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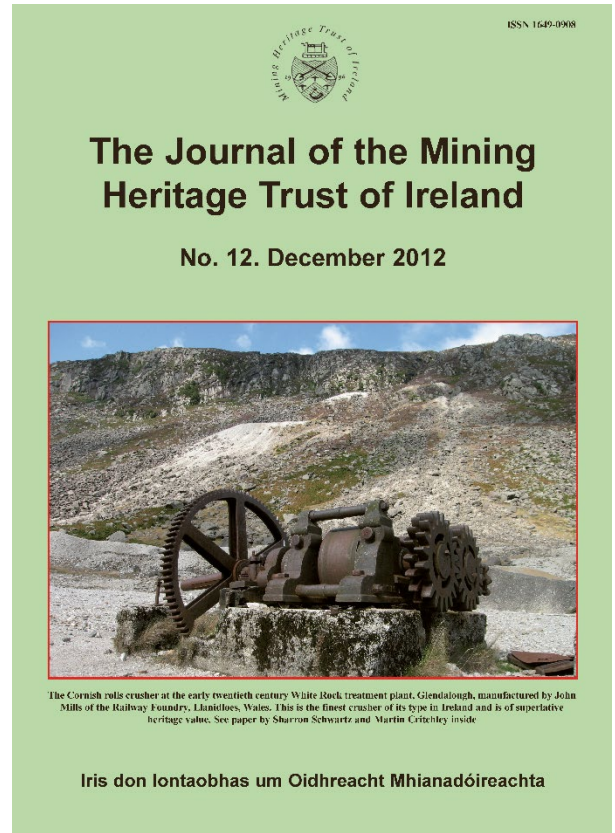
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MINING HERITAGE AND TOURISM IN SOUTH AUSTRALIA AND VICTORIA: OBSERVATIONS AND IMPRESSIONS

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Abstract: This autumn, we visited Australia twice to attend various academic workshops. Whilst there, we spent time in numerous mining centres in the states of South Australia and Victoria, examining the various methods of conserving, protecting, valorising and presenting mining heritage to the public. As the mining heritage sector is a truly global one, our observations, which are entirely our own and purely subjective, undoubtedly have relevance to some Irish sites and the mining heritage tourism market here. *Journal of the Mining Heritage Trust of Ireland*, 12, 2012, 87-107.

METALS SHAPE A NATION

As a free colony (and the only Australian state to be populated entirely by free settlers), South Australia was established on the theory of 'systematic colonisation', with its twin tenets of civil liberty and religious tolerance. From the mid-1830s, thousands of able bodied poor from across Britain and Ireland migrated there taking advantage of free and assisted passage schemes in the hope of owning their own land. But the Cornish influence in particular is writ large on the South Australian landscape, their presence inextricably linked to metalliferous mining, for South Australia was the birthplace of commercial mining in the Australian continent which saved the fledgling colony from financial disaster (Blainey 1963).

The first mineral which attracted the attention of the early settlers in South Australia was silver-lead, accidentally discovered in early 1841 at Glen Osmond in the Adelaide foothills. This galena deposit gave rise to Australia's first mine – Wheal Gawler – named after Governor Gawler (Payton 1984) and its subsequent development resulted in the formation of the South Australian Mining Association and the first mineral export from Australia. Other silver-lead mines were opened up soon after in the area and most of the early ore was transported to Britain for smelting until South Australia acquired its own smelters on East Terrace and at the Glen Osmond Mine. The short-lived Talisker Mine in the Fleurieu Peninsula was commenced in 1862 and was briefly the largest lead producer in Australia before the Broken Hill deposit was developed in the early 1880s.

Copper was first discovered in South Australia near Montacute in the Mount Lofty Ranges, 16 km ENE of Adelaide, in 1842 and followed in rapid succession by much more substantial finds at Kapunda (1843), Burra (1845) and Callington–Kanmantoo (1846) (Drexel 1982). The Bremer Smelting Works, erected near Callington (named after a Cornish town), in 1848, was Australia's earliest commercial smelter. By 1851, prior to the Victorian gold rush (see below), the now sleepy town of Burra was the largest inland population centre in Australia attracting migrants from all over the world, from

Chilean muleteers, Welsh and German smelters, Irish labourers and hauliers, to mineworkers from Cornwall and England, whose cultural influences still dominate the town today (Auhl 1983 and 1992; Drew 2002). Burra, dubbed the 'Monster Mine' (Auhl 1986) operated by the South Australian Mining Association, was producing 10 per cent of the world's copper and South Australia was known as the 'Copper Kingdom' (Auhl and Marfleet 1975). This mine was the major contributor to Australia's earliest mining boom, which saved the then struggling South Australian economy, founded on short-lived land speculation, from bankruptcy (Selby 1987).

However, the state's premier copper mining area is undoubtedly the area centred on Moonta, Kadina and Wallaroo on the northern Yorke Peninsula (Hand 1974; Wehr 1979). Mining commenced here in 1860 when large and rich deposits of copper were discovered and the area witnessed 64 years of continuous production (Paterson 1993). The mines were situated at Kadina (Wallaroo Mines) and Moonta, and served by a smelting works and port at Wallaroo where there was a significant Welsh community (Drew 1989). The township of Moonta was laid out in 1863 and by 1875 was the second most populous town in South Australia after Adelaide (Shelley 1974). Cornish methods were widely applied in the construction, design, labour organisation and the mine works of these towns, where families settled in familiar village patterns around the mines, and held onto their traditions and religious beliefs (Faull 1979 and 1983; Payton 1984 and 2007), although there were a smattering of Irish migrants here too. Today, Moonta, Kadina and Wallaroo are dubbed the 'Copper Triangle' (Wehr 1979) with Moonta priding itself on being known as 'Australia's Little Cornwall' (Pryor 1962 and 1976). Here, many a Cornish pasty can be bought, albeit hybridized ones containing unfamiliar ingredients such as carrot and pumpkin with which we were not at all impressed! A myriad of smaller copper mining ventures proliferated in the arid north up in the Flinders Ranges until around the turn of the twentieth century. Burra closed in 1877 (and operated briefly again in 1970-1981) and Kapunda the following year, but Moonta–Wallaroo continued mining until 1923 and smelting to 1926.

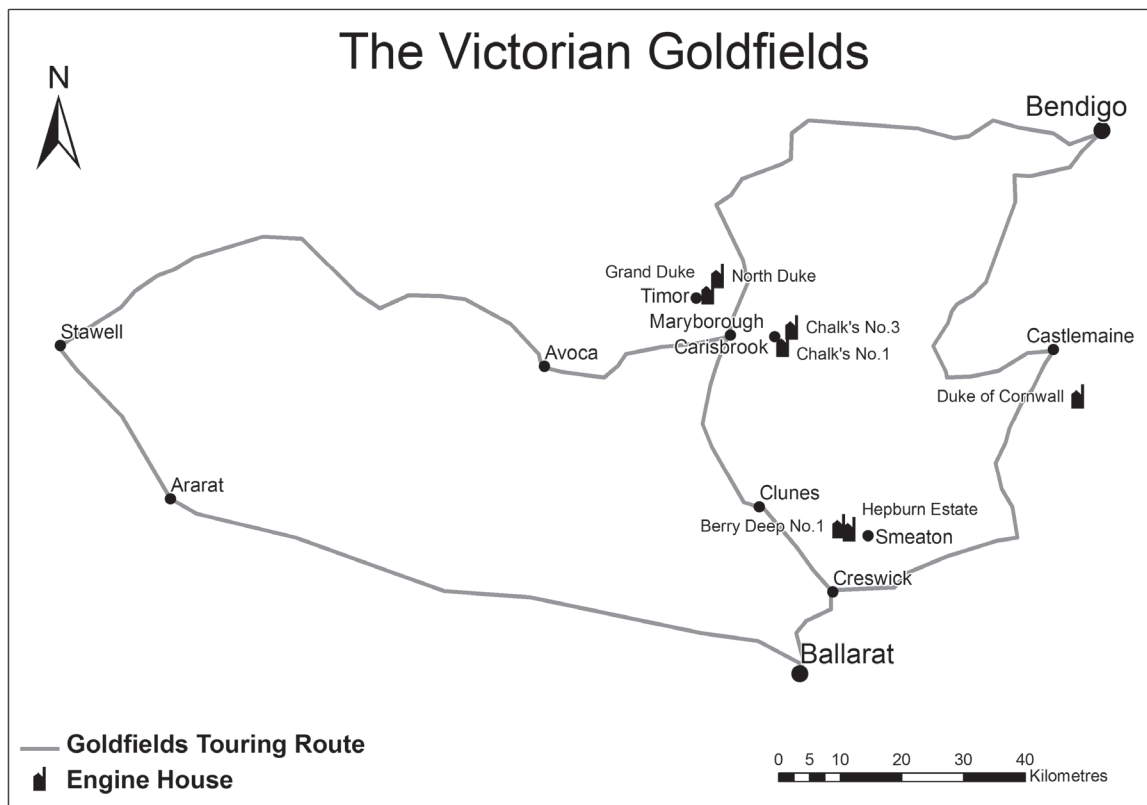


Map 1. The mines and mining areas of South Australia

Mention a gold rush and most people will instantly think of that which took place in California in 1848-9. Yet Central Victoria was also home to one of the world's richest and greatest gold rushes which began in 1851 (Patterson 1863; Adcock 1977; Annear 1999, Hocking 2000). Alluvial gold, first discovered lying as nuggets on the surface was gathered, then the creeks were panned and puddled and finally, the deep leads (pronounced 'leeds' – ancient river courses covered by recent basalt rock) were mined (Hunter 1909; McGeorge 1966). The impact of gold on the development of Victoria, declared a separate state in 1851, was immense, on Australia enormous and on the world, hugely significant (Smyth 1980). The discovery of gold was a substantial factor in the economic expansion of the British Empire with the £500,000 million worth of gold exported from colonial Victoria to Britain in the 1850s, paying all her foreign debts which secured the foundation of her enormous commercial expansion in the latter half of the century (Woodward 2001). Australia underwent a transformation from penal backwater to a vibrant, progressive country, her population almost tripling in a decade. Victoria was the home of a seminal moment in Australia's history, the Eureka Uprising (1854), an organised revolt with a strong Irish dimension against British colonial authority in response to the crippling expense of miners' licenses, taxation without representation and the heavy handed tactics of the government and its law enforcement agents (the literature is huge, but see Cranston 1988; Molony 2001 edition and Mayne 2006). Gold empowered mineworkers to pursue new ideas of social mobility, education and community, challenging and changing Australia's economy, government and ultimately her society. Little wonder then, that gold has been dubbed 'the democratic metal'.

The legacy of this incredible period in Australia's history is indelibly stamped on the landscape: countless abandoned mines marked by their glaringly white quartz mullock heaps (an Australian term for mine waste); umpteen creek banks that still betray signs of the closely spaced holes (at the centre of an eight foot claim) made by the first diggers; scores of settlements, some mere ghost towns, with their quaint shop façades, hotels with decorative iron verandas, old pubs and wooden churches seemingly frozen in time (Carroll 1986); thriving urban centres with nineteenth century architecture that is both elaborate and ostentatious, testament in stone to the huge wealth that gold created (Serle 1995 reprint). The goldfields were also a melting pot, attracting people from every corner of the globe and almost signalling a death knell to South Australian copper mining, as the miners there headed east in their droves. All were eager to make their fortune in a strange, largely unmapped hinterland that had only recently been settled by European pastoralists and where they came face to face with the Aboriginal inhabitants, the Kulin Nation, whose lands they tore apart. The provenance of these immigrants is often betrayed in the names they bequeathed to some of the early diggings: Welshman's Creek, Glamorganshire Reef, Cornish Reef, Derby Hill, Scotsman's Lead, Tipperary Gully, Frenchman's Hill Reef, Swiss Mount, Italian Hill, Hamburg Reef, German Lead, Chinaman's Flat, Yankee Creek, California Gully and Waterloo near Maryborough, so called after a reputed battle between the Irish and English diggers! These intrepid fortune seekers brought their cultural norms, traits and idiosyncrasies which are now seamlessly woven into the fabric of modern Australia.

The mining areas of South Australia are very widely dispersed



Map 2. The mines and mining areas of the Victorian Goldfields

but easily accessible from Adelaide (see Map 1). To visit the majority of them does not require a 4X4. A booklet entitled *Discover South Australia's Mining Heritage Trails* (1998) is highly recommended as a guide. Informative booklets on sale in most local information centres have also been produced for the main mining townships including Kapunda, Burra, Kadina, Wallaroo and Moonta (Drew 1989, 1990a, 1991, 2002 and Drew and Jones 1992) and these are invaluable companions for self-guiding visitors. The Victorian goldfields, easily accessible from Melbourne, cover a large area (see Map 2) which can be explored via the circular Goldfields Tourist Route marked by a brown heritage sign with a distinctive golden 'G'. This takes in important heritage sites, cities and villages including Ararat, Stawell, Avoca, Maryborough, Bendigo, Castlemeaine, Daylesford, Clunes, Creswick, and Ballarat. An excellent companion in the shape of the comprehensive and beautifully illustrated *Traveller's Guide to the Goldfields* (2006) is recommended. With time at a premium and there is simply so much to see, you can easily tailor make your own routes allowing you to cherry pick things of specific interest in both states.

MINING HERITAGE MUSEUMS AND UNDERGROUND ATTRACTIONS

One attraction that virtually everyone who visits the Victorian goldfields is aware of is the award winning Sovereign Hill in the former mining city of Ballarat, which is undoubtedly one of Australia's top tourist attractions (Sovereign Hill 1971 and 2010). We arrived late in the afternoon on our first visit and had missed the last underground trip. We instantly regretted this, for Sovereign Hill requires at least a whole day to take in

all it has to offer. Covering around 37 hectares of land, a recreated mining township capturing the impact of the rush on Ballarat in the early 1850s has been created as an outdoor living museum, with a significant emphasis on working machinery and exhibits, costumed interpreters and visitor participation. Horses and carriages ply the earthen route of Main Street over which towers a brick chimney and a poppet head; people in Victorian costume peer through shop windows across a multitude of old-time wares that are for sale; the Red Hill Gully Diggings with its puddling pits and windlasses are alive with the sounds of running water and the hiss of gravel being tossed in cradles and gold pans (Figure 2); pigs and chickens forage amid gardens in the Chinese village and the air is scented with wood smoke from the chimney of a pair of Cornish boilers that are used to steam several engines keeping various items of period machinery in motion. You truly feel that you have stepped back in time.

As we stood dejectedly in Main Street listening to a group of costumed musicians playing an Irish reel, one of the on site volunteers in full Victorian dress engaged us in conversation. By this time we had already resolved to return to Sovereign Hill the following month and told him this, explaining how keen we were on mining heritage. As we chatted away, he happened to spot the Deputy CEO and Museums Director passing by and called him over. He introduced himself as Tim Sullivan, whose ancestors hailed from Cork! He kindly gave us his card and told us he'd be more than happy to have a meeting with us should we return. He was true to his word and a month later we were sat with him in one of the hotels in a Victorian style tearoom at Sovereign Hill to discuss the secrets of its phenomenal success.



Figure 1 Children searching for gold at the Red Gully Diggings at Sovereign Hill

Sovereign Hill and the Gold Museum close by are run by the Sovereign Hill Museums Association, a nonprofit community-based organisation structured as a company limited by guarantee. It is controlled by a board who are elected by Members and serve voluntarily. Membership of the Association is open to all and the management is in the hands of an Executive Director and professional staff. In all, some 350 people are employed and there are almost the same number of volunteers. Sovereign Hill attracts 600,000 visitors annually and by the middle of 2005, more than 16 million people had passed through the entrance gate, which places it in the front ranks of museums in Australia. It has a strong brand and it is refreshing to learn that it happily describes itself as an outdoor mining living museum and not a 'visitor attraction', a term that is annoyingly nebulous and seems to be the 'in-phrase' for virtually everything these days! It runs a rigorous market campaign and a dedicated tourist office has recently opened in China.

Sovereign Hill began life as Ballarat Historical Park, a visionary community project to ensure that Ballarat's mining industry, which had ceased in 1918, should not be forgotten. Inspiration for the park came from visiting established attractions overseas, such as Colonial Williamsburg in the USA and the Ulster Folk and Transport Museum in Northern Ireland. In the summer of 1968-9 a poppet head was erected on Sovereign Hill overlooking the old Ballarat East goldfield and close to the mullock heaps of the Normanby North Mine, and alluvial diggings and a township were also created. It was officially opened by Victorian Premier, Sir Henry Bolte, in November of 1970. In 1978 the nearby gold museum opened its doors and in 1993 an evening sound and light show entitled *Blood on the Southern Cross* was launched (Cuffley 2006).

Quality of presentation borne of close attention to historical detail is undoubtedly a key element in the site's success and the management is deeply committed to ongoing academic research which is fundamental in refreshing and maintaining world class displays. For example, an 1860 newspaper report was the inspiration behind the creation of the joss house, a traditional Chinese temple (consecrated by the local Chinese

community) and heart of the Chinese village, itself modelled on an early map and 1860 photograph of a real village. Original 1850s and 60s lithographs of Ballarat street scenes provided the blueprint for the creation of many of the stores and businesses that line Main Street today, while other buildings are authentic, bequeathed to the museum by local families. Period steam machinery include a beam engine by Ruston of Lincoln (c1881), a 1908 Donald winding engine (both steamed by a pair of wood burning Cornish boilers) and two locally built engines, one a Phoenix tandem-compound engine driving a Californian stamps battery and a Norman engine dating from the 1860s driving a Wilfley table. Seeing the fiery glow of the interior of the Cornish boilers (Figure 2), listening to the rhythmic clatter of the stamps, hearing the low sighs and hiss of the pumping engine as it laboured to move the pump rods and experiencing the smell of industry in the form of heated grease and oil were hugely enjoyable and memorable. Despite its 'ye old world' charm, the site makes excellent use of cutting edge high-tech equipment including interactive media and holograms.

On offer is an underground guided tour via an 18 metre long skip way powered by the steam winding engine into the Quartz Mine below the poppet head. The mine workings are part original, part fabricated. We had ambivalent feelings about this tour, and although we enjoyed the skip ride into total blackness, we felt that the half hour visit was rather rushed, the underground environment was too faux and crowded and explanation by our guide rather minimal. We might have been more satisfied had we been on the Labyrinth version of this tour, which passes by stopes and focuses on the equipment, mining techniques (including drilling) and underground conditions encountered when the deep leads were developed. But there appears to be no choice in the tour you get. Instead, we found ourselves on the Secret Chamber one which details, via an elaborate hologram, the trials and tribulations of a pair of Chinese brothers who arrived on the gold fields to seek their fortune. If you knew very little about mining, then the Secret Chamber tour would not have increased your understanding much. It's not hard to see why it would be popular among the site's Chinese visitors (it can be shown in Cantonese and Mandarin), and indeed, we were heartened to see the Chinese, an ethnic group often neglected or marginalised in mining narratives worldwide, achieve the proper prominence they deserve. But we found the ten minute film to be rather long winded and felt that it could be shortened for western audiences. This could enable more of the omitted Labyrinth tour to be included, even if this means lengthening the total time of the trip. Martin also noted that the format of the mine visit had changed since he was there in 2005. Visitors no longer enter and leave the mine by train along an adit, but via the skipway. He felt that the train ride was more authentic and we speculate that perhaps the skipway enables a speedier throughput of visitors. We opined that it might have made for a more gratifying trip to descend in the skipway and exit via the train. We feel that the underground tour needs to be rethought in terms of visitor flow and actual content and it is our opinion that the Red Hills Mine self guided tour is far better.

This \$1.4 million attraction opened in 2000 and provides an



Figure 2. One of the volunteers at Sovereign Hill proudly shows off the fiery interior of a Cornish boiler

activated example of the developmental link between early, shallow alluvial mining and the later deep mining of the leads. Following the recorded voice of a wily Cornish mine captain, William Tregenza, visitors descend a set of steps and enter a low, narrow, lantern-lit timbered drive. They are instantly immersed in a high tech adventure comprising soundscapes, running water and life sized simulated holograms. The nature and conditions of deep lead mining appear pretty real. Here visitors meet Richard Jeffery, a Cornish miner, and share the moment he discovered the fabulous ‘Welcome Nugget’ in 1858, at that time the largest found anywhere in the world.

We also visited the Gold Museum but we were not entirely enamoured with it. The first gallery attempts to chronicle man’s fascination with gold from prehistory to the present, showcasing various ancient civilisations’ mastery of gold working and how this precious metal has influenced pivotal events in mankind’s history. The golden artefacts on show are stunning, ranging from the sacred and ceremonial to the everyday in the form of coinage. Replicas of famous nuggets found throughout Victoria are displayed. A circular exhibition at the centre of which is a large interactive map of Victoria, allows visitors to select a goldfield and press a button to illuminate a circular tube, within which is a photograph of the relevant digging and which contains a sample of the gold discovered. This varies greatly in nature from mere grains to nuggets. A continual soundscape chronicling gold strikes round the world completes the scene.

We felt that this gallery was rather muddled and the flow through it needed to be more carefully signed. Several of the displays looked jaded, containing faded images and the lights were not working in some of the display cabinets. The Douglas Cowles Gallery was much better. It charts the rise of Ballarat and compliments the outdoor museum. It makes excellent use of period artefacts, paintings by famous artist, S.T. Gill (1864;1972) and working models of mining equipment. The centrepiece built around a stunning model of the Ballarat fire tower that is surrounded by an interactive nineteenth century photoscape works particularly well. This has a ‘Did You See That?’ function, allowing visitors to press buttons to find a variety of buildings which, when activated, shine a circle of light on the relevant spot which is very

informative about the growth of the city. Sadly the display that explored the fate of the indigenous Watha Wurrung people was destroyed in recent flooding, but the management is planning to renew this and to ensure that the Aboriginal inhabitants are portrayed not as passive victims of racism, but as important and fully participating social actors.

We opted to do the *Blood on the Southern Cross* show, an evening sound and light extravaganza which tells the story of the Eureka Uprising, a dramatic battle between gold miners and Government forces at Ballarat on 3 December 1854. The show, which is run twice nightly and for which booking is essential, is available as part of a day entry to Sovereign Hill; optional extras at an additional price include a special VIP package with a two-course, pre-show dinner served with drinks and a variety of souvenirs. There is also a package on offer that includes overnight on site accommodation at the Comfort Inn Sovereign Hill. We opted for the show only, preferring to eat and sleep in our wild camp on the sandy bank of a gully in the nearby bush!

Some 150 people sat down in a theatre to watch a brief introductory film. Holograms of two adversarial figures, Irishman Peter Lalor and a uniformed Gold Commissioner, outlined diametrically opposing views concerning the way the diggings were being run, engaging the visitor in such a way that they could make their own judgements and feel part of the debate. We then proceeded on foot to the Red Hill Gully Diggings, its canvas dwellings and shacks now alive with light and sound, where the conditions that the diggers worked in were laid bare, the cosmopolitan nature of the men and women who toiled there highlighted, and the frequent clashes with ‘Joe’, the dreaded license enforcers, made apparent. We were then whisked away by a slick battery powered tram up the charmingly gas-lit Main Street to an area on the outskirts of the museum called Backblocks. Here we entered a viewing gallery cleverly disguised as a weather board hotel, the front of which opened to reveal a landscaped amphitheatre of the Eureka Lead with life sized buildings and tents, fires flickering in the darkness and multi-phonoc sound creating the noise of both camp and bush.

We sat enthralled as historical events unfolded before our eyes: the dramatic burning of Bentley’s Eureka Hotel, the emotive raising of the Southern Cross flag, the swearing of the oath to it and the rise and fall of the stockade, all played out with stunning effects such as flaming runaway wagons, a rain storm, lightening and atmospheric music. The 1.5 hour show is completed with a return by tram to Main Street where an actor playing Peter Lalor makes an impassioned address from the balcony of an hotel reflecting on the outcome of the Eureka Uprising. We felt that keeping people on the move to maintain interest was excellent and it was obvious that much thought had gone into the scripting of the show; we appreciated the attention to detail such as the variety of regional accents and the characterisation of women and children who bear witness to many of the pivotal events. One criticism that has been levelled at the show is that it has no actors. It does not need them, for a viewer has only to exercise their imagination to become so immersed in events as to be transported back in time to 1854.



Figure 3. One of the costumed volunteers in Main Street, Sovereign Hill

The authentic atmosphere created at Sovereign Hill is in large part due to an army of volunteers, many of them from the local community (Figure 3) which retains close links to the site. From Chinese to European, they are all dressed in appropriate period costume and constantly interact with visitors, answering questions and demonstrating a variety of crafts, including those of the blacksmith, wheelwright and confectioner. The dedication and love of the job that these men and women possess is very evident. A variety of activities are available including diggings tours, a spectacular \$150,000 gold pour, a chance to pan for real gold, 9 pin bowling, theatre performances and musket firing demonstrations. All this appears to be good value for money and it needs to be, as the basic entry price for adults to the site is a whopping \$45 (almost 37 euro/£30); concessionary rates are available. This price includes admission to the nearby Gold Museum, but does not include the cost of the underground guided tour of the Quartz Mine (which is an additional \$ 7.50), or the *Blood on the Southern Cross* show (which can be purchased as a combined ticket for \$100 per adult and £50 per child over 5, or \$261.50 for a family of four (214 euro/£171). There are also additional costs for horse and carriage rides, hands-on crafts and the cream tea we had in one of the reconstructed hotels was on the pricey side, so a day out for a family could work out to be a tad expensive. Having visited two similar outdoor living museums recently - Big Hole in Kimberley, South Africa, that costs 200 rand for a family of four (18 euro/£14), and the St Fagan's Museum of Welsh Life near Cardiff which is free – Sovereign Hill's basic entry price of \$113 (93 euro/£74) for two adults and up to four children is hefty.

We quizzed Tim about how the entrance price (which has doubled within eight years) and perceived value for money might impact on visitor figures, especially given the double whammy for overseas visitors of a recent general rise in Australian prices and the strong Australian dollar against other currencies. He did note that visitors can get two days for the price of one by validating their ticket to cover a return on a consecutive day and indeed, we would agree that there is more than enough to see and do at the outdoor museum and gold museum to warrant a full two days. The site currently receives about 130,000 international visitors, around 70,000 of whom are Chinese, reflecting a new trend in the visitor profile; they now exceed visitors from traditional destinations such as the UK, US and Europe, so the global recession is having some effect. About 90,000 school children pass through the site each

year, but worryingly, the domestic market has fallen, even given the fact that on average Australian wages are currently about 50 per cent higher than those in Ireland or Britain. The management is looking at why Australians, especially those from the main catchment region of Melbourne, are not making repeat visits. At the moment the rise of Chinese visitors is offsetting this domestic shortfall and because bespoke events are too costly to put on regularly, we wonder if a concessionary rate for residents of Ballarat or even Victoria could be devised to stimulate more frequent return visits?

We cannot help but think that should the Australian economy enter the same type of recession as is currently being experienced here, or if the Chinese stop travelling for some reason, then Sovereign Hill with its high site maintenance costs and staff overheads and its slim annual surplus of capital might find itself in trouble. It only receives 5 per cent state capital, the remaining 95 per cent is earned income. Just last year the Australian Prospectors and Mining Hall of Fame at Kalgoorlie in Western Australia was forced to close after only a decade due to a perennial operational shortfall. Sharron visited this attraction in 2006 and met the then CEO who expressed reservations about its long term sustainability due to its reliance on the mining industry to make up annual financial shortfalls. It is fair to say that the Mining Hall of Fame was a far different beast, but we sincerely hope that Sovereign Hill will not suffer the same financial issues, because as a mining heritage attraction it's unique in Australia and in a league all of its own internationally. Moreover, market research shows the positive knock on effect it has on the economic health of Ballarat, with every dollar spent at Sovereign Hill generating up to \$4 within the local economy. Despite the high cost, we highly recommend Sovereign Hill which we consider to be the best mining heritage attraction of its type we have visited anywhere in the world.

The importance attached to this region's mining heritage is manifested in the large-scale refurbishment (2009-11) of the existing Eureka Centre in Ballarat which has received \$10 million in grants from the State and Federal governments. It will be renamed the Australian Centre for Democracy at Eureka, and will tell the story of the 1854 Eureka Uprising using innovative and cutting edge exhibits and installations. The Clunes Mining Museum, sited in a picturesque settlement that has, like Blaenavon in Wales, turned itself into a quality book town in a bid to attract tourists, is also currently undergoing refurbishment. There is another mining museum at Creswick (entrance fee \$5) that commemorates Australia's worst mining disaster which claimed the lives of 22 miners in 1882, many of whom were Cornish and Irish.

Having parted with a considerable amount of cash at Sovereign Hill, we were disinclined to fork out for an underground visit at the Central Deborah Mine in Bendigo, an attractive city at the northern end of the goldfields (Lerk 1993). This is run by the Bendigo Trust set up in 1970 and billed as Victoria's heritage and cultural attraction of 2011 offering a variety of differently priced tours with expert guides into a gold mine that closed in 1954. For one of the most popular trips, visitors gear up in overalls, boots, miner's hat and lamp and descend by cage to the third level of the mine, 85 metres underground,

where they find themselves in authentic surroundings of drives and stopes. There are opportunities to climb ladders and work a mine drill and the tour also includes a 'miner's lunch' served underground in the Crib Room. Visitor ratings on TripAdvisor are very good indeed and perhaps we should have flashed the cash after all! Ticketing has been cleverly combined with other attractions such as Bendigo's talking tram and joss house, and a family ticket for the underground adventure and talking tram costs \$213 (174 euro/£139); a single adult ticket costs \$75 (61 euro/£49). However, we doubt that the average family or many casual visitors not obsessed with mining heritage would pay to go to Sovereign Hill and the Central Deborah Mine, given the high entrance prices charged by these attractions, and both might find a less hospitable economic climate testing.

There is no mining museum comparable to Sovereign Hill in South Australia. All of them are considerably cheaper, but also rather staid, making use of didactic boards, models and relying on a variety of artefacts in glass cases with little or no public interaction. Some of these are quite well done, particularly those that set out to recreate authentic nineteenth century surroundings, but we feel that most will need to up the ante in the future to remain attractive to fee paying visitors, perhaps by installing some interactive displays or multi media.

The Bon Accord Mine Complex, owned and administered by the National Trust Burra branch, is one such museum at Burra, South Australia and contains a mining museum concerned with preserving and exhibiting items depicting the ill-fated Bon Accord Mine and the story of Burra and district covering the working and living conditions of its miners (Drew 1990b). The highlight here is a six metre by five metre model of the Burra Mine site as it appeared in 1860 (Figure 4). Also displayed is a working forge with a selection of forging tools used to repair mine equipment. In the old waterworks building visitors can peer down a former mine shaft from which Burra pumped its water supply until 1966. The museum can be visited either individually (\$5 per adult) or free with the purchase of a Burra Heritage Passport (see below).

Bagot's Fortune museum at Kapunda covers the history of this, the oldest copper mining town in Australia, and the early mining and pioneer lifestyle of the miners (Bettison 1960; Charlton 1979). An audio visual presentation introduces Kapunda's history to the visitor and the exhibits include models of various items of mining machinery including a

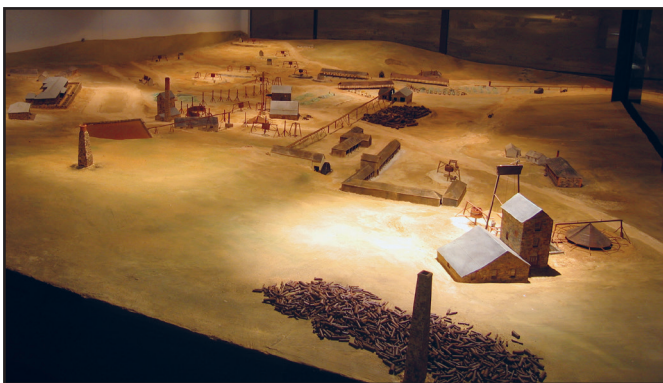


Figure 4. The Burra Mine model, Bon Accord Museum



Figure 5. Rosie's Cottage at Bagot's Fortune, Kapunda

working 38 per cent scale model of the Cornish 'Buhl' (Bull) Pumping Engine that was installed on the mine in 1852. We particularly liked this small museum which gave prominence to many of the migrant groups that worked at Kapunda's mines and did not focus exclusively on the Cornish, which is perhaps a weakness of many attractions in South Australia where other ethnic groups seem to have been more or less erased from the historical narrative. Visitors can peer into 'Rosie's cottage' (Figure 5), typical of the small thatched squatters' cabins that sprang up at the Irish Settlement on Baker's Flat close to the mine-workings, and look down the mine shaft to see Cornish Miner, Robert Nicholls, filling the kibble ready to be loaded into an ore truck by Paddy the Irish labourer, to be taken to the Welsh smelter operators. Admission costs are very reasonable at \$5 per adult/\$2 per child and this includes entry to the Kapunda Historical Society's museum, recognised as the finest folk museum in Australia, housed in a former Baptist church nearby.

The Moonta Mines Museum, operated by the National Trust of SA, Moonta Branch, is housed in the old school building (dating from 1878) and focuses almost exclusively on the Cornish pioneers who came to South Australia to work in the copper mines 1861-1923. The museum has 14 rooms and houses thematic displays including mining, lodges and friendly societies, sports and pastimes, death and hardship. There are extensive displays of costumes, china, silverware, photographs and memorabilia and a classroom furnished in the manner of 1900. It is open every day except Sundays (check times as these vary), and is closed when the temperature is 37°C and above! Admission costs are reasonable: adults \$6 and children \$2. The National Trust Miner's Cottage and Garden also provides an insight into the lives of the Cornish miners and their families who settled in Moonta. Built around 1870 from wattle and daub, mud bricks, clay and limestone and given a coat of plaster and whitewashed, it is typical of many such cottages once found throughout the mineral lease. It has been carefully furnished in period style, the garden recreated in the style of the original cottage garden and the stick fence is characteristic of the mining era.

Currently, there is no underground attraction in South Australia. Wheal Hughes, one of the first mines to be discovered in the Moonta area that reopened in 1998 as a



Figure 9. A welcome sign to the Yorke Peninsula incorporates a cartoon character by Cornish-Australian, Oswald Pryor, which demonstrates the global nature of Cornish mining culture, a heritage that also belongs to Moonta

that entails, and could be used elsewhere to good effect on large mining landscapes with dispersed features that require a degree of security.

The Moonta Mines State Heritage Area on the Yorke Peninsula, declared on 10 May 1984, encompasses the site of colonial South Australia's largest copper mining. The mining area is amongst the most significant in Australia and the designation acknowledges the mine's significant association with Cornish culture (Payton 2007), and the considerable collection of nineteenth century mining and residential structures that remain. The Moonta Mines State Heritage Area extends approximately 2.5 kilometres east-west, and 3.5 kilometres north-south, of the town. It covers most of the former Moonta Mining Company lease, and includes the main mining, industrial and residential components of Moonta Mines and Yelta. Six items within the Moonta Mines State Heritage Area are State Heritage Places: Moonta Railway Station; Moonta Mines Uniting Church (the former Wesleyan Chapel), and Sunday School Building; Moonta Mines Model Sunday School Site; the Miner's Cottage and Fence and the Hughes Cornish Pumphouse and Chimney. Since the State Heritage Area was declared in 1984, there has been extensive development of walking and vehicle trails and interpretation facilities, including a tourist tramway through the cementation works. The former school and a miner's cottage with replanted garden have been developed as museums; the huge cemetery with its hundreds of Cornish memorials has been cleaned up (and now sees little vandalism); the railway station has been restored and conservation work has been carried out on the Methodist Church, Richmans' and Hughes' engine houses.

Kadina is the largest of the three 'copper triangle' towns (Bailey 1990). Surrounding the town are the remains of several townships and their mines including the Kadina, Wandilta, Bingo, Matta, Devon, Kurilla, Duryea, New Cornwall and most significant of all, the Wallaroo (Bailey 1985 and 2002). This mine worked to a depth of 900 metres, made extensive use of Cornish mining technology and customs, and by 1876 had installed several Cornish beam

engines. The Wallaroo historic mine site contains the consolidated remains of Harvey's engine house (see below) and a self-guided walking trail with interpretation boards has been laid out at the site. In the nearby settlement of Wallaroo Mines are examples of some fine houses, the site of a former pioneer cemetery, a Cornish Mine Captain's house, the Wallaroo Mine Institute (now renamed St Piran's Church) and some company-constructed terraced cottages built to accommodate miners from Cornwall (Drew 1989). The foundations of an engine house built to accommodate a 60-inch Cornish engine can be seen at the site of the Matta Mine. The Matta Mine Manager's House is a random rubble construction under the maintenance of the Kadina National Trust, and is open to the public.

We also managed to locate the Bingo Mine site, on private property belonging to a Cornish-Australian who was delighted to meet a fellow 'Cousin', and allowed us access to the site. Our research of Irish mining migrants has determined that this copper mine was initially worked by men entirely from County Wicklow (Schwartz and Critchley forthcoming). The site for the former smelting works at Wallaroo, is dominated by the 120 feet (36m) high square brick 'Hughes Stack', constructed in 1861 in Welsh style to serve the reverberatory furnaces. It was deliberately left standing as a memorial when the smelters were being demolished in 1925 (Wiltshire 1983; Drew 1989). It is the largest historic chimney remaining in South Australia and was entered in the Register of the National Estate.

Preserving and promoting the region's rich mining heritage provides a definite boost for the tourism sector in an area that has little industry besides farming. The region is marketed as the *Copper Coast* (echoing our own Copper Coast in Waterford!) to broaden its appeal beyond the historic towns. The biennial Cornish festival, the *Kernewek Lowender* (Cornish happiness) has undoubtedly helped to put the area firmly on the tourist map (Faull, 1983; Payton 2007). Dating from 1973, this is now the largest Cornish festival in the world, attracting around 80,000 people and clearly demonstrates how Australians perceive Cornish cultural heritage to be very much their own (see also Figure 9). Indeed, there is considerable support at local and state government level for Moonta, as well as Burra, both of which demonstrate superlative extant remains of a panoply of Cornish cultural and technological features (Drew and Connell 2012 reprint), to become a part of a transnational Cornish Mining Landscape World Heritage Site (WHS). This will hopefully be progressed by the British government in due course.

We formed the impression that overall, Victoria was ahead of South Australia in terms of using new technologies for presenting mining heritage, with some sites having devised various pod casts and apps that can be downloaded to ipod or mobile phone. We found the tourist information centres in each major goldfields settlement to be highly informative; whilst in the Avoca one for example, we discovered that it was not mineworkers from Wicklow who gave it this name, but pastoralists who settled the land before the gold rush.

The Castlemaine Diggings National Heritage Park stretches

from north of Chewton, south through the Fryerstown and Vaughan Springs areas in Victoria (Baragwanath 1903). From 1851 to 1854, this area was the world's richest shallow alluvial goldfield and home to tens of thousands of migrant gold seekers (Bate 1988). The park, deep in bush-land, contains the remains of the mines and gullies which yielded fortunes and retains much of its gold rush character. It enjoys special protection status, becoming Australia's first ever National Park for its cultural heritage in 2002 as part of the Box-Ironbark Parks and Reserves network. Despite the widespread impact of gold mining, the park contains many significant Aboriginal sites and lies within the lands of the Jaara people. Future plans include getting the park onto Australia's Tentative List for WHS status. Rather surprisingly for a great mining nation, Australia, like South Africa, currently has no WHS's that cover metalliferous mining. We were fortunate in having a leading expert, state archaeologist, David Bannear, accompany us to this remarkable area. The Department of Natural Resources and Environment have commissioned detailed reports of all known sites and these are entered into a GIS. But to our knowledge, there has never been a systematic archaeological survey of any of the sites.

The Eureka Reef site boasts some of the earliest quartz mining relicts in Victoria including the exposed reef (the only place in Victoria where it can be observed), the foundations of numerous Cornish stamp batteries, tramways, leats, kilns (for roasting the quartz to make it more friable for crushing), chimney flues, waterwheel pits, puddling pits, cyanide works and miners' housing. The Eureka Reef Mine, formerly the Eureka Consols Mine, only ceased working about 15 years ago, a concrete cap marking the site of the main shaft. The whole area, that can be explored on a short 1.8 km walk, was denuded of its box and ironbark trees at the height of the gold rush, which were chopped down as fuel for steam engines, but which have now regenerated. There has been no consolidation of extant remains and unobtrusive low wooden fences keep visitors away from sensitive areas. Unlike on the sites we visited in South Australia, there is a deliberate policy of not displaying interpretation panels to preserve the wilderness character of this part of the park and visitors are encouraged to make use of podcasts and the more recent mobile app available from iTunes. It is possible to rent a MP3 player containing the podcast from the Castlemaine Visitor Centre.

At nearby Poverty Gully, once you get your eye in, it is possible to see the tightly packed depressions left by the eight feet claims of the early diggers (Birrell 1998). We were particularly interested in a rather well-preserved puddling pit which David explained was one of the only uniquely Australian invention to have benefitted the global mining industry. These circular pits, always 22 feet (6.7 metres) in diameter, were common on the goldfields and came about due to the scarcity of water to clean the auriferous alluvial soils. They were highly effective and could process about two tons of material a day. The sides and bottom of the pit were lined with hard wood and in the centre was a revolving perpendicular shaft worked by horse-power. Two harrows suspended from the cross-beam on this shaft were dragged round the circle by a horse thus 'puddling' the contents. Sufficient water was continuously supplied and the gold and sandy material that

collected at the bottom of the pit were removed at intervals and panned out.

At the Garfield Mine site, is the magnificent stone casement for the giant 24 metre diameter waterwheel which today resembles a Mayan temple hidden deep in the bush north of Chewton. This wheel was erected by Cornishman, Captain John Ebbott, of the Garfield Mining Company in 1887. It contained 220 cast iron buckets and rotated at the breakneck speed of one revolution every 45-55 seconds, providing power to drive a 15 head quartz stamp battery (later increased to 23) until 1904, when steam took over. Water was supplied by a leat installed by the Colonial government as part of the Coliban Water Supply Scheme. Hailed as the largest waterwheel in the southern hemisphere, it could be seen for miles around. It was said that the racket of the stamps powered by the wheel could be heard in Castlemaine 24 hours every day, except on Sundays, when all work on the goldfields stopped! Here, an interpretation board and walking trail provide on site information. The use of downloadable podcasts for sites within the park was quite innovative at the time, and now, with the advent of mobile phone apps, David believes it will be even easier, cheaper and more effective to provide visitors with up to date, yet non-intrusive information. He did however express concern about the long-term cost of the physical maintenance and care of the industrial monuments within the park, which will be a stringent requirement of a future management plan if the park is to be put forward as a candidate WHS.

ENGINE HOUSE HUNTING

Engine houses that contained high pressure engines for pumping, winding and stamping, are among the most iconic and visible of nineteenth century mining remains and can be found worldwide. In recent years, six houses that accommodated high pressure engines have been consolidated in Ireland, the works at each site fully detailed in previous editions of this journal (Morris 2002 and 2003; Critchley and Morris 2005; Morris 2011). There were probably between 60-70 engine houses across Ireland for vertical steam engines running on the Cornish cycle, of which perhaps recognisable remains of roughly half are evident (we are currently researching this with the view to placing the information into a GIS).

Australia too, had a large number of engine houses accommodating high pressure engines. From 1848-88, thirty three Cornish engine houses were erected in South Australia (see Drew and Connell 1993, 2012). Today just eight of these houses remain largely intact. Three of these are at Burra, built to accommodate engines from the Perran Foundry in Cornwall. Graves engine house (Figure 10) was erected in 1868 using the stone from Schneider's engine house (demolished to make way for opencast operations) and Schneider's 80-inch engine was also to be re-erected in the newly built engine house. But this never happened and Graves engine house remained unused (Drew and Connell 1993, 83-97). It is in remarkably good condition and stands on a platform above the flooded opencast.



Figure 10. Graves engine house, Burra, built for an 80-inch engine that was never installed

Morphett's pumping engine house was erected in 1858 and originally housed an 80-inch cylinder Cornish pumping engine. The engine commenced pumping in 1860 and ceased in 1877. The engine house was derelict for a number of years and in 1925 it suffered a fire which destroyed the timbered interior and part of the shaft. The engine house was reconstructed and the shaft re-timbered in 1986 as part of the South Australia's Jubilee 150 celebrations and now houses a small interpretation centre (Drew 1987). A circular void which passes through the flooring of the middle and top chambers, has been created to give an idea of the engine cylinder's diameter, a highly effective concept that would not be difficult to recreate here in Ireland in a refurbished engine house. On the western side of the engine house are the remains of the walls of the boiler house that contained six Cornish boilers (and on this visit, thankfully, no brown snake in sight!!). Access by a drainage adit was provided for visitors to inspect the re-timbered shaft, but health and safety legislation and the financial cost of maintaining this to the required standard, has resulted in this being discontinued. Moreover, the pitch pine used for the replacement spring beams within the engine house was not sufficiently seasoned and it is shrinking and splitting, highlighting the importance of using only top quality materials which can stand the test of time. There are also issues about the safety of the wood of the replacement bob plat which means that it is no longer possible for visitors to use this as a look out point over the flooded opencast. Alongside is the winding engine house built in 1861 for a 20-inch engine (Figure 11). It was consolidated in 1987.

The house for Richmans engine (named after a director of the Moonta Mining Company) was constructed between 1867 (Figure 12) and 1869 using stone from Moonta Beach (Drew and Connell 1993, 148-154), and features a concealed roof surrounded by a parapet. It housed a 32-inch Cornish internal beam engine and was unusual in that it had a back bob for pumping water from Stuckey's Shaft and it also powered a rock crusher, a set of Cornish rolls and jiggling machines on the nearby dressing floor. The engine was taken out of service in 1917 due to problems with providing sufficient water to



Figure 11. Morphett's winding engine house (right). The restored pumping engine house (left) hosts a small interpretation centre



Figure 12. Richmans engine house, Moonta Mines

steam the boilers and the engine house and surrounding buildings were salvaged in 1925. The engine house, sited below the towering tailings heaps dubbed 'Moonta's Himalayas' was consolidated in 1986 which included replacing its roof behind the parapet wall and ornate corbel. The internal bob wall is still intact as is the cylinder bedstone with four holding down bolt holes, although visitors cannot get far enough into the house to see this. One thing we noticed was that the interpretation board (badly damaged by graffiti) inside the house does not correspond to the archaeology, in that it omits to illustrate the back bob. Four projecting tie down bolts for the engine's back bob can be clearly seen at the top of the rear wall above the cylinder bedstone. The roof-line of the original boiler house can be seen on the northern side of the building which housed two boilers. This was superseded in about 1901 by a new boiler house with three boilers, the up draught provided by a steel chimney. A further boiler house was constructed six years later for four boilers.



Figure 13. Hughes engine house, Moonta Mines, built for a Harvey's of Hayle engine

Hughes engine house at Moonta was constructed in 1865 (Figure 13) and named after Walter Watson Hughes, the founder of the Moonta Mining Company (Paterson 1993). The building housed a 60-inch vertical Cornish pumping engine, which operated pumps in Hughes and Taylor's Shafts (Drew and Connell 1993, 139-145). The engine worked continuously, except for maintenance, for more than 58 years until closure of the mine in 1923. The engine house and its chimney (not integral) of cream coloured limestone, was consolidated by the National Trust in 1974, an interesting fact, as this predates the conservation programmes undertaken on engine houses in Cornwall. The boiler house on the northern side of the building for three boilers has not survived but there is a boiler on site. The cylinder bedstone is complete as is the main timber girder and the steam eduction pipe is also extant. The timber lining of the wooden cistern in the condenser pit has survived well in the dry Australian climate. Hughes' Shaft has been stabilised and the ground level around the pumping engine house has been lowered by removing the post-1923 tailings dump.

Harvey's engine house built of white limestone (Figure 14), is the sole survivor of four engine houses erected on the Wallaroo Mines, Kadina. It was built on the North Hughes Shaft in 1873 for a 60-inch Cornish pumping engine that worked until 1904 when it was replaced by electric pumps (Drew and Connell 1993, 127-129). The house is in an overall good state of preservation, with plaster still evident on the interior walling. The cylinder bedstone with its four holding down bolts is intact as is the parallel motion mechanism, hanging from the bob wall. The boiler house for three boilers has not survived, neither has the chimney - just the lower stump of it is extant. The pump rod is protruding from the shaft which is flooded to surface and the masonry slot with bolts for the bearing of the balance bob and the square void beyond for the balance box



Figure 14. Harvey's engine house, Wallaroo Mines, Kadina

are in excellent condition. A strange feature of the site is the constant issuing of gas bubbles from the water in the shaft which has the distinct whiff of rotten eggs!

The Worthing engine house is on private property close to Hallett Bay south of Adelaide and is the oldest extant engine



Figure 15 *South Australia's oldest extant engine house, at Hallett Bay south of Adelaide*

house in Australia (Drew and Connell 1993, 102-105). It is in good overall condition being largely intact except for its roof. Plans have been mooted for its protection from encroachment by a nearby quarry but it will probably not be in its original location in the Field River Valley. Being in the Adelaide Metropolitan area, it is also under threat from suburban sprawl that will inevitably diminish its landscape context. 'Private property Keep Out' signs have been prominently sited to dissuade motor bike scramblers who are damaging the archaeology at the site.

Constructed of local limestone in 1851, the engine house (Figure 15) is sited about 40 metres from Engine Shaft and accommodated a 22-inch internal engine which was started in 1856. A levelled area on which a whim was sited can be seen in front of the house. Engine shaft, filled to the surface with stone, is visible, complete with masonry block for the pump mounting. Flat rods connected the pump with the crankshaft that was mounted on the left side of the engine house. Inside the engine house was a 12 ft diameter flywheel operated by a hand-brake to control the engine during hauling. On the exterior eastern wall of the house is a block of masonry that comprised the base for the winding drum operated by the crankshaft passing through an opening in the wall. The boiler house is no longer extant but the cavity for the condenser and air pump is visible. The mine chimney, built of limestone with a red brick upper section, is in very good condition. A long flue runs in an arc from the northern end of the boiler house to this chimney.

At the North Rhine Mine near Keyneton, is what we believe to be possibly the finest Bull engine house in the world (Figure 16), which accommodated Copes Engine, one of only two such engines to be exported from Cornwall to Australia (Drew and Connell 1993, 111-113). This 48-inch engine had originally been installed at the Tungkillo Mine further south and was started at North Rhine in 1860. This engine house was a little hard to locate and it took us two attempts, as it is on farmland and reached via a maze of dirt tracks, which resulted in us getting a puncture! There were never any Bull engines erected in Ireland, but this differed from a traditional Cornish

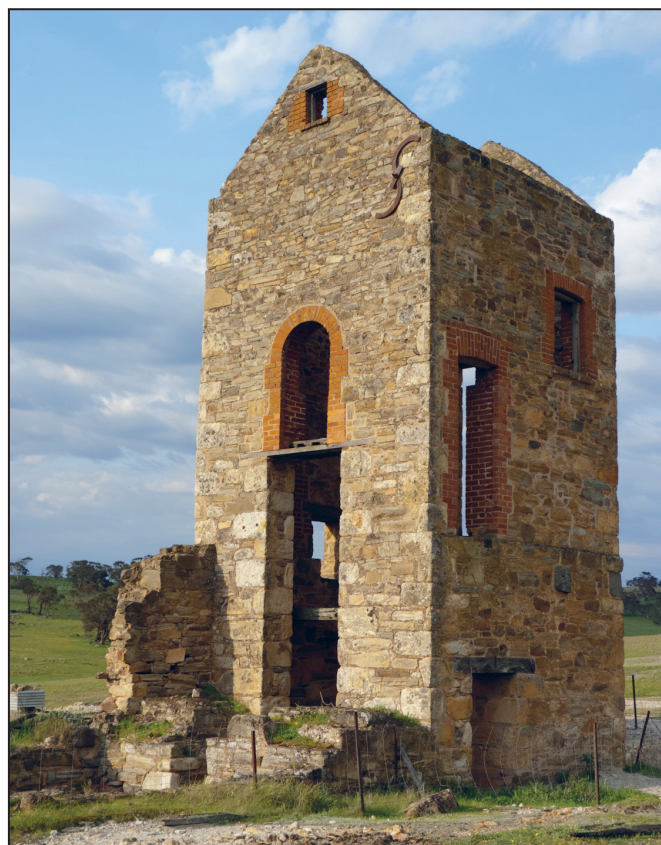


Figure 16. *The Bull engine house at the North Rhine Mine, Keyneton, is possibly one of the best preserved in the world*

beam engine in that the steam cylinder was inverted over the pump and thus dispensed with the need for a main beam. This design meant that a Bull engine took up about half the space of a beam engine of similar pumping capacity and made the engine safer to operate and quicker to erect. The engine house for a Bull engine is therefore of a slightly different design, there being no bob wall. The brick and stonework of the North Rhine engine house were stabilised in 1987. The stonework over the shaft is supported on huge gum timbers, and these and the supporting timbers for the cylinder and condensing cistern are in fair condition. Remarkably, part of the balance bob mechanism remains within its masonry slot and the pump rod is still in the shaft, which is flooded almost to surface. It is possible to see where the boiler house was attached to the northern wall of the building. The 36 metre high chimney has unfortunately not survived – it was destroyed in a storm in 1974.

There are thirty eight confirmed Cornish beam engine sites in Victoria and another possible seven, of which around twelve houses remain (Milner 1997). Surprisingly, these have less profile than those in South Australia, possibly because fewer have been consolidated. The first Cornish engines were in use on the gold diggings by 1859 at places such as Eaglehawk and Specimen Hill and were small rotative ones used for crushing, winding and pumping. It was only when the deep leads were discovered and their exploitation began that large Cornish pumping engines, up to 80-inch cylinder in size, were deployed to unwater these very wet workings; their massive houses have tended to survive somewhat better. Some of these

engines were locally made, but the Cornish engineering company, Harvey's of Hayle, are known to have exported two 80-inch 10 foot stroke engines to Australia, in 1868 and 1872, and we were keen to see the extant house known to have accommodated one of these engines. In all, we managed to locate the extant remains of seven engine houses, and were surprised to discover that most were almost entirely built of brick, often with the bob wall or just support for the trunions made of stone. This was apparently due to a shortage of suitable stone in the area. Another odd feature of some of these engine houses is that their brick built boiler houses seemed to be sited away from them, and these have not survived well.

The most quintessentially Cornish-type engine house to survive in Victoria is that on the Duke of Cornwall Mine (Figure 17) near Fryerstown (Rowe 1992), which was managed by Cornishman, Richard Luke Middleton Kitto of the short-lived Australian United Gold Mining Company. It dates from 1869 and accommodated a 25-inch rotative engine with a 10 foot stroke (provenance unknown) used for pumping and initially running 24-head of stamps. Built of rough hewn local stone with red brick surrounding the windows, plug doorway, cylinder doorway and edges of the building, it has an integral chimney and adjacent boiler house and has been consolidated and re-roofed. However, there is no public access to the site, which is surrounded by a high chain link fence with signs warning people to keep out. A nearby plaque installed by the Victoria Cornish Association in 1992 commemorates the significant role played by the Cornish in the area.

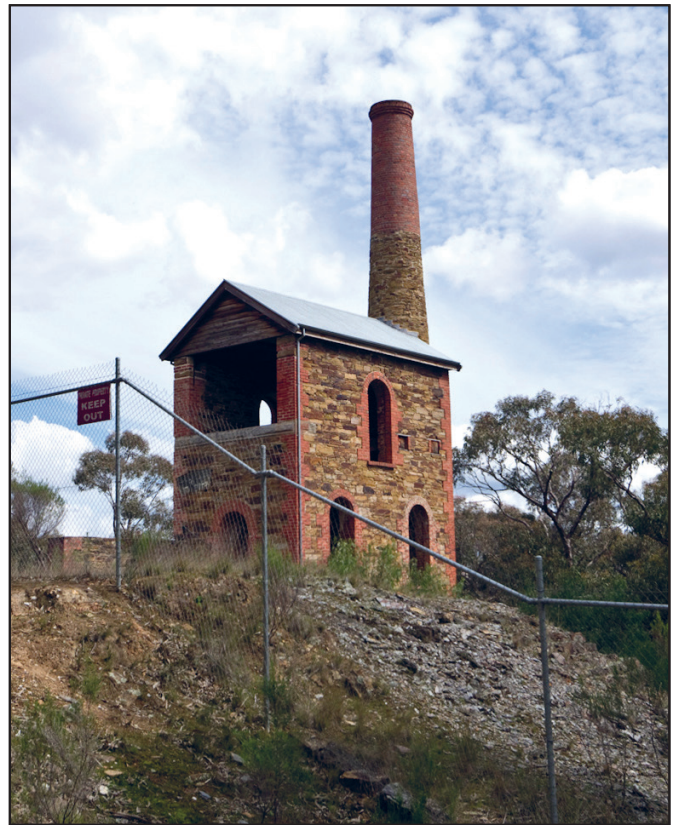


Figure 17. An engine house design familiar to us here in Ireland is the Duke of Cornwall near Fryerstown in Victoria which has been consolidated

Between 1872 and 1900, more than 30 companies worked Victoria's richest deep alluvial gold lead system known as the Berry Deep Leads that runs between Creswick and Smeaton (Hunter 1909; McGeorge 1966; Fahey 1986). The mines here produced about 1.7 million oz of gold and have left a distinctive landscape of huge quartz mullock heaps. Two Cornish engine houses can be seen about 3-4 km west of Smeaton along the Daylesford-Clunes Road. Both accommodated pumping engines built by John Hickman's Union Foundry in Ballarat (Bannear 1999). Sited on Crown Land on the north side of this road 2.7 kms west of Smeaton, is a large brick engine house built in 1884 on the Hepburn Estate Mine (Figure 18). Its 70-inch 9 feet stroke engine was capable of working two sets of pumps and was steamed by four Cornish boilers, the updraft provided by a brick stack 80 feet (24 metres) high. A report of 1884 noted that 300,000 bricks were required to build this engine house. Today, the impressive brick bob wall some 7.5 metres high with dressed basalt blocks for the trunions, is a visible landmark. The partially extant basalt cylinder bedstone with three inch wide hold down bolt holes (two bolts are in situ) is comprised of six wedges and built on a brick bed (two wedges are missing). The adjoining cataract pit is full of rubble and the shaft is in-filled with agricultural debris. The site of the boiler house, betrayed by depressions and quantities of basalt rubble and brick, is barely discernible. There is no sign of the chimney.



Figure 18. The huge pumping engine house on the Hepburn Estate Mine on the Berry Deep Leads near Smeaton

A little further down the road from the Hepburn Estate engine house and also on Crown Land, is that of the Berry No. 1 Mine (Figure 19), the 70-inch single acting engine of which was installed in 1884. Its 32 ft long and 6 ft wide beam cast in two



Figure 19. The well-preserved brick built engine house of the Berry No. 1 Mine near Smeaton

sections was capable of lifting 60,000 gallons of water per hour. All the walls of this house, constructed of buff coloured brick with red brick ornamental surrounds for the cylinder archway, windows, edge of the building etc., have survived exceptionally well to a height of about 7.5 metres but only half of its basalt cylinder bedstone is extant. Immediately in front of the engine house is a pretty dangerous open shaft and the remains of the balance box pit. The boiler house has been demolished, its site betrayed by a patch of rubble several metres away from the engine house on its western side.

Near Maryborough, a gold rush town founded in 1854, are the villages of Timor and Carisbrook, both of which contain extant remains of Cornish engine houses (Bannear 1994). A walking trail with interpretation panels directs visitors around the site of the Grand Duke Mine, Timor, operated by the Duke and Timor Gold Mining Company. One of Victoria's richest deep lead mines, it produced 216,000 oz of gold from 1869 to 1896. A very wet mine, it had one of the imported Harvey's engines installed on it (Figure 20). The house, built by John James of Ballarat for £1,030, had a bob wall six feet wide and 26.5 feet long, constructed on foundations sixteen feet deep. The 80-inch 10-foot stroke engine could generate 270 hp and its 30 ton iron beam was said to have been the most massive in the state. The engine, erected in 1876 by John Ward, could raise 200 gallons of water per stroke or 2,000 gallons per minute (20,160,000 gallons per week). The granite bob wall, some 7.5 metres high with its plug doorway 2 metres wide and 4 metres high, partial remains of the brick wing walls, the brick lined cataract pit, cracked cylinder bedstone with its six



Figure 20. The bob wall of the Grand Duke Engine House, Timor, which accommodated a Harvey's of Hayle engine



Figure 21. Each block of the stone-built bob wall of the North Duke engine house hidden deep in the bush, bears an engraved number, suggesting that the house, and probably its engine, had been moved from elsewhere



Figure 22. The brick built bob wall of Chalk's No. 1 engine house near Carisbrook

hold down bolt holes and balance box pit are extant. The site was placed on the Register of the National Estate due to its historical importance.

After much searching, we finally located the North Duke Cornish engine house on private property in the bush 3.4 km NE of Timor, on the east side of the Bet Bet-Bromley road (Bannear 1994). This house (Figure 21) was erected by the North Duke Mining Company that operated from 1895 to c.1903. On the eastern side of an in-filled shaft is the intact bluestone bob wall of the engine house measuring approximately 7 metres in height. The wing walls constructed of bluestone blocks with red brick in-fills have been largely demolished. The cataract pit on the eastern side is completely in-filled and part of a mullock heap obscures the cylinder bedstone. An interesting feature of this engine house is the fact that the bluestone blocks, 13 courses high, each bear an engraved number, strongly suggesting that with good building stone at a premium, the engine house (and maybe the engine it accommodated), had been moved from another site, possibly Duke No. 1.

Near Carisbrook are another pair of Cornish engine houses (Bannear 1994). Chalk's No. 1 engine house (Figure 22) can be seen 1.5 km SE from the village across the fields from Freehold Lane and is on private property. It was built in 1887 and accommodated another very large engine, provenance unknown. We located the brick built bob wall approximately 7.5 metres high, on the northern side of the shaft which is choked with agricultural rubbish and the malodorous carcasses of numerous sheep! The wing walls have been demolished and the cataract pit is completely in-filled and hidden by a large boxthorn bush which also obscures part of the cylinder bedstone. All the cylinder bolts are missing, but the placement of the six hold down bolt holes and a faint circular impression on the bedstone suggests that the cylinder was about 70-80-inches in diameter. Nearby are some bluestone footings that might be associated with the flue of the boiler house which has vanished.

The engine house on Chalk's No. 3 North Shaft can be seen 2.3 km north-east of Carisbrook, 0.8 km north-east of junction of Baringhup and Donavans Roads. It is on private property and entails an 800 metre walk across pastureland. We set off in burning heat and knee high grass, plagued by bush flies that necessitated giving the 'Aussie salute' every few seconds, and eventually located the house behind a large mullock heap. One of the later houses to be erected, in 1896, our efforts in locating it were well rewarded even though the brick engine house has been badly damaged and most of it lies in a chaotic rubble. The brick-lined cataract pit measuring roughly 5.5 metres by 2 metres (partially in-filled with brick rubble) is extant, as is the large bluestone cylinder bedstone with six hold down bolt holes, suggesting an engine of about 70-80-inches. But of greater interest is that the open shaft contains a section of rising main and the pitwork attached to an angle bob leading to the balance box pit, now choked with the remains of two rusting car bodies (Figure 23). Nearby are the brick loadings for what appeared to be a horizontal winding engine, but we had no time to measure these as we beat a hasty retreat after Martin was stung on the face by an



Figure 23. Pitwork attached to an angle bob leading to a balance box pit at Chalk's No. 3 Shaft near Carisbrook

angry hornet!

CONCLUDING THOUGHTS

South Australia and Victoria are blessed with an abundance of mining heritage which each state has attempted to present to the public in myriad ways. It is unlikely that any mine site in Ireland, or elsewhere in Australia for that matter, could ever hope to emulate Sovereign Hill, although we may take some satisfaction in the fact that this 'living museum' drew its early inspiration from the excellent Ulster Folk and Transport Museum in Northern Ireland. It remains to be seen whether Sovereign Hill can continue its successful trajectory in the current global economic climate. We were made acutely aware of the benefits of aggressive marketing of the mining heritage 'product', particularly in emerging markets such as China, but also alerted to the risks of neglecting to explore continuing ways of appealing to the domestic audience. We also learned from our trip that the viability of mining heritage attractions in Ireland cannot be guaranteed, especially in remote areas distant from major centres of population. For even those sites not far from major metropolitan areas in

Australia with the 'wow' factor of an underground tour, or those 'piggy-backing' on pre-existing tourist offers, seem to have fallen victim to the escalating costs of maintenance and insurance required to comply with necessary health and safety legislation. Perhaps diversity of on-site attractions (evident at the Castlecomer Discovery Park in Kilkenny for example) will have to be considered to ensure a site's survival, although this might not please the purists. Crucial too, is local community participation and engagement: local communities need to feel that they will get some return on the presence of a mining heritage attraction in their midst, or they might not bother to support it. Sovereign Hill, with its state of the art underground tour which relies heavily on local volunteer participation, has a slim annual profit margin and it could find itself in trouble if state capital input was ever to be withdrawn.

We may also take great pride in the fact that we have managed to consolidate, protect and interpret nineteenth century mining sites and landscapes at Allihies, Bunmahon and Silvermines, that demonstrate the global migration of technology and labour during the period of the 'industrial revolution', to a standard that equals, and even better, that which we saw in Australia. Indeed, there is even the possibility that at least one of our mine sites could one day join Moonta and Burra in South Australia as part of the future transnational Cornish Mining Landscape WHS. The Cornwall and west Devon Mining Landscape was inscribed onto the WHS List by UNESCO in 2006 because it demonstrates the importance of this region to the development of deep lode metalliferous mining and high pressure steam engine technology which lay at the vanguard of Britain's 18th-19th century 'industrial revolution' and from whence this technology was exported worldwide. In South Australia the nineteenth century hard rock mining technology widely perceived to have been perfected in one small region of SW Britain and the culture that is associated with it, has been wholeheartedly embraced; local residents now proudly claim ownership of this as a vital part of *their* history and heritage. However, hard rock mining was not the sole preserve of the Cornish and there is definitely a bias in interpretation in many South Australian museums and visitor centres and a clear need for a heightened visibility of the role played by other ethnic groups, such as we saw demonstrated at mining heritage venues in neighbouring Victoria. This includes the Irish for example, who were undoubtedly instrumental in the growth of commercial mining in South Australia.

It is also interesting that many of the issues facing mining heritage sites and landscapes in Australia affect us equally: problems and complications surrounding the listing procedures at local, county/state and national level to ensure the future protection of vulnerable sites/landscapes; issues concerning public safety and access and also how sites are to be maintained, interpreted and presented in the future. It would be hard to see how any mining area in Ireland could utilise the excellent Burra passport type scheme, as our mining landscapes are not large or dispersed enough. But we felt that Victoria led the way in novel, interactive and cost effective methods of promoting and interpreting mining heritage independent of purpose built museums or interpretation centres. This was effected via the use of downloadable apps and podcasts for

smart phones and ipods to enable self-guiding in a type of 'eco-museum' fashion, enabling every visitor to have their own unique journey of discovery. We feel that this approach will probably be the future for interpretation at many Irish mining sites, as improved mobile phone coverage, advancements in technologies such as augmented reality and geo-referenced PDF maps, bring such interpretive tools ever closer.

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To find out more about the Castlemaine Diggings National Heritage Park see the Visit Victoria website:

<http://www.visitvictoria.com/Regions/Goldfields/Activities-and-attractions/Tours/Audio-tours.aspx>

The mobile phone app referred to in this article is called Vic-Heritage and is available on iTunes.

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