

REPORT ON THE ARCHAEOLOGICAL EXCAVATION OF THE KITCHEN WING, HARPER'S MANSION, 9 WILKINSON STREET, BERRIMA, NSW 2577.



Harper's Mansion in December 2006 (Dr. Edward Higginbotham).

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Archaeology • History • & Heritage

A.B.N. 79 072 316 968

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For
Harper's Mansion Management Committee, National Trust, NSW.

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EXECUTIVE SUMMARY.

The excavation permit for the archaeological excavation was approved on 21 August 2012.¹

The archaeological excavations were completed from Monday, 8 to Friday 12 September 2014. The excavation team comprised the excavation director, supervisor and ten volunteers, assisted by members of the Harper's Mansion Management Committee.

The footings of the Kitchen Wing are located behind the house (north of the house), and are located on the frontage of Wilkinson Street.

The archaeological excavations revealed the Kitchen Wing comprised a two room structure with brick walls. In the main room a fireplace was located in the north end wall. It had an iron bracket on one side, which would have originally housed a vertical rod with a horizontal attachment to support cast iron cauldrons or pots over the fire. The main room had a brick floor, which was later cement rendered.

The second room had a stone flagstone floor, which may have been used as a store or cool room.

The overall dimensions of the Kitchen Wing cannot be precisely measured, since both the east and south walls were totally destroyed by demolition in the later twentieth century. Surviving dimensions indicate a building up to 9 metres long by up to 4 metres wide. The kitchen measured 4.8 metres in length, while the store or cool room could have measured up to 4 metres in length.

Later features in the kitchen suggest that it went out of use as a kitchen in the later nineteenth century and was converted into a room for a service or production usage. A brick pad, cement rendered, was constructed in the fireplace and a brick bench erected along the west wall of the room.

The archaeological evidence reveals that the kitchen usage of the Kitchen Wing probably lasted from the 1830s to the late nineteenth century, after which date, the cooking facilities were probably relocated into the main house. The fire risk associated with open fires in kitchens was probably dramatically reduced with sealed stoves.

There is evidence that the Kitchen Wing had a series of later utilitarian usages, from food preparation and cooking, to the laundry and mending of clothes, through to storage of items relating to hunting and gardening, as well as a workshop or work store, possibly with mechanical items in place.

¹ Excavation permit approved 21 August 2012. SHR 1500. File 10/23969. Your ref A933757.

Two interpretations of the brick pad and brick bench in the Kitchen have been researched. A possible association with eucalyptus oil production in the 1930s has been investigated, but the most obvious use of these features in the former kitchen is for a washing machine or clothes boiler and concrete laundry tub. The interpretation remains uncertain.

The artifact assemblage reveals a household with a large variety of disposable items. There is evidence for men, women and children, evidence for literacy and education.

The evidence for rabbit trapping and perhaps hunting indicated the possible supplementing of the diet with cost free items, a common economy measure during the Depression and at other times.

1 INTRODUCTION.

1.1 Background.

Harper's Mansion, Berrima, is owned by the National Trust (NSW) and is managed by the Harper's Mansion Management Committee.

The Harper's Mansion Plan of Management, 1988, concentrates on the interpretation and display of the house and property. It proposes a number of themes, including:

1. Early history of the Berrima District.
2. Growth of Berrima to the present day.
3. Phases of ownership.
4. The house as an exemplar of an 1830s suburban house.
5. The conservation of Harpers Mansion, and
6. The historic landscape of Berrima.

Various roles were seen as important by the National Trust. The primary role is educational. Other roles include:

1. Use as a meeting venue.
2. A resource for continuing research.
3. National Trust shop.
4. The grounds may be used for the agistment of stock.²
5. Other uses, for example, a plant nursery.
6. Fundraising functions.
7. Advertising and promotional purposes.
8. Temporary exhibitions.

With increasing numbers of visitors, the Harper's Mansion Management Committee has proposed that a new building should be constructed as an entrance facility, interpretation facility and National Trust shop.³ As part of this proposal, the site of the former Kitchen Wing is being considered for this purpose. The proposal includes:

1. The archaeological investigation of the site of the Kitchen Wing.
2. The conservation and display of the remains beneath the floor of the proposed new facility.
3. The construction of the new facility over the archaeological remains, to allow for the protection, display and interpretation of the remains in a secure environment. (See Chapter 1.2 for revised position for proposed for new entrance facility).

The removal of the entry point and shop from the house itself will also free up more interior space for interpretation and display of the historic house.

² The agistment of stock did not proceed. Instead the Trust decided in 1998 to plant out a maze and cool temperature garden to increase visitation.

³ Over the last five years (2008-2012), Harper's Mansion has had over 6,000 visitors (open only on weekends and public holidays).

The archaeological excavation of the Kitchen Wing forms the primary stage of the proposed new facility. The results of the archaeological excavation will determine the feasibility, together with the opportunities and constraints imposed on the new facility.

The design of the new facility will only be prepared and finalized after the archaeological excavation is completed and the site temporarily protected against the elements.

Dr. Edward Higginbotham prepared a research design for the archaeological investigation of the Kitchen Wing in June 2012.⁴

The excavation permit for the archaeological excavation was approved on 21 August 2012.⁵

The archaeological excavations were completed from Monday, 8 to Friday 12 September 2014. The excavation team comprised the excavation director, supervisor and ten volunteers, assisted by members of the Harper's Mansion Management Committee.

1.2 Revised position for proposed for new entrance facility.

The Harper's Mansion Management Committee has been pleased to see the extent of the archaeological remains of the Kitchen Wing and their good state of preservation. As a result, the proposed position of the new entrance facility is under reconsideration. It was originally intended to be constructed over the archaeological site. More recent discussion has tended to prefer a position between the Maze and the Kitchen Wing, on the Nicholson Street frontage. The conservation of the remains of the Kitchen Wing may now be considered independently. The remains have been temporarily conserved, awaiting a firm decision. It is possible that a deck or other structure may be erected over the archaeological site to provide not only protection but also a means of viewing the archaeological remains. The Harper's Mansion Management Committee is seeking advice on the most appropriate outcomes.

1.3 Brief.

The purpose of this report is to describe the results of the archaeological excavation of the Kitchen Wing of Harper's Mansion.

⁴ Edward Higginbotham and Associates Pty Ltd. Excavation Permit Application (Section 60) & Research Design for proposed archaeological investigation - Harper's Mansion, 9 Wilkinson Street, Berrima, NSW 2577. Harper's Mansion Heritage Committee, National Trust of Australia (NSW). June 2012.

⁵ Excavation permit approved 21 August 2012. SHR 1500. File 10/23969. Your ref A933757.

1.4 Location of site.

Harper's Mansion is located at 9 Wilkinson Street, Berrima, NSW 2577. It comprises Lot 5, DP 258420 (Figure 1.1).

1.5 Heritage Listings.

The house is listed on the State Heritage Register and also by Wingecarribee Council.⁶

1.6 Study methodology and limitations.

This report has been prepared in accordance with standard guidelines for archaeological investigation, as follows:

NSW Department of Planning & Heritage Council of NSW. 1993. Historical Archaeological Sites. Investigation and Conservation Guidelines.

Edward Higginbotham. 1985 "Excavation techniques in historical archaeology", Australian Journal of Historical Archaeology, vol. 3, 8-14.

1.7 Author identification.

This report was prepared by Dr. Edward Higginbotham.

⁶ Research of NSW Heritage Branch Website on 7 February 2012.
http://www.heritage.nsw.gov.au/07_subnav_04_2.cfm?itemid=5050765

1.8 Figures.



Figure 1.1 Location Plan of Harper's Mansion, 9 Wilkinson Street, Berrima, NSW 2577 (Lot 5, DP 258420).
Source. SIX Maps.

2 HISTORICAL BACKGROUND.

The historical background for Harper's Mansion is described in the Harper's Mansion Conservation Plan, 1984.⁷ A detailed reassessment of the history of the property has recently been published.⁸

The house stands on part of 100 acres, purchased as a Crown grant to James Harper on 27 May 1834. The house and outbuildings were originally thought to have been built in 1834, but recent research suggests 1835-1836.⁹

The house, kitchen and stables, together with a garden and paddock, are shown on a survey plan, dated to 1841. Harper was unable to repay a mortgage taken out in 1844. The trustees of the mortgagor sold the house in 1856 to the Roman Catholic Church, which retained ownership until 1970. The Church subdivided the property and sold Lot 1 of 26 acres to W G Ernest and V L Williams. The Williams subdivided the land and sold the house on two acres to the National Trust in 1978.

The Kitchen Wing appears to have collapsed in the 1930s to 1940s. It was replaced by a small tin shed on part of the kitchen site. The shed no longer survives.¹⁰

Harper's Mansion was vacated by Mary Harper in 1847 and it was probably at this time the house was rented to the Roman Catholic Church as the Presbytery.¹¹ The Presbytery closed in 1903, and became a Convent for the Daughters of Our Lady of the Sacred Heart (OLSH) until 1910. The house was then rented by the Church to a number of tenants, including Mrs. Bridget Curran, from 1910 to 1929. She earned an income as a foster mother to various children. The Church failed to spend any money on maintenance of the house and it fell into disrepair.¹²

From 1930 a man named Finran lived in the house with his mother and father. He was an eucalypt distiller and Ann Beaumont suggests he worked for the Bosisto Company, which had established an eucalypt distillery at Mandemarr in 1925.¹³

⁷ Harper's Mansion, Conservation Plan and Plan of Management, comprising: Clive Lucas Stapleton & Partners. Harper's Mansion, Wilkinson Street, Berrima, NSW. Australia. Conservation Plan. National Trust of Australia (NSW). 1984. National Trust of Australia (NSW). Harper's Mansion, Plan of Management. 1988.

⁸ Ann Beaumont. A Light in the Window. Harper's Mansion, Berrima, the Place and its People. National Trust. 2013.

⁹ Op. cit: 23.

¹⁰ Linda Emery, Harper's Mansion, Berrima NSW. Site Report – Detached Kitchen Block. National Trust of Australia (NSW). 1995: 1.

¹¹ Ann Beaumont. A Light in the Window. Harper's Mansion, Berrima, the Place and its People. National Trust. 2013:50.

¹² Ann Beaumont. A Light in the Window. Harper's Mansion, Berrima, the Place and its People. National Trust. 2013:69-72.

¹³ Ann Beaumont. A Light in the Window. Harper's Mansion, Berrima, the Place and its People. National Trust. 2013:72

Later tenants are named, including families named Evans, Hayes, Fennamore, Burton, O'Shea and Johnson. Mrs O'Shea, who lived in the house from 1949-1951, revisited the house in 1993 and recalled, "At the back of the house was a small galvanised iron shed used as a bathroom/laundry, with a bath, copper and washtubs."¹⁴

¹⁴ Ann Beaumont. *A Light in the Window*. Harper's Mansion, Berrima, the Place and its People. National Trust. 2013:72.

2.1 Figures.

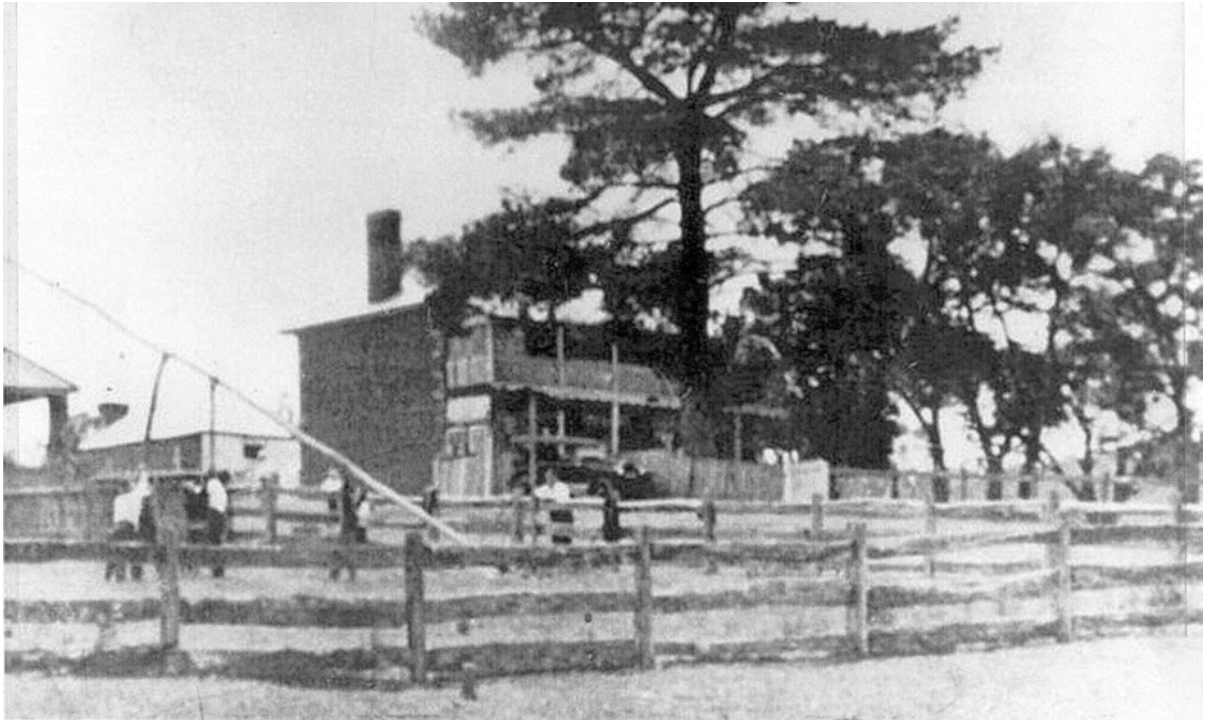


Figure 2.1. Photograph of Harper's Mansion, probably in the 1930s, showing the Kitchen Wing behind the house.

Source. Harper's Mansion Management Committee.



Figure 2.2. The back of Harper's Mansion during restoration in 1979 or soon after. The tin shed is shown on the site of the Kitchen Wing.

Source. Harper's Mansion Management Committee.

3 RESEARCH DESIGN.

This chapter is a copy of the Research Design, submitted with the application for an excavation permit to the NSW Heritage Division in June 2012.¹⁵

3.1 Excavation methodology.

In accordance with the ICOMOS Burra Charter, prior to archaeological excavation, an archival photographic recording of the current condition of the site will be completed in accordance with standard guidelines.¹⁶

The archaeological excavation will be carried out by hand, using area trenches. In anticipation of finding evidence of room divisions within the former building, the layers and other archaeological contexts will be divided into at least two areas, as required.

As soon as any room divisions are exposed, the contexts, layers and artifacts will be adjusted accordingly and divided into separate sequences.

Excavation will continue through demolition rubble and other layers to expose structural footings and floor surfaces. No significant footings or other structural evidence will be removed, except where detailed recording will allow them to be reinstated during conservation, interpretation and display. If the remains of timber floors are encountered, then deposits beneath the floor will be removed only where the remains of the timber floor will allow.

3.2 Backfilling of the excavation.

Once the archaeological excavation is completed, the site will be backfilled with a layer of geotextile and at least 200 mm of sand. Garden soils may be added for plantings of flowers and small shrubs (minimum depth of soil 200 mm). Any walling that survives above this level will also be protected with geotextile and sandbagged. These measures will provide temporary protection of the site in advance of the construction of the new facility, if approved. (See Chapter 1.2 for revised position for proposed for new entrance facility).

¹⁵ Edward Higginbotham and Associates Pty Ltd. Excavation Permit Application (Section 60) & Research Design for proposed archaeological investigation - Harper's Mansion, 9 Wilkinson Street, Berrima, NSW 2577. Harper's Mansion Heritage Committee, National Trust of Australia (NSW). June 2012.

¹⁶ ICOMOS Burra Charter, 1999, Articles 27 and 32.
Heritage Office NSW, *How to Prepare Archival records of Heritage Items* (1998) and *Guidelines for Photographic Recording of Heritage Sites, Buildings and Structures* (2001).
Laurie Greenup. *Photographic Recording of Heritage Items using film or digital capture. Heritage Information Series*. NSW Heritage Office, 2006.

3.3 Research Themes.

There have been numerous attempts to establish a research framework for historical archaeology, one of the most recent being a paper by Dr. Ilka Schacht entitled, "Towards a thematic research framework for historical archaeology".¹⁷ There are a number of themes that may apply to Harper's Mansion, including:

1. Early history of the Berrima District.
2. Growth of Berrima to the present day.
3. Phases of ownership.
4. The house as an exemplar of an 1830s suburban house.
5. The historic landscape of Berrima.

The archaeological resources include the structural remains, occupation or demolition layers, other features and also the artifact assemblage. Each part of the resource may contribute to these themes.

In order for an artifact assemblage to contribute in any meaningful way to research themes, it should be of sufficient size for analysis, namely more than 500-1,000 artifacts.¹⁸ The assemblage analysis should be completed as part of the archaeological report and the results compared with other sites.

A number of research questions relate to the above themes. Examples include:

1. How does the layout of the Kitchen Wing contribute to our understanding of an 1830s suburban house? How does the use of the Kitchen Wing evolve in the nineteenth and twentieth centuries?
2. Why did the Kitchen Wing go out of use in the mid twentieth century.
3. How does the evidence provided by the Kitchen Wing contribute towards our understanding of the social and economic standing of the owners and occupants of the house? How did this vary over time?
4. What does the Kitchen Wing and particularly its artifact assemblage contribute to our understanding of the growth of Berrima and its possible economic stagnation?

Not all research questions can be considered within the budget of this excavation. Particular social and economic indicators will be identified in the assemblage, including:

1. Presence of women.
2. Presence of children.
3. Presence of literacy.
4. General indicators of affluence or poverty.

¹⁷ Ilka Schacht, "Towards a thematic research framework for historical archaeology", in *Australasian Historical Archaeology*, Volume 28. 2010: 61-76.

¹⁸ For assemblage analysis, see:
Edward Higginbotham. 2010. 'Say it with Assemblages. A Simple Method for Comparing Sites'. *Australasian Historical Archaeology*. 28: 43-60.

It will only be possible to complete analysis to a stage sufficient to demonstrate the value of the assemblage for further research. It is appropriate that this additional research should be carried out in the future, as part of the primary educational role of Harper's Mansion.

3.4 Figures.



Figure 3.1. View of the site of the Kitchen Wing, looking west (Dr. Edward Higginbotham, 2012).
Figure 3.2. View of the site of the Kitchen Wing, looking south. The west wall of the building survives to several courses (Dr. Edward Higginbotham, 2012).



Figure 3.3. View of the site of the Kitchen Wing, looking north (Dr. Edward Higginbotham, 2012).

4 ARCHAEOLOGICAL EXCAVATION.

The excavation permit for the archaeological excavation was approved on 21 August 2012.¹⁹

The archaeological excavations were completed from Monday, 8 to Friday 12 September 2014. The excavation team comprised the excavation director, supervisor and ten volunteers, assisted by members of the Harper's Mansion Management Committee.

4.1 The site before excavation.

The footings of the Kitchen Wing are located behind the house (north of the house), and are located on the frontage of Wilkinson Street. A gate and path separate the house from the Kitchen Wing. A timber post is located at the south-west corner of the site and serves to provide the switchboard for electrical supply. A cable is buried beneath the pathway and continues into the garden.

The remains of the Kitchen Wing form a low mound, measuring approximately 8 metres long, by 5 metres wide. The remains of several courses of brickwork are located on the Wilkinson Street side of the former building. The mound appears to be largely composed of demolition rubble (brick) and soil. At the north end of the former building, the site is bounded by a hedge and a lawn on a higher level (Figures 3.1 to 3.3).

4.2 Progress of excavation.

On Days 1 and 2 of the excavation, the team removed the topsoil from the site, revealing a mound of demolition rubble.

With the removal of demolition rubble on Day 2, the brick dividing wall of the Kitchen Wing was revealed.

On Day 3 the demolition rubble was completely removed to reveal the structure and floors of the Kitchen Wing.

Artefact processing and the excavation of demolition layers outside the Kitchen Wing were tasks completed on Days 3 and 4 of the excavation.

On the final day, Day 5, the team completed the backfill and protection of the site. A layer of geotextile was placed over soil surfaces, followed by a layer of sand and a

¹⁹ Excavation permit approved 21 August 2012. SHR 1500. File 10/23969. Your ref A933757.

final layer of wood chips (see cover photograph). Straw bales were used to protect the walls, with all the masonry structures finally covered with a thick tarpaulin to protect the site from the weather and light penetration. The straw bales and tarpaulin can be removed on occasion to allow for display of the site to visitors.

4.3 Detailed description of excavation.

The numbers in brackets refer to context numbers, the location of which can be seen in Figure 4.1.

The archaeological excavation of the Kitchen Wing commenced with the removal of surface artifacts (011, 012, 013 and 014) and then topsoil (015, 016, 017 and 018). The site of the Kitchen Wing was divided into four for this purpose, thus enabling finds to be allotted to a particular room, when any partition walls were recognised. Topsoil on the north and west side of the Kitchen was removed separately (019 and 020 respectively). Both these contexts were located outside the building.

Brick demolition rubble was visible under the topsoil layers. Again the demolition layer was divided into four contexts (021, 022, 023 and 024). A layer of topsoil and cinder was located on the east side of the Kitchen Wing (025). At this point a partition wall within the Kitchen Wing was located (059). It now became clear that previous layers (011, 015 and 021) were located in the south room, Store or Cool Room (054) and that the remaining previous layers (012, 013, 014, 022, 023, 024) were located in the north room or Kitchen (053).

Layer (026) comprised the topsoil layer on the east side of the trench. Full excavation revealed that this layer was located within the east wall of the Kitchen Wing.

The brick rubble within the Store or Cool Room was removed (030) to reveal a flagstone floor (055). The brick rubble (022, 027, 028) within the Kitchen (053) was removed to reveal a brick floor covered with a layer of cement render (045), together with other features.

The Kitchen Wing comprised a two room structure (053, 054) with brick walls (039, 040) and a partition wall (059). In the main room (053) a fireplace (041) was located in the north end wall. It had an iron bracket on one side (044), which would have originally housed a vertical rod with a horizontal attachment to support cast iron cauldrons or pots over the fire. The main room had a brick floor, which was later cement rendered (045, 058). Some of the bricks in the floor have a diamond frog (dated from 1840s to 1880s), suggesting that the floor was repaired, as well as being smoothed off with cement render (046).

The second room (054) had a stone flagstone floor (055), which may have been used as a store or cool room.

The overall dimensions of the Kitchen Wing cannot be precisely measured, since both the east and south walls were totally destroyed by demolition in the later twentieth century. Surviving dimensions indicate a building up to 9 metres long by up to 4 metres wide. The kitchen measured 4.8 metres in length, while the store or cool room could have measured up to 4 metres in length.

There were two holes in the kitchen floor (032 and 033), suggesting intensive usage or simple disrepair.

Later features in the kitchen suggest that it went out of use as a kitchen in the later nineteenth century and was converted into a room for an as yet uncertain service or production usage. A brick pad, cement rendered (048), was constructed in the fireplace and a brick bench erected along the west wall of the room (047). The bench survived to 3 and 4 courses in height and was built over the cement rendered floor. The brick pad was one course high and cement rendered on its sides and top. A circular impression in the cement has an approximate diameter of 530 mm and indicates that a circular drum or container was placed on the pad while the cement was still wet.²⁰

Historical research and artifact analysis assist with the interpretation of these features (See Chapter 5).

With the change of use of the Kitchen Wing, it is assumed that a room within the house was converted for cooking purposes. An enclosed stove, rather than an open fireplace, would have posed less of a fire risk, allowing the kitchen to be relocated within the house.

Additional layers of fill were removed from the north side of the Kitchen Wing (outside the building) (029, 036, 037, 038, 063 and 073). They revealed the natural soil profile (074) and a brick boundary wall (072), continuing north of the Kitchen Wing.

The east side of the Kitchen Wing has been destroyed by previous demolition work. Removal of topsoil and cinder layers (025, 026) revealed the backfill (034, 035) of robber trenches (050), where the wall footings had been removed. This revealed that the walls of the Kitchen Wing were constructed with a base course of roughly shaped sandstone blocks (049) with brick walling above.

A stone and brick rubble layer (051) was located on the east side of the Kitchen (053). It was flush with the brick floor and possibly part of the backfill (034) of the

²⁰ 520 mm (20 1/2 inches) is the diameter of a tierce, a barrel containing 1/6 of a tun, or approximately 158-160 litres, 42 US gallons or 35 imperial gallons.

The diameter is slightly smaller than the current international standard for a 55 US gallon, 44 imperial gallon, 200 litre drum of 572 mm diameter. The dimensions varied slightly according to manufacturer, but the drums came into common usage only after WW II.

robber trench (050). This would make the layer contemporary with demolition. However beside the Store (054) a similar layer of stone and brick rubble (057) was located at the east side of the trench. The layer again appeared to be located above the sand bedding layer (056) for the flagstone floor (055), thus also contemporary with demolition.

Two small trenches were dug outside the wooden sleepers, which formed an edge to the grass around the Kitchen Wing. Their purpose was to locate the continuation of the west wall (039) of the Kitchen Wing and also the south-east corner of the building. The first trench located only topsoil (064), over a layer of sandy soil (065), probably the fill of a service trench (electricity) (066). Any evidence for the continuation of a wall would have been destroyed by the service trench.

At the south-east corner of the Kitchen Wing, the findings were again unclear. Topsoil (062) was removed to natural subsoil (071), revealing a service trench (068) and remnants of brick paving (067, 070) and a broken sandstone flagstone (069). This paving may belong to the tin shed, which was erected after the demolition of the Kitchen Wing. It is clear that a number of demolition layers (031, 035, 060 and 061) have removed any evidence for the south and east walls of the Kitchen Wing. It is possible that the two sandstone slabs extending from the alignment of the west wall (039) may be the footings of a buttress or pier, supporting the kitchen wall. This feature may be visible in an historical photograph (Figure 2.1).

4.4 Plan.

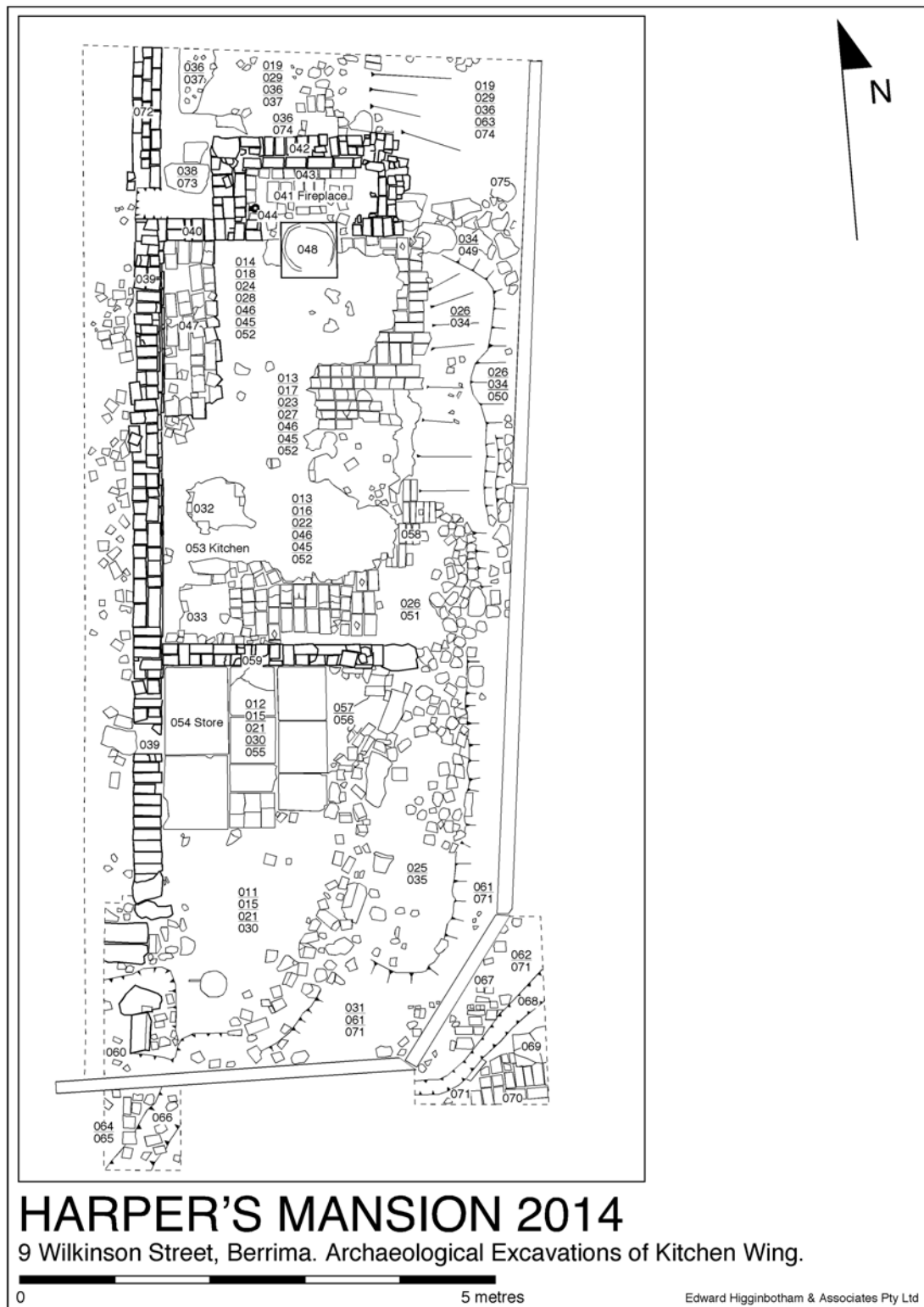


Figure 4.1. Harper's Mansion, Kitchen Wing. Plan of archaeological excavations, 2014.

4.5 Figures.



Figure 4.2. Harper's Mansion. The Kitchen Wing after removal of topsoil layers to reveal brick rubble. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.

Figure 4.3. Harper's Mansion. The Kitchen Wing after removal of brick rubble layers to reveal the floors of two rooms and partition wall. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.



Figure 4.4. Harper's Mansion. The Kitchen Wing, main room, looking north. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.

Figure 4.5. Harper's Mansion. The Kitchen Wing, main room, looking north-west, showing (048) in front of fireplace and brick bench (047) along side wall. Note also the iron hook on the west side of the fireplace. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.



Figure 4.6. Harper's Mansion. The Kitchen Wing. Detail of trench at south-west corner of building. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.

Figure 4.7. Harper's Mansion. The Kitchen Wing. Detail of trench at south-east corner of building. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.



Figure 4.8. Harper's Mansion. The Kitchen Wing, from the upstairs window of the house, looking north. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.
Figure 4.9. Harper's Mansion. The Kitchen Wing. Detail of north wall of Kitchen, showing sandstone footings. Scale 1 metre, with 0.5 metre subdivisions. Dr. Edward Higginbotham.



Figure 4.10. Harper's Mansion. The Kitchen Wing. Detail of rabbit traps found on the south side of the partition wall in the Store. Scale 0.5 metre, with 0.10. metre subdivisions. Dr. Edward Higginbotham.

5 ARTIFACT ANALYSIS.

Artefact processing was completed on Days 3 and 4 of the excavation. The artifacts were cleaned and packaged in archive boxes. The artifact cataloguing has been completed by Jeanne Harris.

5.1 A representative sample.

A total of 7,838 artifacts were recovered, comprising 5,679 items relating to the building and construction of the Kitchen Wing and 2,159 other items. The artifact collection is typical of many domestic assemblages and is large enough to allow for more detailed analysis and comparison with other sites.²¹

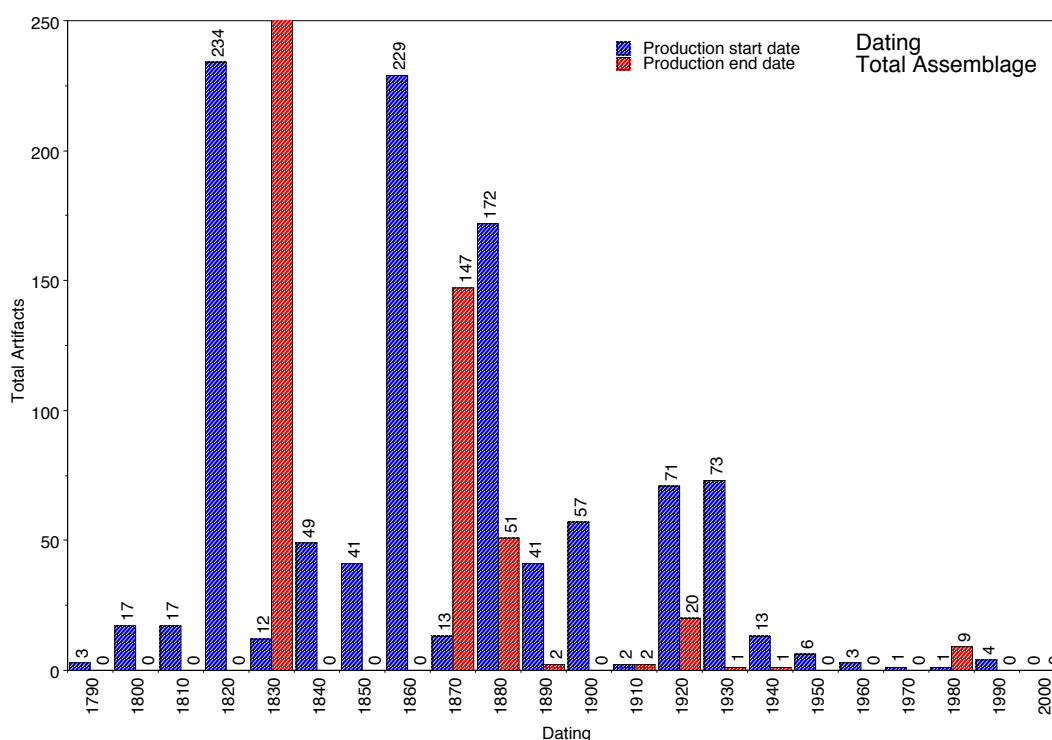


Figure 5.1. Harper's Mansion. The Kitchen Wing. Graph showing the date range of the artifact assemblage, with production start and end dates.

5.2 Date range, 1870s or 1920s to 1940s.

Most artifacts within the assemblage can be dated in accordance with known production date ranges. The graph in Figure 5.1 indicates the dates when artifacts were first produced (production start dates - blue columns) and also when they went out of production (production end dates - red columns).

²¹ A sample size of less than 1,000 artifacts is unlikely to provide a sufficient sample for reliable analysis, according to studies undertaken on other sites.
Edward Higginbotham. 2010. 'Say it with Assemblages. A Simple Method for Comparing Sites'. *Australasian Historical Archaeology*. 28: 43-60.

The artifacts in the assemblage came into production from the 1790s through to the 1990s. The peak for production start dates ranges from 1800s to 1940s, or from the 1820s to 1930s, depending on what artifact frequency one may wish to accept.

The important fact revealed by the graph is that new artifact deposition fell off dramatically in the 1940s (blue columns), which suggests the demolition date for the Kitchen Wing.

The date range for when items go out of production (red columns) is also informative (Figure 5.1). The date range is from the 1830s through to the 1980s, but the frequency is much more sporadic than production start dates. The dramatic peak in the 1830s represents the sandstock brick used to construct Harper's Mansion and its Kitchen Wing. It goes out of production in the 1830s. This brick type may not have been used, had the house been constructed in the 1840s.²²

Some of the other production end dates are also for building materials, for example, Crown glass for windows (1870s), cut nails (1880s) and bricks with frogs (1880s). However these production end dates relate to the building, rather than the materials discarded during the occupation of the building. If construction materials are excluded from the assemblage, there are only a few production end dates, one for a beer or wine bottle (1870s), another for a component of an oil lamp (1892), another for some soft paste porcelain dinnerware (1898), a glass bottle (1915) and then a series of dates for the 1920s for food and alcohol bottles.

The production end dates for domestic items, rather than construction materials, suggests that the artifact assemblage represents occupation of the Kitchen Wing from the 1870s onwards, but possibly as late as the 1920s onwards.

The occupation of the Kitchen Wing from the 1830s to at least the 1870s is poorly represented in the artifact assemblage. In other words, the Kitchen Wing was kept clean and tidy until the 1870s to 1920s, after which time items were allowed to accumulate within the structure. This implies that the Kitchen Wing was used as a kitchen until this date and was kept scrupulously clean.

What can we conclude from the above dating evidence? The dating of the archaeological assemblage confirms the historical documentation for the building of Harper's Mansion, namely the 1830s. The date for demolition of the Kitchen Wing was also thought to be in the 1930s or 1940s and has again been confirmed by the dating of the assemblage. There are a small number of later artifacts in the

²² This statement requires qualification. Sandstock bricks without a frog, commonly known as flat sandstock bricks (FSB) go out of production in the Sydney area in the 1830s. They are replaced by bricks with shallow stamps or fully formed frogs in the 1840s. Outside Sydney older brick types continued to be manufactured, until the advent of the railways made the better produced bricks less costly to transport. Thus the flat sandstock brick (FSB) may survive until the 1860s in some country areas.

assemblage, but these can be explained by accidental losses while gardening and perhaps by renovations.

However the detailed analysis of the artifact assemblage has indicated that it represents only the period of occupation from the 1870s, or even the 1920s, until demolition in the 1930s and 1940s. It does not represent the occupation of the building from the 1830s to the 1860s.

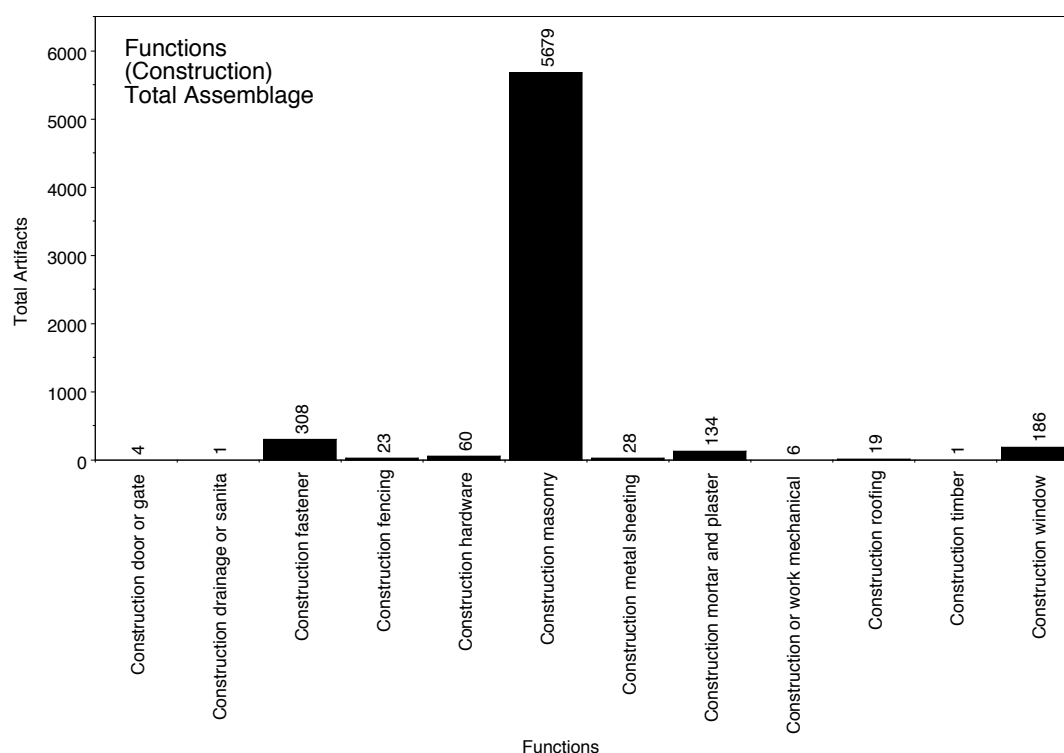


Figure 5.2. Harper's Mansion. The Kitchen Wing. Graph showing the range of key functions (construction) in the artifact assemblage, with frequencies of each function.

5.3 Domestic assemblage.

The assemblage recovered from the Kitchen Wing contains a total number of 68 key functions. They are listed below and their numerical frequencies indicated in Figures 5.2 and 5.3. A complete list of available key functions is provided in Appendix 1, with an explanation of the main types of artifact in each function.

Construction door or gate
Construction fastener
Construction fencing
Construction hardware
Construction masonry
Construction metal sheeting

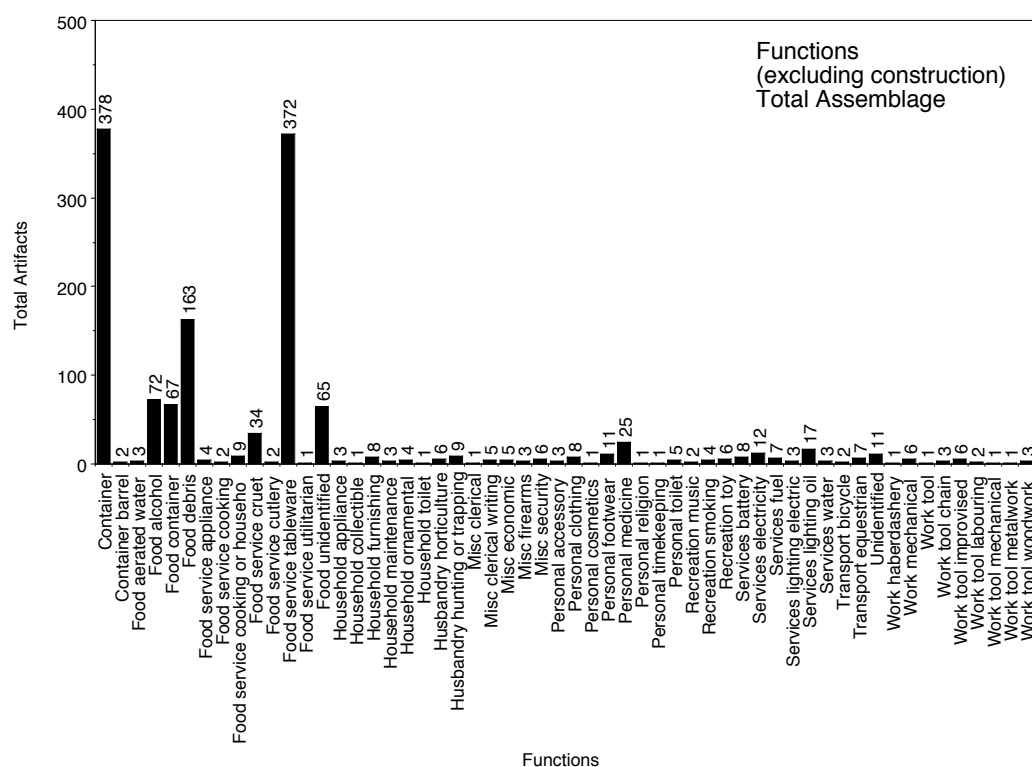


Figure 5.3. Harper's Mansion. The Kitchen Wing. Graph showing the range of key functions (other than construction) in the artifact assemblage, with frequencies of each function.

Construction mortar and plaster
Construction or work mechanical
Construction roofing
Construction timber
Construction window
Container
Container barrel
Food aerated water
Food alcohol
Food container
Food debris
Food service appliance
Food service cooking
Food service cooking or household heating
Food service cruet
Food service cutlery
Food service tableware
Food service utilitarian
Food unidentified
Household appliance
Household collectible
Household furnishing
Household maintenance
Household ornamental
Household toilet
Husbandry horticulture

Husbandry hunting or trapping
Misc clerical writing
Misc economic
Misc firearms
Misc security
Personal accessory
Personal clothing
Personal cosmetics
Personal footwear
Personal medicine
Personal religion
Personal toilet
Recreation music
Recreation smoking
Recreation toy
Services battery
Services electricity
Services fuel
Services lighting electric
Services lighting oil
Services water
Transport bicycle
Transport equestrian
Unidentified
Work haberdashery
Work mechanical
Work tool
Work tool chain
Work tool improvised
Work tool labouring
Work tool mechanical
Work tool metalwork
Work tool woodwork

The total number of key functions provides a basic means of comparing assemblages with other sites, as indicated by the table below:²³

Site Names	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work.	Total functions
S008 Cadia Village	1	1	5	0	0	0	1	0	0	1	0	9

²³ See Appendix 2.

Edward Higginbotham. 2010. 'Say it with Assemblages. A Simple Method for Comparing Sites'. *Australasian Historical Archaeology*. 28: 43-60.

Site Names	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work.	Total functions
S004 Cadia Village	3	1	5	0	0	0	1	0	0	2	0	12
S009 Cadia Village	4	2	3	1	0	0	0	0	0	0	2	12
Cottage 2, North, Belgenny Farm, Phase 011	10	1	4	1	0	0	2	1	0	1	0	20
Free Overseer's Cottage 2, Port Macquarie, post 1830s.	6	1	6	3	0	2	2	1	0	0	2	23
Cottage 2, South, Belgenny Farm, Phase 012	9	1	6	2	0	1	2	2	0	1	1	25
Free Overseer's Cottage 3, Port Macquarie, 1820s-1830s.	8	1	7	5	0	2	2	1	2	0	1	29
S011 Cadia Village	10	1	7	0	0	2	1	2	0	5	4	32
The 'Small Miserable Hut', Belgenny Farm, Phases 005, 007 & 008 combined	10	1	7	2	1	2	3	3	1	1	1	32
Free Overseer's Cottage 3, Port Macquarie post 1830s.	6	2	9	4	1	2	3	2	0	0	4	33
Waringa, Cadia	8	2	10	1	0	2	4	2	1	1	3	34

Site Names	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work.	Total functions
Free Overseer's Cottage 2, Port Macquarie, 1820s-1830s.	10	1	10	4	1	2	3	2	1	1	3	38
S002, Cadia Village	9	2	9	3	0	2	9	2	3	1	6	46
1831 cottage, 50-50a O'Connell Street, North Parramatta	10	1	10	4	1	3	7	3	5	0	3	47
Bakery, 8-10 Grose Street, North Parramatta	11	1	8	7	1	3	10	3	5	1	2	52
1830s cottage, 21-23 Grose Street, North Parramatta	12	1	9	6	0	3	9	5	3	2	2	52
School of Arts, Port Macquarie, 1880s onwards.	12	2	10	5	1	3	7	2	4	1	5	52
Tynan's, Cadia	9	1	10	6	0	6	11	3	1	1	5	53
W001, Cadia Village	13	2	10	5	1	3	7	1	3	6	10	61
Harper's Mansion, Kitchen Wing	12	2	12	6	2	5	9	3	6	2	9	68

Site Names	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work.	Total functions
Town Hall, Port Macquarie, 1890s onwards.	15	2	12	8	1	5	7	2	4	2	10	68
House and Back Yard to 1880s-1890s, 18-20 Clarence Street, Port Macquarie	15	2	12	9	2	4	12	4	7	2	8	77
W002, Cadia Village	13	2	11	6	1	5	13	2	4	8	13	78
S005, Cadia Village	16	1	13	6	1	7	15	3	3	6	15	86
Old Village Centre, Cadia	14	2	14	7	4	6	13	3	2	6	18	89

A large number of sites now form a comparative database.²⁴ Comparative analysis has allowed the following characteristics of assemblages to be established:

²⁴ Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavation of part of Cadia Mining Village, near Orange, NSW. Volumes 1-3. Cadia Holdings Pty Limited. 2005.

Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavation of 50, 50A & 52 O'Connell Street and 6-12 Grose Street, North Parramatta NSW. Order Architects & Parramatta Leagues Club Pty Ltd. 2005

Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavations of the Little Cadia Copper Mine, near Orange, NSW. Cadia Holdings Pty Limited. 2006

Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavations, 134-140 Marsden Street and 45-47 Macquarie Street, Parramatta, NSW. Estate Constructions of Australia Pty Ltd. March 2007.

Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavations of the Glasshouse, Clarence and Hay Streets, Port Macquarie, NSW. Volumes 1-3. Port Macquarie Hastings Council. 2008.

Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavation of the Todd Holden Site, 18-20 Clarence Street, Port Macquarie, NSW. Debbie Moore Real Estate Pty Ltd. 2009.

Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavation of 21-23 Grose Street, North Parramatta, NSW. Northcore Pty Ltd. July 2009.

Number of Functions	Social and Economic Indicators
0-26	Households occupied by men only. Poverty. Examples – convict accommodation.
27	Threshold for evidence of women and children. Threshold for evidence of literacy.
34-53	Borderline between property rental and property ownership.
54-80+	Property ownership. Varying degrees of affluence. Danger of bankruptcy and loss of property with greater affluence.

There is a trend towards greater levels of affluence during the nineteenth century, so that by the 1880s there are a number of examples of highly affluent households. The large number of functions at Harper's Mansion may also indicate a continuing trend towards affluence or an increasing range of disposable items.

Assemblages will also reflect the overall economic conditions of the time. For example, the early years of settlement from 1788 to the 1810s and the 1840s Depression were times of frugality and need.

Through this basic comparison with other sites, it is likely that the assemblage at Harper's Mansion represents a household where persons had sufficient resources to own property, had they wished to purchase a house or land.

The evidence that the members of the household could have potentially owned property is unexpected. The historical evidence indicates that the house was owned by the Catholic Church from 1856 onwards. It was used as the Presbytery from 1847 to 1903, then as a Convent until 1910, after which time it was tenanted. The large number of key functions may be indicating the affluence of either the priests who lived there, the nuns in the convent or the later tenants. Alternatively there may be another explanation. The assemblages, on which the initial comparative analysis was based, were all dated up to the 1870s to 1890s. Some have suggested that the greater number of key functions may also indicate the proliferation of disposable items in the later nineteenth and twentieth centuries. In other words, the later the date, the more disposable items, regardless of wealth.²⁵ Thus it is possible that the assemblage from the Kitchen Wing, dated to the twentieth century, represents the

Edward Higginbotham & Associates Pty Ltd. Report on the archaeological excavation of the site of the "small miserable hut", near Belgenny Farm, Elizabeth Macarthur Avenue, Camden, NSW. Belgenny Farm Trust. January 2010.

Edward Higginbotham and Associates Pty Ltd. Report on the archaeological excavation (Season 3, 2010) of the site of the "small miserable hut", near Belgenny Farm, Elizabeth Macarthur Avenue, Camden, NSW. Belgenny Farm Trust and Department of Primary Industries, October 2011.

²⁵ Personal communication. Jeanne Harris.

large number of disposable items, rather than the wealth of the occupants of the house.

As expected from the comparative database, an assemblage of 68 key functions in the Kitchen Wing of Harper's Mansion will also reveal evidence of men, women and children, as well as literacy.

The presence of men is assumed in an assemblage. The presence of women is harder to discern. At Harper's Mansion, women are almost invisible in the archaeological record, except in a small number of cases. The list below makes a series of assumptions about the division of labour in the household. One notable absence is any item associated with personal jewellery. The crucifix is more likely to have been worn by a female member of the household, although male use cannot be ruled out. The crucifix is an apt confirmation of the use of the buildings by the Catholic Church, priests, nuns and other Catholic persons.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Household appliance	Coal iron, complete; oval shape - embossed on top - ENTERPRISE / MFC CO PHILA PA - Enterprise was in business from 1866 to 1955, manufacturing cast iron products, but discontinued manufacture of irons in the 1920 (electric iron introduced circa 1912).	705	1866	1920	1	027	007 Room 1
Household maintenance	Laundry blue bag. Tongs, complete; distal end of each are has a circular recessed surface with a series of differing sized circular holes; suggested use to grasp bluing bag; L = 250 mm	643	0	0	1	031	014 Modern demolition layers
Household maintenance	Spring hinge - small 34 mm hinge spring, similar to that used in a modern clothes peg	564	0	0	2	061	001 Unstratified

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Personal accessory	Unidentified; L-shaped section of larger item; folded over flattened metal - resembles clasp closure hardware for handbag	672	0	0	1	029	007 Room 1
Personal cosmetics	Bottle, fragrance; body/base; embossed on body - LON.. // NEW..; square body profile with chamfered heel corners	196	1812	2000	1	035	011 Room 2
Personal religion	Crucifix, attached at top to 3 double chain links; part of rosary; embossed on back - FRANCE	456	0	0	1	019	004 Outside
Work haberdashery	Pin, long white; machine made	483	1830	2000	1	034	010 Room 1

Children are more clearly represented by the following items:

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Recreation toy	Ball, fragment	449	1870	2000	1	017	003 Room 1
Recreation toy	Marble, complete; Rockingham type glaze - brown	440	1870	1920	2	015	002 Room 2
Recreation toy	Toy, action figure with head missing; melted	451	1900	2000	1	019	004 Outside
Recreation toy	Toy, complete; action figure in grey, yellow and black; movable limbs	444	1950	2000	1	018	003 Room 1
Recreation toy	Toy, spoked wheel; light blue	450	1940	2000	1	019	004 Outside

Literacy is indicated by the following items:

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Misc clerical writing	Bottle, ink; near complete; machine made; embossed on shoulder - SIMPSONS; embossed on base - THIS BOTTLE ALWAYS REMAINS THE PROPERTY OF SIMPSONS; b = 45; h = 50; Simpsons Ink was based in Rozelle.	81	1920	2000	1	018	003 Room 1
Misc clerical writing	Pencil lead; diam = 5 mm	481	0	0	1	033	009 Room 1
Misc clerical writing	Pencil lead; diam = 5 mm	486	0	0	1	034	010 Room 1
Misc clerical writing	Pencil lead; diam = 5 mm	491	0	0	1	035	011 Room 2
Misc clerical writing	Writing slate	493	0	0	1	061	001 Unstratified

For the basis of these findings, please refer to the paper on artifact analysis published by Dr. Edward Higginbotham in 2010.²⁶

5.4 Usage of the Kitchen Wing.

The dating of the artifact assemblage has revealed that the Kitchen Wing was kept clean and that artifacts were not deposited in the building before the 1870s or even the 1920s. The scrupulous cleaning of the spaces is consistent with the use of the building as a kitchen until this date. It is therefore assumed that the kitchen function was removed to elsewhere in the house by this date. More cleaner forms of energy may have been available by this date, which meant that the fire risk of having the kitchen in the house was reduced.

The assemblage relates to the later use of the Kitchen Wing, post 1870s, even post 1920s, until demolition by the 1940s.

The structural evidence within the Kitchen Wing reveals primary and secondary functions. The flagstone floor (055) in the south room (054), the absence of a fireplace, indicate a utilitarian function that did not require heating. Located on the

²⁶ See Appendix 2.

Edward Higginbotham. 2010. 'Say it with Assemblages. A Simple Method for Comparing Sites'. *Australasian Historical Archaeology*. 28: 43-60.

south side of the building, it may have been coolness, rather than heat that was required.

The fireplace (041) in the main room of Kitchen (053) reveals the primary function of this room for preparing meals and serving food. The iron hook (044) to the side of the fireplace is the same as in the fireplace of the Surveyor General Hotel, Berrima, where the apparatus survives complete to indicate how pots and cauldrons were suspended over the open fire. The brick floor (045) is probably original in this room, but had been repaired at a later date with diamond frog bricks (1840s to 1880s), before the floor was cement rendered.

The strongest evidence for the secondary usage of the Kitchen (053) is suggested by the brick and cement rendered pad (048) in front of the fireplace and by the brick bench (047) on the west side of the room. Both these features belong to the period from the 1870s/1920s to the 1940s. The brick pad had the imprint of a metal drum set into it, with a diameter of 530 mm. A component of this item may have been found in the Store (054), a sheet iron disc, with a similar diameter (Bag 814) of 510 mm.

Other indications of use of the Kitchen Wing can be found in a number of artifacts.

A series of nine rabbit traps were found in the Store, but also some cartridge cases. Rabbiting and hunting may have provided means to supplement the diet of the inhabitants, particularly through the 1930s Depression. Indeed, rabbit bones have been found in the assemblage. It is also understood that a ready market was found at the Prison for rabbit.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Food debris	RABBIT - LEPUS	3061	0	0	1	030	008 Room 2
Food debris	RABBIT - LEPUS	3085	0	0	1	035	011 Room 2
Food debris	RABBIT - LEPUS	3064	0	0	1	031	014 Modern demolition layers
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	673	1880	1980	1	030	008 Room 2
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	674	1880	1980	1	030	008 Room 2
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	675	1880	1980	1	030	008 Room 2

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	676	1880	1980	1	030	008 Room 2
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	677	1880	1980	1	030	008 Room 2
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	678	1880	1980	1	030	008 Room 2
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	679	1880	1980	1	030	008 Room 2
Husbandry hunting or trapping	Gin trap - commonly referred to as Rabbit Trap	681	1880	1980	1	030	008 Room 2
Husbandry hunting or trapping	Gin/Rabbit trap; stamped - S. GRIFFITH / * * IXL	680	1880	1980	1	030	008 Room 2
Misc firearms	Cartridge, casing; b = 12 mm	609	0	0	1	015	002 Room 2
Misc firearms	Cartridge, casing; b = 14; stamped on base - M 38 (or 58) / VII - possibly military use	522	0	0	1	035	011 Room 2
Misc firearms	Shot, diam = 16 mm	660	0	0	1	034	010 Room 1

The finding of three bottle openers is unusual, though this may simply be because of the late date of the assemblage, although crown caps were known from the 1870s onwards.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Food service appliance	Bottle opener - for crown cap bottle closure; impressed - K R LAGER (made by Tooth & Co)	521	1926	2000	1	035	011 Room 2
Food service appliance	Bottle opener, stamped construction	527	0	0	1	035	011 Room 2
Food service appliance	Corkscrew/can opener; complete	726	0	0	1	025	014 Modern demolition layers

A number of cooking appliances, cooking pots and stoves were found in the Kitchen Wing. The purposeful discard of the four stove legs (Bag 625) behind the kitchen fireplace suggests that a kitchen stove went out of use and the function of the fireplace may have changed.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Food service appliance	Shaker/sifter, lid; a circle of perforated holes centred on top; overhang flanged lid	542	0	0	1	038	004 Outside
Food service cooking	Cook pot handle; U shaped with U shaped ends; diam = 11 mm	714	0	0	1	025	014 Modern demolition layers
Food service cooking	Handle for cook pot; ring in one end for hanging	549	0	0	1	061	001 Unstratified
Food service cooking or household heating	Stove part, corrugated cast iron plate	729	0	0	2	023	006 Room 1
Food service cooking or household heating	Stove part, corrugated cast iron plate; same as Cat no 729	748	0	0	1	019	004 Outside
Food service cooking or household heating	Stove part; 4 complete cast iron feet; L= 250 mm	625	0	0	4	029	007 Room 1
Food service cooking or household heating	Unidentified, cast; th = 3.5 mm	787	0	0	2	018	003 Room 1

It should be noted that tablewares are ubiquitous in domestic assemblages. Their presence in particular rooms or spaces does not imply that they were kitchens or dining rooms.

A number of items indicate that the Kitchen Wing could have been used as a laundry or for mending clothes.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Household appliance	Coal iron, complete; oval shape - embossed on top - ENTERPRISE / MFC CO PHILA PA - Enterprise was in business from 1866 to 1955, manufacturing cast iron products, but discontinued manufacture of irons in the 1920 (electric iron introduced circa 1912).	705	1866	1920	1	027	007 Room 1
Household appliance	Hills hoist fitting or similar?; 2 fittings connected by 8 bolts; diam of bore = 83 mm	641	0	0	1	038	004 Outside
Household maintenance	Laundry blue bag. Tongs, complete; distal end of each are has a circular recessed surface with a series of differing sized circular holes; suggested use to grasp bluing bag; L = 250 mm	643	0	0	1	031	014 Modern demolition layers
Household maintenance	Spring hinge - small 34 mm hinge spring, similar to that used in a modern clothes peg	564	0	0	2	061	001 Unstratified
Work haberdashery	Pin, long white; machine made	483	1830	2000	1	034	010 Room 1

Horticulture or gardening is indicated by a flower pot, a spade and a shovel.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Husbandry horticulture	Flowerpot, complete profile; rouletted braid band on exterior body	343	0	0	5	027	007 Room 1
Work tool labouring	Shovel, round point	811	0	0	1	030	008 Room 2

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Work tool labouring	Spade/shovel, head; near complete;	638	0	0	1	038	004 Outside

One or more bicycles may have been kept in the Kitchen Wing, or alternatively the rooms may have served as a workshop or store for spare items.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Transport bicycle	Crank/handle/spanner; cast iron; hexagonal hole at one end; perpendicular handle at other end	626	0	0	1	029	007 Room 1
Transport bicycle	Pedal; oval shaped hard rubber with inset copper threading	537	0	0	1	035	011 Room 2
Transport bicycle	Tag/plate, complete; oval bevelled plate with rivets in either end; L = 80; w = 18 mm possible bicycle pedal	752	0	0	1	019	004 Outside

The workshop or work store usage is further supported by a number of mechanical items or tools. The mechanical items could also imply the location of machinery within the Kitchen Wing.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Work mechanical	Gasket, partial	759	0	0	1	015	002 Room 2
Work mechanical	Machinery part, complete component; long bar with teeth; fitting attached to one end; L = 360 mm; th = 24 mm; w = 40 mm	639	0	0	1	038	004 Outside
Work mechanical	Spike, complete; cylindrical upper body; flattened tapered lower shank similar to 758	518	0	0	1	037	004 Outside

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Work mechanical	Unidentified object; L = 310 mm; square profile for most of length with cylindrical ends (30 mm each); slit through square section with band off centre (photographed) similar to 518	758	0	0	1	015	002 Room 2
Work mechanical	Unidentified object; rod attached at either end to threaded bolt	538	0	0	1	035	011 Room 2
Work mechanical	Weight/ball - with attached (wielded hook); diam = 77 mm	577	0	0	1	012	001 Unstratified
Work tool	Tool, handle; two pieces of curved metal that would have encased a wooden handle - remnants of wood around two bolts that join the curved metal pieces	515	0	0	1	036	004 Outside
Work tool chain	Jack chain, segments - toilet chain pull, or item to suspend lights or decorations. This example looks rough and may be more functional than ornamental	749	0	0	3	019	004 Outside
Work tool metalwork	Hack-saw blade; L = 148 mm; w = 12 mm	576	0	0	1	011	001 Unstratified
Work tool woodwork	Bore brace, handle/crank;	740	0	0	1	018	003 Room 1
Work tool woodwork	Drill bit; L = 64 mm	766	0	0	1	015	002 Room 2
Work tool woodwork	File, composite manufacture; L = 325 mm	806	0	0	1	030	008 Room 2

In summary, the following usages are suggested by the artifact assemblage in the Kitchen Wing:

Rabbit hunting and hunting in general.

Opening of bottles.

Cooking or heating of food or other ingredients.

Food preparation and consumption (tablewares are generally ubiquitous in any domestic assemblage, not implying that a particular room was used as a kitchen or dining room).

Laundry and mending clothes.

Horticulture or gardening.

Bicycle storage or workshop.

Workshop or work store.

Possible location or use of machinery.

In general the assemblage in the Kitchen Wing implies a series of utilitarian usages, from food preparation and cooking, including the laundry and mending of clothes, through to storage of items relating to hunting and gardening, as well as a workshop or work store, possibly with mechanical items in place.

5.5 Laundry or other use.

The secondary usage of the Kitchen (053) as a laundry may imply that the pad in front of the fireplace or the bench on the west wall were used for this purpose. By the 1920 to 1940s washing machines and clothes boilers were coming into fashion. It is possible that the apparatus placed on the pad in front of the fireplace was one of these items. The artifact assemblage does indicate that electrical power was available in the Kitchen Wing.

The most obvious related item that could have been placed on the brick bench along the west wall would have been a concrete laundry tub with twin basins, although such a primitive or rough support is not common. The assemblage also includes iron piping for water supply, but there is no obvious waste water piping or drainage.

The other items associated with laundry use are described in the previous section. The following table lists items that were associated with electrical and water supply in the assemblage of the Kitchen Wing.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Services electricity	Heating element; mica wrapped with copper alloy flat filament; example such filaments used in electric blankets	464	0	0	2	017	003 Room 1
Services electricity	Insulator, partial; semi-globular with centre hole	375	0	0	1	034	010 Room 1

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Services electricity	Wire, coated	510	0	0	3	036	004 Outside
Services electricity	Wire, electrical coated with synthetic substance	790	0	0	1	018	003 Room 1
Services electricity	Wire, electrical; double strand coated with synthetic substance	707	0	0	1	027	007 Room 1
Services lighting electric	Lamp globe, base	533	190 0	200 0	1	035	011 Room 2
Services lighting electric	Vacuum tube, end; blown - part of light bulb.	192	191 0	200 0	1	034	010 Room 1
Services lighting electric	Vacuum tube, partial; blown; thin copper wire embedded in glass - part of light bulb.	206	191 0	200 0	1	035	011 Room 2
Services water	Pipe collar, diam = 19 mm	596	0	0	1	017	003 Room 1
Services water	Pipe, diam = 10.5 mm	750	0	0	2	019	004 Outside

However the location of the pad may imply that whatever was placed on it included a form of heating, ducted up the existing chimney.

It has also been noted above that the diameter of the vessel placed on the brick pad was 530 mm. The diameter of a tierce is 520 mm (20 1/2 inches), a barrel containing 1/6 of a tun, or approximately 158-160 litres, 42 US gallons or 35 imperial gallons. The diameter is slightly smaller than 572 mm diameter, which is the current international standard for a 55 US gallon, 44 imperial gallon, 200 litre drum. The dimensions varied slightly according to manufacturer, but the drums came into common usage only after WW II.

It is in this context that the historical reference to one of the tenants should be further considered. A man named Finran, who rented the house in the 1930s was described as an eucalypt oil distiller.²⁷ Further research has indicated that this man was named William Thomas Joseph Finneran.²⁸ This research has also indicated that by the time he became a tenant he had sold his interests in commercial eucalyptus oil production and had served a 12 month prison sentence for fraud.

²⁷ Ann Beaumont. *A Light in the Window*. Harper's Mansion, Berrima, the Place and its People. National Trust. 2013:72

²⁸ See Appendix 4. William Thomas Joseph Finneran.

The possibility that the pad in front of the fireplace and the bench on the west wall were used in eucalyptus oil production must therefore be considered. It should be noted at the outset that commercial eucalyptus oil production was on a much larger scale. Any apparatus used in the Kitchen Wing must have been on a much smaller scale, possibly on an experimental scale.

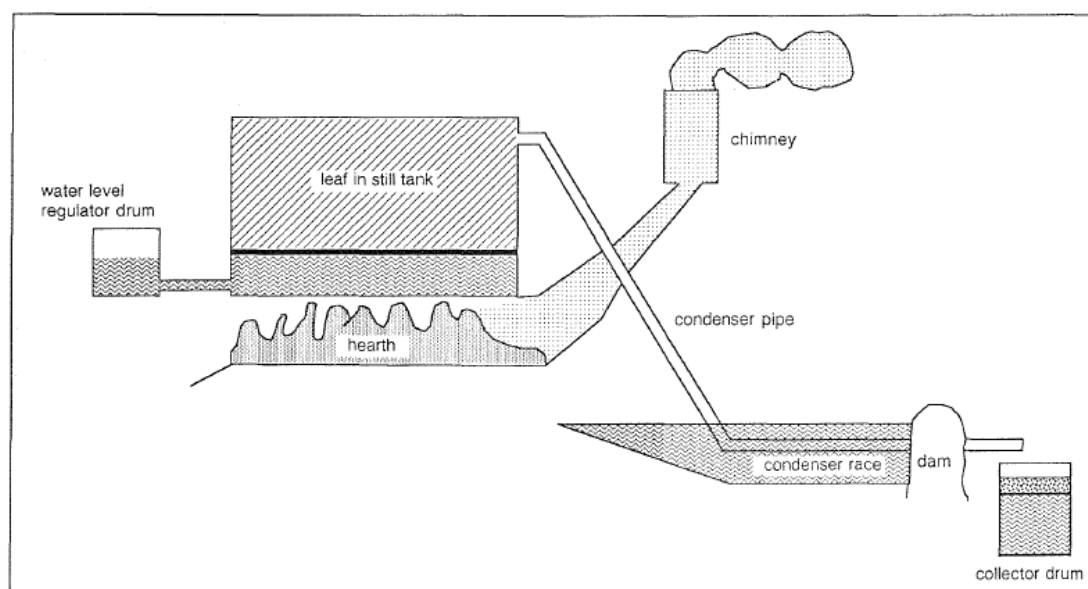


Figure 5.4. Typical arrangement for eucalyptus oil production.

Source. Michael Pearson. "The Good Oil: Eucalyptus Oil Distilleries in Australia", in *Australasian Historical Archaeology*, Vol 11. 1993: 99-107.

In this scenario, the pad in front of the fireplace was used to support a metal drum. A fire in the base of the drum was used to boil water in the upper part of the drum. The steam would have passed through a stack of eucalyptus leaves and carried away the volatile oils in a sealed pipe through a condensing tank and finally into a container for the oil. The oil may then have gone through a final stage of separation to produce the final product. The condensing tank may have been located on the brick bench.

Apart from the pad and bench (048, 047) in the Kitchen, the only other items that may be associated with the drum on the brick pad are a sheet iron disc (Bag 814) and a section of sheet iron flue, found resting in context 033, the hole in the floor of the Kitchen. The flue could have been attached to the drum to direct the fire up the chimney, but could also possibly have been part of the distillation piping.

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Construction metal sheeting	flue, sheet iron, with seam, diameter 130 mm. 2 main pieces and two frags		0	0	4	033	009 Room 1

Key Function	Object Name	Bag	Date from	Date to	Total in Context	Context	Phase
Container	Drum/barrel, top/bottom; galvanised, 810 mm diam	814	1860	2000	1	030	008 Room 2

The typical set up for an eucalyptus oil distillery is shown in Figure 5.4. A comprehensive article on the history of the industry is provided by Michael Pearson.²⁹ In the Kitchen at Harper's Mansion it is possible that the still was set up on the pad in front of the fireplace, with the condenser pipe leading to a tank resting on the side bench, with the oil collected in a container resting on the kitchen floor.

Two interpretations of the brick pad and brick bench in the Kitchen have been researched. A possible association with eucalyptus oil production in the 1930s has been investigated, but the most obvious use of these features in the former kitchen is for a washing machine or clothes boiler and concrete laundry tub. The interpretation remains uncertain.

²⁹ See Appendix 3.

Michael Pearson. "The Good Oil: Eucalyptus Oil Distilleries in Australia", in *Australasian Historical Archaeology*, Vol 11. 1993: 99-107.

6 CONCLUSIONS.

How has the archaeological excavation of the Kitchen Wing at Harper's Mansion contributed to the research questions and themes formulated prior to the investigation? The following questions were considered most appropriate:

1. How does the layout of the Kitchen Wing contribute to our understanding of an 1830s suburban house? How does the use of the Kitchen Wing evolve in the nineteenth and twentieth centuries?
2. Why did the Kitchen Wing go out of use in the mid twentieth century.
3. How does the evidence provided by the Kitchen Wing contribute towards our understanding of the social and economic standing of the owners and occupants of the house? How did this vary over time?
4. What does the Kitchen Wing and particularly its artifact assemblage contribute to our understanding of the growth of Berrima and its possible economic stagnation?

The archaeological evidence reveals that the kitchen usage of the Kitchen Wing probably lasted from the 1830s to the late nineteenth century, after which date, the cooking facilities were probably relocated into the main house. The fire risk associated with open fires in kitchens was probably dramatically reduced with sealed stoves.

There is evidence that the Kitchen Wing had a series of later utilitarian usages, from food preparation and cooking, including the laundry and mending of clothes, through to storage of items relating to hunting and gardening, as well as a workshop or work store, possibly with mechanical items in place.

Two interpretations of the brick pad and brick bench in the Kitchen have been researched. A possible association with eucalyptus oil production in the 1930s has been investigated, but the most obvious use of these features in the former kitchen is for a washing machine or clothes boiler and concrete laundry tub. The interpretation remains uncertain.

The artifact assemblage reveals a household with a large variety of disposable items. There is evidence for men, women and children, evidence for literacy and education.

The evidence for rabbit trapping and perhaps hunting indicated the possible supplementing of the diet with cost free items, a common economy measure during the Depression and at other times.

APPENDIX 1. KEY FUNCTIONS FOR ASSEMBLAGES.

Updated to 1 June 2011.

Key function and function names	Object names.
Construction	This function includes all construction materials, but, where possible, is divided into specific categories, see below.
Construction canvas tent or sail	Large eyelets for canvas materials, for example tents or sails
Construction decorative	Glazed tiles for bathrooms, fireplaces, etc. Paint finishes, etc
Construction door or gate	Door or gate hinges and fittings
Construction drainage	Items associated with stormwater drainage.
Construction drainage or sanitation	Principally ceramic drainage pipes, which may be used for stormwater and/or sewerage.
Construction fastener	Clips, nails, spikes, brackets, pegs, rivets, studs, tacks
Construction fencing	Fencing wire and other fencing components, but not palings or posts, which are listed under Construction timber
Construction hardware	Principally metal items, the specific usage unidentified, including band, bar, cover, disc, offcut, piping, plate, ring, rod, tubing, wire.
Construction improvised	Construction materials that have been hand made, representing bush craft or reuse of materials.
Construction industrial	Materials used in the construction of industrial buildings, furnaces, ovens, kilns, etc.
Construction masonry	Brick, stone, concrete
Construction metal sheeting	Galvanised iron or other iron, zinc, tin sheeting
Construction mortar and plaster	Plaster, mortar, render
Construction or household furnishing	Items which could be part of a building, household furnishing or other item of furniture, usually nails and screws, brass and other.
Construction or work mechanical	Nuts, bolts, washers
Construction roofing	Roof coverings or fasteners.
Construction timber	Wood, worked, sawn, etc. Masonite, etc. Fence palings.
Construction window.	Window glass, sash weights
Container	Containers, use not specifically identified: bottles, containers, handle, jar, lead foil bottle tops, lid, rim, storage jars. Unidentified ceramic and glass fragments.
Container barrel	Barrel hoops. Taps or spigots for barrels, usually brass.
Container petrol or oil	Container for petrol or oil, oil can, petrol can.
Container shipping	Shipping containers
Food aerated water	All aerated water containers, including soft drinks and ginger beer.
Food alcohol	All containers of alcohol, for example, stout bottles.
Food baby goods	Items used in baby food preparation or feeding.
Food container	Containers, sardine tins, fragments of food containers, ginger jars, storage jars or jugs, for food.
Food debris	Bone and shell debris from food species.
Food service appliance	Kitchen appliances, e.g., meat mincers, meat safes, water filters
Food service cooking	Cast iron cooking pots and other cooking containers
Food service cooking or household heating	Items used to cook food or heating of the household.
Food service cruet	Salt and pepper dispensers, mustard etc.
Food service cutlery	All cutlery.

Key function and function names	Object names.
Food service kitchenware	Basins, bowls, containers, handles, jars, jugs, lids, etc. Usually in cheaper or coarser ceramics, metal, etc.
Food service tableware	All parts of ceramic dinner sets, including food serving items. Glass bowls and other tablewares, principally clear glass, stemwares and tumblers.
Food service tableware children	Tablewares associated with children, with alphabet, verses and pictures associated with children's stories. See also recreation toy for children's toys and children's tea sets.
Food service utilitarian	Enamel wares and other hard wearing food service wares, other than cooking pots (listed as food service kitchenwares).
Food unidentified	Bone fragments, species not identified, but most likely food species.
Household accessory	Items used in the household, not as appliances, but as accessories, for example, a stand for an iron, Fire iron, Coat hangers.
Household appliance	Appliances.
Household collectible	Items collected for their intrinsic beauty, rather than usefulness, including, Shells, non-edible species.
Household furnishing	Household furnishing, other item of furniture, including fittings, Fixed toilet bowls, but not chamber pots, Mirror glass, Floor coverings, linoleum, etc
Household heating	Fireplace ironwork
Household maintenance	Blacking bottles, polish, laundry blue, clothes pegs
Household ornamental	Vases, ornaments and other household decorative items.
Misc packaging	All packaging materials, including foil, plastic, foam
Household pet or animal	Bone from cats or dogs and other objects associated with pets, including bird cages.
Household poison	Usually cobalt blue glass bottles
Household timekeeping	All component parts of clocks, but not watches.
Household toilet	Chamber pots, wash basins and bowls, wash jugs. Excluding fitted toilet bowls.
Household vermin	Rodent bones, rat or mouse traps.
Husbandry farming	Items associated with farming, including, ceramic eggs to induce hens to lay eggs, ploughshares, branding irons, cow bells
Husbandry fishing	Items used in fishing.
Husbandry horticulture	Items associated with horticulture including basins, bowls, plant pots in coarse earthenwares or terracotta. Where fine earthenware or similar, place in Household ornamental.
Husbandry hunting or trapping	Rabbit trap
Misc clerical	All stationery items, excluding writing materials. Glue bottles, paper scissors, magnifying glasses.
Misc clerical writing	Writing materials, including penny ink bottles, slate pencils, slate tablets.
Misc commercial media	Newspaper, printing equipment, typesetting, TV aerials.
Misc commercial merchandising	Labels, brand names and signs for the marketing or advertising of goods.
Misc economic	Coinage, tokens used as currency.
Misc firearms	Items used in combat or hunting including musket balls, cartridges, gun flints
Misc government or administration	Items associated with government administration or public office. For example, seals, mayoral insignia, ceremonial robes of office bearers.
Misc human skeletal	Human bone or teeth.
Misc Measurement	Weights and measures.
Misc natural	Items not altered by man, including roots, branches.

Key function and function names	Object names.
Misc natural fauna	Native animals, if not used for food
Misc scientific	Scientific instruments, telescopes, etc.
Misc scientific Photography	All items associated with photography.
Misc security	All items associated with the security of property, including latches, bolts, locks, keys, padlocks, window locks, escutcheon plates.
Personal accessory	Personal accessories, including belt buckles, handbags, purses, suitcases
Personal clothing	Items of clothing, including buttons, studs, cloth or fabric, eyelets, hooks, studs, safety pins, hat pins
Personal cosmetics	All containers of perfume and other cosmetics
Personal dental	Dentures.
Personal footwear	All component parts of boots and shoes.
Personal jewellery	Items of jewellery. Note that glass beads may also be used in cloth covers for jugs and bowls.
Personal medicine	Pill boxes, medicine bottles, phials, tubes, syringes and other medicine containers.
Personal medicine or cosmetics	Objects with a medicinal or cosmetic use.
Personal medicine or toilet	All containers of medicines or toiletries, excluding perfumes or cosmetics.
Personal military	Items of military uniform.
Personal optical	Spectacles and lenses.
Personal religion	All items associated with religious beliefs, including icons, rosaries, Chinese tear bottles, Christmas decorations
Personal timekeeping	All component parts of watches and fob watches.
Personal toilet	Personal toiletries, excluding perfume. Including combs, toothbrushes, hand-held mirrors, razors
Personal trophy	Plaques, cups, medals and trophies awarded for excellence in sport or other endeavour. Memorabilia associated with sports.
Recreation game	Counters, dice, balls, quoits and other gaming pieces, not already included under Toys.
Recreation music	All component parts of musical instruments, including pianos and mouth organs.
Recreation smoking	All tobacco pipes, of kaolin or other materials. Lighters
Recreation toy	Children's toys, including: Marbles, Children's tea-sets.
Services battery	Batteries for torches and other items.
Services electricity	All items associated with the supply and use of electrical items, including brass and copper wiring, electrical cables, conduits and fittings.
Services energy	Gas piping, petrol containers.
Services energy or water	Principally iron piping, which may be used for gas or water supply.
Services fuel	Coal, coke, charcoal, burnt wood.
Services lighting	Items relating to the provision of light, including glass covers.
Services lighting arc	Items relating to arc lighting
Services lighting candle	All items associated with the provision of candle lighting
Services lighting electric	All items associated with the provision of electric lighting.
Services lighting gas	All items associated with the provision of gas lighting.
Services lighting oil	All items associated with the provision of oil lighting.
Construction sanitation	Fitted toilet bowls, excluding chamber pots.
Services telephony	Items associated with telephony, insulators of various types for telegraph wires.
Services water	Water taps or piping, plug for sink.

Key function and function names	Object names.
Transport	Items associated with vehicular transport, including parts and accessories.
Transport automotive	Items associated with vehicular transport, specifically cars, trucks and buses.
Transport bicycle	Items associated with bicycles, including parts and accessories.
Transport equestrian	All items associated with horse transport, including horseshoes, horseshoe nails, harness.
Transport equestrian draught	Horseshoes over 150 mm in diameter
Transport equestrian pony	Horseshoes less than 115 mm in diameter
Transport rail narrow gauge	Narrow gauge tramways and associated equipment
Transport vehicular	Buggy, trap, cart or other vehicles
Unidentified	Unidentified usage.
Work blacksmithing	Iron slag
Work button manufacture	Button blanks, usually bone.
Work copper assay	Crucibles for copper assay
Work copper smelting	Copper slag
Work flour milling	Grindstone
Work glassblowing by-product	Rupert's drops, a by-product of glassblowing.
Work haberdashery	Items used in making or mending cloth or clothing, including pins, safety pins, thimbles, bobbins, scissors
Work leatherworking	Leather offcuts.
Work mechanical	Items of machinery or other equipment.
Work metalworking	Slags and other residues of metalworking. Note that slag like materials may be produced in ordinary fires.
Work tool	Tools or other items associated with trades or employment. See also Work mechanical
Work tool blacksmith	Tools associated with blacksmithing
Work tool butchery	Butcher's hook.
Work tool chain	Chains and links, pulleys, block & tackle, hooks
Work tool copper smelting	Tools used in the smelting of copper
Work tool improvised	Work tools that have been hand made, representing bush craft or reuse of materials.
Work tool labouring	Tools used in labouring, picks, mattocks, spades, shovels.
Work tool leatherworking	Tools associated with leatherworking, saddlery
Work tool mechanical	Tools used on machinery
Work tool metalwork	Hacksaw blades, used to cut piping, etc
Work tool mining	Tools associated with mining, gads, picks, mining picks, mattocks, etc.
Work tool regional	Tools of regional origin, for example, round bladed shovel – often referred to as a Cornish shovel, regional style of shovel in UK.
Work tool sheep shearing	Shears
Work tool timber working	Axes, usually associated with working timber, as in timber getting, fencing, cutting firewood, bush construction, etc.
Work tool woodwork	Brass hinged ruler, drill bits
Work tool woodwork or blacksmith	Chisels, files, rasps, punches, used in woodwork or blacksmithing. Punches associated with leatherworking, see Work tool leatherworking

Key function and function names	Object names.
Work tool pharmaceutical	Pestle and mortar, porcelain, syringe, test-tube.
Work ship or boat building and repair	Wrought brass nails, boat or ship fittings
Work tool horticulture	Forks, hoes, rakes, etc.
Work tool masonry or plaster	Trowels, etc.
Work sealing or whaling	Items used in the sealing or whaling industry.
Misc government penal	Items associated with penal administration and imprisonment. For example, shackles and leg irons.
Work metalworking lead	Lead solder, possibly for roofing. offcuts, mould trimmings

APPENDIX 2. ASSEMBLAGE ANALYSIS.

Edward Higginbotham. 2010. 'Say it with Assemblages. A Simple Method for Comparing Sites'. *Australasian Historical Archaeology*. 28: 43-60.

Say it with assemblages: A simple method for comparing sites

EDWARD HIGGINBOTHAM

This paper develops a simple methodology for the analysis of artefact assemblages to enable comparisons between sites in a wide range of chronological and geographical contexts, from the early 'convict huts' of Parramatta to the most affluent sites of the late nineteenth century. First used on the excavation of a mining village at Cadia in Central Western NSW, the methodology has the capacity to provide comparative data on levels of affluence or on social and economic standing, also highlighting the key roles of literacy, marriage and children. The methodology is one layer of analysis among several standard techniques, but has the potential to provide powerful explanations of people's lives and decision-making when integrated with historical documentation.

INTRODUCTION

The combination of both historical and archaeological data provides wide ranging opportunities to investigate the human condition. Yet, while historical documentation is for many a tractable and fruitful resource, the same cannot be said of the archaeological evidence, particularly the large and seemingly intractable assemblages of artefacts recovered from urban or even rural sites. We all know that when dealing with 'domestic assemblages', it is often challenging to synthesise the artefact evidence from each site in a manner that makes a substantial contribution to historical archaeology and is also seen as an adequate return for the funding expended in salvage excavation. While differing in its approach and outcomes, the Exploring the Archaeology of the Modern City project (EAMC, commenced in 2001) was initially motivated by similar concerns – '... Mayne and Murray were interested in finding a way in which we could tell the stories locked up in all those boxes of artefacts from urban sites in Australia'. The catalyst for that project was the Little Lon excavation (1996) in Melbourne, but was expanded to include Casselden Place (2002), also in Melbourne, as well as the results of the 'Big Dig', Cumberland and Gloucester Streets, The Rocks, in Sydney (Murray, T. et al. 2003: 114, 115, 125). The recent synthesis of Australian historical archaeology by Susan Lawrence and Peter Davies also indicates that substantial progress is being made with artefact analysis not only through contract archaeology, but also through well funded research programmes (Lawrence and Davies 2011: 251-325). However there remain challenges, particularly for salvage or rescue excavation, in formulating efficient and cost effective methods of extracting information from artefacts on a limited budget that can still be effectively used for comparative purposes.

For the author, the investigation of archaeological sites at Cadia in Central Western New South Wales provided the catalyst to compare and contrast the domestic assemblages from urban sites with those from rural and village sites in regional NSW (Higginbotham E. & Associates Pty Ltd. 2005a) (Figure 1). The result has been the formulation of a methodology for comparing assemblages between sites, further developed by the author through subsequent archaeological excavations of sites in Parramatta and Port Macquarie in NSW (Higginbotham E. & Associates Pty Ltd. 2005b; 2007; 2008; 2009a; 2009b). This methodology is simply based on the number of functions in each assemblage, but has the potential to provide a comparative scale of access to goods and services, or of affluence, as well as insights into the subjects of literacy, marriage and children. The

methodology can be easily adopted and adapted to provide a large body of comparative information which will assist in the study of current research themes.

ACCEPTING THE CHALLENGE

In a recent editorial of the *Australasian Historical Archaeology*, in a volume devoted to the contribution of artefact analysis, Martin Gibbs stated that:

'... as a community of researchers we have failed to establish many of the fundamental structures which should underlay our endeavours. In particular I am speaking of the tools and frameworks which should allow us to compare sites, and in the context of this volume, the artefact assemblages recovered from within different sites.'

He further challenged the profession in this way:

'... it cannot be denied that comparative studies in Australasian historical archaeology are rarities, while a sustained application of a comparative structure across several studies is something that I have not seen at all. Could someone point out to me any instance where we have unambiguously and systematically stacked up the assemblages of a 'convict hut' against a 'free settler home' (or preferably several of each), or either of these against a 'gentry' house, or the servants' quarters associated with that house, or any of the shades beyond and between (such as 'aspirational ex-convict')? If anyone puts up their hand to insist that they have done this – and I would be happy to be proved wrong – I would also ask that they demonstrate the consistent analytical and comparative structures by which they achieved this, so that the rest of us can follow them. In theory the exploration of similarity or difference should be simple, although in practice I am not sure that anyone in Australasian historical archaeology has actually done it, and if they have they have been awfully quiet about it.' (Gibbs 2005:3).

The challenge is therefore to:

1. 'unambiguously and systematically' compare assemblages between sites of varying types.
2. demonstrate 'the consistent analytical and comparative structures' used, and
3. provide a 'simple' and straightforward approach.

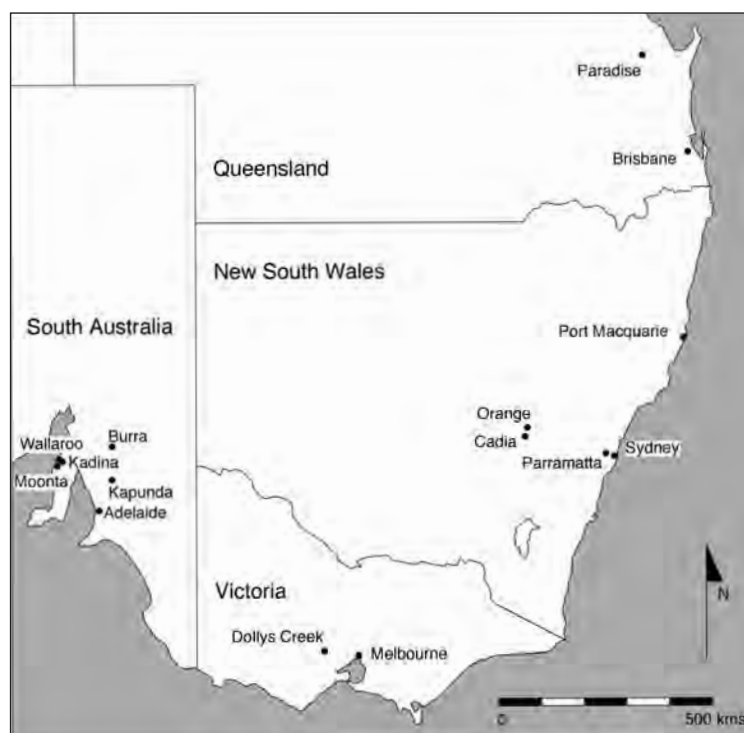


Figure 1. Plan showing the location of sites mentioned in the text.

The author recognises that this research has been confined to 'grey literature' for too long, but the methodology has taken a number of years to develop. From being initially frustrated at the limited findings that could be gleaned from basic artefact cataloguing and analysis from excavations completed during the 1990s (for example, Higginbotham E. & Associates Pty Ltd. 1991a; 1994; 1995a; 1995b; 1997, 2000), the author has been determined to confirm the value and application of the findings from the excavations at Cadia.

A STANDARD METHODOLOGY FOR EXCAVATION REPORT PREPARATION

This section describes the basic foundations required to make use of the proposed methodology for comparative analysis of assemblages. In other words, here are the system requirements for running this program. All components should be installed before use in the field or laboratory.

It would be easy to say that we should follow 'best practice' in archaeological investigation and report preparation, but 'best practice' is an evolving and mutable concept, and so what one understands as best practice should be clearly articulated.

I suggest that the basic tenets for archaeological assessment, investigation and reporting are as follows:

1. Detailed assessment, including thorough historical research.
2. Comprehensive research design and permit application.
3. Methodical archaeological investigation.
4. Environmental sampling, as appropriate.
5. The recording and description of each context and unit using text, plan and photograph, sufficient to allow for the understanding and interpretation of the site (and indeed reinterpretation at a later date).
6. The cataloguing of artefacts, including description, quantities, date range and function.
7. Report preparation and synthesis of the results by the excavation director.

A detailed discussion of the above tenets is outside the scope of this paper, although a few comments are appropriate. Standards for artefact cataloguing have been outlined in a number of recent papers (Crook et al. 2002; Brooks 2005). It is appropriate that cataloguing methods and standards should improve over time. It is the responsibility of the excavation director to ensure that the artefact catalogue is prepared to a standard that is usable by future researchers without extensive, unnecessary and time consuming reworking of the data. It is also the responsibility of the excavation director to draw together all the evidence produced by an archaeological excavation in order to write a report that adequately realises the contribution of the site. The drawback of specialist reports on single artefact categories is that they are unable to assess the assemblage as a whole and cannot provide a holistic assessment of each context or phase. The responsibility therefore lies with the excavation director to do this, by using the whole artefact catalogue as well as all site records to bring together the results. A practical solution at the report preparation stage would be to divide cataloguing and specialist reporting (analysis) into two stages. The catalogue and other site records are then drawn together to 'phase' and date the site (see below).

This information is then fed back to the artefact specialist, who is then much better informed on the potential of the evidence to reveal information and meaning.

Some have almost accepted with resignation that artefact cataloguing and analysis is always going to be underfunded (Crook et al. 2002: 26, 28, 31). Yet it is often the case that the lack of funding is because an adequate budget has not been negotiated for cataloguing and analysis in the first place. There is also a need for the profession to decide what is the minimum standard of analysis for a salvage excavation report, an issue discussed in outline below.

Detailed analysis for excavation report preparation

In the preparation of the final report (Item 7 in the list above), the first task is to draw together the information provided by the artefact catalogue and site records into one database. Once the artefact catalogue is produced by a number of artefact specialists, the only major adjustment before report preparation should be to ensure that all the data is consistent. Most important of all is to ensure that dating and function terminology is consistent across all artefact categories.

Brooks has argued that the Australian tradition of artefact cataloguing is based on the work by Judy Birmingham at Regentville and then on the American tradition, strongly influenced by Stanley South (Brooks 2005). However most consultants and artefact specialists in New South Wales use a methodology that is probably more directly based on the work of the Sydney Cove Authority (now Sydney Harbour Foreshore Authority) in the 1990s (Snelgrove 1990) or the Port Arthur Archaeological Procedures Manual (Davies and Buckley, 1987). This methodology has been updated and adapted by the author to meet the specific requirements of each site and also to support the proposed comparative analysis of assemblages.

The analysis of assemblages described in this paper has depended on the consistent use of function terminology for all the sites that are compared. This is essential because the findings depend on the total number of functions found in each assemblage. The latest version of the inventory of functions is therefore included in Appendix 1 (Table 12).

The second imperative for any excavation director is to correctly assess the date range of the artefacts in each phase or assemblage. To do this the artefact cataloguer should provide the date range of manufacture where possible, including the date ranges of particular patterns or types, where known. The more accuracy and detail in dating, the more evidence can be extracted from each assemblage. (It could be argued that the catalogue should record several date ranges, namely manufacture, introduction into the Australian market, and indeed time lag, but these issues are outside the scope of this paper (Adams 2003)).

The combined artefact and site records catalogue can then be used to 'phase' the site. Phasing simply means the grouping of contexts or units according to the four 'S's':

1. Structural evidence (buildings, wells, cess pits, etc),
2. Similarities and associations between features (groups of post-holes forming structures; layers in a cess pit),
3. Spatial information (rooms, yards and other spaces),
4. Stratigraphy and chronological similarities or sequences (deposits associated with construction, occupation and demolition)

Once this process is complete, the dating and functional analysis of each phase can be undertaken.

It is important to assess the date range indicated by artefacts, structural evidence and stratigraphy independently from other sources. Care should be taken to identify both residual and intrusive artefacts. The evidence should then be compared with the historical sequence of development to check how the archaeological dating confirms or refines the historical dating. Any inconsistencies between the archaeological and historical dating should be investigated and explained. While researchers may wish to identify time lag in artefact deposition (Adams 2003), a lack of consistency between historical and archaeological dating is also a primary indicator of potential sample bias in an assemblage and a warning to be wary in its use for further analysis. With few exceptions, small samples that do not provide a consistent date range are unlikely to provide a representative set of functions. In practice, it has been found that assemblages of less than 250 artefacts fall into this category and researchers should be wary of depending on results from these small assemblages, unless every effort has been made to account for possible sample bias (see for example, Higginbotham E. & Associates Pty Ltd. 2007, Vol. 3:19, 32, 121).

The functional analysis of each phase should proceed after the dating is completed. Bearing in mind the distinction between cataloguing and analysis (Crook et al. 2002: 29; Brooks 2005: 10-11) it is fundamental that the artefacts in each phase should be catalogued and described. But it is also essential that a level of analysis is included in every excavation report, not only for the adequate interpretation of the site, but also to complete the groundwork necessary to enable further research without extensive and time consuming reworking of the evidence. For all salvage excavations, a budget should be set aside for basic artefact analysis (dating and functional analysis), in addition to cataloguing. The budget should also include, where the evidence is suitable, the spatial analysis of the assemblages within and around structures, providing valuable information on the usage of rooms, yards and spaces, as well as the areas predominantly used by women and children.

The methodology outlined in this paper relies on the prior completion of this holistic analysis of the artefact catalogue.

A defence of functional analysis

The recent debate on functional analysis reveals some fundamental misunderstandings of the use of typology and

classification in archaeology (see the critique by Crook et al. 2002; Brooks 2005). These misunderstandings relate to the primary intended function of cataloguing, as well as the idea that the catalogue should be the sole and complete repository of information on the artefacts.

The primary purpose of cataloguing in archaeology is not to put everything in its box in an archive, but rather to seek answers from archaeological evidence. All classification should be purpose built to assist understanding and seek explanation. The primary aim of classification is to elucidate meaning from each assemblage. The first question we might ask, either explicitly or implicitly, is what activities are revealed by the artefacts on each site? Our catalogues are built for this purpose, to extract this information. Hence we need to ascribe function in all catalogues. It is appropriate that we should be aware that each catalogue entry includes not only description, but also terms that *interpret* the artefact. It is appropriate to differentiate between form (description) and function (interpretation) (Brooks 2005:9; see also Crook et al. 2002: 30-31). But it is not appropriate to exclude interpretation (in this case, function) from a catalogue, because this defeats the whole purpose of classification in archaeology. It is certainly not an efficient approach for salvage archaeology, when the goal is to extract as much meaning as possible within available budgets.

Since salvage archaeology also has to efficiently interpret the basic information in the whole catalogue, in the first instance we should also choose terms that are applicable across the whole catalogue, rather than only part of it. Terms restricted mostly to ceramic or glass analysis can be used in later research, but at the stage of report writing for salvage excavation, the primary purpose of cataloguing should focus on elucidating the range of activities on a site, as well as other basic research questions regarding the roles of men, women and children. This is clearly not an exhaustive set of research questions, but the basic groundwork that is necessary to form the foundation for other research goals, without extensive reworking of the data.

It may be as simple as using function terminology like 'construction' rather than 'architecture' or 'building'. It is a much more inclusive term, which can include fencing wire as well as bricks and mortar. It is better 'to construct' than 'to architecture' (Brooks 2005: 7).

We should also be careful in using terms like *primary intended function* or *primary intended use*, which are not applicable for the whole catalogue. It would be difficult to place slag from copper smelting in either category, as it is a waste product. The principal requirement for the artefact catalogue is to recognise that the waste product of copper smelting is present on a site. This fulfils *the purpose* of the catalogue, *to reveal the activities that have taken place*. Elsewhere in the report, the industrial processes of copper smelting can be explained, as appropriate, and the reuse of the slag for road metallurgy or as a building material can be described. It is not necessary to burden the artefact catalogue itself with the multiplicity of functions or reuse, if these characteristics can be discussed elsewhere in the report. This is not to deny polyfunctionality, but to deal with the issue outside the artefact catalogue. We must remember that the catalogue is a tool to assist interpretation, but does not need to be the sole repository of all information relating to each artefact (above and beyond what are essential characteristics or minimum standards).

There is a need to be explicit in how we construct our artefact catalogues. If we also ask questions relating to gender and class, these questions should be made clear in the categories we use. Since we should have flexibility in our cataloguing systems, it may be appropriate to have multiple

fields to describe function, gender, class, etc, in order to clarify what we are trying to research and make it easier to extract the evidence (Brooks 2005: 9, 10). Anything that makes it easier to extract meaning, rather than confusion, should be encouraged. There is possibly an attempt among cataloguers to cram too much information into one function field. If several fields will relieve the congestion, these should be used.

Once it is understood that typologies and classifications should be purpose built, it should also be recognised that a rigid classification system is totally inappropriate. Archaeologists should therefore have no fear of adapting catalogues for a specific research purpose, adding fields or changing definitions. To limit ourselves in this regard would be to stifle research. But the point needs to be made: it is essential for the artefact catalogue from a salvage excavation, created within budgetary constraints, to comply with basic standards, so that it does not limit future research, interpretation and reinterpretation by requiring extensive reworking of the data (Crook et al. 2002).

Function terminology – asset classes, key functions and functions

The methodology proposed in this paper relies on the above groundwork being completed to a high standard. If the methodology is to be used for the research purposes it is designed for, then it is necessary for the function terminology to be used consistently with each assemblage, to allow for comparative analysis. If researchers have other research questions, then they should be easily able to adapt the catalogue to their own research questions, because the foundations are completed.

To add new sites to this comparative database should not be a difficult task. Before final report preparation, it is necessary to check the artefact catalogue for consistent function terminology and have a separate field available in the database to record the revised function name, leaving the original terminology of the artefact specialist as a separate record. This is not a time consuming task. It can be done by any researcher for any assemblage and for any research purpose, providing the assemblage has already been catalogued to a high standard.

In providing a consistent function terminology, the author has allocated each function to a key function group. The 11 key functions are also allocated into three asset classes, which emphasize their role in assessing levels of affluence (Higginbotham E. & Associates Pty Ltd. 2005a. Vol. 3: 156ff; 2007, Vol. 3: 232ff) (See Appendix 1 for detailed information on the allocation of objects to functions and key functions) (Table 1). The three classes are:

Capital Assets: which represent real estate, and the improvements made on an allotment or household site. They belong to the owner of the property, but also reflect the standard of property that is affordable to a tenant.

Disposable Income: which comprise all the chattels, the ‘consumer discretionary’ and the ‘consumer staple’ items. More than any other category this represents levels of affluence and access to goods and services.

Income Producing Resources: which are those items that may be used in the obtaining of income, including the growing of crops (Husbandry), the use of various forms of transport (Transport), the tools of trade or industrial processes (Work).

This terminology has been formulated for a specific

research purpose, namely the assessment of levels of affluence or access to goods and services at a macro level, so it is appropriate to now briefly discuss research goals or research design.

Table 1: Asset classes and key functions

Asset Class	Key Functions
Capital Assets	Construction
Disposable Income	Containers
	Food
	Household
	Miscellaneous
	Personal
	Recreation
Income Producing Resources	Services
	Husbandry
	Transport
	Work

Research goals

In their assessment of archaeological sites and assemblages, Murray and others have promoted an approach that brings together both the historical and archaeological evidence for each site. They have formulated a set of research questions that can be answered by excavation, analysis of assemblages and historical documentation, both for specific locations and larger geographical areas (Murray et al. 2003:114-117, 126-127). The Exploring the Archaeology of the Modern City project (EAMC) has chosen to examine domestic assemblages in the urban context and to ask research questions about the role of cities, not only in the movement of goods, but also of people.

Historical research on the biographies of individuals, families or groups lends itself to questions relating to migration, the movement of people and social mobility. Given that the settlement of Australia was largely the result of the social upheaval and dislocation caused by the industrial and agricultural revolution in the United Kingdom, it is appropriate to ask whether the decision to migrate, either forced or freely made, was ultimately a blessing or a curse in terms of life outcomes and descendants. In addition, the same question can be asked of the career and other choices or decisions made in the Australasian context to determine whether they had successful outcomes or not for the people concerned.

For example, for the period from 1788 to the 1840s in New South Wales, we might ask whether the choices available to the convict, the emancipated convict, the ‘native born’ and the ‘came free’ enabled them to take advantage of the opportunities available to them in the colonies or whether they were constrained by a lack of opportunity. We can adapt these same questions to a multitude of situations. In this paper the case study seeks to determine what choices were available, and what decisions were made by the migrant Cornish copper miners and Welsh smeltermen and their families at a mine site in Central Western New South Wales.

By integrating both historical documentation and archaeological data, historical archaeology has a fundamental and distinct contribution to make. These questions are answerable by the primary historical and archaeological evidence, provided we are prepared to let it speak. The methodology proposed in this paper is by no means the complete answer, but makes a contribution by providing a scale of affluence, or access to goods and services, that is objective and independent of the debate about class divisions. It supplies an independent

means of determining the success or otherwise of the decision-making described above. It also provides insights into questions of literacy and the roles of women and children, by providing thresholds for this type of evidence. In this context, threshold means the minimum number of functions in an artefact assemblage before evidence of literacy appears, or before the presence of artefacts usually associated with women or children.

Archaeological evidence for literacy is frequently provided by slate pencils and slate writing tablets, as well as by ink bottles. The former articles are usually associated with teaching children to read and write, but could also be used in the home or workplace for keeping tallies or records (for slates likely to have been used by adults in a domestic and industrial context, see Higginbotham E. & Associates Pty Ltd. 1991b: 166; Davies, P. 2005). Literacy was and is highly valued as an important factor leading to improved life conditions. It is therefore an important marker in the archaeological record. The question is can we correlate literacy and affluence in the archaeological record or is literacy more likely to be influenced by other factors, such as occupation?

The study of the 1828 Census of NSW reveals a population dominated by penal institutions and classifications. The population was heavily biased by convict transportation, so that for every female there were two males. Marriage was heavily skewed in favour of those men with property or a trade. The unskilled men had little chance of finding a partner, so that ultimately many died without issue (Higginbotham 1994:48-49). Although this population imbalance may have been redressed in the generation following the end of transportation in 1840, nonetheless marriage continued to require a certain level of income and is an important marker of successful outcomes in life choices and decision-making. But at what threshold do women and children become apparent in the archaeological record? Or, to rephrase this question, what is the minimum number of functions in an assemblage at which artefacts associated with women and children first present themselves?

In a society without social welfare, an accident, ill-health or unemployment could easily lead to poverty and starvation. Means of support in these circumstances were limited to family and relations, employee welfare mechanisms, unionism or occasionally the church or government institutions. Marriage was therefore a valued institution, not only for the rearing of children, but also to satisfy the requirements of support in times of need, by creating a group of relatives and in-laws.

Table 2: Sites of buildings

Buildings	Interpretation – usage
Building (W001) and associated buildings (W008, W009, W010, W011, W012, W013, W014)	Mine management – Chaplain's House or Underground Manager's House. Housing of senior staff at mine or chaplain and respective families.
Buildings (W005 and W006) Building (W002) and associated buildings (W003, W007, W015)	Industrial or agricultural use Domestic use – housing of mine employee and family.
Buildings (S005) and associated structures (S006, S007)	Bon Accord Hotel
Individual buildings (S002, S004, S008, S009, S011) and associated structures.	Miner's huts – accommodation for a miner and family or for groups of miners.
The Old Village Centre (S015-S020, S149-S155)	Shops and residences for shopkeepers

Table 3: The principal characteristics of the Minor and Major Habitation Groups

Minor Habitation Group	Major Habitation Group
Small buildings	Large buildings
Single structure	Multiple structures
Minimal development	Extensive development
Small artefact assemblages	Large artefact assemblages
Small number of functions	Large number of functions
Less capital investment (Construction)	More capital investment (Construction)
Less disposable income (Food, Household, Miscellaneous, Personal, Recreation, Services)	More disposable income (Food, Household, Miscellaneous, Personal, Recreation, Services)
Less access to income producing resources (Husbandry, Transport, Work)	More access to income producing resources (Husbandry, Transport, Work)

Table 4: Sites belonging to the Minor and Major Habitation Groups

	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work	Total functions
Minor Habitation Group												
S002	9	2	9	3	0	2	9	2	3	1	6	46
S004	3	1	5	0	0	0	1	0	0	2	0	12
S008	1	1	5	0	0	0	1	0	0	1	0	9
S009	4	2	3	1	0	0	0	0	0	0	2	12
S011	10	1	7	0	0	2	1	2	0	5	4	32
Major Habitation Group												
W001	13	2	10	5	1	3	7	1	3	6	10	61
W002	13	2	11	6	1	5	13	2	4	8	13	78
S005	16	1	13	6	1	7	15	3	3	6	15	86
OVC	14	2	14	7	4	6	13	3	2	6	18	89

CADIA, A CASE STUDY

The former mining village of Cadia is located 22 kms south of Orange in Central Western NSW (Higginbotham E. & Associates Pty Ltd 2005a) (Figures 1 and 2). Mining of copper commenced in the late 1850s and was strongly associated with migrant groups of Cornish miners and Welsh smeltermen. The mine ceased operation in 1868 with the collapse of international copper prices. Gold extraction became the focus of mining from 1870 onwards, with another boom in copper extraction from 1905–1917. From 1919 to 1928 iron ore was quarried before closure of the mine, with a brief resurrection of iron ore extraction during WWII. The mining village thrived from the 1860s, but waxed and waned with the vicissitudes of mining until the 1920s. By the 1940s insufficient of the village infrastructure survived, forcing Australian Iron & Steel to construct a work camp for its employees. The first burial in Cadia Cemetery took place in 1864, the last in 1927, neatly framing the life of the village, now abandoned (Higginbotham & Associates Pty Ltd 2002).

Archaeological investigation of part of Cadia Village in advance of goldmining by Cadia Holdings Pty Limited took place in 2002, covering a large area of the south-western or earlier part of the village (Figure 2). The importance of historical research of the lives of the inhabitants of Cadia Village was recognised from the outset, in order to provide a high level of integration of the historical documentation and

archaeological evidence. In fact over one hundred historical biographies had already been researched by Terry Kass for the 1997–1998 excavation of Cadia Cemetery, located a short distance to the south of the village site (Kass 2002). Before the Cadia Village excavation, this research was extended to include the history of the Cadia Village community, together with the role played by a significant number of Cornish and Welsh migrants (Kass 2005; Symonds 2004).

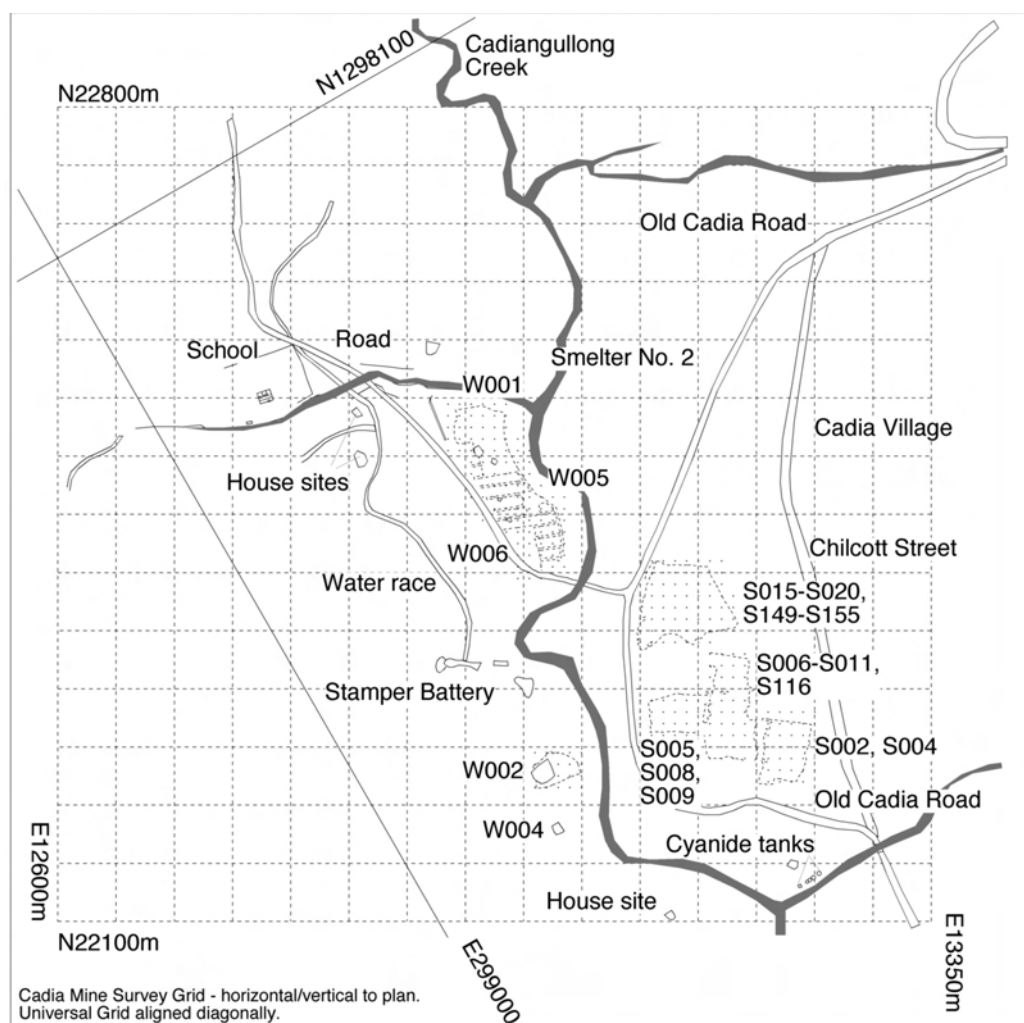
Within the south and western parts of the village, an area comprising approximately 180,000 square metres (18 hectares), various house sites were selected for archaeological investigation, based on a series of research questions (Higginbotham E. & Associates Pty Ltd 2005a. Vol. 1:183ff). The completed archaeological investigation allowed these structures to be grouped according to their principal use (Table 2). The results of archaeological excavation and artefact analysis enabled a typology of house sites to be formulated, dividing them into two habitation groups (Table 3). The analysis of the assemblages from each house site revealed

wide variation in the total number of functions represented within them, but with no overlap between the two habitation groups (Table 4). The dichotomy revealed by the structural archaeological evidence was thus confirmed by the mutually exclusive ranges of functions (Table 4). (Sites W005 and W006 are not included in this analysis, since they were industrial buildings with no domestic assemblage.)

Minor Habitation Group

The Minor Habitation Group includes a range of huts, principally of post and timber framed construction (Table 5, Figures 2 and 5). The structural evidence and artefact assemblages confirm that these were the huts occupied by miners and their families, or by groups of miners sharing accommodation.

1865 – ‘Nearly the whole of the buildings on the ground belong to the Company, and they are let to the



CADIA VILLAGE.
Archaeological Excavations, 2002.
Location of archaeological sites (W and S numbers).
(Other features on west side of Cadiangullong Creek and to south of Village plotted by Carpenter Collins & Associates, surveyors, 1997.
Topographic detail from aerial photograph, Land Information Centre, 1993).

Figure 2: Plan of Cadia Mining Village, showing principal features and areas of excavation.

0 500 metres

Edward Higginbotham & Associates Pty Ltd

men at very moderate rents. For an ordinary slab cottage, sufficient for a married man and his family, 4s. per month are charged; whilst single men who lodge together are charged 1s. per month.' (*Sydney Mail*, 16 September 1865)

1868 – 'upwards of 60 huts suitable for officers and workpeople's residences, a few of the latter built of slabs with shingled roofs, the remainder of slabs and bark roofs.' (French 2000)

The dating evidence suggests that buildings S002 and S004 may represent company huts built in the 1860s to 1880s, although the photographic evidence indicates that similar buildings were still being erected at a later date (Higginbotham E. & Associates Pty Ltd. 2005a Vols. 2 and 3).

Only two huts, namely S002 and S011, provided consistent artefact evidence of occupation by women and children. For all the other huts in the Minor Habitation Group, namely S004, S008 and S009, there is no artefact evidence of

occupation by females or children. On this basis the assemblage analysis suggests that a minimum of 32 functions is near the threshold for a level of income sufficient to support a wife and children (Table 4 – S011).

The low level of affluence implied by a limited range of artefact functions in some of the huts (S004, S008, S009) indicates that there were some miners at Cadia, who were not in a financial position to support a wife (Table 4). Other men may have been married, but may have left home to find work, living a frugal lifestyle in order to send their wages to their families. There is historical evidence that the women and children remained at Cadia when the mine closed in 1868, while the menfolk travelled to find work elsewhere. The families only removed themselves completely when the chances of reopening the mine appeared hopeless (Kass 2005:106-109). An archaeologist excavating a miner's hut on the next mine site in this transition period could easily conclude it was a male dominated frontier settlement, and totally miss the status of the men as married with children.

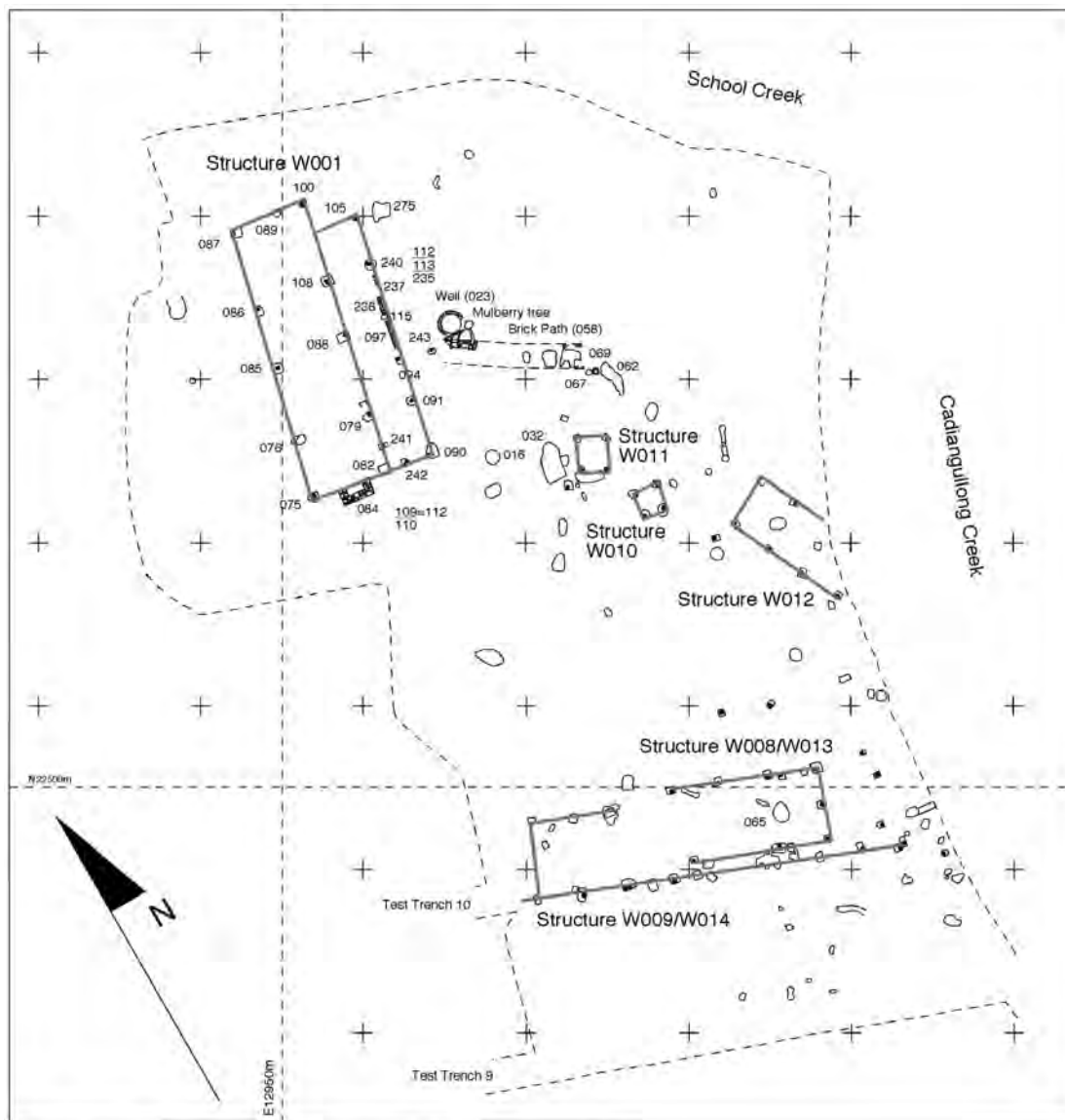


Figure 3: Plan of Chaplain's House, later the Underground Manager's Residence (W001) and associated buildings on the west bank of Cadiangullong Creek.

CADIA VILLAGE - WEST VILLAGE.

Archaeological Excavations, 2002.

Building W001 (Chaplain's House; Underground Manager's Residence) and Structures W008/W014, W009/W013, W010, W011 and W012.

0

50 metres
Edward Higginbotham & Associates Pty Ltd

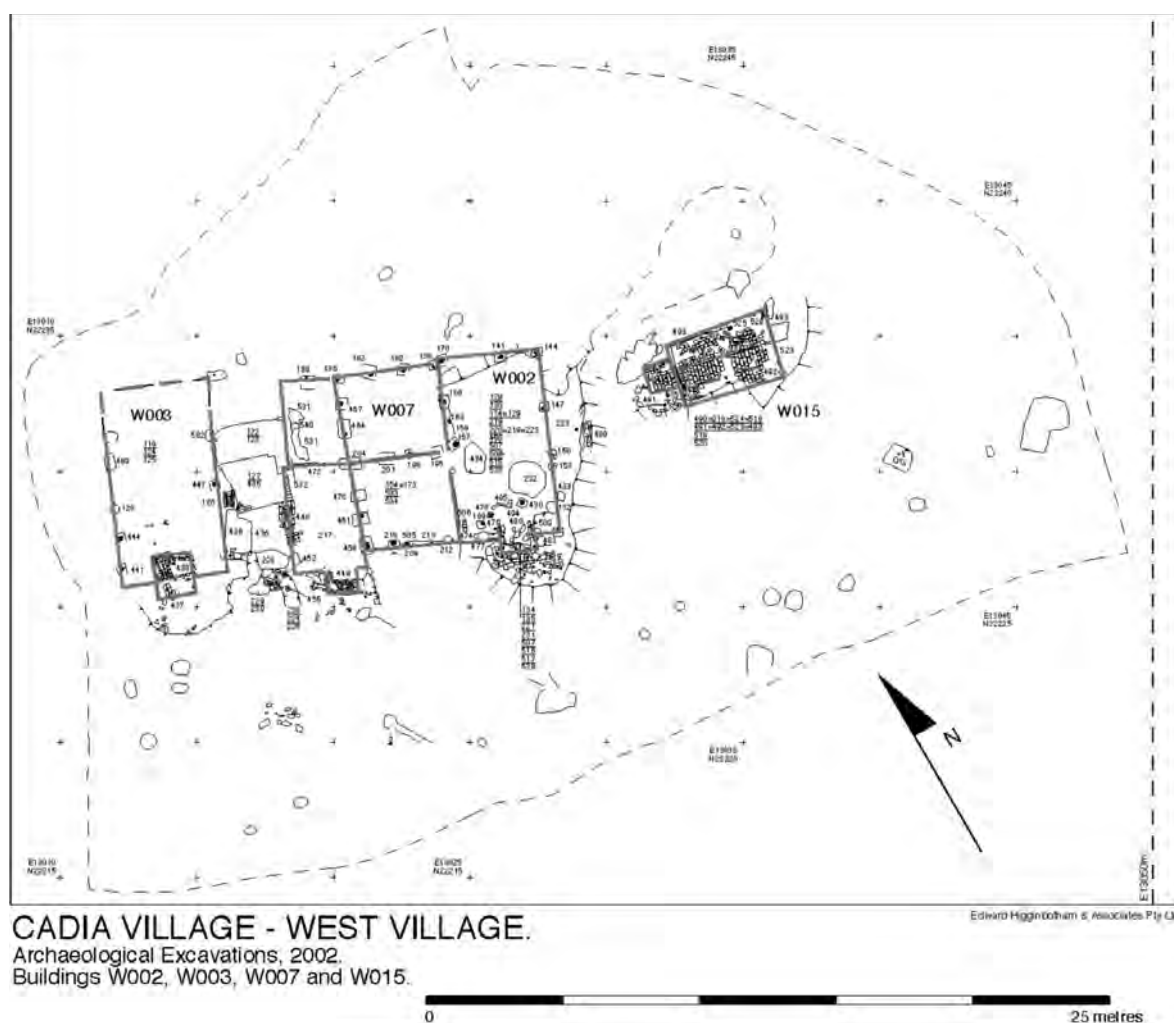


Figure 4: Plan of buildings on west side of Cadiangullong Creek (W002, W007 and W015).

Nonetheless there is one common element for all the occupants of the miner's huts, namely, absence of evidence for literacy. While some may argue that slate pencils and tablets are indicative of the education of children alone, there is ample evidence to suggest that this was also a basic writing material for adults as well (Higginbotham E. & Associates Pty Ltd. 1991b: 166; Davies 2005). If there is no evidence for children on a site, there is thus no need to suggest there will be a similar absence of writing materials. Even in the miners' huts where there is evidence of children, there is none for literacy. In contrast, all sites in the Major Habitation Group possess evidence for literacy. The importance placed on schooling by the Cadia community, as reflected by the petition for the school in 1863, should have benefited all the children of the village, yet the archaeological evidence suggests that this education did not necessarily include the poorest miners and their families, who may not have been able to afford the fees.

The evidence from Cadia therefore reveals that even among the miners there were people with a range of means

and incomes. The better off miners had brought their families with them, though there are still distinct differences in the level of domestic comfort indicated by the assemblages from S002 and S011. The limited number of functions in the assemblages for S004, S008 and S009 provides a stark measure of the poverty and disadvantage of some of the miners.

Major Habitation Group

The range and variation in means and income indicated by the artefact assemblages for the Minor Habitation Group provide even greater contrast when compared to the Major Habitation Group (Table 4). Each site comprises a range of structures (Table 6). The sites in the Major Habitation Group all exhibit a higher total number of functions. In each case there is ample artefact evidence for women and children, as well as literacy.

The level of affluence indicated by mine management or the chaplain's residence (W001), namely 61 functions, is at

Table 5: Structural evidence for Minor Habitation Group

Site sub-division	Name or function	Size (metric)	Area (square metres)	Construction technique
S002	Hut	6.6 by 6 ?	39.6 ?	Post and timber framing
S004	Hut	5.5 by 5.5 ?	30.25 ?	Timber framing on piers
S008	Hut	7 by 3.2	22.4	Post construction
S009	Hut	7 by 3.9	27.3	Post and timber framing
S011	Building	8.55 by 6 ?	51.3 ?	Post and timber framing



Figure 5: General plan of buildings and other structures on the east side of Cadiangullong Creek, in the south-west part of Cadia Village. The concentration of buildings (upper left) is the Old Village Centre (OVC).

CADIA VILLAGE - EAST VILLAGE.

Archaeological Excavations, 2002.
Structures S002, S004-S009, S011, S015-S020, S149-S155.

0 50 metres

Edward Higginbotham & Associates Pty Ltd

the lower end of the number of functions for the Major Habitation Group, in contrast to 46 functions being the maximum exhibited for the Minor Habitation Group (Table 4, Figures 2 and 3).

The group of small buildings (W002, with W003 and W015), with its various additions and alterations, was originally interpreted as a miner's hut, to which additions had been made, possibly as the family grew (Figures 2 and 4). But the assemblage reveals that the occupants were among the better off at Cadia. The assemblage implies a miner with his wife and children, but it seems likely that he had a more responsible and more highly paid position at the mine because the number of functions in the assemblage equates with sites

associated with mine management (W001) and the more wealthy inhabitants of Cadia in the Major Habitation Group. Unfortunately his identity is unknown, because the individual tenants on company land are unrecorded.

Historical evidence suggests that building (S005), with its accompanying sheds, stockyard, toilet and rubbish dump was the 'Bon Accord Hotel', run by Humphrey Hicks (Figures 2 and 5). The high range of functions is to be expected in these commercial premises. The same is also true for the Cadiangullong Store and other retail premises in the Old Village Centre (OVC) (Figures 2, 4 and 5). On the basis of this evidence, the village entrepreneurs and innkeepers shared in the wealth available to mine management. The shared social

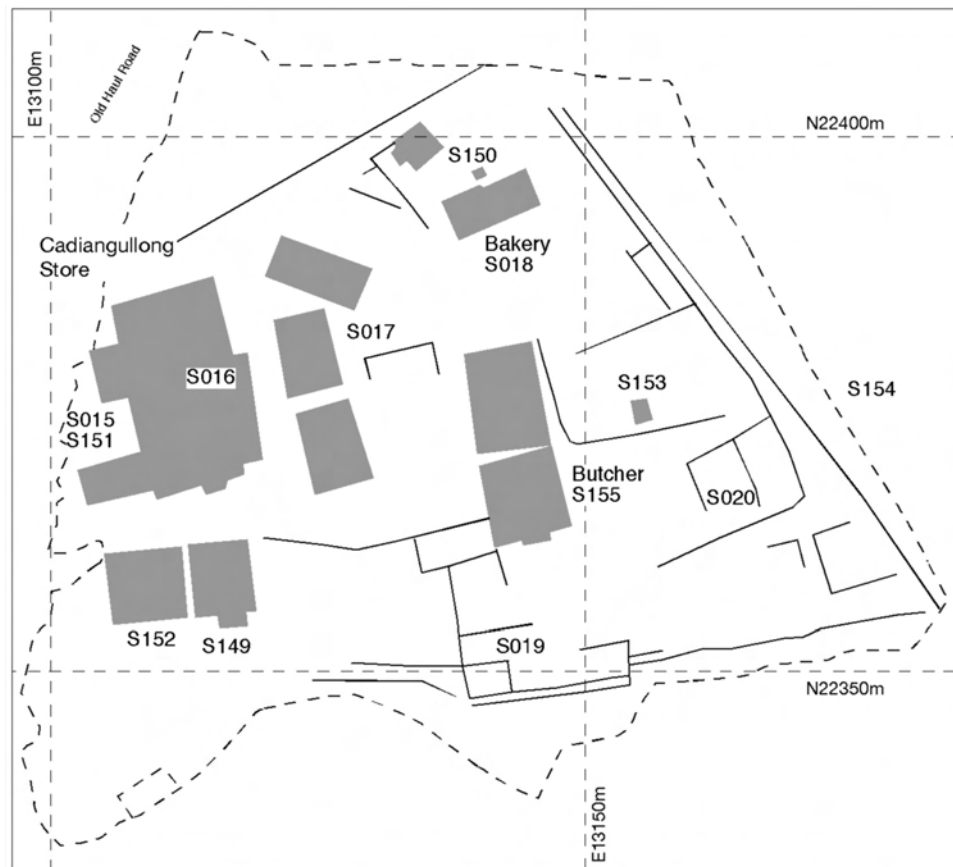


Figure 6: A simplified plan showing the buildings in the Old Village Centre (OVC), including the Cadiangullong Store (and Post Office), the butcher, the bakery and four other buildings, probably two conjoined shops and residences.

CADIA VILLAGE - EAST VILLAGE (Old Village Centre)

Archaeological Excavations, 2002.
Structures S015-S020, S149-S154.
Showing buildings, fencelines and other structures.

0 50 metres

Edward Higginbotham & Associates Pty Ltd

standing of the mine management and entrepreneurs is further confirmed by the close family relationships between the two groups (Kass 2005:76-80, 85-87; Symonds 2004). The evidence from Cadia indicates that this mine site, though remote, was not a male dominated frontier settlement, but an integrated community.

The ability of integrated communities to thrive around the larger copper mining sites is incontrovertible, including examples such as Burra, Kapunda, Kadina, Wallaroo and Moonta in South Australia (Auhl 1986; Drew 1989, 1990, 1991, 2002; Drew and Jones 1992) (Figure 1). Though the village no longer survives, the same processes occurred at Cadia. Even at short-lived gold mines, like Paradise, Queensland, the brief flowering of a community has been demonstrated (Quirk 2008). It is perhaps more surprising at typical 'poor man's diggings', like Dollys Creek, Victoria (Lawrence 1998). Some workings, like Wire Gully, near Cadia, may never have spawned a settlement, but were worked by small groups or people from surrounding farms (Higginbotham E. & Associates Pty Ltd 2003b). Yet where an income could be made by both man and wife, sufficient to support a family, people chose to live adjacent to the mines in perhaps primitive, but nonetheless domestic surroundings.

This paper has demonstrated that it was not the women alone who provided domesticity, but a certain level of income that enabled the miner and his wife to purchase domestic chattels.

While the number of functions in the Minor and Major Habitation Groups appears to be mutually exclusive, further comparative analysis reveals that the social and economic data may have additional meaning. Prior to the excavation of Cadia Village, two other excavations had been completed on huts belonging to farmers, who took up land under the conditions of the 1861 Crown Land Alienation Act in the Cadia Village hinterland (Figure 1). This act allowed persons with few resources to purchase and improve small acreages of land. Both blocks of land were taken up in the late 1870s. The first, Portion 251, Parish of Waldegrave (200 acres), was known as 'Waringa'. The first house was built in 1879 and was occupied until 1886 or 1887, being then abandoned for a more favourable farm site on the neighbouring portion (Higginbotham E. & Associates Pty Ltd 2003a). The second was located on Portion 84, Parish of Clarendon, 100 acres, and was again taken up in 1879 by Henry Hunt, a former miner. The house continued in occupation until 1929 and became part of Tynan's slaughterhouse, which supplied Cadia Village with meat (Higginbotham & Associates Pty Ltd 2001).

Table 6: Structural evidence for Major Habitation Group
(The table is limited to a catalogue of the living spaces, excluding ancillary buildings and structures.)

Site sub-division	Name or function	Size (metric)	Area (square metres)	Construction technique
W001	Chaplain's house/ Underground Manager's house	17.4 by 4.9	Total 127.82	Timber framing on piers Timber floor?
W001	Skillion	15.2 by 2.8		
W001	Fireplace	2 by 1.05		
W002	Hut	6.68 by 3.72	24.84 (total wattle and daub building = 47.62)	Post and wattle and daub
W002	Fireplace	1.2 by 0.95		
W007	2 rooms	3.36 to 3.76 by 6.4	22.78	Post and wattle and daub
W007	2 rooms	2.08 by 3.15 and 2.5 by 3.8	16.05	Timber framing
W007	Fireplace	1.05 by 0.8		
W003	Hut	7.1 by 3.7	26.27	Post construction
W003	Fireplace	1.4 by 0.8		
W015	Hut	3.76 by 2.5	9.4	Post and timber framing. Brick floor
S005 (1)	Building	15.6 by 3.5 ?	54.6 ?	Timber framing on stone rubble platform
S005 (2)	Building	–	–	Timber framing and possibly wattle and daub
S016	Building	19.35 by 8.75	169.31	Post and timber framing
S016 E	Fireplace	1.6 by 1.1		
S016 E	Skillion	11.2 by 2.8	31.36	Post and timber framing
S016 W	Awning or loading bay	5 by 2.8	14	Post and timber framing
S017 (1)	Building	8.2 by 5.2 ?	42.64 ?	Timber framing on stone rubble platform
S017 (2)	Building	6.5 by 4.6	29.9	Post and timber framing. Later cement floor
S017 (2)	Fireplace	2.7 by 0.8		
S017 (3)	Building	–	–	Post and timber framing
S018	Bakehouse	3.65 by 3.65	13.32	Post and timber framing
S018	Bakers oven	4.08 by 3.4	13.87	Brick
S149	Building	6.75 by 5.5	37.12	Post and timber framing
S149	Fireplace	2.85 by 1.3		
S152	Building	6.6 by 4.7	31.02	Post and timber framing
S154	Building	–	–	–
S155 (1)	Building	7.7 by 7.1	54.67	Post and timber framing
S155 (1)	Fireplace	2.6 by 1.2		
S155 (2)	Building	9.7 by 7.05		Post and timber framing

Table 7: Functional analysis of the sites at Cadia, including neighbouring farms

	Construction	Container	Food	Household	Handiwork	Miscellaneous	Personal	Recreation	Services	Transport	Work	Total functions
S008	1	1	5	0	0	0	1	0	0	1	0	9
S004	3	1	5	0	0	0	1	0	0	2	0	12
S009	4	2	3	1	0	0	0	0	0	0	2	12
S011	10	1	7	0	0	2	1	2	0	5	4	32
Waringa	8	2	10	1	0	2	4	2	1	1	3	34
S002	9	2	9	3	0	2	9	2	3	1	6	46
Tynan's	9	1	10	6	0	6	11	3	1	1	5	53
W001	13	2	10	5	1	3	7	1	3	6	10	61
W002	13	2	11	6	1	5	13	2	4	8	13	78
S005	16	1	13	6	1	7	15	3	3	6	15	86
OVC	14	2	14	7	4	6	13	3	2	6	18	89

The assemblages for Tynan's and Waringa are slotted into the sequence for Cadia, now sorted by the number of functions (Table 7; Figure 7). Both Tynan's and Waringa belong to farmers making their first foray into property ownership under relatively generous government incentives. The implication is that an assemblage containing between 34 and 53 functions is characteristic of a person or family with the means to purchase property. This evidence has been confirmed by subsequent archaeological excavation as a threshold for property ownership (discussed further below). The evidence therefore reveals that a number of the miners and their families at Cadia may have had the means to purchase property, had they wished to do so. For example, the inhabitants of huts S002 and W002 would have been able to purchase land, on the evidence of the functional analysis. The same also applies to the mine managers, licensees of the Bon Accord Hotel and potentially also the proprietors of the Cadiangullong Store and other shops.

While social upheaval and dislocation were characteristics of the industrial and agricultural revolution, social mobility

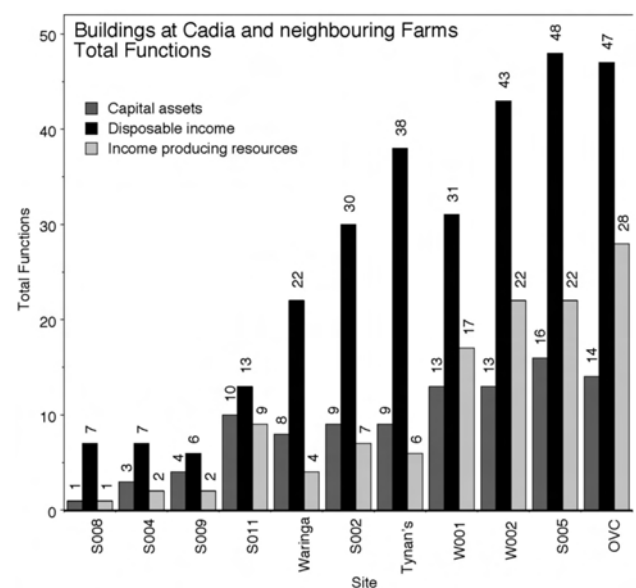


Figure 7: The assemblages from the farm sites (Waringa and Tynan's) bridge the gap between the Minor and Major Habitation Groups at Cadia and indicate the threshold of property ownership.

was also a feature in the burgeoning growth of the middle classes during this same period. The evidence revealed by the assemblage analysis indicates that social mobility was not just a possibility, but was an opportunity actively grasped by the Cadia community (Kass 2005:112-115). The saying, ‘once a miner, always a miner’ (Knapp 1998:4) did not apply to them, for the inhabitants of the village frequently took advantage of the conditional purchase provisions to obtain land in the neighbourhood (Kass 2005). The independent scale of affluence produced by the assemblage analysis has the potential to reveal a greater level of understanding of the choices made by miners and villagers after the closure of the mine in 1868. Some were constrained to seek work on neighbouring or distant mines. Others chose to stay in Cadia Village, while others again managed to put down roots on the land through Conditional Purchase arrangements or other land purchases (Kass 2002, 2005; Symonds 2004).

Comparative sites – a brief synopsis

Since the archaeological excavation at Cadia in 2002, this methodology has been extended to other sites. One of the foremost of these was 45 Macquarie Street, Parramatta (Allotment 16, Section 12, Parish of St. John) (Higginbotham E. & Associates Pty Ltd 2007) (Figure 1). Due to the depth of stratigraphy on this site it was possible to physically separate assemblages from the 1800s, 1820s, 1830s, 1840s, 1860s and 1880s. The 1800s assemblage belonged to the original ‘convict hut’ erected on the town allotment. The majority of historical archaeological sites in Australia have very shallow stratigraphy. In many cases, features belonging to the whole date range of occupation are cut into subsoil, so that only horizontal stratigraphic relationships are discernible. Occupation layers, if they exist, can sometimes be limited to a single layer or series of thin lenses, so that the separation of artefacts from one period of occupation from another becomes impossible or at least unreliable. Even with the favourable conditions found at 45 Macquarie Street, Parramatta, the common problem of the mixing of the assemblages of convict and later free occupation had to be overcome. The resulting 1800s assemblages (with and without intrusive artefacts) reveal a highly impoverished male-only existence (Table 8, Figure 8).

Table 8: Functional analysis of assemblages – 45 Macquarie Street, Parramatta

	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work	Total functions
1800s Assemblage with intrusives	5	1	5	0	0	0	0	1	1	0	1	14
1800s Assemblage without intrusives	2	1	5	0	0	0	0	1	0	0	0	9
1820s Assemblage	6	1	7	1	1	4	4	2	1	0	0	27
1830s Assemblage	9	1	9	6	2	2	1	2	3	1	4	40
1840s Assemblage	7	1	8	5	1	2	4	3	3	1	3	38
1860s Assemblage	7	1	9	3	1	1	4	2	3	2	4	37
1880s Assemblage	11	2	11	11	2	3	11	3	8	3	5	70

This ‘convict hut’ was later used as a wheelwright’s workshop and residence, before being replaced by a brick cottage, directly after title to the land was secured by grant, which was purchased in 1841. The assemblage reveals social and economic stagnation in the situation of the owners of this household from the 1840s to 1860s. This was tied in with the death of John Walker (1799–1846), wheelwright, leaving his widow and children to cope as best they could with the loss of the main breadwinner for the family. They appear to have survived with a reasonable income, if the assemblage analysis is to be relied upon. They sold the property in 1875, after which the allotment was divided into two lots. The eastern lot was owned and occupied from 1879 by Samuel Sweeney, Parramatta, coachbuilder, with his coachworks further east on Macquarie Street. He was the person to whom the affluent assemblage of 70 functions appears to have belonged. He overreached himself in his affluent lifestyle, the house being sold by mortgagee sale in 1886 – not the last time this has happened on a site where this methodology has been tested.

The assemblage from 45 Macquarie Street has been compared with other sites in North Parramatta (Table 9) (Figure 1). All of the sites provided confirming evidence for thresholds for:

1. Literacy – reduced from 34 (Waringa) to 27 functions (45 Macquarie Street).
2. Women and children – reduced from 32 (Cadia) to 27 functions (45 Macquarie Street).
3. Threshold between the leasing and ownership of property – 34–53 functions.

The first two assemblages from North Parramatta belong to households where the property was owned, while the latter was tenanted from the 1830s to 1890s (Higginbotham E. & Associates Pty Ltd 2005b and 2009b). The assemblages from North Parramatta raise questions about the character of the area, where owners and occupiers seem largely to have been restricted to middle income levels throughout the nineteenth century. The numerous small cottages of the area, now conserved in the North Parramatta Conservation Area, suggest

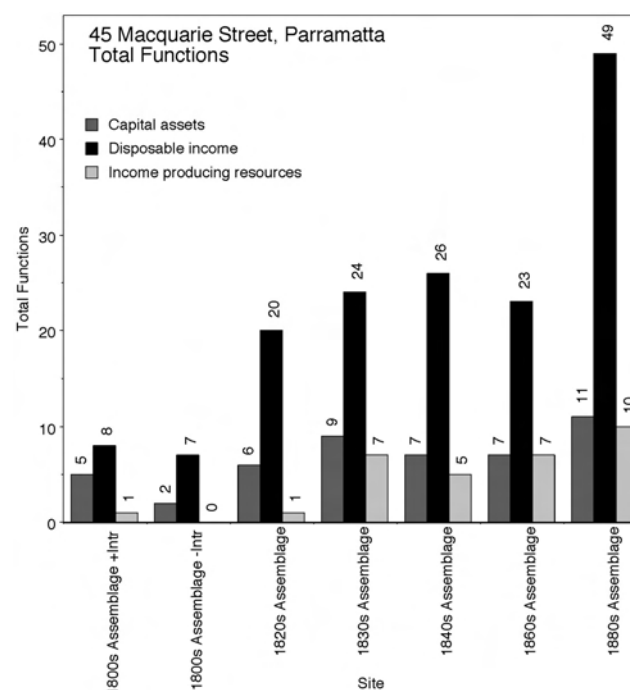


Figure 8: The assemblage from 45 Macquarie Street, Parramatta, indicates social and economic stagnation in the situation of the owners between the 1840s and 1860s.

that the methodology of assemblage analysis may also be used as a pointer to the social and economic standing of localities, suburbs and even wider regions, as demonstrated below.

Further afield the methodology has also been tested on sites in Port Macquarie in NSW (Figure 1). The town

Table 9: Functional analysis of assemblages – North Parramatta

	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work	Total functions
1831 cottage 50-50a O'Connell Street	10	1	10	4	1	3	7	3	5	0	3	47
Bakery 8-10 Grose Street	11	1	8	7	1	3	10	3	5	1	2	52
1830s cottage 21-23 Grose Street	12	1	9	6	0	3	9	5	3	2	2	52

Table 10: Functional analysis of assemblages – Free Overseers' Cottages 2 and 3, School of Arts and Town Hall, at the Glasshouse, Clarence Street, Port Macquarie

	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work	Total functions
Cottage 2, 1820s-1830s	10	1	10	4	1	2	3	2	1	1	3	38
Cottage 3, 1820s-1830s	8	1	7	5	0	2	2	1	2	0	1	29
Cottage 2, post 1830s	6	1	6	3	0	2	2	1	0	0	2	23
Cottage 3, post 1830s	6	2	9	4	1	2	3	2	0	0	4	33
School of Arts, 1880s onwards	12	2	10	5	1	3	7	2	4	1	5	52
Town Hall, 1890s onwards	15	2	12	8	1	5	7	2	4	2	10	68

Table 11: Functional analysis of assemblages – 18-20 Clarence Street, Port Macquarie

	Construction	Container	Food	Household	Husbandry	Miscellaneous	Personal	Recreation	Services	Transport	Work	Total functions
Outbuildings to 1860s	15	2	8	6	2	4	10	3	4	1	7	62
House and back yard to 1880s-1890s	15	2	12	9	2	4	12	4	7	2	8	77
House to 1880s	15	2	12	8	2	4	10	6	5	2	7	73
Back yard to 1890s	14	1	9	6	1	3	11	4	4	1	6	60
Rubbish pit to 1880s	10	2	9	4	1	3	3	0	4	0	4	40

commenced its life as a penal settlement from 1821 until 1830, when allotments for the town were laid out and offered for sale. Some penal institutions continued until withdrawn in 1847, with convicts being used for public works. The assemblages from the Free Overseers' Cottages (Nos. 2 and 3) dating to the 1820s and 1830s, revealed an assemblage consistent with public officials, housed by government (i.e. at or below the range of 34–53 functions, the threshold between the leasing and ownership of property) (Higginbotham E. & Associates Pty Ltd 2008). The level of affluence of the occupants of these quarters did not improve in the post 1830s period, suggesting stagnation in the local economy, caused by the combination of the 1841 Depression, the end of transportation and the closure of the government penal establishment in 1847. The local economy did not recover until the 1860s, but flourished in the 1880s (Table 10, Figure 9).

The necessity of testing this hypothesis with other sites in Port Macquarie was answered by the recent excavation of 18-20 Clarence Street, a property that started its life as the Post Office for the penal settlement (1825–1830), and then become the house of Stephen Partridge, his wife and 11 children until 1852 (Higginbotham E. & Associates Pty Ltd 2009a). Partridge had served as Superintendent of Convicts from 1822 to 1830. He obtained the first liquor licence in Port Macquarie in 1830, became a constable in 1835 and was reappointed to his original position from 1836–1846. Of all the people in Port Macquarie, he would have been likely to weather the economic doldrums of the town, but he chose to take out a mortgage on his house for £257 at 8 per cent interest for a five year period in 1842. As with many people who entered the 1840s Depression with high debt levels, he too succumbed to a mortgagee sale in 1852. While he chose to maintain an affluent lifestyle, he could not escape the consequences of the financial crisis and appears to have lived beyond his means, as indicated by the large number of functions in the assemblage (Table 11, Figure 9). The prevailing economic conditions not only for the town, but the colony as a whole from the 1840s to 1860s, took their toll. In contrast, Henry Frederick Brown,

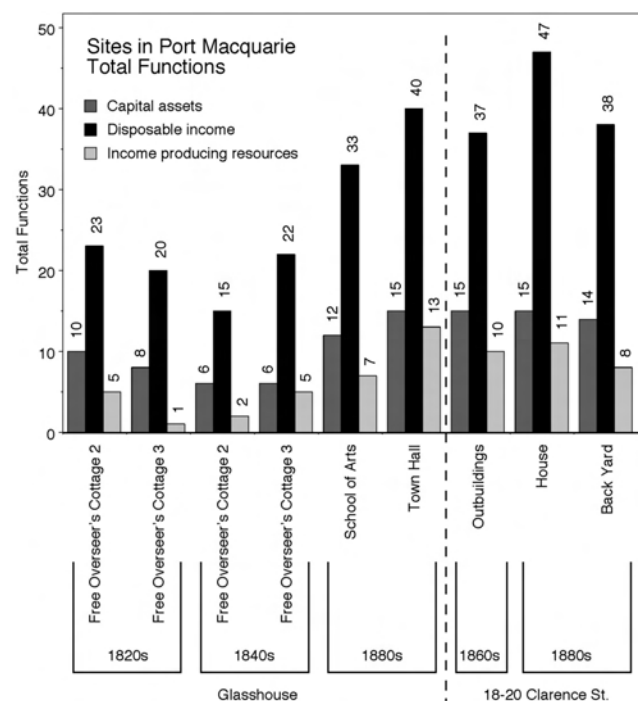


Figure 9: The assemblages from the Free Overseers' Cottages indicate economic stagnation in the 1840s. This is contrasted with the affluence of the owners of the house at 18-20 Clarence Street up to the 1860s and 1880s, a level of affluence not reached in the assemblages for the School of Arts and Town Hall until the 1880s and 1890s.

Chief Constable, purchased the property in 1859, just as the economy was showing signs of recovery. With secure employment, he was able to live a comfortable lifestyle (Table 11, Figure 9). The levels of affluence are similar to those indicated by the Town Hall and School of Arts in the 1880s and 1890s. It is interesting to note how these public buildings also possess domestic assemblages, the latter indicating that the School of Arts had become a centre of social and community life in the late nineteenth century (Table 10, Figure 9).

Limitations of the methodology

The methodology outlined in this paper has a number of limitations in its usage. It requires extensive area excavation to ensure the recovery of large artefact assemblages. Each site also has to belong to a period where on-site garbage disposal is the norm. Those familiar with urban excavations in Sydney or Parramatta will readily acknowledge that off-site garbage disposal was introduced from the 1870s to 1890s.

Small sample bias must be considered as an important issue and potential detractor from the findings of this methodology. At Cadia Village, large assemblages of artefacts were usually present in fireplaces, cess-pits and rubbish dumps, though not always within each house. Providing an assemblage was available in one or more of these locations, it was considered a sufficient sample for functional analysis. Both S004 and S008 had features (rubbish dumps and cess-pits) which normally provided large artefact assemblages. The fact that they did not provide a large assemblage is therefore more likely due to the nature of occupation, rather than sample bias. Apart from S009, the small range and limited diversity of the assemblages for the remaining four sites in the Minor Habitation Group may actually reflect the nature of occupation rather than sample bias. This conclusion was assisted by extensive area excavation, which was more likely to recover places of garbage disposal had they been present.

It is also necessary to recognise when one or more households are potentially present in an assemblage. For example, it is highly likely that the Old Village Centre (OVC) at Cadia represents a number of premises, in addition to the Cadiangullong Store. Re-analysis of this particular assemblage would prove fruitful, though this does not affect the interpretation of the other households in the Major Habitation Group. In other instances, when ownership or tenants change, the assemblage has to be considered as the combination of the lifestyles of all occupants, unless the assemblage can be divided on a chronological basis.

Usage of this methodology has highlighted the potential for tracing changes in socio-economic standing over time, from the 1800s to the 1890s. When an assemblage is split up in a chronological sequence, there is a tendency for each phase to exhibit a smaller number of functions than present in the whole assemblage. Caution should be exercised when comparing a sub-assemblage of this type with the whole assemblage on another site. Likewise assemblages from individual rooms, yards and spaces have the same affect on the number of functions, limiting how these sub-assemblages can be compared with other sites.

There is a range of other sampling issues that should also be acknowledged, for example, the role of residual artefacts in multi-period sites; the possible proportional relationship or ratio between the numbers of artefacts and the number of functions and its influence on findings; or the general assumption that affluence increases throughout the nineteenth century. But comparative analysis has already revealed sufficient independence or divergence of the data from the expected results of these assumptions, in order to indicate that the methodology is providing valid results.

CONCLUSIONS

This paper has identified some of the broad social and economic factors which had a critical impact on people's lives, particularly in regard to the case study of miners in the Central West of New South Wales. Comparative analysis with other sites in Parramatta and Port Macquarie, including an assemblage from a 'convict hut', has indicated that this methodology has wider application, showing how individual families coped with changing conditions and even providing evidence for the local or regional economy. This paper has shown that assemblages can be used to reveal incomes that allowed for education, marriage and children, the purchase of property, as well as lifestyles that had the potential to lead to financial ruin. It has indicated how people's circumstances changed over time.

The methodology relies simply on the total number of functions. It does not make a distinction between the social and economic implications of individual artefact types, for example, between utilitarian and luxury wares. This is an approach that should be used for broad comparative analysis, but also to focus and stimulate the more detailed research of artefact categories, typical of specialist reports or pure or applied research. It is therefore an appropriate level of analysis for the salvage excavation report, being the first stage of an ongoing process of investigation, research, interpretation and reinterpretation. This methodology is only part of the process, one layer of analysis among many.

While the primary focus of this paper has been on the analysis of assemblages, the structural evidence for social and economic status usually recovered from sites should not be ignored. It may not be appropriate to try and fit each site or household into a defined group such as the Minor or Major Habitation Groups recognised at Cadia, but the characteristics of each group should still be taken as guidelines for comparison. The actual floor space available in each habitation may be a more precise means of comparison between sites, though the more useful statistic of floor space available per person may be out of the reach of the available evidence, except when compared with census returns.

The methodology described in this paper, initially used to analyse the assemblages at Cadia Village, is a broad measure of poverty and affluence, comparable not only from household to household, but also from settlement to settlement. Although extensive historical research was completed for individuals buried in Cadia Cemetery and the growth and development of the Cadia Village community, there was no other source of documentation that was able to provide either clear evidence of poverty among the poorest miners or an indication of the comparative wealth of mine management or village businesses. These insights provide a potential for a greater level of understanding of the reasons behind the choices made by the miners and villagers after the closure of the mine in 1868 (Kass 2002, 2005; Symonds 2004). The single most important advantage of this methodology is that it provides a yardstick for poverty and affluence, a scale of access to goods and services, with key indicators for literacy, marriage and children, derived from the artefacts themselves. It gains further effectiveness through integration with known historical contexts, for example, rental or home ownership, and through integration with historical biographies and lifepaths.

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Note: All the excavation reports by Edward Higginbotham & Associates Pty Ltd referenced in this paper are available in the Library of the NSW Heritage Branch at Parramatta.

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APPENDIX 1 INVENTORY OF KEY FUNCTIONS

The inventory includes key function, function and object descriptions (Table 12). The inventory is included in each excavation report, referenced in this paper, but has been updated where necessary for each site.

The terms 'Male', 'Female', 'Children' can be added to function names where there is a direct association with men, women or children.

The term 'Improvised' can be added to a function to indicate bush craft or the adaptation of items to serve other purposes.

In most cases, the function will identify the primary use. Any secondary use will be identified in the report, as required, when the identification of secondary or other uses adds to the ability to interpret the archaeological remains.

Table 12: Inventory of Functions

Key function and function names	Object names
Construction	This function includes all construction materials, but, where possible, is divided into specific categories, see below
Construction canvas tent or sail	Large eyelets for canvas materials, for example tents or sails
Construction decorative	Glazed tiles for bathrooms, fireplaces, etc. Paint finishes, etc
Construction door or gate	Door or gate hinges and fittings
Construction drainage	Items associated with stormwater drainage
Construction drainage or sanitation	Principally ceramic drainage pipes, which may be used for stormwater and/or sewerage.
Construction fastener	Clips, nails, spikes, brackets, pegs, rivets, studs, tacks
Construction fencing	Fencing wire and other fencing components, but not palings or posts, which are listed under Construction timber
Construction hardware	Principally metal items, the specific usage unidentified, including band, bar, cover, disc, offcut, piping, plate, ring, rod, tubing, wire
Construction improvised	Construction materials that have been hand made, representing bush craft or reuse of materials.
Construction industrial	Materials used in the construction of industrial buildings, furnaces, ovens, kilns, etc.
Construction masonry	Brick, stone, concrete
Construction metal sheeting	Galvanised iron or other iron, zinc, tin sheeting
Construction mortar and plaster	Plaster, mortar, render
Construction or household furnishing	Items which could be part of a building, household furnishing or other item of furniture, usually nails and screws, brass and other
Construction or work mechanical	Nuts, bolts, washers
Construction roofing	Roof coverings or fastener
Construction sanitation	Fitted toilet bowls, excluding chamber pots
Construction timber	Wood, worked, sawn, etc. Masonite, etc., fence palings
Construction window.	Window glass, sash weights
Container	Containers, use not specifically identified: bottles, containers, handle, jar, lead foil bottle tops, lid, rim, storage jars. Unidentified ceramic and glass fragments
Container barrel	Barrel hoops. Taps or spigots for barrels, usually brass
Container petrol or oil	Container for petrol or oil, oil can, petrol can
Container shipping	Shipping containers
Food aerated water	All aerated water containers, including soft drinks and ginger beer
Food alcohol	All containers of alcohol, for example, stout bottles
Food baby goods	Items used in baby food preparation or feeding

Key function and function names	Object names
Food container	Containers, sardine tins, fragments of food containers, ginger jars, storage jars or jugs, for food
Food debris	Bone and shell debris from food species
Food service appliance	Kitchen appliances, e.g. meat mincers, meat safes, water filters
Food service cooking	Cast iron cooking pots and other cooking containers
Food service cooking or household heating	Items used to cook food or heating of the household
Food service cruet	Salt and pepper dispensers, mustard etc.
Food service cutlery	All cutlery
Food service kitchenware	Basins, bowls, containers, handles, jars, jugs, lids, etc. Usually in cheaper or coarser ceramics, metal, etc.
Food service tableware	All parts of ceramic dinner sets, including food serving items. Glass bowls and other tablewares, principally clear glass, stemwares and tumblers
Food service tableware children	Tablewares associated with children, with alphabet, verses and pictures associated with children's stories See also recreation toy for children's toys and children's tea sets
Food service utilitarian	Enamel wares and other hard wearing food service wares, other than cooking pots (listed as food service cooking)
Food unidentified	Bone fragments, species not identified, but most likely food species
Household accessory	Items used in the household, not as appliances, but as accessories, for example, a stand for an iron, fire iron, coat hangers
Household appliance	Appliances
Household collectible	Items collected for their intrinsic beauty, rather than usefulness, including, shells, non-edible species.
Household furnishing	Household furnishing, other item of furniture, including fittings, mirror glass, floor coverings, linoleum, etc.
Household heating	Fireplace ironwork
Household maintenance	Blacking bottles, polish, laundry blue, clothes pegs
Household ornamental	Vases, ornaments and other household decorative items
Household pet or animal	Bone from cats or dogs and other objects associated with pets, including bird cages
Household poison	Usually cobalt blue glass bottles
Household timekeeping	All component parts of clocks, but not watches
Household toilet	Chamber pots, wash basins and bowls, wash jugs. Excluding fitted toilet bowls
Household vermin	Rodent bones, rat or mouse traps
Husbandry farming	Items associated with farming, including, ceramic eggs to induce hens to lay eggs, ploughshares, branding irons, cow bells
Husbandry fishing	Items used in fishing
Husbandry horticulture	Items associated with horticulture including basins, bowls, plant pots in coarse earthenwares or terracotta. Where fine earthenware or similar, place in Household ornamental
Husbandry hunting or trapping	Rabbit trap
Misc clerical	All stationery items, excluding writing materials. Glue bottles, paper scissors, magnifying glasses.
Misc clerical writing	Writing materials, including penny ink bottles, slate pencils, slate tablets
Misc commercial media	Newspaper, printing equipment, typesetting, TV aerials
Misc commercial merchandising	Labels, brand names and signs for the marketing or advertising of goods
Misc economic	Coinage, tokens used as currency
Misc firearms	Items used in combat or hunting including musket balls, cartridges, gun flints
Misc government or administration	Items associated with government administration or public office. For example, seals, mayoral insignia, ceremonial robes of office bearers
Misc government penal	Items associated with penal administration and imprisonment. For example, shackles and leg irons.
Misc human skeletal	Human bone or teeth
Misc measurement	Weights and measures
Misc natural	Items not altered by man, including roots, branches
Misc natural fauna	Native animals, if not used for food
Misc packaging	All packaging materials, including foil, plastic, foam
Misc scientific	Scientific instruments, telescopes, etc.
Misc scientific photography	All items associated with photography
Misc security	All items associated with the security of property, including latches, bolts, locks, keys, padlocks, window locks, escutcheon plates
Personal accessory	Personal accessories, including belt buckles, handbags, purses, suitcases
Personal clothing	Items of clothing, including buttons, studs, cloth or fabric, eyelets, hooks, studs, safety pins, hat pins
Personal cosmetics	All containers of perfume and other cosmetics
Personal dental	Dentures
Personal footwear	All component parts of boots and shoes
Personal jewellery	Items of jewellery. Note that glass beads may also be used in cloth covers for jugs and bowls
Personal medicine	Pill boxes, medicine bottles, phials, tubes, syringes and other medicine containers
Personal medicine or cosmetics	Objects with a medicinal or cosmetic use
Personal medicine or toilet	All containers of medicines or toiletries, excluding perfumes or cosmetics
Personal military	Items of military uniform
Personal optical	Spectacles and lenses
Personal religion	All items associated with religious beliefs, including icons, rosaries, Chinese tear bottles, Christmas decorations
Personal timekeeping	All component parts of watches and fob watches
Personal toilet	Personal toiletries, excluding perfume. Including combs, toothbrushes, hand-held mirrors, razors
Personal trophy	Plaques, cups, medals and trophies awarded for excellence in sport or other endeavour. Memorabilia associated with sports
Recreation game	Counters, dice, balls, quoits and other gaming pieces, not already included under Toys.
Recreation music	All component parts of musical instruments, including pianos and mouthorgans

Key function and function names	Object names
Recreation smoking	All tobacco pipes, of kaolin or other materials. Lighters
Recreation toy	Children's toys, including: marbles, children's tea-sets
Services battery	Batteries for torches and other items
Services electricity	All items associated with the supply and use of electrical items, including brass and copper wiring, electrical cables, conduits and fittings
Services energy	Gas piping, petrol containers
Services energy or water	Principally iron piping, which may be used for gas or water supply
Services fuel	Coal, coke, charcoal, burnt wood
Services lighting	Items relating to the provision of light, including glass covers
Services lighting arc	Items relating to arc lighting
Services lighting candle	All items associated with the provision of candle lighting
Services lighting electric	All items associated with the provision of electric lighting
Services lighting gas	All items associated with the provision of gas lighting
Services lighting oil	All items associated with the provision of oil lighting
Services telephony	Items associated with telephony, insulators of various types for telegraph wires
Services water	Water taps or piping, plug for sink
Transport	Items associated with vehicular transport, including parts and accessories
Transport automotive	Items associated with vehicular transport, specifically cars, trucks and buses
Transport bicycle	Items associated with bicycles, including parts and accessories
Transport equestrian	All items associated with horse transport, including horseshoes, horseshoe nails, harness
Transport equestrian draught	Horseshoes over 150 mm in diameter
Transport equestrian pony	Horseshoes less than 115 mm in diameter
Transport rail narrow gauge	Narrow gauge tramways and associated equipment
Transport vehicular	Buggy, trap, cart or other vehicles
Unidentified	Unidentified usage
Work blacksmithing	Iron slag
Work button manufacture	Button blanks, usually bone
Work copper assay	Crucibles for copper assay
Work copper smelting	Copper slag
Work flour milling	Grindstone
Work glassblowing by-product	Rupert's drops, a by-product of glassblowing
Work haberdashery	Items used in making or mending cloth or clothing, including pins, safety pins, thimbles, bobbins, scissors
Work leatherworking	Leather offcuts
Work mechanical	Items of machinery or other equipment
Work metalworking	Slags and other residues of metalworking. Note that slag-like materials may be produced in ordinary fires
Work metalworking lead	Lead solder, possibly for roofing. offcuts, mould trimmings
Work tool	Tools or other items associated with trades or employment. See also Work mechanical
Work tool blacksmith	Tools associated with blacksmithing
Work tool butchery	Butcher's hook
Work tool chain	Chains and links, pulleys, block & tackle, hooks
Work tool copper smelting	Tools used in the smelting of copper
Work tool improvised	Work tools that have been hand made, representing bush craft or reuse of materials.
Work tool labouring	Tools used in labouring, picks, mattocks, spades, shovels
Work tool leatherworking	Tools associated with leatherworking, saddlery
Work tool mechanical	Tools used on machinery
Work tool metalwork	Hacksaw blades, used to cut piping, etc
Work tool mining	Tools associated with mining, gads, picks, mining picks, mattocks, etc.
Work tool regional	Tools of regional origin, for example, round bladed shovel – often referred to as a Cornish shovel, regional style of shovel in UK
Work tool sheep shearing	Shears
Work tool timber working	Axes, usually associated with working timber, as in timber getting, fencing, cutting firewood, bush construction, etc.
Work tool woodwork	Brass hinged ruler, drill bits
Work tool woodwork or blacksmith	Chisels, files, rasps, punches, used in woodwork or blacksmithing. Punches associated with leatherworking, see Work tool leatherworking
Work tool pharmaceutical	Pestle and mortar, porcelain, syringe, test-tube
Work ship or boat building and repair	Wrought brass nails, boat or ship fittings
Work tool horticulture	Forks, hoes, rakes, etc.
Work tool masonry or plaster	Trowels, etc.
Work sealing or whaling	Items used in the sealing or whaling industry

APPENDIX 3. EUCALYPTUS OIL

Michael Pearson. "The Good Oil: Eucalyptus Oil Distilleries in Australia", in *Australasian Historical Archaeology*, Vol 11. 1993: 99-107.

The Good Oil: Eucalyptus Oil Distilleries in Australia

MICHAEL PEARSON

The qualities of eucalyptus oil have been recognised since the early years of Australia's European settlement, and an industry based on it grew from the mid-nineteenth century to reach maturity by the turn of the century. Eucalyptus distilling has always been a 'struggle' industry, based on the geographic and social margins of Australian society, subject to environmental, market and labour fluctuations, and ultimately largely supplanted by overseas production, an ironic outcome given the essential Australianness of the product. This article traces that history, and the technology of eucalyptus distilling, focusing on a case study of the Queanbeyan district of New South Wales in the 1950s and the archaeological remains of that era.

EUCALYPTUS OIL: ITS USES AND EXTRACTION

Eucalypts, like many other plants, contain volatile oils, called 'essential oils'. In the eucalypts, essential oils can occur in many parts of the plant, depending on the species, but it is in the leaves that oils are most plentiful. Eucalyptus oil is produced and stored in small glands, the leaves of different species containing from 0.1 up to 7 per cent of the fresh weight of the leaves.¹ The essential oils of the eucalypt are readily volatilised (vaporised), and it is this characteristic that produces the blue haze of the Australian forests in summer, gives crushed eucalyptus leaves their distinctive aromatic odour, and allows easy distillation of the oils by heating the leaves.

The volatile oil of the eucalypt has a number of constituent parts, called odorous terpenes, such as cineole, phellandrene and piperitone, which occur in different proportions depending on the species, and can vary within species depending on subspecies and specific environmental conditions.² Table 1 lists the principal eucalypt species that have been utilised for their oil, and the type of oil they contain. Of the more than 600 species of *Eucalyptus* less than 20 appear to have been used for the commercial extraction of oil, either in Australia or overseas.³

There are three broad categories of uses for Eucalyptus oil: medicinal, industrial and perfumery/flavouring, the latter being little produced in Australia. Medicinal oils are defined by the British Pharmacopoeia as containing not less than 70% cineole; industrial oils contain principally piperitone and phellandrene as their main constituents; and perfumery and flavouring oils contain high percentages of citronellal (a lemon scent) and geranyl acetate (a rose scent). Raw oils are often treated by distillation and blending (known as 'rectification') to produce an oil with the necessary proportions of desirable constituent parts to meet particular commercial needs. This allows the mixing of oil from different species and different qualities of raw oil, to produce a saleable product.⁴

Medicinal oils are used primarily as a decongestant agent and antiseptic in inhalants, sprays, embrocations, gargles, lozenges, emulsions and ointments and other preparations. Industrial oils are used in the manufacture of disinfectants, deodorants, liquid soaps, germicides and in the manufacture of synthetic menthol and thymol. Earlier in the century, eucalyptus oil was also used extensively in the flotation-separation of base-metal ores. Perfumery and flavouring oils

TABLE 1: Eucalyptus species most commonly exploited for oil

Species	Common name	Principle leaf oil constituent and %	Oil yield as % of fresh weight
Medicinal oils			
<i>E. polybractea</i>	blue mallee	cineole 60-93%, & pinene	0.7-5.0
<i>E. cneorifolia</i>	Kangaroo Island gum, narrow-leaved mallee	cineole 40-90%	2.0
<i>E. dives</i> (cineol variant)	broad-leaved peppermint	cineole 60-75%, & phellandrine & piperitone	3.0-6.0
<i>E. elaeophora</i> (<i>E. goniocalyx</i>)	long-leaved box, apple box	cineole 60-80% & pinene	1.5-2.5
<i>E. leucoxylon</i>	yellow gum, white gum	cineole 65-75% & pinene	0.8-2.5
<i>E. radiata</i> subsp. <i>radiata</i>	narrow-leaved peppermint	cineole 65-75% & phellandrine & piperitone	2.5-3.5
<i>E. sideroxylon</i>	mugga, iron bark	cineole 60-75%	0.5-2.5
<i>E. globulus</i>	Tasmania blue gum	cineole 60-85%	0.7-2.4
<i>E. viridis</i>	green mallee, red mallee	cineole 70-80%	1.0-1.5
<i>E. smithii</i>	gully gum	cineole 70-80%	1.0-2.2
<i>E. cinerea</i>	argyle apple	cineole?	av. 1.2
<i>E. morrisii</i>	grey mallee	cineole?	av. 1.6
<i>E. considiniana</i>	yertchuk	cineole & phellandrine	
<i>E. amygdalina</i> (<i>E. phellandra</i>)	black peppermint	cineole & pinene & phellandrine	
Industrial oils			
<i>E. dives</i> (phellandrine variant)	broad-leaved peppermint	phellandrine 60-80%, & piperitone & cineole	1.5-5.0
<i>E. dives</i> (piperitone variant)	broad-leaved peppermint	piperitone 40-56% & phellandrine & cineole	3.0-6.5
<i>E. radiata</i>	narrow-leaved peppermint	phellandrine 35-40% & piperitone & cineole 20-50%	av. 3.5
<i>E. elata</i>	river peppermint	piperitone 40-50%	av. 2.5
Perfumery and flavouring oils			
<i>E. citriodora</i>	lemon scented gum	citronellal 65-80%	0.5-2.0
<i>E. macarthurii</i>	Camden woollybutt	geranyl acetate 60-70%	0.2-1.0

(Sources: Boland et al 1991: 14; Penfold 1933: 5; Kelly 1983: vol 1.; Small 1985:171; Baker & Smith 1902.)

are used either directly as a scenting agent and food flavouring, or in the synthesis of other scents and flavours.⁵

The extraction of eucalyptus oil from the leaves is very simple. The process described here refers to historical, rather than current, distillation practice. Leaves are gathered by cutting branches from the trees then plucking the leaves from the branches, or by mechanical harvesting of low-growing plantation species such as mallee. The leaf is placed in a sealed container, usually a large tank or vat, and steam is introduced. In the most simple stills the steam is produced by directly heating the tank holding the leaf, which has water in its base which is constantly replenished to prevent it running dry. More sophisticated stills have steam produced in a separate boiler, which is then piped into the leaf tank. As the leaf is heated by the steam, the essential oils volatilise and are carried with the steam through pipes placed near the top of the tank. The volatilised oil and steam is then condensed, either by passing it through a coil condenser, or 'worm', or by simply running it through a pipe that is resting in cool water. The condensed water and oil is gathered in a container at the end of the condenser, the oil floating to the top. The oil is then ready for packaging, or more usually is sent off for rectification by an oil distributor, before sale.

Throughout much of south-eastern Australia, and particularly in New South Wales, oil production was largely by means of simple field stills (sometimes referred to as 'pot stills' or 'stewpot stills'). These consisted of one or two iron tanks, often simply 400 gallon ship-tanks with their tops cut off and refitted as removable lids.⁶ Stronger steel tanks, up to 6 feet cubed, and army-surplus steel pontoons were also common still tanks. The lid usually sat in a channel fabricated around the top of the tank, in which mud or clay was placed to create an air-tight seal when the lid was bolted, clipped or wedged closed. The tanks were usually set on slightly sloping ground and heated by a fire set in a shallow trench below them. The back of the hearth was usually connected by a short tunnel (often made of drums with their ends removed) to a drum chimney, to create a draught. The base of the tank had an iron pipe fitted to it that was connected to a 44-gallon drum which held water. This maintained a constant level of water inside the tank, and was replenished by topping up the drum either by hand, or by connecting it with a water supply system such as a race or a pipe from a dam. The leaf inside the tank was kept above the water level by laying logs in the base, or by inserting a steel mesh floor about 9–12 inches (23–30 cm) above the base of the tank.⁷ From the top of the tank another iron pipe to carry off the volatilised oil ran downslope and along the bottom of a section of water race or trough, which was kept full of water so as to condense the oil in the pipe. The condenser pipe ran through the wall of a small dam at the end of the race, and the condensed oil and water dripped into a collector drum. Quite elaborate water race systems were sometimes constructed to maintain a constant supply of water to the still tank and to the condensing race. The degree of complexity in the construction of field stills varied, ranging from the simple stills described in this article, to more elaborate plant with tanks sunk into brick pits and substantial furnace arrangements, as recommended for use in South Australia in 1919.⁸

The stills were fired with timber, and distillation times varied from 3–4 hours for *E. radiata* to 14–18 hours for *E. dives*.⁹ To operate such a still, an area of forest between 1 000 and 4 000 acres (404–1618 hectares) was required, depending on the species. Trees of the target species were cut down about 50 cm above the ground (though in some areas the branches alone were cut from the tree), and the leaves and terminal branchlets removed by hand axe, cane knife, or a 'eucy' hook (a sickle-shaped knife). Regrowth of the stumps could usually be harvested again after two years.¹⁰ In mallee areas the mallee was often rolled and flattened, then dried and burnt-off, the subsequent regrowth being harvested for distilling.¹¹

These simple field stills, which represented 90% of the

working stills in NSW in the 1950s, were popular because of their low establishment cost, which made them popular with independent distillers, and their portability, an important factor in mountainous country where it was easier to take the still to leaf supplies than it was to transport leaf long distances to the still.¹² Figure 1 shows the schematic operation of a field still of this type.

More sophisticated stills were used in other areas, especially where flatter terrain allowed the easy importation of leaf from a large surrounding district. These stills had external steam sources, often supplied by Cornish boilers, and ranged from simple in-ground brick pits, as in the mallee country of western New South Wales, Victoria, and eastern South Australia, to more elaborate commercial stills in Victoria.¹³ Modern oil producers have gone a step further, and now often use portable trailer-mounted still tanks, into which mechanically harvested leaf is fed directly in the field, and the tanks transported back to the steam source for distillation.¹⁴

An example of the more elaborate still of the nineteenth century is the Hartland still at Bendigo, Victoria, established in 1890, that has an in-ground brick still tank 12 feet (3.6 m) deep and 8 feet (2.4 m) in diameter.¹⁵ Similar stills existed in New South Wales (where they were less common than in Victoria), with in-ground cylindrical tanks 5–8 feet (1.5–2.4 m) in diameter, and 9–14 feet (2.7–4.2 m) deep, holding 2–5 tons of leaf. One such still, supplied with steam at 40 psi from a Cornish boiler, was at Rosewood, near Tumbaramba.¹⁶

An advantage of stills with external steam sources was that the steam could be delivered under pressure, which dramatically speeded up the distillation process. For example, distilling *E. dives* by the direct-fire field still method took 14–18 hours for 800 lbs (362 kg) of leaf, while a still with steam supplied under pressure would take just 3–4 hours to distil 5000 lbs (2268 kg) of leaf or more.¹⁷

HISTORY OF EUCALYPTUS OIL DISTILLING

First Fleet assistant surgeon Denis Considen, in 1789, is credited as the first to send a sample ($\frac{1}{4}$ gallon) of eucalyptus oil to Britain for testing. Considen, together with Surgeon-General John White, took a strong interest in testing the commercial potential of the flora of the new colony. The oil was claimed to be better for 'colicky complaints' than the English peppermint, and the tree was therefore named 'Sydney peppermint' (*E. piperita*).¹⁸ No industry stemmed from this early discovery, despite the setting up of a still in Hobart by Robert Officer in the 1830s, and the report by the Colonial Botanist Mr Fazer in the *Sydney Gazette* in 1839 that he had extracted oil from *E. globifera* and had treated rheumatism with it.¹⁹

The eucalyptus oil industry had its effective genesis in the activities of Victorian government botanist, Baron Ferdinand von Mueller, and Melbourne pharmacist, Joseph Bosisto. Von Mueller experimented with eucalyptus oils, and at his urging, Bosisto established a distillery on Dandenong Creek in 1854, to gather the oil of *E. radiata*.²⁰ Bosisto exhibited his oil at seventeen exhibitions between 1854 and 1891, and spread the word about the potential of the industry, probably stimulating the commencement of oil distilling in New South Wales and Tasmania in the 1880s.²¹

As the local industry gathered strength, the chemical analysis of eucalyptus oil began to be put on a scientific basis, with the properties of the *E. globulus* oil being established by French chemist Cloez in 1870.²² Even at this time, however, the idea persisted that the eucalyptus was a 'fever tree', and if planted in areas affected by fevers such as malaria, would absorb moisture and produce vapours to counter 'miasmas', held to be a cause of fever. This belief was stimulated in part by the known efficacious affects of eucalyptus oil. Joseph Bosisto himself published articles on this subject, supporting the eucalypt as a fever tree by pointing out how few fevers

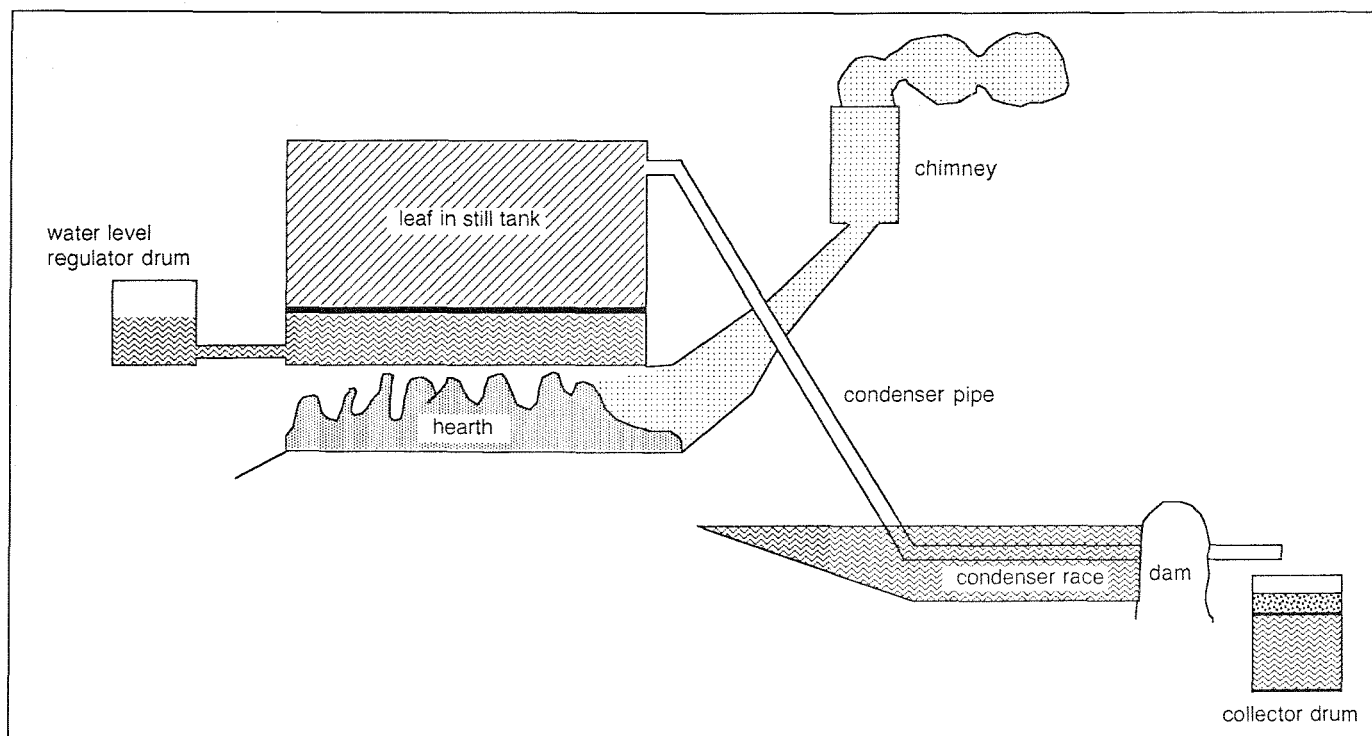


Fig. 1 Schematic cross-section through a simple field still.

existed in Australia!²³ Eucalyptus trees had been exported and propagated in California, Italy, France, Algeria, Portugal, Spain, Brazil, Argentina and Hawaii as a malaria-reducing tree from the 1850s, with von Mueller's encouragement. It was not until the late nineteenth century that the true cause of malaria was isolated, by which time eucalypts had become established as an element of the landscape in these countries.²⁴ Research on the chemical composition of different eucalyptus oils was further progressed by Smith and Baker at Sydney's Technical Museum in the early 1900s, and by Penfold and Morrison in the 1930s.

In the 1880s the first large-scale commercial eucalyptus oil operations commenced in the Mallee-Wimmera area of north-western Victoria. Joseph Bosisto, backed by Melbourne businessmen Alfred Felton and Frederick Grimwade, established the 'Eucalyptus Mallee Company' in 1882, based at the 600 acre Antwerp Station, near the town of Dimboola.²⁵ By the turn of the century eucalyptus oil was being produced in many places. By 1902 large-scale plants operated at Ockenden's works at Spring Bay, Tasmania (2,000 gallon tank), Bosisto's plant in Victoria, and Faulding's plant at Punyelroo in South Australia (4-5,000 gallon tanks), while smaller field stills were in operation in parts of NSW, Victoria and Kangaroo Island.²⁶ Bosisto died in 1898, and in 1905 the Felton Grimwade Company bought a leasehold on 40,000 acres at Ki Downs near Euston in NSW, and subdivided the Antwerp property for sale in 1907.²⁷ The Ki Downs plant had still tanks with a capacity of 4.5 tons of leaf each, but the operation could not compete with independent distillers, and closed in 1908.²⁸

Until 1904 eucalyptus oil was used only for pharmaceutical purposes, and only that fraction of oil then called 'eucalyptol' (now called cineole and piperitone) was utilised. In 1904, however, Herbert Lavers of Broken Hill discovered the value of the phellandrene portion of eucalyptus oil in the separation of metallic sulphides in ores, which process he patented in 1909.²⁹ By 1911 Broken Hill Zinc Corporation was using 600 lbs (272 kg) of oil per day in the separation of 600 tons of ore, most of the oil coming from Kangaroo Island.³⁰ *E. cneorifolia* was being exploited for oil on Kangaroo Island at this time, with one large still owned by a Mr Burgess able to hold 5,000 lbs of leaf giving 100 lbs of oil per distillation, and 13 smaller

plants using field stills operating elsewhere on the island.³¹ New South Wales and Victorian distillers shared in the boom. A field still establishment using three field stills, coil condensers and a crane, was set up by George Ashton at Wingello, south of Sydney, in 1912, to produce oil for mineral separation. This still, which has been described in detail elsewhere, utilized oil production methods typical of the period.³²

The industry continued to boom during the First World War and immediately following, eucalyptus oil being much in demand for medicinal purposes throughout the war and in the world-wide influenza epidemic of 1919. Domestic prices crashed in 1920, however, and production did not boom again until the Second World War. Australia was able to maintain its position in the international market because two companies, Bosistos and H.M. and W.K. Burnside, dominated the bulk production of oil during the 1920s, and Australia retained 90% of the world market, with Spain holding the rest.³³ This situation started to deteriorate during the 1930s as other countries commenced to produce eucalyptus oil from trees initially imported from Australia in the nineteenth century. Australia's export market share began to decline, a situation not helped by the fact that Australia experienced difficulties in guaranteeing consistency of oil quality.

During the Second World War, up until 1943, production increased significantly over the preceding decade, then fell to an annual rate of about half the 1930s average for the rest of the war. This was possibly due to man-power problems, even though eucalyptus distilling was in theory a reserved occupation, at least at the start of the war. Production picked up quickly for a time immediately after the war, 1947 being the industry's record year with 1,000 tonnes of oil produced.³⁴ Following this Indian summer, however, Australia's market share declined progressively, and by the mid-1970s Australian imports of eucalyptus oil exceeded its exports.³⁵ By the early 1980s the only areas producing oil were the Southern Tablelands of NSW, the West Wyalong area, and the St Arnaud-Inglewood-Wedderburn area in Victoria. By then Australia's share of the world market was exceeded by China (45%), South Africa (18%), Portugal (17%), Spain (9%), with Australia holding on to only 3% of the world total.³⁶

The domestic industry boomed again during the 1950s in

New South Wales, where basic field-still technology remained the mainstay of the industry. The dominance of New South Wales during this period, when it overtook Victoria in oil production, has been attributed to the different expectations of labour in the New South Wales and Victoria, the New South Wales eucalyptus oil workers being more willing to work in primitive circumstances than their Victorian cousins, who had become accustomed to centralised sophisticated stills, and hence working conditions more akin to other areas of industrial operation.³⁷

THE INDUSTRY ON THE GROUND

A report written by the District Forester for the Queanbeyan Forestry Sub-District in 1951, described the organisation and economics of the industry in the Queanbeyan district at that date.³⁸ This report provides a very useful insight into the industry at the local level, and the following description is drawn from it. The species utilized within the district were *E. dives* and *E. radiata* (yielding phellandrene and cineole).

A central factor in the organisation of the local industry were ten oil-purchasing companies, who acted as both facilitators and marketing middle-men for the distillers.³⁹ These companies held the Forestry Department licenses for oil-producing country, financed individual distillers, and paid the royalties to the government on oil produced on Crown and leasehold lands. Between April and September 1951, for example, 70 licenses were issued in the district for eucalyptus leaf gathering operations. Of these only 22 were issued to individual distillers, the rest going to five oil-purchasing companies, one of which held 28 licenses. The independent distillers would have sold their oil to the same companies. The licenses attracted substantial guarantee deposits, which were paid by the companies. Royalties paid for production of oil under the licenses was based on monthly returns by the companies purchasing the oil, showing amounts of oil purchased from distillers operating on the licensed land. The royalties were based on still-site prices paid for oil, which ranged from 4 shillings per pound (royalty 3 pence per pound), to 5 shillings and 11 pence per pound (royalty 5 pence per pound). That the system was open to blatant abuse by the companies supplying the returns was recognised by the District Forester, one means of avoiding royalties being to claim oil gathered on crown land as coming from private land, where royalties were not demanded.

The oil-purchasing companies also controlled the still-site prices paid to distillers. In the 10 years preceding 1951, prices ranged from 7 pence to 7 shillings per pound of oil, and production fluctuated accordingly. Some protection from monopolistic practices was provided, in that individual distillers were not bound to sell to the company licensing the land or owning the still, and there was considerable competition at the still-site for oil purchases. As competition forced up still-site prices, production and employment in the industry increased, until still-site prices exceeded the price obtainable in the market place, and prices dropped and the industry contracted again. The industry had expanded greatly in the late 1940s due to the high prices for *E. dives* oil, and between 800 and 1,000 men had been employed locally in the industry. In late 1951 approximately 130 plants were operating in the district, employing 500 men, and it was feared that if demand again increased the spread of distilleries might exceed the supply of bush available for production.

The oil-purchasing companies, in most cases, financed the setting-up of a new still, which in 1951 cost about £150. The Customs Department required a guarantee of £100 for each still up to 1951, but reduced that figure subsequently. The individual distiller was then charged for the use of the still, dependent on the current demand for oil. In periods of high demand the companies did not charge for the use of the stills. The life of a still was estimated at 2–5 years depending on the

degree of use and maintenance it received, while still tanks (mainly ship tanks or slightly larger) usually only lasted 2 years. The oil-purchasing companies sometimes also financed the purchase of a truck by the distiller, though most distillers still relied on horse and cart.

The District Forester pointed out the general inefficiency of the oil industry in the district, depending as it did on crude distillation processes. He estimated that loss of oil due to bad distillation methods amounted to as much as 33% of total production, pointing out that the output of a 1,000 gallon tank could vary between 10 and 15 gallons per boil using identical leaf. Another result of poor methods was the low grade of oil recovered, due to incomplete distillation of some fractions of the oil. For example, an accepted percentage range for piperitone production was 40–50% of total oil from *E. dives*, whereas the majority of local distillers fell as low as 30% piperitone. A similar situation occurred with cineole distillation. This inconsistency in oil quality increased the cost of rectification in secondary distilling plants, and affected the demand for the local product. The problem of low grade oil was not helped by the alleged practice of adding a gallon of kerosene to each nine gallons of eucalyptus oil as a filler.

It was estimated that the local production could be doubled if the inefficient crude stills were improved. Apart from the poor distillation practices, other problems included generally poor water supplies, which were seasonal, heavy demands on man-power and time in cutting, transporting, loading and unloading stills, cutting fuel and supervising long distillation periods. Many of the local stills did not even have a crude crane pole to assist in the loading and unloading of the leaf. Several plants of the 'improved type' had recently appeared in the district, costing between £300 and £1,000 to set up, but unfortunately these are not described in detail.

Many of the distillers were post-war migrants from central Europe, who found the independence of the industry attractive. A still in the Snowy Mountains, set up at that time by locals and manned by German and Yugoslav migrants has been recently described.⁴⁰ The majority of Australians involved in the industry were said to be seasonal workers, who in some instances owned areas of land and combined wool growing with oil production.⁴¹ The lifestyle and working conditions of the 'eucy' workers has been described by a number of authors, of whom Des Shiel stands out.⁴²

This description of the eucalyptus industry in the Queanbeyan district in the 1950s provides the context for the discussion of the still-sites described in the next section, which are within the Queanbeyan district and appear to date to this period.

THE ARCHAEOLOGY OF EUCALYPTUS DISTILLING

The eucalyptus distilleries described here are simple field stills, of the type that has been common across the nation since the last century, and were the mainstay of the New South Wales eucalyptus oil industry. The stills are located in or around the Tinderry Nature Reserve, near the town of Michalego, south of Canberra, and were recorded by the author in 1982. They are within the Queanbeyan Forestry Sub-District described in the last section, and probably date from the 1950s and later decades. Precise locational information is not provided here, because of access and management problems this could cause. The stills are described because they are typical and there are likely to be many other examples in other parts of south-eastern Australia.

The stills are of the field still type described at the start of the article, and the typical arrangement is that the still tanks are located within about 10 metres of a seasonally flowing creek. Upstream is a dam or stream diversion, directing water into one or more races, which provide water for the replenishment of

the still tank during boiling, and for the trench in which the condenser pipe lies. The site of a bush hut is located near each still site, with clay ovens being a common feature, some attached to what appear to be tent sites. Domestic items such as bottles, tins, billys, kerosene refrigerators, iron bedstead parts, and assorted ceramic, glass and metal fragments, are scattered around the living areas.

Still No. 1 has a steel still tank 215 x 155 square x 146 cm deep (7 x 5 ft x 4 ft 8 in) built into the steeply sloping bank of the creek, the tank being supported on two stone walls which provide a 40 cm high fire hearth beneath the full base of the tank. A steel lid rests beside the tank and what is probably a collapsed crane used to load and unload the leaf, and several beams used to fasten the lid, lie nearby (Figs. 2 and 3). Behind the still and one metre away is a short chimney made from a 44 gallon drum, which is connected by a short tunnel to the rear of the hearth beneath the still.

Seven metres to the north of the still tank is a drum connected to the base of the tank by a 2 inch (5 cm) iron pipe. This provided the water level regulation within the tank, and appears to have itself been filled by hand. From the top of the tank a 2 inch iron condenser pipe, now with missing section, leads steeply down to creek level, where it runs north in the base of a water race for about 40 metres, to where the pipe stops at creek level. The oil collection system has been dismantled and its operation is not clear. The condenser race originates at a washed-out dam site 200 metres south of the still.

The remains of a collapsed hut, 5 x 4 metres, is located 15 metres east of the still. An Electrolux refrigerator and assorted domestic items lie in the hut site, and the engine and chassis of a 1930s vintage Buick truck is a short distance away. About 10 metres to the south are two 1.5 metre square camp ovens, which may have been originally built on the side of tent-huts.

There is no definitive evidence to suggest a date for this site, though the remains are consistent with a 1940s-50s operation. A severe bushfire burnt out the area in 1957, and is said locally to have put an end to many of the local distilleries, by destroying leaf supplies which would take two years to recover.

Still No. 2 has a cylindrical tank of riveted steel plate, 211 cm in diameter and 120 cm deep (7 ft diam x 4 ft deep). The tank is built into the creek bank, and is supported by two parallel stone walls giving a 40 cm hearth beneath the tank. A flue extends from the rear of the hearth, and surfaces through a 44 gallon drum chimney 2 metres behind the tank (see Figs. 4 and 5). A trench extends a further 5 metres west from the chimney, and is possibly an earlier extension of the flue or the collapsed trench of another still tank. The tank is full of leaf, not having been discharged after its final distillation, and the channel around the top of the tank is still full of clay, used to make the seal with the lid. The lid rests against the edge of the tank, and would have been held tight by the four steel stirrups welded onto the tank's side, into which timber beams would have been wedged across the top of the lid. The beams lay beside the tank, as does a 'Y' shaped pole, possible part of a crane used to load the tank.

The water-level regulating drum is located 2 metres west of the tank, to which it is connected by a 2 inch pipe. In this case the regulator drum appears to have been automatically filled by a pipe running from a water race and cistern 7 metres west and slightly above the level of the drum. However, the feed pipe, if such existed, has been removed.

A 2 inch pipe runs from the top of the still tank down-slope 5 metres to a water race, along which the condenser pipe is laid. The condenser pipe runs through three dams which subdivide the race and maintain a sufficient water level in each division. Beyond the third dam the condenser pipe empties into a half-44 gallon drum, about 26 metres from the still. The two water races originate at a dam on the creek about 100 metres south-west of the still.

The remains of a 4 x 5 metre hut lie 15 metres south of the

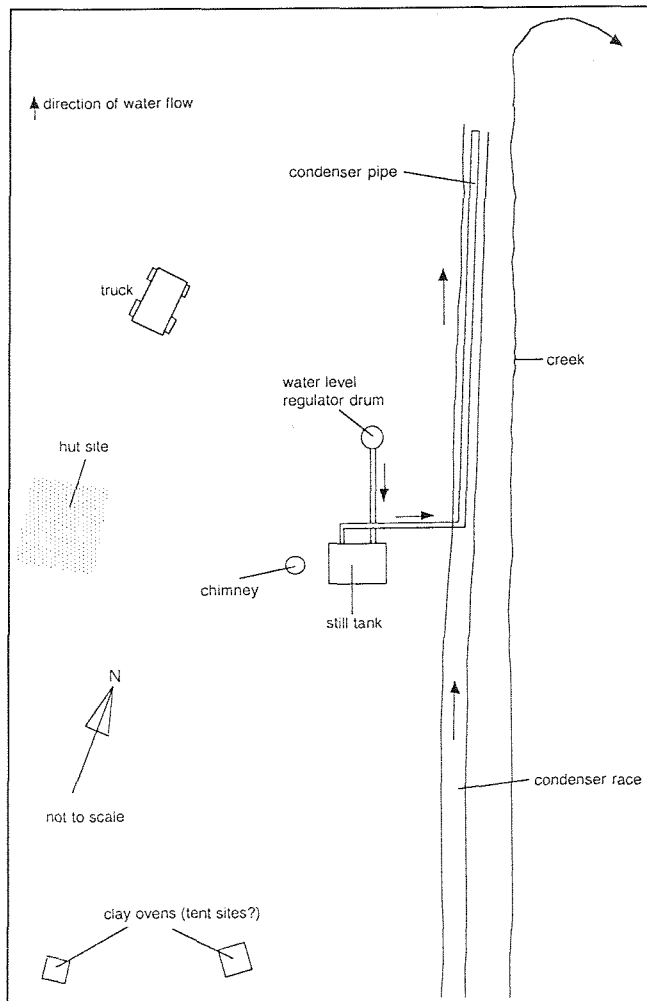


Fig. 2: Still No.1, a simple arrangement with single still and hand-filled water level regulator drum.

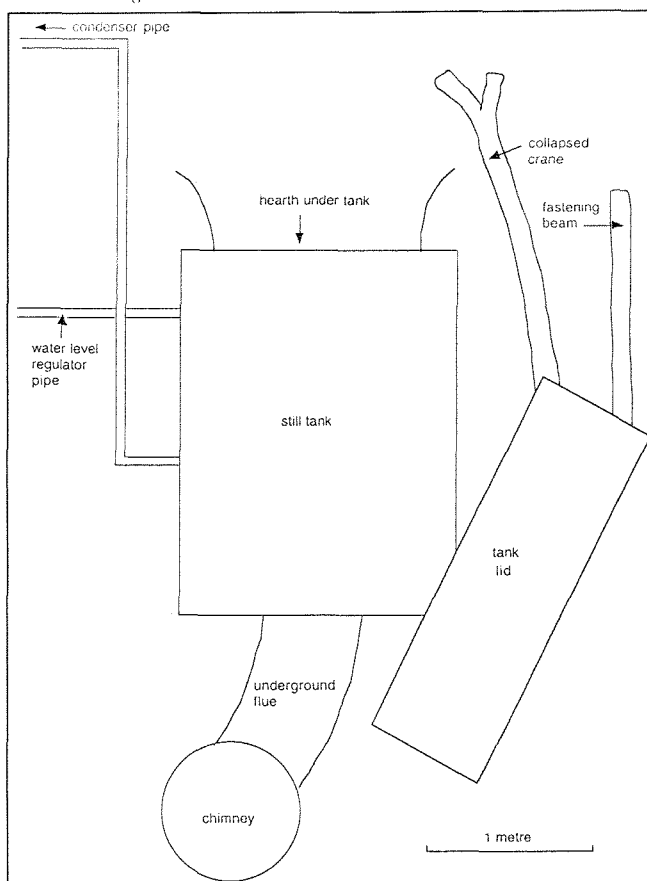


Fig. 3: Detail of arrangement of Still No. 1, with the tank lid and collapsed crane and beam for fastening lid.

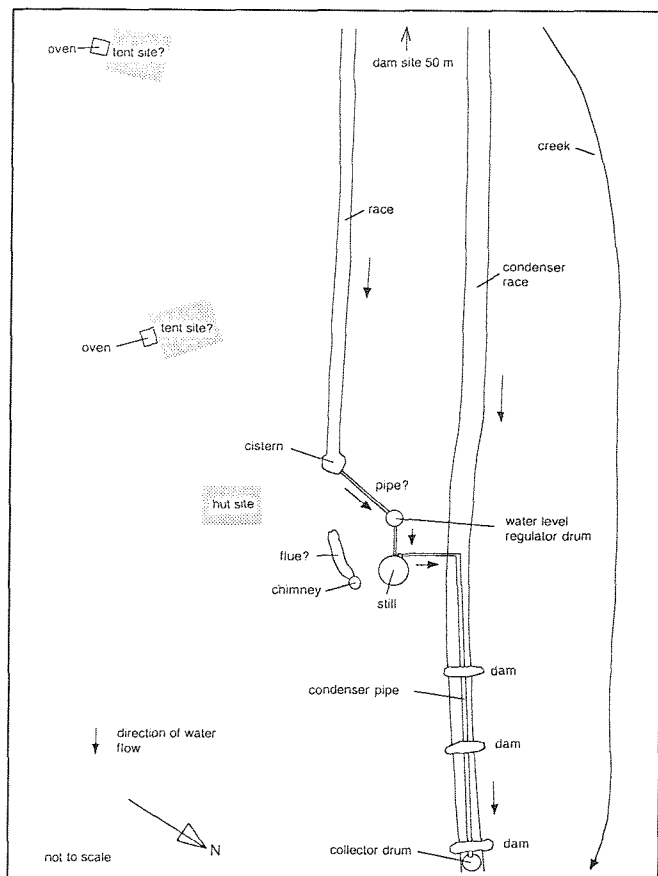


Fig. 4 Still No. 2, with self-filling water level regulator drum, and more complex condenser race system.



Fig. 5: Still No. 2, showing lid resting on the tank, the chimney to the left, and the hearth and condenser pipe to the right.

still, and at least two tent-hut sites are benched into a slight slope nearby, with clay camp ovens adjacent to each site. A chicken coop or other animal enclosure is also nearby. Bottles at the site date to the 1940s and 50s, suggesting the operating period of the still.

Still No. 3 is on private land adjacent to the Tinderry Nature Reserve. This site has two still tanks which operated in unison (see Figs. 6 to 9), though only one tank still remains *in situ*, the other being used by the landowner as a feed bin. The remaining tank is steel and is 246 x 125 x 123 cm deep (8 x 4 x 4 ft or 800 gallon capacity). It is built into the sloping bank of the creek, supported by two walls of stone and brick, providing a hearth 40 cm deep which was connected by a flue to a 10 gallon drum chimney 2 metres to the rear of the still.

The sealing channel around the top of the surviving tank is still full of clay, and the lid is still sealed in position, held down with three parallel timber beams wedged into steel stirrups welded at each side of the tank. There is no evidence of a crane

being used at this site, so the leaf and lid would have had to have been handled manually. The water-level regulating drum is located 5 metres from the tank, connected to it by a 2 inch pipe which is buried for half its length. The regulator drum is fed by a pipe running from a race-fed cistern 4 metres away. This same cistern feeds an underground pipe which supplies water to the condenser race.

The condenser pipe has a double connection to the top of one side of the tank, and runs north 9 metres to the condenser race (or more accurately, trough), through which it runs for 29 metres before passing through a small dam wall at the end of the trough, and emptying into a half-44 gallon drum.

The second still, now devoid of its tank, was 3 metres from the first, and sat over a hearth cutting 3 x 2 metres and 1 metres deep, with a flue to a 44 gallon drum chimney behind. The water regulator drum is located 6 metres to the north, and appears to have been filled by hand. The condenser pipe for the second still survives, and joins onto the condenser pipe from the first still. With this arrangement, the two stills could have been used independently or in tandem, depending on the supply of leaf and the demand for oil at a given time.

North-east of the still site a wooden bridge crosses the creek, and a rough track leads to a standing hut about 30 metres away. The hut has a bush-timber frame clad in corrugated galvanised iron. A broken cane-knife, of the kind used to harvest leaf, was found lodged in a tree nearby.

The still site is said locally to have been used since the 1920s as a eucalyptus distillery (though the tanks and fittings would not be original), and the current plant was last used in 1980 for a short period.

Even on sites where the still tanks have been removed, there survives a distinctive archaeological signature. The hearth trenches and water races are persistent features in the landscape: 2 inch galvanised iron pipe was used in large quantities and is often left behind: cutting of eucalyptus leaf often resulted in distinctly coppiced trees, branching lower

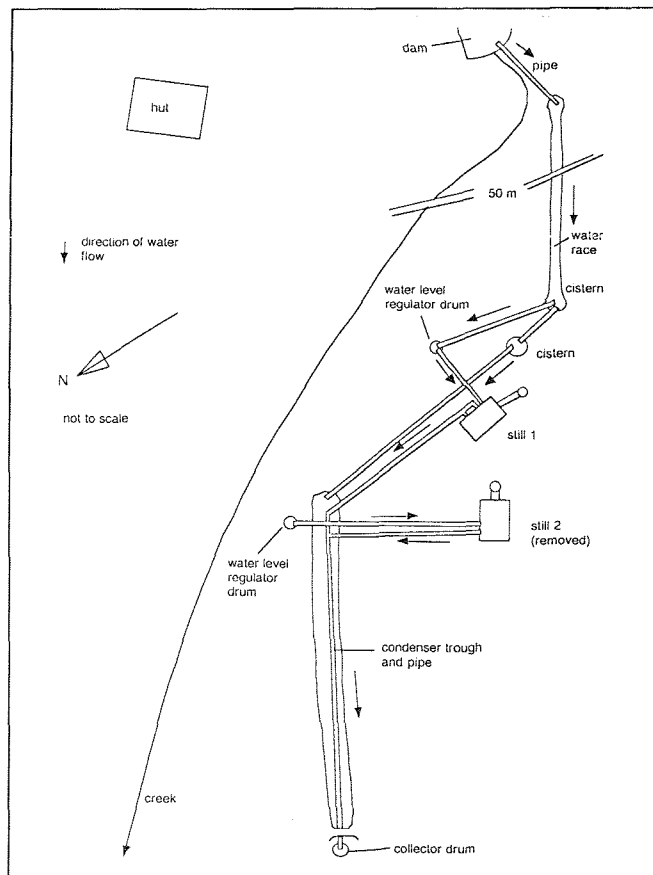


Fig. 6: Still no. 3, with two still tanks, and more complex water race system feeding one of the water level regulator drum and a condenser trough.

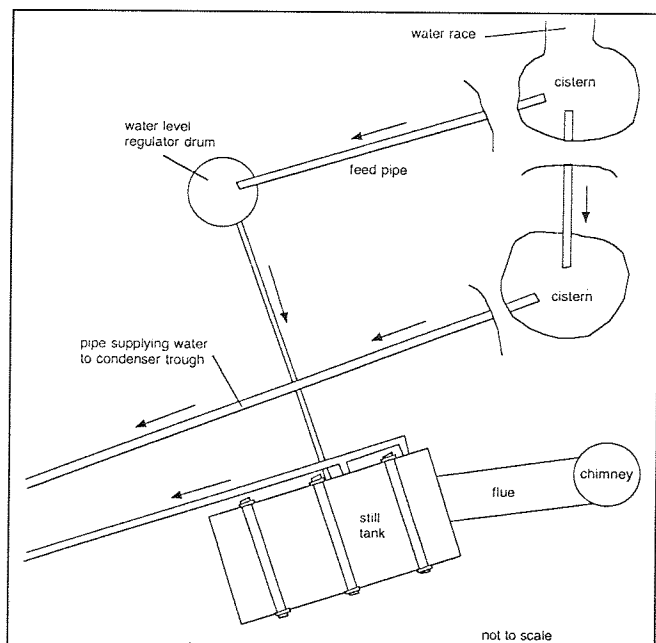


Fig. 7: Detail of the arrangement of one of the still tanks at Still No. 3. The tank is still fitted, with beams secured by stirrups.

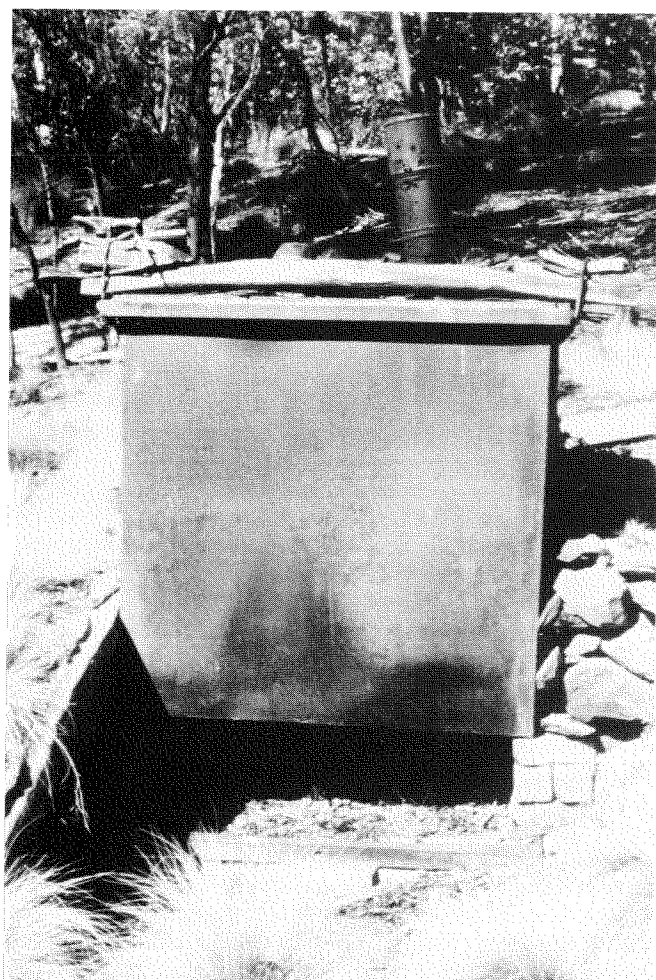


Fig. 8: The surviving tank at Still No. 3, showing the method of securing the lid by means of beams held down by stirrups at the side of the tank. The shallow hearth beneath the still and the drum-chimney at the rear can be seen.

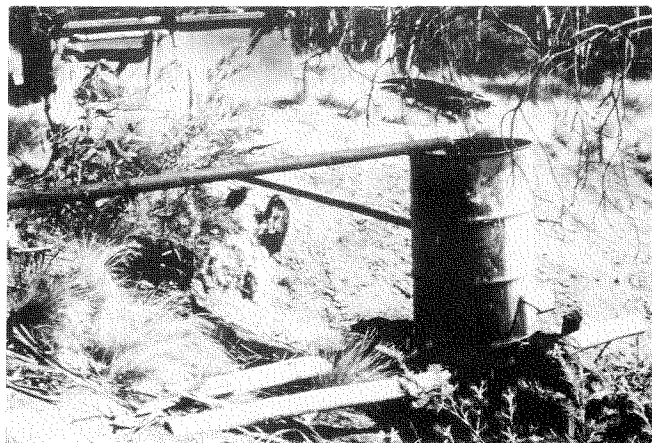


Fig. 9: The water level regulator drum at Still No. 3. The pipe bringing water from a race empties into the drum from above, and the pipe connected to the still exists from the base of the drum. The still tank is seen at the rear, with the condenser pipes showing.

than free-grown trees of the same species: and the living areas are usually able to be identified by the scatter of fragmented domestic artefacts, often little disturbed because of their isolated locations, their absence from maps, and the low density and relative poverty of the material making the sites unattractive to bottle hunters and metal detectors.

DISCUSSION

Eucalyptus distilling is seen today as a somewhat exotic and romantic activity, having shared in the general veneration shown to traditional bush pursuits over the last decade. It has, however, not always been a well regarded industry, as is suggested not least by the absence of a Banjo Paterson or Henry Lawson having immortalised it at an earlier time. Eucalyptus oil workers occupied a lower status than their brothers in other industries, even in other 'bush' industries such as saw-milling. The industry received little of no government assistance, other than the research and publicity provided by the Technological Museum in Sydney early in the century and its recognition by the man-power regulating authorities during WWII, and it was subject (at least in theory) to reasonably hefty government fees and royalties. On the other hand, despite the often arduous nature of the work, it was an attractive option for men seeking independent and flexible employment not requiring particular skills or experience. Both the historical and archaeological contexts of this marginal industry deserve further research.

The eucalyptus oil industry has probably had a more widespread impact on the environment than has been recognised. As shown by the Queanbeyan example, the forested areas of south-eastern Australia were extensively exploited for oil, and the practices of the distillers had a dramatic impact on the nature of the forests. Targeted species were coppiced (cut down low on the trunk and encouraged to bush-out), 'over-mature' trees were ring-barked to provide space for younger saplings, and the practice of ring-barking non-oil-producing species to allow increase in oil-producing species may have been widespread. The long-term ecological impact of this intervention has not, to the author's knowledge been thoroughly researched, and indeed seems to have been totally overlooked in, for example, the attribution of 'biophysical naturalness' to areas of forest as part of the process of identifying wilderness quality.⁴³

There seems to be great scope for including the impacts of the eucalyptus oil industry in future ecological history research in Australia. The information provided in this article may help in the identification of eucalyptus distilleries as an important element of Australia's forest environment.

NOTES

1. Boland *et al* 1991:11.
2. Boland *et al* 1991:11.
3. Small 1981:171.
4. Boland *et al* 1991:11-15.
5. Small 1981:171; Penfold and Willis 1961:245-8; Silman 1938:39-42.
6. see Penfold 1932 for a detailed description.
7. Penfold 1932:20-21 claimed raising the grate to 12-18 inches reduced distillation time.
8. Journal of Agriculture of South Australia, July 1919:1033-4.
9. for descriptions, see Penfold and Morrison 1952; Penfold and Willis 1954; and Baker and Smith 1902.
10. Penfold and Willis 1954:320-21.
11. *Chemical Trades Journal and Chemical Engineer*, 1927:553-4.
12. Penfold and Morrison 1952:15.
13. Boland *et al* 1991:187; Penfold and Morrison 1952:15; see Shiel 1985 for some good illustrations of the different types of still.
14. Boland *et al* 1991:193; Small 1981:172.
15. Birmingham 1976:3-4.
16. Penfold and Willis 1954:322-4.
17. Penfold and Morrison 1952:14, 18.
18. Penfold and Willis 1961:245; Boland *et al* 1991:3.
19. Shiel 1985:9; Jervis 1949.
20. Boland *et al* 1991:3; Penfold and Willis 1961:245-6 gives the date as 1852.
21. Shiel 1985; Boland *et al* 1991:3.
22. *Chemical Trades Journal and Chemical Engineer*, 1927:553-4.
23. Bosisto 1876.
24. Thompson 1970; Bolton 1981:41.
25. Boland *et al* 1991: 4; Poynter 1967:16-17.
26. Baker and Smith 1902:257.
27. Poynter 1967: 18,108.
28. Eastburn 1984:2, 6.
29. Baker and Smith 1911:451-4; Woodward 1952:87.
30. Smith 1911.
31. Smith 1911:20-22.
32. Ashton 1973; Baker and Smith 1902:256-7.
33. Shiel 1985:xx.
34. Small 1981:172; Poynter 1967:237; Shiel 1985:169.
35. Small 1981:174; Boland *et al* 1991:4.
36. Small 1981:174.
37. Shiel 1985:25.
38. Crumpton 1951.
39. the oil-purchasing companies were:
A. J. Bedwell Pty Ltd, agencies at Braidwood and Adaminaby.
Sheldon Harris Oil Industries, agencies at Braidwood, Jerangle, Cooma and Yass.
W. K. Burnside Pty Ltd, agencies at Braidwood, Captains Flat and Nerriga.
Cox Findlayson & Co Ltd, agencies at Braidwood and Cooma.
Affiliated Eucalyptus Oil industries, agencies at Cooma and Captains flat.
Nightingale Supply Co Ltd, agencies at Braidwood and Nerriga.
Bon Manufacturing Pty Ltd, agencies at Braidwood and Nerriga.
Blok Van Rooyen Pty Ltd, agencies at Braidwood and Captains Flat.
M. Nomchong & Co, a Braidwood firm selling to Reckitt & Colman.
H. Hatrick Pty Ltd, Pioneer Soap Company.
40. Hill 1994.
41. Crumpton 1951.
42. Shiel 1985.
43. see discussion in Robertson *et al* 1992:20-21.

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APPENDIX 4. WILLIAM THOMAS JOSEPH FINNERAN, EUCALYPTUS OIL DISTILLER.

William Thomas Joseph Finneran was born in Sydney in 1876.³⁰ Other Finneran family members are listed in Sydney and Berrima.

William Thomas Joseph Finneran first comes to public notice in 1901, playing cricket for the Association Cricket Club against Robertson Park.³¹

He is also reported as exporting 6 cases of eucalypt oil in 1901.³² He was investigating eucalyptus oil ventures at Gundaroo in 1910.³³

By 1913 Finneran was reported to be opening works near Mandemar for the Australian Natural Oil Company.³⁴

By 1919 it was reported that Finneran was a director or manager of the Essential Oil Company, part financed by William Tighe Farrell, Bond Street, Sydney. Finneran had been selling eucalyptus oil through Farrell for some years and used the latter's offices when in Sydney.

Finneran had registered the Essential Oil Company in 1916, with Laird as partner. The company was re-registered with Livingstone as partner in 1919. In this year the company was about to exploit 3,000 acres in the Burruga District, although Finneran was also working in the bush at Hazelgrove.³⁵

Also in 1919 it was reported that P L Livingstone and T S Finneran were intending to start an eucalypt oil distillery in the Orange District.³⁶

In 1925, Finneran disposed of the eucalyptus oil business at Mandemar to Bosisto Pty Ltd, of Melbourne.³⁷

³⁰ Registrar General, Births. 2038/1876.

³¹ *Bowral Free Press and Berrima District Intelligencer* (NSW : 1884 - 1901) Saturday 23 February 1901.

³² *Daily Commercial News and Shipping List* (Sydney, NSW : 1891 - 1954) Thursday 20 June 1901 p 2

Daily Commercial News and Shipping List (Sydney, NSW : 1891 - 1954) Thursday 24 October 1901 p 2

³³ *Queanbeyan Age* (NSW : 1907 - 1915) Tuesday 24 May 1910 p 2

³⁴ *Robertson Advocate* (NSW : 1894 - 1923) Tuesday 18 March 1913 p 2

³⁵ *National Advocate* (Bathurst, NSW : 1889 - 1954) Wednesday 17 September 1919 p 2

³⁶ *Leader* (Orange, NSW : 1912 - 1922) Wednesday 5 February 1919 p 1

³⁷ *The Scrutineer and Berrima District Press* (NSW : 1892 - 1948) Wednesday 11 February 1925 p 2

The Sydney Morning Herald (NSW : 1842 - 1954) Tuesday 10 February 1925 p 10

Finneran's cricket career was obviously well known. At a match between Berrima and Bowral in 1925, he scored 80 runs and played against Donald Bradman. He took 8 wickets in the match and Bradman was lucky to retire as the last man standing. Needless to say Berrima beat Bowral by 61 runs.³⁸

Unfortunately the story comes to a sad end. Finneran was convicted in 1927, aged 51, of receiving goods under false pretences, namely "a soda water fountain complete, 18 gallons of essence, two decanters, three jugs, and a dozen glasses", wrongly claiming that he was carrying on business as the Australian Forest Oils Company. He was sentenced to 12 months hard labour at Bathurst.³⁹

There are no later references to Finneran in the newspapers. He lived at Harper's Mansion from the 1930s.⁴⁰ He died in 1948, aged 74, his death registered in Sydney.⁴¹

³⁸ *Robertson Mail (NSW : 1924 - 1930)* Tuesday 6 October 1925 p 2

³⁹ *The Scrutineer and Berrima District Press (NSW : 1892 - 1948)* Wednesday 23 November 1927 p 4

⁴⁰ Ann Beaumont. *A Light in the Window. Harper's Mansion, Berrima, the Place and its People.* National Trust. 2013:72.

⁴¹ Registrar General, Deaths. 6957/1948.

APPENDIX 5. ARCHIVAL MATERIALS.

A total of five reports were produced.

The respective volumes contain the following archival materials:

Location	Report	Photographs in report	Report on CD	Photographs on CD
OEH	1	JPG	Yes	RAW and JPG
OEH	1	JPG		
Client 1	1	JPG	Yes	RAW and JPG
Client 2	1	JPG		
Local Council	1	JPG	Yes	RAW and JPG