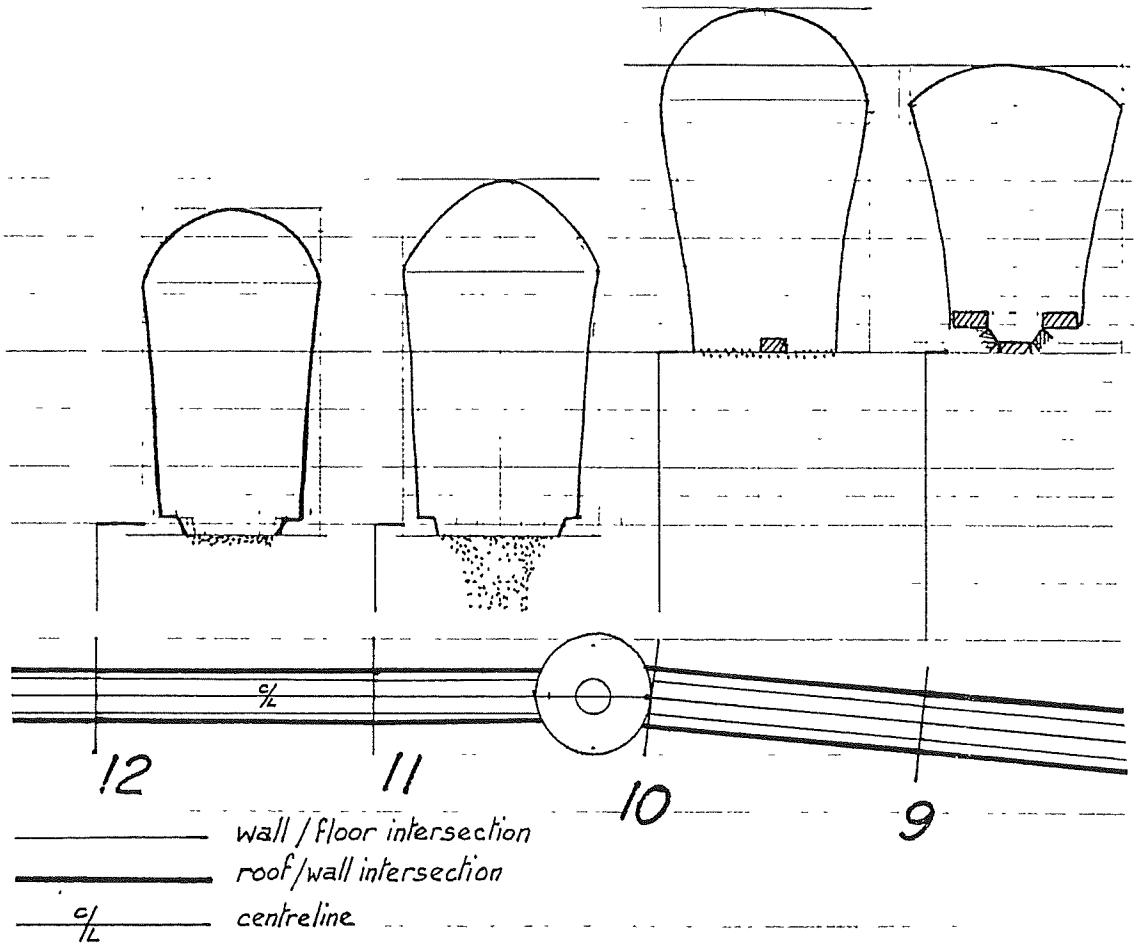
EXCAVATIONS IN FREMANTLE JAIL



P. BINDON & J.-P. RAYNAL

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EXCAVATIONS IN THE FREMANTLE JAIL

by

Peter BINDON[1] & Jean-Paul RAYNAL[2]

[1] Anthropology Department, Western Australian Museum.
[2] Université de Bordeaux 1, UMR CNRS C9933, Visiting Scientist WA Museum.

CONTENTS

LIST OF FIGURES

EXCAVATIONS IN THE FREMANTLE JAIL

FOREWORD

Following a request from the Building Management Authority, archaeologists from the Anthropology Department of the Western Australian Museum agreed to undertake a watching brief on excavations of historical fills in parts of the Fremantle Jail complex. Archaeologists attended the site on six different occasions[3] to supervise work, to excavate and to examine sediments and fills which were to be removed. Discussions on techniques and methods to be followed were held with B.M.A. staff and contractors and advise was given concerning the procedures to be followed.

The report attached describes some of the methods used and discoveries made during the attendance of the archaeologists, however there has been no attempt made in this report to interpret the numerous portable cultural objects found during excavation.

1 - EXCAVATION BY VACUUM UNIT

Limited access was available to Location "A" (Figure 1) through an unused gateway and a path beside the sloping ramp adjacent to the north wall. An examination of the sediments and limited test pitting indicated that it was possible to remove large amounts of fill using a vacuum-truck. This special machine is normally used in cleaning up spills of hazardous or dangerous powdered chemical residues. The truck and trailer were parked in the access way between the Main Cell Block and New Division. Sections of suction hose were added as necessary, allowing excavations to proceed more than twenty metres away from the unit. The vacuum hose was passed to the face of the excavation through ports in the paved areas and through doorways or windows without any fear of damage to the fabric of the buildings.

[3] Visits on February 11, 19, 23 and March, 3, 4, 9.

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The high suction capacity of this machine and the eighteen centimetre diameter suction hose readily and quickly removed dry loose sediments. Pieces of brick and chunks of limestone up to fifteen centimetres across were able to be sucked up along with the matrix into the enclosed, high capacity, trailer-mounted bin. As the bin filled, it was taken to an on-site dump area where each load was tipped as a discrete unit. Thus it will be possible, if necessary, to screen these deposits for artefacts. To prevent the loss of valuable historical artefacts found adjacent to identified features, a piece of woven wire mesh was used. This heavy mesh had wires of five millimetres in diameter and openings one centimetre square. A piece of this mesh fifty centimetres by thirty five centimetres was laid on sections of the fill and by placing the sucker hose on top of this grid, the sandy matrix was sucked away from rubble and cultural objects. When the grid was removed, any remaining objects could be examined and bagged or discarded as required.

2 - SEDIMENTS AND CULTURAL FEATURES OBSERVED IN LOCATION "A"

2.1 - STRATIGRAPHY

Sediment removal was organized to reveal several faces and sections for close examination. We identified two different sedimentary units which represent at least two infill episodes of the area.

The upper one (Unit 1) consisted of fine grey silts and sands at the top grading into white calcareous sands at the bottom. It was very poorly consolidated, with lumps of calcrete, broken roof tiles, pottery shards and charcoal fragments scattered throughout. At the base were a few cultural objects. These included a bucket, boots, pieces of wood and several glass bottles. Unit 1 extended over most of the surface of the northern excavation and was between one and a half and two metres thick and probably derived from within the walls of the jail complex. The upper contours of this unit and

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"Sketch plan of the cellar under the northern end of the main cell block. Based on main cell block, BMA plan, 1859. Key to original use. 1. steward's office; 2. clerk's office, 3. issuing office, 4. clothing store; 5. provision store; 6. prisoners' property store." (From p.42, KERR J S., 1992. *Fremantle Prison, A policy for its conservation.* B.M.A. Perth).

Locations in this report :
"A": area examined first,
"B": latex peel taken from sediments in this area,
"C": see Figure 2 for detail,
"D": walls (not removed at this stage),
"E": vestibule area,
"F": entrance to tunnel system,
"G": access door to Location "C",
"H" lightning rod,
"J": cistern

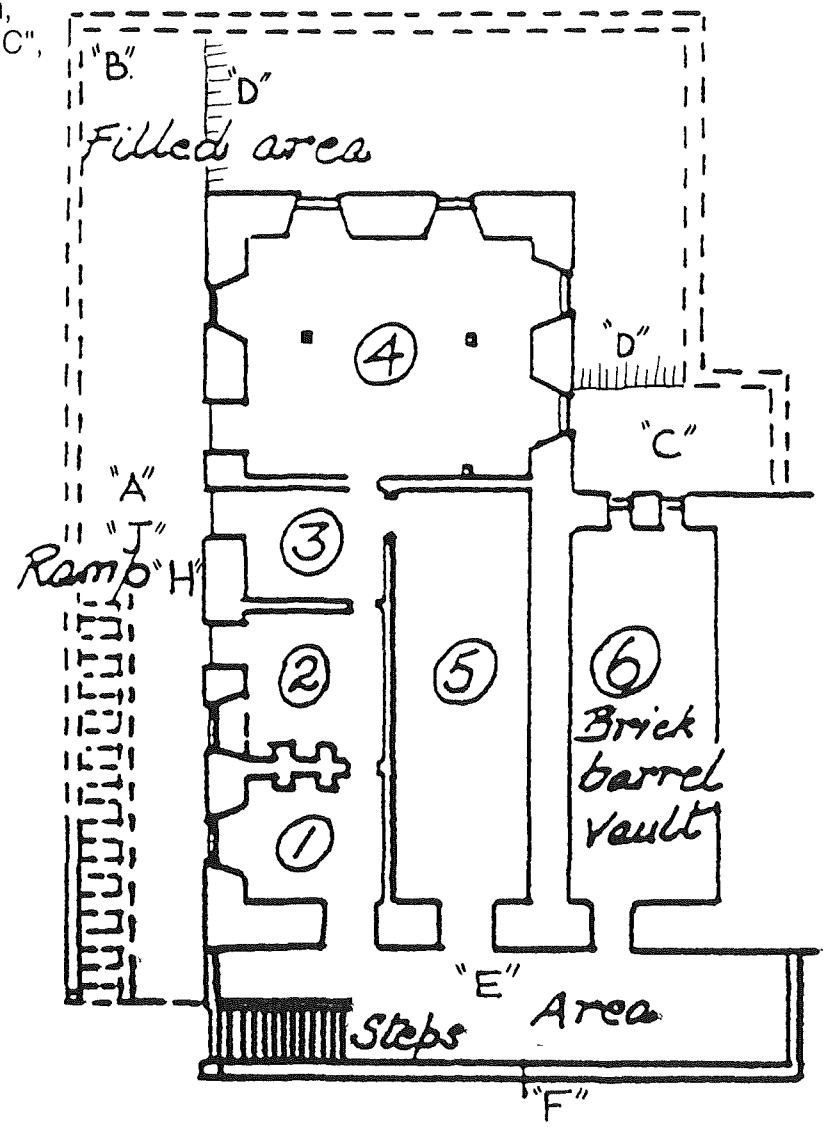

FIGURE 1
SKETCH PLAN OF CELLAR AREA
FOUR DIVISION MAIN CELL BLOCK
(P.B./J.P.R., March 1993)

the termite tunneling activity within it suggest that it was brought to this location on several different occasions. It was deposited through ports in the paved area adjacent to the north wall of the main cell block in order to fill the underground space after the concrete roof was installed.

A latex peel (located at "B", Figure 1) has been taken to preserve a two metre deep section of unit 1 in the eastern part of the excavation., however we consider this sediment to be of limited historical importance, although the latex peel will be an interesting artefact for display in the jail museum.

Beneath unit 1, in the central and western part of the excavation, a different type of sediment was encountered (Unit 2). The top surface of this unit consisted of horizontally bedded and well compacted ashes, charcoal and roof slates. Beneath some areas of this unit, we discovered fine lenses of pink sediment indicating *in situ* burning or deposition of live coals. This feature suggests that the sedimentary subunit was also derived from within the jail complex, perhaps from a building destroyed by fire very close to this location. The lower part of unit 2 consisted of white calcareous sands, large lumps of calcrete, shards, and pieces of decayed wood. This fill apparently also derived from building rubble and alterations within the jail complex . We consider that this portion stands on a more or less level part of the quarry floor. This latter surface may have been the trackway or access to the lower rooms when the ramp into the open space was still in use, as the finely crushed limestone and sand which derived from the quarrying operations are very strongly compacted, indicating heavy usage.

2.2 - CISTERN

The bottom section of wall on the north side of the ramp is cut into a solid limestone face. At the foot of the ramp, an horizontal framework of wood was discovered. Careful excavation revealed that this framework, which was fitted neatly between a series of limestone blocks, formed the cover of a small cistern (Figures 2, 3). The Jarrah framing, joined with neat pegged joints, was in very

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FIGURE 2
CISTERN DETAILS
(P.B./J.P.R., March 1993)

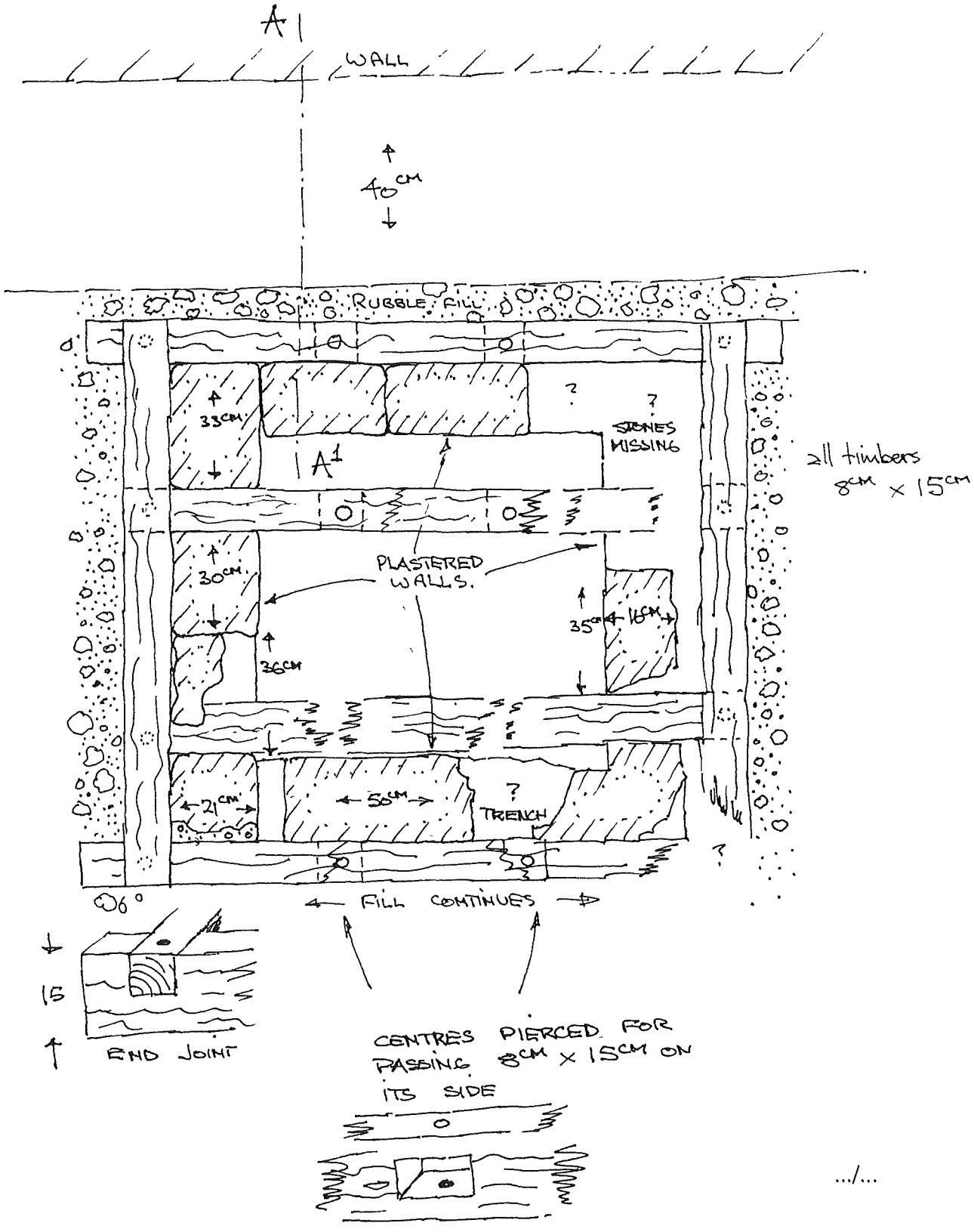

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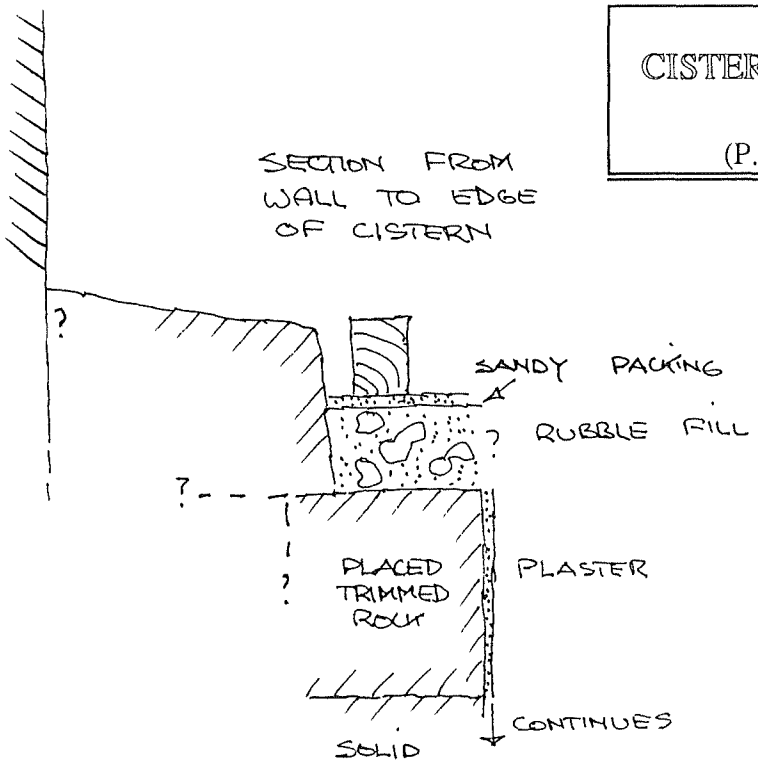
FIGURE 3
CISTERN CROSS-SECTION
ON A-A1
(P.B./J.P.R., March 1993)



poor condition and we do not consider it would be worth conserving these pieces of timber. When the top of the cistern was revealed, parts of the timber framing were missing. We know that a few pieces were removed by the sucker truck and some may have decayed in earlier times or have been deliberatly broken to allow unhindered access. It is unclear why the timbers roofing the cistern were so substantial, but perhaps it was because this cistern was still in use when the ramp leading down to these lower rooms was being used. Notes on the construction methods used were made as the remaining framework was removed. The cistern was ninety one centimetres square and ninety one centimetres deep (i.e. three feet square and three feet deep) and filled with blocks of stone, broken paving slabs and fine sands. We think that the sediment which filled the cistern predates the other two sediment units in the series described above. A layer of greenish silty clay, very finely bedded, five centimetres thick, covered the floor of the cistern. We think this shows that surface water drained into the cistern and remained for some time allowing

.../...

suspended sediments to settle. As the floor and the four sides of this structure were plastered with an impervious cement layer, we consider it conclusive that the structure served as a water tank. One edging stone on the southern side of the lip of this cistern had been grooved at some previous time (see below).

2.3 - EARTHING TRENCH

Attached to the north wall of the cell block, more or less level with the foot of the ramp, is a thick iron lightning rod. This descends into the ground adjacent to the southern side of the cistern. We think that the lightning rod was intended to go north, perpendicular to the wall, but when the builders discovered the edge of the cistern where they grooved an edging rock and then encountered the wooden frame, they decided to turn north east. The underground extremity of the lightning rod was encased in the new trench which was then filled with pieces of scrap iron, axe heads, blacksmith's tools, charcoal and salt. We presume this fill was to provide better conductivity. An unknown length of this trench remains to be uncovered although the forked end of the lightning conductor has been revealed. In the trench, close to where the lightning rod enters the ground, a hole about fifteen centimetres in diameter descends vertically for about one and a half metres ultimately encountering yellow Spearwood sands. If this hole was deliberately bored then these sands may have prevented further descent at this spot. The purpose or function of this hole, if deliberately made, is not known, but perhaps it was originally intended to earth the lightning rod in this hole. For some reason this scheme was abandoned in favour of the north-east heading trench. Further exploration of the trench and this hole is desirable.

Mister E. SMITH, of Bourke St., Yokine, attended the excavation to comment on the metal artefacts found in the trench. He has long experience with axes and wood hewing implements. His comments on individual pieces were recorded separately by the Site Curator. In general, he concluded that many of the axe heads had been used in quarrying and squaring limestone blocks. Many of the axe polls had been repaired by a blacksmith adding slabs of metal suggesting that the backs of the axes had been battered with heavy hammers or other

.../...

axes. The contours of the blades were of the kind suggesting stone work rather than wood work. The cutting edges were thick and the top part of each blade was heavily worn. Many of the polls were cracked or crushed. This wear pattern is typical of axes used in stonework. Some squaring and mortising axes, both used on wood, were also recovered along with picks, a spade, blacksmith's stakes and other miscellaneous pieces of iron. On the north edge of the trench, a cache of copper bars and rods was uncovered which supports our conclusion that the trench was to increase local soil conductivity. We presume that the iron objects were gathered from a scrap pile, perhaps from a blacksmith's shop, where they had been sent for repair and re-sharpening.

3 - SEDIMENT REMOVAL, LOCATION "C"

A doorway ("G", Figure 1) in an unused room of the lowest level of the northern end of the Main Cell Block was cleared to reveal fill which, it was believed, filled to ground level a previously open area (Location "C", Figure 1). This sunken area ultimately joins with Location "A" on the northern end of the building and is clearly shown in old plans. Before proceeding with the excavation, the reinforced concrete flooring above the fill was chiseled away so that sediment removal could take place without fear of collapse from above.

Excavation proceeded southwards from the door along the east wall of the main cell block. The stratigraphy of the fill as revealed from the top was as follows :

- Unit 0 : Reinforced concrete which varied in thickness between eight and sixteen centimetres. This lay on a bed of compacted pisolites and clay (common fill material obtained from the Darling Scarp due east of Perth). The contact surface between these two capping parts was undulating.

- Unit 1 : Below this, poorly compacted grey silty sands were encountered. We believe that this unit correlates with the upper part of Unit 1 in Location "A".

.../...

This material lacked structure and contained numerous cultural objects and was probably gathered from within the prison complex. Stratigraphic features demonstrate that this fill was deposited in several more or less contemporaneous episodes. There were large gaps in the lower part of this unit, caused by the lack of compaction and the large spaces between the limestone chunks. These features show that this fill was tipped in from above with no attempt being made to tamp it solidly. For thirty centimetres above the old floor level, this sediment was damp, an indication of the proximity of a false rising water table. Some halo-clasticism developing on the adjacent brick and stone walls indicates that the removal of this sediment was timely as far as the preservation of the fabric of the walls and rooms is concerned.

Included in this lower sediment were the following :

- lumps of limestone which became more numerous towards the base of the deposit but never composed more than about twenty per cent of the fill by volume,
- burnt limestone,
- broken brick,
- pottery plumbing tiles,
- dolerite flakes,
- lenses of yellow gravels up to five centimetres thick. The origin of these gravels is unknown,
- ashes and cinders, which probably derive from the brick kilns on site and whose presence explains the base colour of this and other fills examined around the jail complex,
- broken roof slates, not lying horizontally indicating there were no trodden or living surfaces within the fill,
- hand forged roofing nails,
- broken beer bottle (green glass),
- other broken glass bottle fragments,
- bird breastbone (Welcome Swallow),
- burnt shells. These lay in an horizontal lens shape and,by the wall thickness, seem to be baler (*Melo* sp.) shells, but no specific determination could be made because of the small size of the pieces.

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been squared. Some holes and solution pipes in the original calcrete face are filled with limestone rubble and a plaster of lime mortar.

The east wall of the stores ramp is composed of limestone rubble pointed to give the impression of limestone blocks. The ramp is a plastered oblique surface (angle is rising 50°) with an edging of halved sandstock bricks with their squared ends facing outwards away from the ramp. They protrude about two centimetres beyond the east wall of the ramp.

Half way along the easternmost wall of Location "C", the quarry turns east at 90° and the space between the end of the quarry wall and the south end of the building has been walled with limestone blocks grouted with lime mortar. Behind this wall is a fill of limestone rubble, paving slabs and a few bones of sheep suggesting a fill of similar composition to that seen in the south corner. Spearwood sand fills a cavity in the top of the limestones close to the corner of the quarry excavation.

The floor of this excavation revealed the upper surfaces of several bricked drains. These are original storm drains for the building, and are settled more or less fifty centimetres deeper than the original ground level of the quarry. A hatch into a junction of two of these revealed that they were choked with chunks of limestone and sands.

4 - TUNNEL

4.1 - FIRST EXPLORATION[4]

Several brick-lined drains were encountered at the base of the eastern wall of the main cell block (Number 4 Division) in Location "C" (Figure 1). These lead under the building and were located where they emerge on its western side in Location "E" (Figure 1). Each drain, which all seem

[4] March 3 and 4.

contemporaneous on the eastern side of the building at least, is composed of a circular tubing about thirty centimetres in diameter, formed of sandstock bricks[5] laid longitudinally and cemented with lime mortar.This type of construction is known as a "barrel drain". A rectangular inspection sump made of the same sandstock bricks is located at a junction of two drains near the bottom of the store's unloading ramp which adjoins the eastern face of the building. A cast cement slab which was probably once the inspection hatch cover can be seen in a collapsed portion of the fill in the eastern wall of the excavation. On the eastern side of the building, the drains are filled with the same limestone rubble which occurs at the base of the fill described in section 3 of this report concerning Location "A". We conclude thet the drains must have thus fallen out of use prior to the filling of the open areas "A" and "C".

In the western vestibule of the lower rooms at the foot of the stairs (Location "E", Figure 1), the compacted calcrete and sand floor has been pierced in several places to locate the western extremity of each of the drains. Two different types of drain construction were found here :

- Type 1 : matches those discovered on the eastern side of the building and following the angles and directions at which they disappear in the east, we determined that these correlate with the ones found on the western side where they re-emerge.

- Type 2 : occurs about thirty centimetres higher in the sequence and is built in a different manner. This has the same longitudinal brick casing on its lower semi-circular half but the top half is roofed with a single line of bricks placed lengthwise across the channel. At the western extremity of this channel, a hole has been pierced in the top of an underlaying T1 drain, into which the water carried in the T2 channel passes. According to old plans, the western extremity of all these drainage features passes into a tunnel dug in the solid limestone basement.

[5] Probably fired on-site.

.../...

The entrance to this tunnel (which collects waste water from several other drains along its length) could not be located until a portion of the seemingly solid limestone facing of the western wall of the vestibule was pierced (Location "F", Figure 1). This was because the drainage tunnel is not exactly in the position marked on old plans of the gaol, but is a few metres north; perhaps this was done to confuse any would-be escapees who had access to plans of the prison complex! An observation hole broken through the west wall of the vestibule through which the drains disappear revealed a section of tunnel leading away to the west. For two metres from the quarry wall, loosely cemented limestone blocks and rubble closed off the tunnel entrance. The sideways extent and exact profile of the tunnel at this point has not been prospected. It is likely that at least fifty centimetres of fill covers the bottom of the tunnel as the brick conduit which emerges further on down the tunnel is completely covered by fill and rubble walling at this stage. We suggest that the tunnel profile and the brick drainage channel be carefully exposed here. On the northern side of the tunnel end of the brick conduit, several rows of bricks are missing, although we think these were complete when the tunnel was first in use.

The limestones composing the walls and roof of the tunnel are poorly cemented, consistent with the characteristic eolianite of the Fremantle area. About twenty metres from its eastern end, the tunnel passes through a contact zone between the upper eolianites and lower calcarenites. Many characteristic features of this limestone series can be seen in the tunnel walls including concreted root tubules, vertical solution pipes (up to twenty eight centimetres in diameter) filled with Spearwood sands, small solution pipes and other secondary limestone formations including small stalactites. These secondary limestone structures are particularly noticeable in the lower walls of the riser described later and here the cavities associated with the limestone formation hold a number of cultural objects. The high humidity levels in the tunnel have allowed the formation of a kind of moonmilk on some parts of the roof but it is more granular than that typically encountered in limestone caves.

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Following an initial exploration of the extent of the tunnel, a plan was made using compass, clinometer and measuring tapes. At five metre intervals a tunnel profile was drawn and distance and direction were plotted continuously. Mean slope in angle depressed from horizontal to the west, was plotted for the initial section as shown on the plan. The curved roof and outward sloping walls of the tunnel have been cut by hand through solid limestone. This tunnel profile is the result of the physical constraints on the kneeling tunnellers wielding picks and other tools, first on their right and then on their left. In many places, the walls clearly show the marks of the metal tools used in this enterprise and demonstrate that the tunnels were driven from both ends to meet at certain points. On either wall, about eighty centimetres above the assumed floor level, small pyramidal or conical holes can be seen. These occur in pairs on opposite walls and seem to represent the anchor points for some kind of cross-bracing which was moved forward progressively as the tunnels were driven. We consider that this cross-bracing probably supported a hand-driven drill which pierced an initial hole or holes in the going end of the tunnel. Crow-bars and picks were then used to cut and lever out large blocks of limestone to form the initial tunnel, the walls and roof of which were later dressed with flat-bladed tools. The marks of these tools are still clearly visible on the tunnel walls and suggest that mattocks and broad bladed picks were used for the trimming and final dressing process.

The size of the tunnel varies along its length and the tunnel changes direction and slope in several places (see plan). The floor of the tunnel is not clearly exposed for its whole length, but we assume it has a continuous brick lining composed of a roughly semi-circular central drainage channel flanked by sloping edges. In some places, where the slope of the floor is close to zero degrees, interbedded clays and sands have been deposited and are up to thirty centimetres in thickness, completely hiding the floor lining.

About fifty five metres into the tunnel, a chamber topped by a vertical shaft or riser is encountered. In its upper parts, this is lined with large smoothly surfaced calcrete blocks in the form of a "Cornish Chimney". Several small brick-lined drains and tile pipes pierce the upper stone walls of this chamber.

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One drain is lined in its lower half with a semi-circular course of sandstock bricks laid longitudinally, and its upper part is covered by substantial blocks of squared and trimmed limestone blocks. These have been cut to fit neatly into the trench in which the brick lining has been placed and they appear to have been stacked back up almost to the previous ground level. The riser is blocked off at the top with a metal plate which appears to sit on a shelf, itself set back from the limestone lining. The exact arrangement of the capping is unclear because without a long ladder, we were unable to examine it closely.

The tunnel continues beyond the riser for an unknown distance, but eleven metres west from the chamber, the tunnel is blocked off with large pieces of limestone, mesh and expanded metal bread baskets, sheets of corrugated galvanised iron and pieces of wood.

Throughout the length of the tunnel examined so far, fine sandy silts cover most of the floor as already noted, and at various points a few cultural objects are partly buried in these sediments. Bones and bone fragments from sheep occur in the sediments and in cavities in the limestone walls of the tunnel and riser. Unbroken glass bottles were found in the riser and glass shards, stems from hand-made drinking glasses and fragments of more modern glass bottles were discovered. Crockery fragments were found in cavities in the wall of the riser and these include the bowl of a clay smoking pipe with a well defined and intact manufacturer's mark. Metal objects are very rare in the tunnel, probably because they were not readily available within the jail and because the constantly damp atmosphere would hasten their decay. One half of what appears to be a metal chain link was found in a cavity of the riser. A few broken sections of brick are scattered along the length of the tunnel and these also occur in cavities in the riser. We consider that most of these artefacts, except perhaps the bricks which may derive from broken portions of the drainage channels, arrived in the tunnel through one or other of the drains feeding into the end of tunnel or the sides of the riser.

Mean water level flow in the tunnel, and a high water surge level in the riser are marked by fine grey greasy sediments deposited on the walls. Where

.../...

the tunnel has least slope, this watermark is about thirty centimetres above the present tunnel floor, but in the riser and the furthest portion of the tunnel against the blockage, much higher water levels were observed. Average waterflow was probably only ten or fifteen centimetres deep and resulted in undercutting at the base of some parts of the walls as shown in the tunnel cross sections on the attached plan.

4.2 - SECOND EXPLORATION[6]

Two hours of work were necessary to clear a passage through the blockage on the western side of the riser, and because of the distance from the entrance, the materials blocking the tunnel were not removed completely but had to be spread over fifteen meters of its length to allow access above them. This has prevented cross-sections from being taken for this portion of the tunnel. However, the parts we have examined show a reasonably consistent cross-section and demonstrate that the construction methods described earlier were also employed in driving this portion of the tunnel. One difference in the finish of the tunnel which was noted was that the brick lining to the central drain was abandoned in favour of a paving of tabular limestone pieces cemented together. This change occurs somewhere beneath the rubble and its position has not been established exactly.

After clearing a crawl space through the rubble, it was discovered that it had been placed in the tunnel through another riser, the surface location of which remains to be determined, but from the plan attached this should be within the rifle range. This riser is still choked above the tunnel with the same metal and rubble components mentioned earlier. The riser is not set evenly above the tunnel but is offset to the south by about thirty centimetres. Where it opens into the tunnel, the riser has a sub-rectangular section, but its upper form is not known as it is still filled with rubble. The construction of this riser is not the same as that of the one previously described, nor of the tunnel. Its "out-of-plumb" alignment suggests to us that it was sunk from the surface to meet the

[6] March 9.

tunnel at some later time. Perhaps it was constructed to facilitate the blocking of the tunnel with the materials described previously being thrown down from the surface. After the original tunnel had been in use for some period, it was apparently decided that it was ineffective as a water supply for irrigating the gardens. Consequently, it became necessary to completely block the tunnel to effectively prevent ingress by outsiders or egress by prisoners.

Beyond this second riser, the tunnel continues to another blockage formed of decayed wood, calcretes and sand. A small hole cleared through part of this revealed a partly collapsed wooden lining to the roof of the tunnel. The longitudinally placed Jarrah planks making up this roofing are between twenty and twenty-five centimetres wide and two centimetres thick. They were supported by Jarrah beams ten centimetres square. This roofing was seen to extend for three metres. The lining and parts of the karst features of this end of the tunnel are filled with fine grey silty soils containing fist-sized chunks of limestone. On the top of the collapse and on the lower sides of the tunnel, is a weakly bedded dark grey silt containing tree roots. The calcretes at this end of the tunnel are pierced by numerous sink-holes and exhibit karst features confirming the close proximity of the surface. We think that this portion of the tunnel was dug into a small cavern which probably contained a seasonal spring.

T.H.J. Browne's watercolour of "The Convict Establishment, Fremantle, W.A.", painted in 1864 shows (above the title word "The"), what appears likely to be the outer drain exit. This is probably located on the Parry St. car park slope near the fig tree whose roots have been seen in the tunnel sediment.

Reference :

KERR J.S., 1992. *Fremantle Prison, A policy for its conservation.* B.M.A. Perth)

5 - RECOMMENDATIONS

1 - The lightning rod trench and the associated features in Location "A" should be further examined.

2 - Conservation experts should see the objects recovered from this location.

3 - Fill material behind the latex peel should be removed and the peel stored carefully pending display.

4 - A replacement wooden framing should be fitted on the cistern.

5 - The remnant of fill in Location "C" should be removed and sieved and samples of fill, objects etc., bagged for further examination.

6 - The tunnel entrance and barrel drain should be exposed by careful excavation at its eastern extremity in Location "F".

7 - The second riser in the tunnel should be cleared of the objects blocking it.

8 - The westernmost end of the drainage tunnel should be located, cleaned and restored to its previous form.

9 - A decision should be made concerning the future of the tunnels. This will lead to action concerning the recovery or conservation in place of cultural items found in the tunnel and riser.

10 - The easternmost end of the tunnel and parts of the barrel drains leading into it should be developed as a location on the jail tour to elucidate early attempts at self sufficiency for the Institution.

11 - Sediments adjacent to the eastern side of Four Division, Main Cell Block should be removed as soon as possible to counter problems of rising damp.

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