Curious Matter for Contemplation: A Pistol from the Eureka Lead, Ballarat

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In 1997 excavations near the site of the Eureka Stockade led to the recovery of a unique assemblage of gold-rush era artefacts, including well-preserved organic items. The most significant of these, a pepperbox pistol, has recently been conserved and is now available for display and further study. The conservation process presented complex treatment problems because of the materials involved and the delicate condition of the pistol. The analysis of the pistol and the associated artefact assemblage can provide important information on the goods available during the gold rush.

INTRODUCTION

'A deserted gold hole in the rear (of the tent) standing in lieu of a refuse pit, which on some future day, long after nature has skinned over the orifice, will probably present curious matter for contemplation to unborn naturalists' (Kelly 1860:202).

William Kelly was describing the Ballarat goldfield in the 1850s. Refuse pits very similar to those Kelly saw were uncovered in 1996–1997 during the construction of the Eureka Centre in Ballarat. At that time Dr Vincent Clark, the archaeologist conducting the watching brief for the City of Ballarat, recovered a number of artefacts from a sealed archaeological deposit dating to the 1850s. The deposit, in a water-logged mine shaft, contained a number of organic objects that were remarkably well-preserved. Most notable was a small, intact pistol. The discovery presented conservation challenges and the possibility of unique insights into the archaeology of the Eureka Stockade era. Although no structural remains were uncovered during the excavations, considerable evidence of the mining activities of the 1850s-1860s was found to have survived beneath modern landscaping.

The historical significance of the pistol and its associated artefacts was recognised immediately, but it is only recently that funding was made available for conservation treatment to take place. In 2003 Heritage Victoria and the City of Ballarat jointly funded a conservation program undertaken by staff at Heritage Victoria and the Western Australian Maritime Museum. This paper discusses the issues associated with the conservation of the pistol, considers its historical significance, and suggests avenues for further research.

THE ARCHAEOLOGY OF EUREKA

The Eureka Centre site is located on the old Eureka Lead in Ballarat, a place most famous as the centre of the 1854 miners' rebellion. Gold was discovered along the Eureka lead in the winter of 1852, and by 1854 it was a focus of the field. It was a 'deep-lead' field, and shafts at that time went down as far as 110 feet without hitting the gold-bearing gutter (Bate 1978:51, Blainey 1963:46–58). Frustration with the depth of the sinkings mounted, and spilled over in the spring of that year when it was combined with the worsening injustice of licensing laws and outrage at the handling of two unrelated legal cases. In response to rioting and the destruction of Bentley's Hotel, Commissioner Rede called for reinforcements. Troops were dispatched from Melbourne and on 3 December fought a pitched battled with the miners at Eureka Stockade. The battle was soon over with 30 miners killed and 25 military casualties (Bate 1978:70–71). Although the miners lost on the day, the rebellion led to a series of significant legislative reforms including the extension of male franchise, and its name and symbolism continue to resonate in Australian culture.

According to contemporary accounts, the stockade was erected at the head of the lead, where the precise location of the gold-bearing gutter had yet to be established (Huyghue in O'Brien 1992). Some parties were shepherding, or digging just enough to retain legal right to their claims, while others were digging larger shafts in an attempt to reach gold. The gutter was located soon after the firing of the stockade, and mining carried on in earnest until 1856. Once the main rush had passed the area was worked over by Chinese miners who sluiced and puddled the tailings of the earlier diggings, and by the 1860s the area was the scene of more industrialised company mining (Smyth 1979:43).

Although the exact location of the stockade itself remains controversial, its general whereabouts has long been known, and the Eureka Stockade Precinct has been a public reserve since 1870. It includes the Eureka Monument erected in 1884, a swimming pool and a caravan park. In 1996 the Ballarat City Council decided to build a formal interpretive centre to commemorate the events at Eureka and their aftermath. The site chosen was on the line of the old lead, and was situated so as to avoid disturbing the two most probable locations of the original stockade itself (Clark 1998:6 Harvey 1994).

During the building works archaeologist Vincent Clark was able to record a number of gold rush-era ground surfaces, including shepherding holes, prospecting shafts, and tailings deposits (Clark 1998:30). Shallow pits up to a metre deep and between 3 and 4 m in diameter were identified as shepherding holes, while larger and more carefully-worked shafts 1.2 m square and up to 3.1 m deep were identified as abandoned prospecting shafts. Both shepherding holes and shafts were sealed by finely laminated deposits of silt characteristic of tailings from puddling machines and sluicing, leading Clark to attribute the shafts and their fill to the period between the discovery of the lead in 1854 and its reworking in the early 1860s.

The fill deposits within the pits and shafts contained numerous artefacts whose age is consistent with Clark's interpretation of the stratigraphy, and because of the moist conditions in which they were found, even organic artefacts were in very good condition. The artefacts included fragments of dark green cylindrical bottles, square case bottles, torpedo bottles, glass tumblers, blue-and-white transfer printed tablewares, leather footware, wooden tubs and tins for foodstuffs. The pistol discussed here was recovered from the fill of an intact prospecting shaft in Area H. The artefacts are essentially domestic rubbish which was disposed of by leaving it in abandoned pits. Although it is tempting to associate the pistol with the events of the Eureka Stockade, it is more likely that it too was domestic rubbish, discarded by someone leaving the field.

It was immediately recognised that the artefacts in the shaft were highly significant. Very few intact deposits from the 1850s have been excavated archaeologically in Victoria, and this assemblage is valuable because of its association with the gold rush, a period which reshaped Victoria culturally, industrially, and economically. Even more, the assemblage's direct association with the location of the Eureka Stockade, one of the most momentous events in Australian history, further adds to this significance. At the same time, to have organic artefacts so well preserved from a terrestrial site is highly unusual, and the archaeological recovery of a firearm even more so.

CONSERVATION

All of the organic materials recovered from the shaft required conservation treatment to stabilise and maintain their condition. As funding for such treatment was not available at the time of the excavation, the artefacts were placed in cold storage as an interim measure. When funding did become available the conservation of the pistol had highest priority due to its historic significance and its unstable condition. However, before the pistol could be brought to a point where it could be safely handled and potentially displayed, a number of obstacles had to be overcome.

The first task was the identification of the pistol. In this case, the workings of the pistol outlined below were revealed through visual and radiographic examination undertaken before and during the course of conservation treatment. One of the most striking features of the pistol is the large barrel group which comprises six bores (or barrels) machined from a single block of steel (Figure 1). The barrel group is designed to rotate around a central rod, which screws into the standing breech on the frame. The barrel is secured to the rod by one pan-headed screw at the muzzle end and rotates in an anti-clockwise direction, by virtue of a pawl and ratchet system. This refers to a pivoted bar adapted to engage and move the indexed, star-shaped machining at the rear of the barrel group when the trigger is pulled back. The bar hammer is of a standard, double-action or 'self-cocking' type, which means that pulling the trigger not only cocked the hammer, but allowed it to fall in a striking action. The frame, which is a single forging, houses the inner spring components as well as the trigger and hammer working mechanisms. These working mechanisms are covered with side plates, often engraved. Two curved, wooden panels form the handle grip, and these are fixed to the frame via a threaded, steel, circular head screw (with sleeve) and hexagonal nut system.

At the end of each barrel and set at right angles to it is a 'nipple' or vent hole, which communicates with each bore. During firing, each nipple was fitted with a small metal percussion cap. The nipples are partially covered by a close fitting shield, which extends forward from the breech and side plates, and functioned to prevent the percussion caps from being brushed or shaken off (Myatt 1981).

To fire the weapon, each barrel was muzzle-loaded with detonating powder and ball (and possibly wadding), after which the percussion cap with explosive was placed over each nipple. The trigger was pulled, causing the hammer to drop. This hit the percussion cap, sending a powerful flash down the vent and the weapon then fired. The barrel assembly was subsequently turned to bring the next bore into line and the procedure repeated (Wilkinson 1977, Hogg 1975).

This kind of weapon is a common kind of percussion pistol known as a pepperbox. Effective primarily as a close quarter self-defense weapon, pepperbox pistols first made their appearance in the late 1830s and were produced mainly for civilian use. They soon achieved popularity because of their multi-shot advantage over single or double-barreled pistols, but by the mid-1850s, they had been largely superceded by the popular Colt-style revolver (Wilkinson 1977, 1990:59–66). Pepperbox pistols actually represent one of several stages in the development of the percussion revolver. Generally, the term 'revolver' is only applied to a gun with a single barrel and rotating cylinder, and a multi-barreled, rotating firearm of the same general type is known as a pepperbox pistol (Boothroyd 1970). Some early pepperbox models had four or six barrels which had to be rotated manually, but by the 1840s mechanisms had developed to the

KEY

- A Barrel group (6 bore)
- B Central rod
- C Nipple (vent hole)
- D Trigger
- E Trigger guard
- F Bar hammer
- G Trigger/hammer mechanisms (hatched)
- H Frame
- I Trigger spring
- J Main spring showing fracture
- K Screw & nut assembly
- L Breech (dotted)

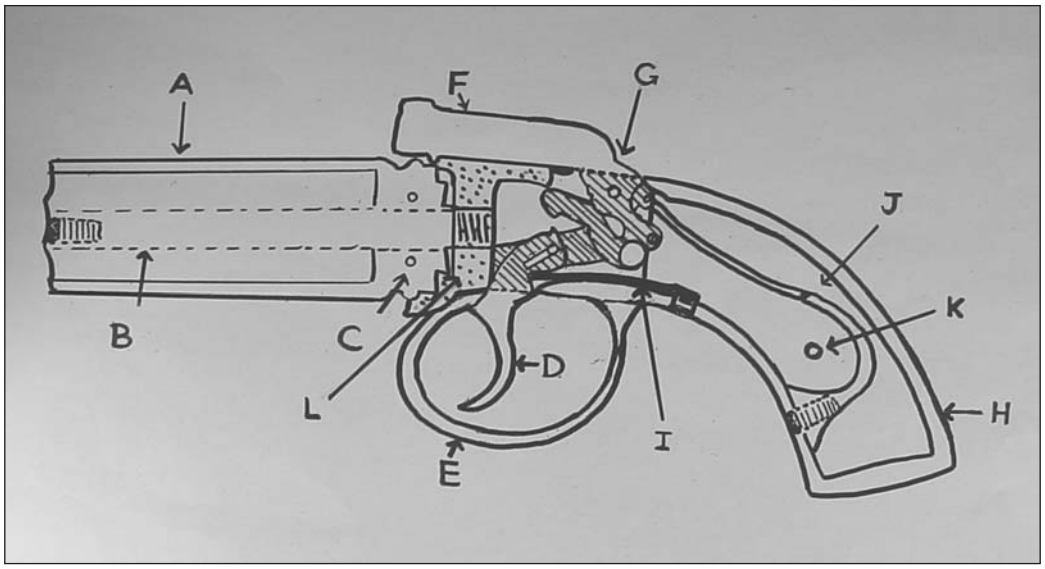


Fig. 1: Drawing of pistol with various labeled parts.

stage whereby pressure on the trigger caused the barrels to rotate (Wilkinson 1990:66). The pistol found at the Eureka Lead site was of the latter type.

Once identified, the next step was to develop a treatment approach which would stabilize the pistol and hopefully reveal engraving or maker's marks, thus helping to establish provenance. Of concern was the fact that the pistol was comprised of materials with different treatment requirements. Specifically, the intention was to remove surface concretions and rust, and thereby facilitate dismantling so that appropriate and thorough treatments for the metal and wood components could be undertaken safely. To this end, the pistol was transported to Western Australia Maritime Museum (WAMM) Conservation Laboratory and a collaborative conservation treatment developed and undertaken by Barbara O'Brien (conservator at Heritage Victoria in 2003) and Richard Garcia (conservator currently at WAMM), the latter having extensive experience in the conservation of firearms.

Condition

Once the pistol had been relocated to WAMM, the condition of the pistol was examined in greater detail. The pistol was intact, but muddy and damp. All surfaces showed heavy concretions, rust and pebble/soil residues (Figures 2 and 3). One bore in the barrel group was almost completely occluded, the trigger guard and trigger were concreted together, and the hammer was corroded and fixed to the frame. Metal surfaces were generally pitted, while thin areas of metal, such as the nipple shield appeared quite fragile The wooden panels appeared in reasonably sound condition apart from surface abrasions and losses along edges, however, the screw and nut assembly joining the wooden handle grips to the frame was extensively corroded and immovable.

Because of its concreted and fragile state, visualization of the inner components was not possible prior to conservation treatment. However, preliminary radiographs from 1997 revealed most of the metal was reasonably sound, and that the main spring located within the handle had been fractured. Other smaller inner springs appeared to be intact. X-rays, taken again in 2003, showed no discernable differences or changes in condition (Figures 4 and 5).

Fig. 2: Image of pepperbox before conservation.

Fig. 3: Image of pepperbox before conservation.

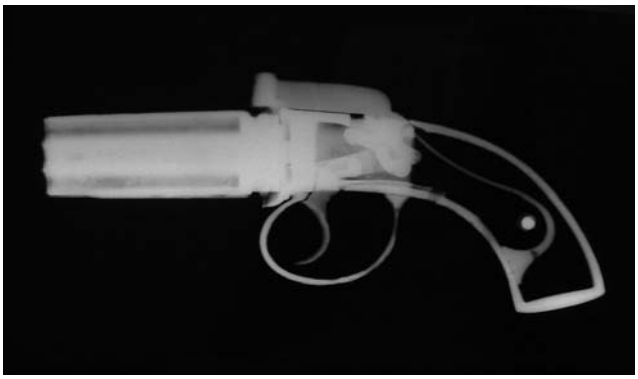


Fig. 4: Radiograph of pistol showing internal components.

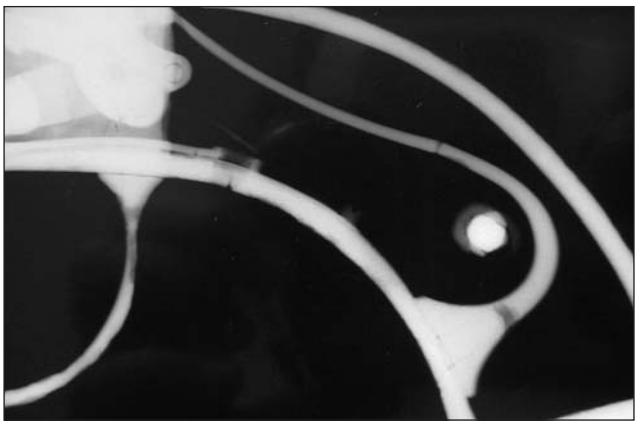


Fig. 5: Radiograph detail showing fractured mainspring.

Treatment

Stage 1 – Removing concretions and rust

The first approach considered was to remove surface concretions from the metal. This was done with a view towards dismantling of the pistol, as well as to reveal maker's marks or engraving if present. Gradually, surface concretions were removed through a combination of controlled heat application (via the tip of flame from an oxy-acetylene torch) to the wetted out metal surface, and mechanical cleaning, utilising fine dental tools and wooden skewers. The pistol was kept wet throughout (using water sprays and wet cloths) to facilitate the process as well as ensuring that the metal and wood were not overheated. Although images of pepperboxes often demonstrate elaborate engraving, maker's marks were not visualized on the barrel grooves and only faint lines and marks of engraving could be observed on the plate metal surfaces, which were generally quite pitted.

Periodically, WD-40® lubricant was sprayed into the bores and around the hammer and nipples to soften corrosion

Fig. 6: Cleaning the pistol in the ultrasonic bath.

products. The pistol was also immersed periodically in an ultrasonic bath of tap water for the same purpose (Figure 6). Following this, hardened concretions and corrosion products were gradually removed using fine dental tools, Eventually, the nipples beneath the shield were exposed and the occluding concretions removed with fine twist drills. Finally, it was possible to rotate the barrel group and rod on its thread, and separate it from the breech for more effective cleaning of the inner star-shaped machining and bores. Thus, the first stage of dismantling was complete.

Debris within the bores was removed by slowly hand-twisting an appropriate sized drill bit into the bore, removing and repeating the procedure with regular applications of lubricant. Once softened, a final clean of the bore chambers was achieved using lubricant and fine bore, nylon brushes (Figure 7). In the completely occluded bore, a small portion of metal from the wall of the barrel was lost when attempting to remove the last of the concretion. Given the perceived fragility of the steel in this area of the barrel group, no further attempts were made to remove remaining concretions.

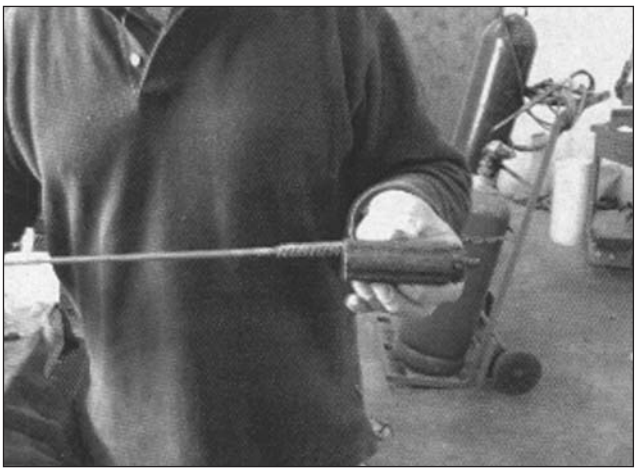


Fig. 7: Cleaning of bores with brush.

Stage 2 – Removing the handles

The next stage focussed on dismantling and treating the inner pistol components. To do this, it was necessary to remove the wooden handle grips from the steel frame, and this posed quite a difficult problem. Not only were there resistant soil residues and pebbles covering the frame and the edges of the handle grips, but the screw and nut fastening them to the frame were highly corroded and their outlines virtually obscured with concretion. To help soften residues, the pistol was again immersed in the ultrasonic bath, and heat applied carefully to the metal frame, (using a provisional heat shield of wet cloth over the wooden components). These processes, combined with mechanical cleaning (using dental tools), made it possible to remove concretions and expose the join between the wooden handle and steel frame.

The next problem was how to remove the wooden handles once the edges had been delineated. Because it was so heavily corroded, it was not possible to undo the screw and remove the handle grips by conventional means. One approach was to sacrifice the screw by drilling off the head but this would have meant leaving the pistol disassembled or using a replacement screw to reattach the handles. Since it was felt to be important to preserve the integrity of the object by retaining all original components, it was decided to explore alternative approaches. It had been noted that some movement of the handle grips could be achieved by putting pressure on the screw remnants, so the screw was manoeuvred back and forth, which eventually caused one of the grips to loosen up and this was eased away from its contact with the metal frame. A fine hacksaw blade was then passed between the wooden grip and the metal frame, the screw was cut in half and the handle components carefully separated.

Finally, it was possible to visualise the inner components. The fracture in the steel main spring was apparent, and two corroded remnants of the trigger spring were found loose within the handle. Thankfully, the small spring attached to the pawl and ratchet system appeared intact and sound. Of more concern, the delicate trigger and hammer components showed hardened soil residues. Again, a combination of mechanical cleaning methods and lubrication with WD-40® was used to remove of most of the concretions and loosen up the working parts, including the hammer. The trigger components and pawl and ratchet system were deemed too fragile to endure much in the way of mechanical cleaning and these were left untouched after removal of most of the softened concretions using a brush and water.

Stage 3 – Repair and reassembly

It was decided at that point that stabilisation of most pistol components had been achieved. Possibly all working mechanisms could have been freed up but due to the fragile nature of delicate components it was decided not to pursue this approach. Consequently, all metal surfaces were degreased using acetone. The loose trigger spring components were repositioned and re-adhered using an acrylic resin adhesive (30 per cent w/v Paraloid B-72® in acetone). This was done as it was felt appropriate to retain all components in as near as possible to original positions, and to prevent them rattling around within the handle space and possibly causing damage (Figure 8). Likewise, the broken ends of the main spring were re-adhered using 30 per cent w/v Paraloid B-72® in acetone, and a pad of Ethafoam® was also placed beneath it for support. The two halves of the screw were welded together, the nut removed and the threads cleaned using WD-40®, heat and wire brushes.

The wood appeared to be in remarkably sound, solid condition apart from external surface abrasions, chipped edges and iron corrosion product staining. It did not appear deteriorated, moist or spongy, therefore, it was decided to coat the wooden handles with Beckett's microcrystalline wax in white spirits, and monitor them for any dimensional changes, at least in the short term. The pistol was then reassembled and packed into a custom-made archival box for its return to Heritage Victoria Conservation laboratory in early October 2003.

After several weeks, it was noted that the wooden handle grips were beginning to show signs of shrinkage. The screw

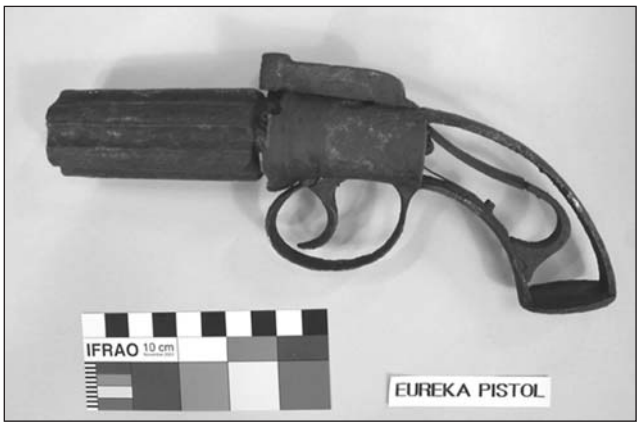
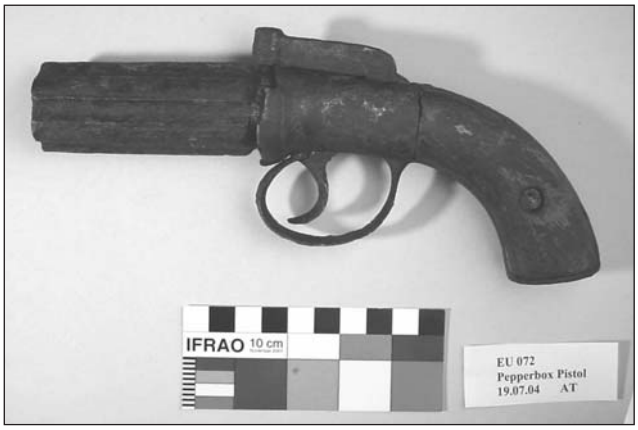


Fig. 8: Image of pistol after conservation and before reassembly.

and nut assembly were duly dismantled, the grips removed and as much wax removed as possible. Over several months, the handle grips were placed in increasing concentrations of PEG 400 (polyethylene glycol), then PEG 3350 in purified water, with a view to imparting strength and dimensional stability to the deteriorated wood. Once impregnation was achieved, the grips were dried in a freezer at -20^{o}C until stable weights were achieved. Once this phase of treatment was complete, the pistol was reassembled using a barrier of Mylar® sheet between the wood handles and metal frame, to protect the latter from the slight acidity of the PEG (Figures 9 and 10).

The pistol is currently housed in a secure, environmentally controlled storage facility at the Heritage Victoria Conservation Laboratory. It is deemed to be stable, although it will continue to be monitored for change. It remains fragile, however it is able to be handled and displayed for periods under appropriate conditions. From this viewpoint, the treatment of this important heritage artefact is felt to be successful in terms of solving complex treatment problems pertaining to different materials, and in establishing the opportunities for collaborative approaches between different institutions and disciplines.



Figs 9 & 10: Pistol after treatment.

RESEARCH POTENTIAL

Guns on the Goldfields

Now that the pistol has been conserved, its significance and research potential can be properly assessed. In the first instance, the pistol is an example of the kind of personal item owned by many people at the time. Firearms were not at all unusual on the diggings, and are well-documented historically. They were carried by many new arrivals, and were among the lists of goods for sale in many goldfields shops (Kelly 1860). One group of four men traveling to the newly-discovered Mt. Alexander goldfield in 1852 carried with them four pistols, a rifle, and a ball gun in addition to a bowie knife and a 'life preserver' or weighted cane (Annear 1999:56). A popular ritual in the early days of the gold rush was to fire the guns into the air each night. Many residents of the goldfields described the cacophony that resulted, and Edward Snell claimed to have counted as many as 1500 shots fired on a typical evening in Bendigo (Snell and Griffiths 1988). Seweryn Korzelinski, a Polish army officer and veteran of the 1848 revolutions, likened it to flanking fire (Korzelinski 1979:64).

Some attributed the gunfire to a lucky discovery, some thought it was a warning to potential marauders, and others suggested that firing, cleaning and reloading were necessary to keep the gunpowder dry in damp conditions. Korzelinski commented acerbically that 'many of the diggers have had little experience with firearms and were as proficient in handling them as I would be if told to change a baby' (Korzelinski 1979:64). He was understandably concerned by the dangers presented, and was on one occasion nearly killed by a random shot. Eugene von Guerard had few such qualms however, and he and his friends happily celebrated an anniversary with 'huge bonfires and much firing of guns' (Tippin 1982:54).

Aside from these exuberant displays, goldseekers believed that guns would have many uses along the roads to the diggings and on arrival. The fear of bushrangers was very real, particularly along stretches of road such as that passing through the Black Forest between Gisborne and Woodend. As early as 1851 it had acquired the reputation of being 'a dismal looking place, and one where a gang is most likely to resort to' (*Melbourne Argus*, Nov. 1851). Members of Korzelinski's party were held up there, and von Guerard on his way to Ballarat met other victims of bushrangers. Thieves were also rumoured to abound on the diggings themselves, and could even be so bold as to slit a tent and steal the contents while the owner was at the front (Korzelinski 1979:137). The nightly display of firepower was allegedly a deterrent to such activities. The ever-prudent Korzelinski relied on a club for protection in case of attack, because 'it is difficult to aim and easy to miss in the dark with a firearm' (Korzelinski 1979:62). He also felt a dog was more effective in guarding a tent. It would keep watch while the miner slept, and its barking would wake the miner and chase away whoever approached unannounced (Korzelinski 1979:63).

Miners also used guns in the pursuit of game. In the earliest days on the diggings, before gardens and domestic animals extended the diet, the regular fare was mutton, damper and tea. Any native birds and animals that could be added to the pot were very welcome. Von Guerard and his friends hunted bandicoot, snipe, and wild turkeys while living

on the Ballarat diggings (Tippin 1982:59). Others ate parrots and cockatoos baked into pies, and of course kangaroos and wallabies, though the latter were rapidly depleted around a new diggings (Annear 1999:110–111). Korzelinski (1979:63) thought hunting was most useful while on the road so that the quantity of provisions carried could be reduced, and presumably because game could be found more reliably where the number of diggers was less.

Despite their widespread documentation in historical accounts, no firearms have been recorded archaeologically from goldfields or gold-rush era sites in Victoria. The pistol recovered from Eureka is thus a unique archaeological example of a once-common item. Anecdotal evidence suggests that firearms are much more frequently found by prospectors and metal detector enthusiasts (Foster 2000). Jim Foster, a metal detector enthusiast, has written of finding a pepperbox pistol on the diggings, while other kinds of firearms have also been recovered, including flintlock muskets and revolvers. It is even more common for detectorists to recover the lead shot and cartridges fired. Foster notes that the evolution of firearm technology 'can be easily traced through the projectiles fired by these weapons on the gold fields around Australia'. He states that musket balls and the percussion caps that replaced them are most common on the earlier Victorian and New South Wales fields. The .44 and .45 caliber balls, some with rifling, that were introduced for the Colt-style revolvers in the 1850s are also found on these fields. The Palmer River goldfield in North Queensland, rushed in the 1870s, is typified by percussion caps and the large shot of the new Snider breech loading rifle, while the Western Australian gold fields of the 1890s produce centre-fire cartridges. While Foster is able to describe some patterning in firearm distribution, finds made by non-professional archaeologists are rarely well-documented. In contrast, the Eureka pistol is not only securely provenanced to 1850s Ballarat, but all of the other artefacts found in association with it are also available for study.

Gold Rush rubbish

The assemblage recovered from the Eureka Centre site, including the material recovered from the shaft, is described in Clark's 1998 report, but as he notes (Clark 1998:34), the analysis undertaken at the time of the excavation was not exhaustive, and further assessment is needed. Despite the limitations of the existing information, it is apparent that the pistol and its associated artefacts are rich in research potential.

As a collection representing gold-rush Ballarat, they have much to contribute to understandings of social history of the era. However, one restriction on the kinds of analysis possible is the discard context of the assemblage. It is a secondary refuse deposit which cannot be attributed to specific buildings or households. As William Kelly's quote suggests, open shafts were convenient receptacles for the rubbish of nearby households and casual passers-by (Kelly 1860:202). The area excavated at the Eureka Centre site was close to what was then the line of the main Ballarat-Melbourne road, and it can be assumed that there was considerable scope for a range of sources to have contributed to the rubbish in the shaft. Fine-grained analyses of status, ethnicity, and gender are probably not therefore feasible.

Nevertheless, at a more general level the assemblage has much to say about goods in a prosperous regional Victorian centre at the height of the gold rush. Most of the glass was from dark olive green bottles in square and cylindrical forms, with very few torpedo-style bottles. One bottle seal from a Bordeaux Champagne Cognac bottle was also found. The ceramics were predominantly British blue-and-white transfer printed earthenwares, with some Chinese storage jars. Other domestic items recovered included fragments of a cast iron kettle, a bone-handled table knife, and a complete small wooden tub, which has also now been conserved. The tub is 25 cm in diameter at the top and 21 cm at the base, and is 15 cm high. Portions of other wooden tubs were also recovered, one 40 cm high, and others too fragmentary for their size to be determined. Several masses of leather, probably boots, were also found in the shaft, together with a small quantity of butchered bone. Surprisingly, one category of good that appears to be absent is clay tobacco pipes. Tobacco smoking was known to be ubiquitous on the gold fields, and the clay pipes used are generally found in assemblages of this period so this raises interesting questions about the nature of rubbish disposal.

This is one of the most tightly-dated assemblages of the mid-nineteenth century yet recovered from terrestrial sites in Victoria, and can be used a benchmark for analysing both earlier and later assemblages. This will be particularly useful when trying to characterise the earlier components of multi-period sites such as the Fox and Hounds, and the later components of sites such as 300 Queen Street, both in Melbourne. As a regional assemblage, it also provides valuable comparable data for inner-Melbourne sites such as Casseldon Place.

The Eureka assemblage may also be an important collection for more detailed investigations into taphonomic issues on historic sites. Recent work by Adams (2003) in particular has begun to challenge the often unstated assumption that goods excavated on historic sites were essentially new when discarded. Adams has begun to quantify and demonstrate that, as many have suspected, this is not the case at all. Comparing the age of the ceramic and glass portions of the Eureka assemblage could add to this discussion, while also providing insights into consumption processes during the gold rush. Were the transfer-printed tablewares, as durables, significantly older than the more 'disposable' glass bottles? Was recycling of bottles apparent? In a highly-mobile diggings society, were all goods (even firearms) equally disposable?

CONCLUSION

The conservation of the waterlogged artefacts from the Eureka Centre has been crucial to their continued survival, and represents a vital first step in the analysis and interpretation of this important assemblage. The techniques used in the conservation process have demonstrated that it is possible to successfully treat complex multi-component objects without compromising their archaeological integrity. The process has also demonstrated the value of inter-agency co-operation in such cases as it can bring together professionals with the complimentary range of skills necessary to effect treatment. Now that the conservation has been completed, it is hoped that the full potential of this material can be realised, and that it can be brought to a much wider audience.

BIBLIOGRAPHY

ADAMS, W. H. 2003. 'Dating Historical Sites: The Importance of Understanding Time Lag in the Acquisition, Curation, Use and Disposal of Artifacts', *Historical Archaeology* 37(2):38–64.

ANNEAR, R. 1999. *Nothing But Gold: The Diggers of 1852*, Text Publishing, Melbourne.

BATE, W. 1978. *Lucky City: The First Generation at Ballarat*, Melbourne University Press, Melbourne.

BLAINEY, G. 1963. *The Rush that Never Ended*, Melbourne University Press, Melbourne.

BOOTHROYD, G. 1970. *The Handgun*, Bonanza Books, New York.

CLARK, V. 1998. Excavations at the Eureka Precinct, Ballarat, 1996–1997: A Report Prepared for the City of Ballarat, Probus Archaeological Consulting Services, Melbourne.

FOSTER, J. 2000. 'A Ballistic History', *Gold Net Australia Online Magazine*, April.

HARVEY, J. 1994. *Eureka Rediscovered – In Search of the Site of the Historical Stockade*, University of Ballarat, Ballarat.

HOGG, I. 1975. *The Illustrated Encyclopedia of Firearms*, Hamlyn Publishing Group, London.

KELLY, W. 1860. *Life in Victoria, or Victoria in 1853, and Victoria in 1858*, Chapman and Hall, London.

KORZELINSKI, S. 1979. *Memoirs of Gold Digging in Australia*, University of Queensland Press, St. Lucia.

MYATT, F. 1981. *An Illustrated Guide to Pistols and Revolvers*, Landsdowne Press, London.

O'BRIEN, B. 1992. *Massacre at Eureka: The Untold Story*, Australian Scholarly Publishing in Association with Sovereign Hill and the Museum of Victoria, Kew.

SMYTH, R. B. 1979. *The Goldfields and Mineral Districts of Victoria*, Queensberry Hill Press (facsimile reprint, originally published by John Ferres, Government Printer, Melbourne, 1869), Carlton.

SNELL, E. and GRIFFITHS, T. E. 1988. *The Life and Adventures of Edward Snell: The Illustrated Diary of an Artist, Engineer and Adventurer in the Australian Colonies 1849–1859*, Angus and Roberston, North Ryde.

TIPPIN, M. (ed.) 1982. *An Artist on the Goldfields: The Diary of Eugene Von Guerard*, Curry O'Neil, South Yarra.

WILKINSON, F. 1977. *The World's Great Guns*, Hamlyn Publishing Group, London.

WILKINSON, F. 1990. *Antique Guns and Gun Collecting*, Chartwell Books, Secaucus, New Jersey.