at the side, thus obtaining increased and more regular power, a large dam keeping at back.<sup>63</sup>

From 1883 to 1891, 1,116 tons of tin oxide were retrieved here, and this despite regular losses when the river flooded.<sup>64</sup> For example, in 1887 about ten tons of coarse and slime tin were washed out of the Ringtail Sheds and about five tons out of the slime sheds in a flood.<sup>65</sup>

In 1888 Kayser established a second recovery plant, the Catch 'em, lower down the Waratah River, where tailings were buddled, crushed in a Chilian mill, classified and treated on rotary tables. He claimed that this plant saved about 50 tons of ore per year. However, the Catch 'em plant ceased operation in 1895 and, with sluicing finished at Mount Bischoff, the electrically-lit Ringtail Sheds were rarely used.<sup>66</sup> They were finally closed in 1909 after becoming a loss-making operation.<sup>67</sup>

### **The Waratah Alluvial tin theft case, 1903**

Recovering tin lost by the Mount Bischoff Co. was one thing. Theft of the company's ore was quite another. A court case in 1903 stood almost as a show trial of German and Cornish mining methods, with the protagonists in that 25-year-old battle slugging it out at the dock. Mitchell and Kayser were now immensely experienced tin dressers, although only Kayser commanded a large, unequivocally successful tin mine.

Three young Waratah men, Walter Penney, James Cobbing and Albert Tippet [Fig 5,6,7] were tried in the Supreme Court on a charge of stealing (or receiving, knowing it to be stolen) more than seventeen tons of dressed tin worth about £1,400 from the Mount Bischoff Co. while in that company's employ. They were alleged to have presented some of the tin for smelting only after taking up the Waratah Alluvial claim, whereupon its high assay value caused suspicion. Police had seized bags of tin after searching Penney's house, shed and garden. Ferd Kayser identified both the bags and the tin found at Penney's house as stolen from the Mount Bischoff Co. However,

the accused men claimed that the tin was not stolen, but recovered from the bottom of the Waratah Alluvial dam, and that, far from hiding it they were keeping it aside in hope of a price rise.<sup>68</sup> Given the amount of tin deposited in the river and the periodic occurrence of flooding to move it downstream, the dam retrieval story seemed reasonable, but it depended upon the Waratah Alluvial dam never having been properly cleaned out before.<sup>69</sup>

**Figures 5, 6 & 7:** *The mug shots of Walter Penney, Albert Tippett and James Cobbing, operators of the Warratah Alluvial claim, who were convicted of receiving tin stolen from the Mount Bischoff Co. in 1903.*



Source for figures 5, 6 & 7: Tasmanian Archive and Heritage Office, Hobart

Cross-examination of prosecution witnesses by the defence counsel was designed to show that Kayser and other officers of his company could not recognise their own (Mount Bischoff Co.) tin, and that the ore dressing appliances at both the Waratah Falls and in the Ringtail plants were defective and poorly operated, permitting large quantities of tin, like those obtained by the accused, to escape down river. Several former workers in the Ringtail Sheds testified that large amounts of tin were lost from the sheds in floods. Martin Healey stated that the Chilian mills in the Ringtail Sheds were a failure and that workers often fell asleep during the night shift. Fred Panitzki recalled defective pipes, and claimed that about 100 teenaged boys who had been employed in the sheds regularly let the water carry off tin.<sup>70</sup> There were some ironic moments in court, including Ferd Kayser failing to identify some of the Mount Bischoff Co's own dressed tin when it was placed in his hand, and Richard Mitchell taking the opportunity to attack his (Kayser's) 'antiquated' machinery, claiming that his own plant at the Anchor tin mine in north-eastern Tasmania was '50 years ahead of it'.<sup>71</sup> Since 1898 Kayser had been living in Launceston as general manager rather than mine manager, only visiting Mount Bischoff once a month. Perhaps he had forgotten what the

company's dressed tin looked like. Mitchell stood at the dock as Kayser's equal, claiming that as the manager of the Anchor mine he was earning an annual salary of £1,000, a far cry from his early days carting tin for the Mount Bischoff Co. Counsel for the defence even tried some of the now traditional racial vilification levelled at Kayser by suggesting that he had interfered in the prosecution case.<sup>72</sup> 'It might be the custom to do that kind of thing in Germany', the counsel crowed, 'but thank God the three men in the dock are tried under British law'.<sup>73</sup>

The prosecution could only cite circumstantial evidence, but its case was hard to refute. The Mount Bischoff Co. was not just a mining company, but a custom smelter, and the Waratah Alluvial ore had been smelted on its Launceston premises for years. Smelting manager George Latta claimed that the Waratah Alluvial ore had never before assayed higher than 69.1 per cent, but the ore in question had assayed from 72 to 73.1 per cent. Mitchell's testimony that tin coming downstream from the Mount Bischoff Co. dressing sheds could be dressed up to 72 per cent, depending on the competency of the ore dresser, did not explain the discrepancy.<sup>74</sup> Previous operators of the Waratah Alluvial, James Stevens, Nicholas Treweek and Anthony Roberts were quizzed about whether they had ever produced tin assaying as high as 72 per cent from the plant (none had). Perhaps the most damning evidence came from battery-man Stephen Hooker, who recalled Cobbing telling him that tin could be removed from the Mount Bischoff Co. dressing sheds in a billycan, and suggesting that he [Cobbing] and Hooker carry out this scheme.<sup>75</sup> The three men were found not guilty of theft but guilty of receiving stolen tin, and each sentenced to five years' gaol.<sup>76</sup>

### **Later tin recovery proposals on the Arthur River system**

Long overdue reform accompanied Kayser's retirement from the Mount Bischoff tin mine in 1907, including installation of a new 40-head crushing plant adapted to the harder rock which now defeated the old 'Queen of the Mount' battery.<sup>77</sup> However, metallurgist H.K. Wellington estimated mill recovery in the period 1908–28 as no better than 50 per cent, meaning that, with Kayser's Ringtail Sheds and Catch 'em plant disabled, the field remained wide open for down-river tin recovery.<sup>78</sup>

In 1909 the Arthur River Prospecting Association was formed to dredge the lower and middle reaches of that river. W.S. Monks reported that the Arthur River right down to the sea was

a complete sluice box ... after every flood there must be thousands of tons of wash and drift sluiced down towards the sea and settled in all the holes which exist in the ten miles of river dredging applied for, therefore the tin and gold must come with it.<sup>79</sup>

This dredging proposal failed, as did later ones, including that investigated by James Smith's sons Leslie and Ron Smith in 1929; that of George Smith, F. Dempster and a Thai dredging company in 1932–33; and that of P. Verbaan and Garry Fisher of Northern Developments Pty Ltd 1973–76.<sup>80</sup> Verbaan believed that, based on Wellington's estimate of tin loss up to 1928, \$45,000,000 worth of tin lay in the Arthur River.<sup>81</sup> However, Northern Developments was refused an environmental licence.

The only dredging actually conducted on the Arthur River system was in the years 1928–29, when the Mount Bischoff Co. operated a Thompson and Co. centrifugal dredge [Fig. 8] in the North Bischoff Valley.<sup>82</sup> A village was created for the workers in the 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.

**Figure 8:** *Thompson and Co centrifugal operating in the North Bischoff Valle, 1928 or 1929.*



Source: J.H. Robinson photo, courtesy of the late Nancy Gillard.

The Waratah River was diverted and the dredge was mounted on a pontoon floating in man-made ponds. The plant was driven by electricity generated at the company's power station. A large gravel pump lifted dirt and stones from the riverbed into a trommel, but boulders in the wash rendered the dredge ineffective. Deforestation, prevention of revegetation by disturbance of the top soil, disruption of streams, and the creation of tailings mounds and dredge channels are typical impacts of dredging—which aptly describes the Waratah River flats in the North Bischoff Valley, although other mining methods have also contributed to that chaotic landscape.<sup>83</sup>

Here again the Mount Bischoff Co. followed in the footsteps of the Cornish tin dressers by trying to reclaim its own lost ore from the river. It was a failed, last-ditch initiative to resurrect a fading mine. The company closed its mine and Launceston smelters almost simultaneously, a decision prompted by the lowest tin price for almost three decades and the disastrous 1929 floods which helped decimate the supply of

smelting tin.<sup>84</sup> Never again would Mount Bischoff Co. employees work its mine, which became a tribute operation.

**Figure 9:** *The village of the dredge workers and their families in the North Bischoff Valley, 1928.*



Source: J.H. Robinson photo, from the *Weekly Courier*, 4 July 1928.

### **Post-script: the Cornish tin dressers post-Bischoff**

Richard Mitchell, W.H. Wesley and William White all had their say at the so-called ‘second Bischoff’, the Anchor tin mine in north-eastern Tasmania (White reviewed the Anchor machinery in 1884 without leaving his Mount Bischoff engagement).<sup>85</sup> Mitchell acquired a reputation not only as a skilled tin dresser but also as a skilled negotiator. In 1895 he floated the Anchor Tin Mine Limited in London, with a nominal capital of £70,000, not a bad effort for an illiterate man. The attachment of the name of the Tasmanian premier, Sir Edward Braddon, to the prospectus sold by Mitchell was highly controversial, Braddon being described in one paper as a ‘decoy duck’.<sup>86</sup> Mitchell also managed the Shepherd and Murphy tin, tungsten and bismuth mine on the Middlesex field near Cradle Mountain, and his swansong was his work for the All Nations tungsten mine on the same field. He died in a London hotel room in 1909 while seeking capital investment for this mine.<sup>87</sup>

W.H. Wesley left Mount Bischoff and returned to Vegetable Creek (Emmaville), on the New England tin fields, in 1879, working at the Garden Palace mine.<sup>88</sup> From 1891 to 1893 he managed the then unsuccessful Mount Zeehan Silver Lead Mining Company operation on Tasmania’s west coast. While James Smith believed that Wesley’s mining methods would have succeeded given a fair trial, the directorship of the company refused Wesley a reference when his contract expired. Subsequently, he had further stints on the Zeehan–Dundas field as superintendent of the

Sylvester silver-lead mine at Zeehan and the Commonwealth tin mine at Dundas.<sup>89</sup> In November 1895 Wesley swapped the Silver Queen mine for the Anchor tin mine in north-eastern Tasmania.<sup>90</sup> Resigning from that management position in 1898, he took on the Mount Black Proprietary mine in western Tasmania before adjourning to Western Australia.<sup>91</sup> He operated the Black Swan property at Burtville, in 1902 and the Mikado gold mine 1903–05.<sup>92</sup> In 1907 he was in South Australia as mine manager for the Golden Gate Gold Mining Company at Angaston.<sup>93</sup> He died in Melbourne in 1911, survived by a widow, four sons and two daughters.

A.S.R. Osborne's subsequent mining career was too diverse for a mere pen portrait to do it justice. After leaving Mount Bischoff, he joined the chorus of Cornishmen spruiking the Mount Heemskirk tin field on Tasmania's west coast.<sup>94</sup> In 1882 he joined another chorus—that of disbelief at Ferd Kayser patenting ore-dressing appliances which some asserted were already in the public domain.<sup>95</sup> Osborne left Tasmania and was in Queensland, including work on the Kangaroo Hills field, until in about 1894, when he headed west to the Champion gold mine and then the Whim Well copper mine near Roebourne, Western Australia. He then returned to Queensland. In the period 1897–1900 he worked at Mount Chalmers and Mount Warminster, then a copper proposition at Stanage Bay near Rockhampton; while 1902–04 he was on the Norton goldfield near Gladstone. From 1904 to 1907 he opened up the Great Fitzroy mine near Rockhampton, and in later years explored Great Fitzroy Mines' option over the Laioki mine in Papua. Osborne died in Brisbane in 1919, at 83 years of age, survived by a widow, three daughters and a son.<sup>96</sup>

William White left Mount Bischoff in 1887, supposedly on doctor's orders, taking a job on the Euriowie tin field near Broken Hill. Later he reported on gold shows in Western Australia. He died of acute pneumonia at Unley Park, Adelaide, South Australia, in 1895, survived by a widow, two sons and four daughters.<sup>97</sup>

Anthony Roberts managed the Weirs Bischoff Surprise mine in the North Bischoff Valley for several years, and was a director of the Mount Cleveland Tin Mining Co, established to work the lode discovered by Waratah draper Sydney Coundon. Roberts appears to have gone osmiridium mining at Nineteen Mile Creek, west of Waratah, during the peak period 1918–20. He died at Devonport, Tasmania, in 1924, survived by two sons and three daughters.<sup>98</sup>

---

## Endnotes

<sup>1</sup> See, for example, the Arthur River Cruises website, <http://www.discovertasmania.com.au/tour/arthurrivercruisesmvgeorgerobinson>, accessed 20 November 2016.

<sup>2</sup> Minutes of Mount Bischoff Company directors' meetings 19 April and 21 June 1910, pp. 22 and 51, NS911/1/14 (Tasmanian Archive and Heritage Office [afterwards TAHO]).

<sup>3</sup> Graham Green, *North-West Rivers Environmental Review: a Review of Tasmanian Environmental Quality Data to 2001*, Supervising Scientist Report 167, p. 30; T. Walsh; cited by Graham Green, *North-West Rivers Environmental Review*, p. 30.

<sup>4</sup> Nic Haygarth, 'S.B. Emmett: a Pioneer Tasmanian Prospector, from Bendigo to Balfour', *Circular Head Local History Journal*, vol. 4, no. 1, December 2004, pp. 37–69.

<sup>5</sup> 'Tin Worth \$45 million in Arthur River', *Advocate* (Burnie, Tasmania), 10 May 1973, p. 1.

- <sup>6</sup> S.B. Emmett, 'The North West Country', *Launceston Examiner*, 24 February 1874, p. 5.
- <sup>7</sup> H.K. Wellington, 'Metallurgical history', in D.I. Groves, E.L. Martin, H. Murchie and H.K. Wellington, *A Century of Tin Mining at Mount Bischoff, 1871–1971*, Geological Survey Bulletin no. 54, Hobart, 1972, p. 159.
- <sup>8</sup> Philip Payton, *Cornwall: a history*, Cornwall Limited Editions, Fowey, Cornwall, 2004 (originally published 1996), p. 234; Ronald M. James, 'Defining the Group: Nineteenth-Century Cornish on the North American Mining Frontier', in *Cornish Studies: Two* (ed. Philip Payton), University of Exeter Press, Exeter, 1994, cited by Philip Payton, *Cornwall: a history*, p. 234.
- <sup>9</sup> Geoffrey Blainey, *The Rush That Never Ended: a History of Australian Mining*, Melbourne University Press, 1978 (first published 1963), p. 244.
- <sup>10</sup> Rod Home, 'Science as a German Export to Nineteenth Century Australia', *Working Papers in Australian Studies*, no. 104, London, 1995, pp. 7–11, 17.
- <sup>11</sup> 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.
- <sup>12</sup> H.W. Ferd Kayser, 'Mount Bischoff', *Proceedings of the Australasian Association for the Advancement of Science*, no. IV, 1892, p. 346.
- <sup>13</sup> See Nic Haygarth, 'King of the Waratah: Ferd Kayser and the Mount Bischoff Tin Mine', *Papers and proceedings of the Tasmanian Historical Research Association*, vol. 48, no. 3B, pp. 205–19.
- <sup>14</sup> 'Scotty', 'Mining in Tasmania', *Tasmanian* (Launceston), 14 March 1891, p. 22.
- <sup>15</sup> H.W. Ferd Kayser, 'Mount Bischoff', pp. 350–51.
- <sup>16</sup> For the East Bischoff Company, see 'Mount Bischoff', *Mercury* (Hobart), 12 December 1879, p. 3; 'Mount Bischoff', *Devon Herald* (Latrobe, Tasmania), 10 January 1880, p. 2; James Hancock to James Smith, 15 June 1881, NS234/3/1/10; Minutes of meeting of directors of Mount Bischoff Tin Mining Company 5 October 1882, p. 281, NS911/1/3 (TAHO). For the Bischoff Alluvial and the Phoenix Alluvial, see register of shareholders for Bischoff Alluvial/Phoenix Alluvial, file J178/2, NS1012/1/23; 'Phoenix Alluvial Mining Co', file J178/1, NS1012/25 (TAHO); and 'Phoenix Alluvial TM Co', *Tasmanian Mail* (Hobart), 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.
- <sup>17</sup> For William Henry (W.H.) Wesley (1845–1911), see 'Tasmania and its Mineral Wealth', special edition of the *Australian Mining Standard*, 1 July 1898, pp. 47–48. He was born at Sancreed, Cornwall, and had started his mining career at the age of nine at the Balleswidden tin mine at St. Just in Cornwall, been educated at evening classes and won prizes for his mineralogy and mining studies in London. In 1867 Wesley had been appointed to the mining branch of the Bessarman Exploring Expedition to Egypt, but when this was delayed he decided to sail for Australia, working at Daylesford and Ballarat before taking the job of mine surveyor under Captain W.R. Hancock at the Moonta copper mine for four years. His ore-dressing machine had come to public attention while he was working the Great Britain tin mine at Vegetable Creek (Emmaville), New England. He believed it surpassed all others in the treatment of stony alluvial wash. After arriving on the Mount Bischoff tin field in 1878 as manager of the West Bischoff mine, Wesley offered to erect his machinery at his own expense anywhere in Tasmania in order to test its effectiveness (W.H. Wesley to James Smith, 2 December 1889, no. 385, NS234/2/1/15 [TAHO]). For a description of Wesley's machine, see 'the Dressing Machinery', *Zeehan and Dundas Herald*, 9 May 1893, p. 2.
- <sup>18</sup> Ferd Kayser to directors, 13 May 1879; Minutes of the meetings of directors of the Mount Bischoff Tin Mining Company 15 May 1879, NS911/1/3 (TAHO).
- <sup>19</sup> For the Mount Bischoff Company's Ringtail and 'Catch 'em' plants, see H.K. Wellington, 'Metallurgical history', pp. 71–90.
- <sup>20</sup> 1861 British census, household schedule no. 75, piece 1594, folio 14, p. 14, registration district of Penzance, sub-registration district of Penzance.
- <sup>21</sup> R. Mitchell, 'Waratah Alluvial Company', *Tasmanian*, 30 June 1883, pp. 729–30.
- <sup>22</sup> James Hancock to James Smith, 15 June 1881, NS234/3/1/10 (TAHO).
- <sup>23</sup> Minutes of the meetings of directors of the Mount Bischoff Tin Mining Company 15 November 1875, p. 167, NS911/1/1 (TAHO).
- <sup>24</sup> 'Alleged Theft of Tin Ore', *Daily Telegraph* (Launceston), 22 April 1903, p. 8.
- <sup>25</sup> See R. Mitchell, 'Waratah Alluvial Company', *Launceston Examiner*, 6 June 1883, p. 3.
- <sup>26</sup> Richard Mitchell to James Smith, 20 October 1883, no. 309, NS234/3/1/12 (TAHO).
- <sup>27</sup> The 1841 British Census records him as five years old, the son of William and Susan Osborne, living at Mount Pleasant, Marazion (registration district of Penzance, sub-registration district of Marazion, civil



- parish of St Hilary, piece 144, book 2, folio 1, p. 1); 'East Bischoff T.M. Company', *Tasmanian*, 2 September 1882, p. 975.
- <sup>28</sup> 'Death of Captain A.S.R. Osborne', *Evening Telegraph* (Charters Towers), 8 January 1920, p. 2; death registration B031024, p. 1538, 23 December 1919.
- <sup>29</sup> A.S.R. Osborne to James Smith, 6 February 1880, no. 53, NS234/3/1/9 (TAHO).
- <sup>30</sup> 'Tin Mining at Mount Bischoff', *Australasian*, 13 May and 20 May 1882.
- <sup>31</sup> A.S.R. Osborne to James Smith, 30 May 1882, NS234/3/1/11 (TAHO).
- <sup>32</sup> For Charles Sprent, see 'Sprent, Charles Percy (1848-87)', *A Biographical Register 1788-1939: Notes from the Name Index of the Australian Dictionary of Biography* (eds H.J. Gibbney and Ann G. Smith), vol. 2, Australian Dictionary of Biography, Canberra, 1987, p. 275. For William Dick, see 'Mining Managers' Association of Western Australia', *Western Mail* (Perth), 16 June 1899, p. 31; 'Personal', *Western Mail*, 5 February 1920, p. 30.
- <sup>33</sup> A.S.R. Osborne to James Smith, 18 October 1881, NS234/3/1/10 (TAHO).
- <sup>34</sup> 'East Bischoff T.M. Company', *Tasmanian*, 2 September 1882, p. 975.
- <sup>35</sup> Minutes of meeting of directors of Mount Bischoff Tin Mining Co., 5 October 1882, p. 281, NS911/1/3 (TAHO).
- <sup>36</sup> 'Tasmanian Telegrams', *Mercury*, 3 August 1880, p. 2; 'Mount Bischoff', *Tasmanian Mail*, 30 July 1881, p. 9.
- <sup>37</sup> 'Notes from Waratah', *Daily Telegraph*, 11 August 1885, p. 4; 'Mount Bischoff', *Tasmanian Mail*, 19 June 1886, p. 20; 1851 British census, piece 1912, folio 205, p. 12, registration district of Helston, sub-registration district of Wendron.
- <sup>38</sup> 'Mining Meetings', *Tasmanian*, 5 May 1883, p. 473.
- <sup>39</sup> William White to James Smith, 14 January 1887, NS234/3/1/15 (TAHO).
- <sup>40</sup> 'Outbreak at Waratah', *Launceston Examiner*, 12 February 1898, p. 11; 'New Insolvent', *North Western Advocate and the Emu Bay Times* (Burnie, Tasmania), 16 August 1899, p. 2.
- <sup>41</sup> 'Mount Bischoff', *Tasmanian Mail*, 3 September 1881, p. 10.
- <sup>42</sup> 'Phoenix Alluvial Mining Co', file J178/1, NS1012/1/25; register of shareholders for Bischoff Alluvial/Phoenix Alluvial, file J178/2, NS1012/1/23 (TAHO).
- <sup>43</sup> 'Phoenix Alluvial TM Co', *Tasmanian Mail*, 1 September 1883, p. 27.
- <sup>44</sup> 1851 British Census, civil parish of St Just in Penwith, registration district of Penzance, sub-registration district of St. Just, piece 1919, folio 78, p. 7.
- <sup>45</sup> 'Death of a Well-Known Mining Captain', *Adelaide Observer*, 29 June 1895, p. 30.
- <sup>46</sup> Stephen Eddy to James Smith 24 March 1874, NS234/3/1/3 (TAHO).
- <sup>47</sup> R. Mitchell, 'Waratah Alluvial Company', *Launceston Examiner*, 23 June 1883, p. 3.
- <sup>48</sup> Ferd Kayser, 'Report on the Anchor Company's Mine', *Launceston Examiner*, 13 September 1884, p. 3.
- <sup>49</sup> See 'Mining Meetings', *Tasmanian*, 7 February 1885, p. 21; also William White, 'Mount Bischoff Company's Meeting', *Launceston Examiner*, 10 February 1885, p. 3.
- <sup>50</sup> 'Notes from Waratah', *Daily Telegraph*, 11 August 1885, p. 4; 'Waratah Mining', *North Western Advocate and the Emu Bay Times*, 12 September 1902, p. 4.
- <sup>51</sup> 'Waratah', *Launceston Examiner*, 5 January 1893, p. 6.
- <sup>52</sup> Richard Mitchell to James Smith, 29 September 1883, no. 286, NS234/3/1/12; R. Mitchell, 'Waratah Alluvial Company', *Tasmanian*, 9 June 1883, p. 633; Waratah Alluvial half yearly report, dated 30 June 1885, NS234/3/1/13; R.A. Murray to James Smith, 18 August 1885, no. 140, NS234/3/1/13 (TAHO).
- <sup>53</sup> William White to James Smith, 8 June 1886, no. 88, NS234/3/1/14 (TAHO).
- <sup>54</sup> William White to James Smith, 14 January 1887, no. 13, NS234/3/1/15 (TAHO).
- <sup>55</sup> James Norton Smith to James Smith, 30 January 1893, no. 29, NS234/3/1/21 (TAHO).
- <sup>56</sup> 'Alleged Theft of Tin Ore', *Daily Telegraph*, 22 April 1903, p. 8.
- <sup>57</sup> 'Waratah Mining', *North Western Advocate and the Emu Bay Times*, 12 September 1902, p. 4.
- <sup>58</sup> H.W.F. Kayser, 'Mount Bischoff', pp. 350-51.
- <sup>59</sup> H.K. Wellington, 'Metallurgical history', p. 80.
- <sup>60</sup> For a full description of Kayser's plant at the Waratah Falls, see Heinrich Wilhelm Ferdinand Kayser and Richard Provis, 'Mount Bischoff Tin Mine, Tasmania', *Minutes of Proceedings of the Institution of Civil Engineers*, vol. CXXIII. 1896-96, part 1, London, 1896, p. 380.
- <sup>61</sup> See, for example, Howard Hayward, *Colonists' Advertiser and Visitors' Guide to Tasmania via the North West Coast*, North West Chronicle, Latrobe, 1888, p. 19.
- <sup>62</sup> 'Alleged Theft of Tin Ore', *Daily Telegraph*, 21 April 1903, p. 4.
- <sup>63</sup> 'Walworth', 'Our Holiday to the N.W. Coast', *Devon Herald*, 29 March 1889, p. 3.
- <sup>64</sup> H.W.F. Kayser, 'Mount Bischoff', p. 351.

- <sup>65</sup> John A. Sewell alluded to this event during his testimony quoted in 'Alleged Theft of Tin Ore', *Daily Telegraph*, 23 April 1903, p. 4.
- <sup>66</sup> Heinrich Wilhelm Ferdinand Kayser and Richard Provis, 'Mount Bischoff Tin Mine, Tasmania', p. 385.
- <sup>67</sup> Minutes of meetings of directors of the Mount Bischoff Tin Mining Company 21 June 1909, p. 273, NS911/1/13 (TAHO).
- <sup>68</sup> 'Alleged Theft of Tin Ore', *Daily Telegraph*, 21 April 1903, p. 4.
- <sup>69</sup> 'Theft of Tin Ore', *Daily Telegraph*, 24 April 1903, p. 4.
- <sup>70</sup> 'Alleged Theft of Tin Ore', *Daily Telegraph*, 23 April 1903, p. 4.
- <sup>71</sup> 'Alleged Theft of Tin Ore', *Daily Telegraph*, 22 April 1903, p. 8.
- <sup>72</sup> See Nic Haygarth, 'King of the Waratah'.
- <sup>73</sup> 'Waratah Tin Stealing Case', *Examiner*, 24 April 1903, p. 7.
- <sup>74</sup> 'Launceston Criminal Sittings', *Mercury*, 22 April 1903, p. 7.
- <sup>75</sup> *Ibid.*
- <sup>76</sup> 'Theft of Tin Ore', *Daily Telegraph*, 24 April 1903, p. 4.
- <sup>77</sup> For the 40-head mill, see 'Mount Bischoff Tin Mine: Half-yearly Reports', *Examiner*, 5 August 1911, p. 9.
- <sup>78</sup> H.K. Wellington, 'Metallurgical history', p. 159.
- <sup>79</sup> 'Arthur River P.A.', *Examiner*, 18 September 1909, p. 4.
- <sup>80</sup> For the Smiths, see P.B. Nye, 'Report on the Arthur River Alluvial Flats North of its Junction with the Waratah River', unpublished report, Department of Mines, Hobart, 1929. For the 1932–33 proposal, see 'Big-Scale Search for Gold', *Advocate*, 1 December 1932, p. 8. For Verbaan and Fisher, see 'Tin Worth \$45 Million in Arthur River', *Advocate*, 10 May 1973, p. 1; 'Everett OKs Mining Operations', *Advocate*, 13 July 1973, p. 3; L.J. Rhodes and H.K. Wellington, *Concentration of Tin from Arthur River Gravels*, Department of Mines, Hobart, 1975; and J.R. Stephens, *A Study of Environmental Factors Relating to a Proposal to Dredge the Arthur River for Tin and Gold*, Northern Developments Pty Ltd, Launceston, 1976. For objections to Northern Developments' proposed Camdale tin processing plant, see file AC250/1/417 (TAHO).
- <sup>81</sup> 'Tin Worth \$45 Million in Arthur River', *Advocate*, 10 May 1973, p. 1.
- <sup>82</sup> 'Mt Bischoff: Important Developments: Pontoon Floated: Encouraging Outlook', *Advocate*, 4 September 1928, p. 4; 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.
- <sup>83</sup> Barry McGowan, 'Mullock Heaps and Tailing Mounds: the Environmental Effects of Alluvial Mining', *Proceedings of the Australian Mining History Association Conferences 1997–2000* (eds Patrick Bertola and Karen Miller), AMHA, 2001, pp. 90–96.
- <sup>84</sup> Minutes of meetings of directors of the Mount Bischoff Tin Mining Company 22 October 1929, p. 169 and 8 November 1929, p. 173, NS911/1/22 (TAHO).
- <sup>85</sup> See Keith Preston. 'Anchor Tin Mine, Tasmania: a Century of Struggle for Profitability' *Journal of Australasian Mining History*, vol. 10, October 2012, pp. 140–59. The 'second Bischoff' claim is from 'Tin Lode Mining', *Zeehan and Dundas Herald*, 5 January 1894, p. 4.
- <sup>86</sup> See, Sir Edward Braddon, 'The Anchor Tin Mine: a Plain Statement by Sir Edward Braddon', *Daily Telegraph*, 22 January 1896, p. 4; and Henry Dobson, 'The Premier and the Anchor Mine', *Daily Telegraph*, 29 January 1896, p. 1. For the 'decoy duck', see 'Mining Investor', 'The Anchor Mine in London and Tasmania', *Examiner*, 23 September 1895, p. 8.
- <sup>87</sup> 'A Middlesex Mining Lease', *North Western Advocate and the Emu Bay Times*, 29 January 1909, p. 4.
- <sup>88</sup> W.H. Wesley to James Smith, 14 February 1880, no. 62, NS234/3/1/9 (TAHO).
- <sup>89</sup> James Smith to James Norton Smith, 4 September 1893, no. 605, NS234/3/1/21 (TAHO).
- <sup>90</sup> 'Farewell to Mr. W.H. Wesley', *Zeehan and Dundas Herald*, 25 November 1895, p. 2.
- <sup>91</sup> 'Mining', *Zeehan and Dundas Herald*, 11 October 1899, p. 2.
- <sup>92</sup> 'A Burtville Mine', *Laverton Mercury* (Laverton, WA), 8 November 1902, p. 3; 'Latest Mining', *Daily News* (Perth), 13 June 1905, p. 11.
- <sup>93</sup> 'Goldmining at Angaston', *Observer* (Adelaide), 6 April 1907, p. 46.
- <sup>94</sup> A.S.R. Osborne to James Smith, 18 October 1881, NS234/3/1/10 (TAHO).
- <sup>95</sup> *Ibid.*
- <sup>96</sup> 'Death of Captain A.S.R. Osborne', *Evening Telegraph* (Charters Towers), 8 January 1920, p. 2.
- <sup>97</sup> 'Death of a Well-Known Mining Captain', *Adelaide Observer*, 29 June 1895, p. 30.
- <sup>98</sup> 'A Mining Pioneer', *Advocate*, 3 September 1924, p. 2.