CHAPTER THREE – Methods

Introduction

The methods used to investigate sites in this study comprised two modes of data-gathering: archaeological fieldwork and historical research. However, due to the rather unique nature of the sites being investigated and the fact that there is no known precedent for the archaeological investigation of civilian-built defensive sites in Australia, the particular methods employed to extract the relevant data needed to be tailored to meet the requirements of the type of material being investigated.

Obviously, one of the main site selection criteria was that an existing myth was associated with a particular site and its purported defensive use. These myths are recorded at the beginning of the relevant site sections. The reason for setting this criterion was so that the myth could be studied as an artefact along with the buildings. These myths were identified through a search of literature relating to colonial Australian buildings and/or local history. These myths always refer to a particular feature or features of the site (such as embrasures, walls, tunnels, etc.). For example, Baillie (1978), writing about Warrow Station in the Eyre Peninsula, describes, "[a] specially built-in rifle loop-hole in buildings near Port Lincoln. They were designed to allow the shoulders to enter" (Baillie, 1978: 134). Such features are the focus of this archaeological investigation. However, this does not mean that the site will be investigated with 'tunnel vision', as the defensive architectural features need to be investigated in the context of the whole site. Indeed, their functionality can only be properly assessed when this is done. Defensive architectural elements do not usually stand alone, but are incorporated into structures

which themselves have a strategic bearing on surrounding structures and features. All of these things must therefore be taken into consideration.

Criteria for Site Identification

This project did not involve a large scale survey of regions or random sampling as a means of site selection. Instead, the method adopted here was geared towards gaining the maximum amount of useful information on the topic from investigating a select number of sites. This method is known as nonprobabilistic sampling. This approach involves selecting sites based on the known presence of material (in this case, structures believed because of the existence of an associated myth to have been built for defence), rather than by any random process (Hester, et al., 1997:25). Several criteria were set in order to select sites. These were:

Criterion 1 – Associated Myth

The site selection process began by finding examples of sites which had an associated myth about their use as defensive structures. This was usually found in local histories (such as Dolling, 1981). Other sources used included more general histories of the frontier (such as Reynolds, 1987) and books about frontier conflict (such as Connor, 2002). It was found early in the research that there was no shortage of such potential sites (Table 1). The reference to their defensive nature was, however, often small, sometimes no more than a sentence such as, "…its two-storeyed walls complete with gun-slot loop-holes against Aboriginal attack" (Dolling, 1981: 213). These words, though few, say more than the fact that a particular building has apertures in its walls. They imply that the building was deliberately fortified. They imply that the local Aboriginal people were

considered hostile and that that the settlers feared them as a source of attack. Overall they imply that there was a state of racial conflict in the area. Any of these implications may be true or false, but all of them call for further investigation.

Summary of Reference	Site Date	Source
(QLD) Huts built in square formation with windows facing inwards, outer walls with "portholes."	1839	Reynolds, 1987: 13-14.
(VIC) Hut loopholed for musketry.	?	Reynolds, 1987: 15.
(QLD) 12 square "portholes" cut into building's walls and a gun and ammunition hung by each one.	?	Reynolds, 1987: 15.
(TAS) Hut built with "portholes" to fire out of. Roof barked and covered with turf so as not to ignite.	Ca1824-1831.	Connor, 2002: 90.
(QLD) Description of loopholed huts.	Late 1840s	Lack & Stafford, 1964: 72.
(QLD) Homesteads built with loopholes for rifles.	?	Lack & Stafford, 1964: 209.
(QLD) Log grog shanties with loopholes to withstand a siege.	Mid 1870s	Holthouse, 1967: 101.
(VIC) Dwellings built with loopholes out of fear of Aboriginal attacks.	Late 1830s-1840s.	Clark, 1995: 2.
(TAS) House with two towers loopholed for gunfire against bushrangers or marauding Aborigines.	Ca 1818	Halls, 1997: 87-88.
(SA) Two-storeyed building of South Australia Company, it's walls with loopholes against Aboriginal attack.	Ca 1840s-1850s	Dolling, 1981: 213.
(SA) Coach-house refuge, loopholed as a precaution against Aborigines.	Ca 1852	Dolling, 1981: 323.
(VIC) Huts loopholed to enfilade each other.	1842	Robinson & York, 1977: 36.
(QLD) Mentions that homesteads contained loopholes in walls for rifles.	1850s-1860s	Robinson & York, 1977: 43.
(NT) Telagraph stations built as forts with loopholes.	Early 1870s	Robinson & York, 1977: 96.
(NT) Telegraph stations with barred windows and loopholes.	Early 1870s	Mulvaney, 1989: 119.
(QLD) Description of 'Rainworth Fort' as defensively constructed.	1862	Mulvaney, 1989: 103.
(QLD) Description of a home being made more secure against the Aborigines.	?	Fysh, 1933: 99.
(QLD) Homestead's doors loopholed to accommodate rifles in case of Adoriginal raids.	?	Fysh, 1933: 126.
(QLD) Log hut with loopholes.	1888	Fysh, 1933: 191.
(NSW) Angled slit in a dwelling's wall thought to be an embrasure for dealing with intruding Aborigines.	1840s (?)	Cantlon, 1981: 46.
(NSW) Hut with embrasures in corners and sides of walls, with hinged wooden shutters which could be opened to fire through.	1845	Cantlon, 1981: 124.
(NSW) Homestead with large flat roofed tower with "port holes" was used as a lookout. Sentry posted to warn of approaching Aborigines. Building also had an armoury.	1888-1891	Croft, 1965: 29, 31.
(NT) Outbuilding's upper-level apertures in walls thought to be embrasures for defence against Aboriginal attack.	1885	Norris, 1976: 78-79.
(NT) Telegraph station with enclosed courtyard and embrasures.	1873 (?)	Norris, 1976: 80-81.

(NT) Telegraph station with enclosed courtyard and embrasures.	1871	Norris, 1976: 82-83.
(TAS) Homestead with high brick enclosing wall with firing positions	Late 1820s-1830s	Ryan, 1996: 104.
(SA) Homestead dwelling with rifle "port-hole."	Late 1840s	Barrowman, 1971: 52.
(SA) Door from station outbuilding with aperture to permit use of a rifle.	Late 1840s (?)	Barrowman, 1971: 52.
(SA) Door from station outbuilding with embrasure for shooting at Aborigines.	Late 1840s (?)	Banks, 1970: 8.
(SA) Rifle "loop-hole" in men's hut on station.	?	Baillie, 1978: 134.
(SA) Building's tiny "windows" built as protection against Aboriginal attack.	Late 1840s	Baillie, 1978: 134.
(SA) Dwelling with "attic retreat" with apertures for rifle fire against Aboriginal attack.	1840s (?)	Baillie, 1972: 20.
(QLD) Log homestead built like a fort with loopholes.	Ca 1860	Pike, 1978: 104-5.
(VIC) Huts built with loopholes.	Ca 1840s	McKernan & Browne, 1988: 103.
(VIC) Huts built like forts with slotted windows for firing through. Settlers using cannon.	1840s (?)	Broome, 2005: 72.
(QLD & VIC) Homesteads built with shutters rather than windows for defence and inward facing homestead layouts.	?	Cannon, 1973: 30.
(QLD) Loopholed civilian fort at Bertiehaugh station fitted with a swivel gun.	1887	Pike, 1978: 165.
(General) Settlers preferred to build atop high creek banks as defence against Aboriginal attack.	Nd..	Taylor, 1988: 24.
(VIC) Contemporary squatter describes huts as loopholed to enfilade each other.	1830s	Taylor, 1988: 65.
(WA) Lillimooloora station described as fortified.	1884	Pedersen & Woorunmurra, 1995: 155.
(WA) Makeshift barricades erected at Noonkanbah station.	1896	Pedersen & Woorunmurra, 1995: 159.
(WA) Fortress-style construction of Oscar Range station.	1896	Pedersen & Woorunmurra, 1995: 182.
(VIC) Log hut with loopholes to defend against superior numbers of Aboriginal attackers.	1840	Gardner, 1993: 13, 44-46.
(QLD) Huts built in square formation with windows facing inwards, outer walls with "portholes."	1839	Armstrong, 1980: 120.
(TAS) Dwelling with two square towers with musket slots for defence against bushrangers and Aborigines	1820	Smolicz & Sharp, 1983: 66.
(General) Homesteads sited on high ground, wooden shutters instead of glass windows and "gun holes" in walls for defence against Aborigines and bushrangers.	Nd..	Cox & Stacey, 1972: 9, 14.

Table 1. Written References to Civilian use of Defensive Architecture in Australia.

Criterion 2 – Preservation

Once a potential structure was identified, its level of preservation needed to be ascertained. In the context of this project, this meant that its purported defensive features

needed to be still extant to enable an effective investigation. This was done by conducting a preliminary visit to the site if possible, or by obtaining relatively recent pictures and/or descriptions of it.

Criterion 3 – Regional Selection

Of the sites identified, one or two were selected from several geographical regions within the overall study area (South Australia and the Northern Territory). South Australia and the Northern Territory provide excellent case studies for a number of reasons. From 1863-1911 the Northern Territory was part of South Australia, being governed and administered from Adelaide (Barraclough, 1994:113/1). This allows the process of colonisation to be followed from the south of the continent to the north under one state system. The dates of European settlement for the central portion of the continent cover a relatively long time span, commencing from the first official settlement of South Australia in 1836 until the 1880s - 1890s, when the frontier had moved to the northern and central parts of the continent. This made it possible to compare the nature of frontier conflict over 50 years or so, as well as changing construction techniques and weapons technology over this time. South Australia and the Northern Territory also provided a wide range of terrains and environments in which to study frontier conflict, from the wet and cold coastal region of the south east of South Australia, to the temperate zones around Adelaide and northwards where the climate becomes tropical in the north of the Northern Territory.

Each site was researched in the context of its particular region, allowing more localised information regarding frontier conflict, and attitudes of settlers, to be used when interpreting the myths (and therefore, more likely to have been known to the site's builders). By researching sites in different geographical regions, usually widely separated, the study was able to cover a relatively large area. The hypothesis here is that if similar findings are made in regions that are widely separated, it is likely that these findings would also apply to the geographical 'spaces' between them, or at least to general attitudes rather than to the idiosyncratic experiences in one area. The four regions focussed on were the area around Kingston in the south east of South Australia, metropolitan Adelaide, in particular the southern suburb of O'Halloran Hill, the western side of the lower Eyre Peninsula and the northern portion of the Northern Territory (and in particular the Katherine area).

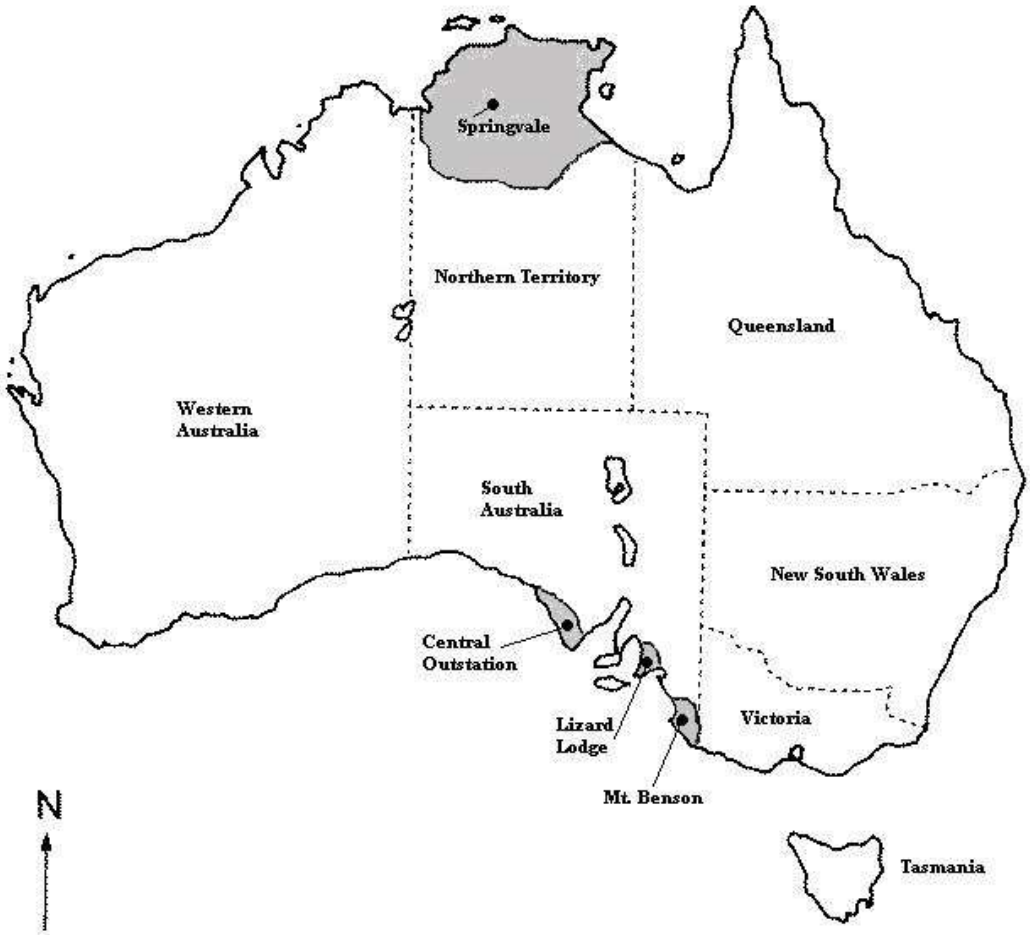

Figure 3.0. Map of Australia showing the location of the sites investigated and the general regions, shaded grey.

In the Kingston region, the site investigated was the ca 1847 Mount Benson Homestead, which has what is thought to be an embrasure for defence against Aboriginal attack (e.g. Barrowman, 1971: 52,56). A door taken from Avenue Range Station which is currently in the Kingston museum was also given special attention due to its uniqueness. This door has a small aperture cut into it, supposedly to permit one to fire through (e.g. Banks, 1970: 8; Barrowman, 1971: 52).

In the O'Halloran Hill area the site chosen was a building known as the 'coach-house' at Major T.S. O'Halloran's homestead, 'Lizard Lodge'. This structure is also very well preserved and appears to have been built between 1851-1855. It has what are believed by some to be embrasures to protect the Major's family from Aboriginal attack (e.g. Dolling, 1981: 323).

In the Eyre Peninsula the site investigated was a ca 1856 dwelling near Sheringa, whose "tiny windows" are believed to have been built as a defence against Aboriginal attack (Baillie, 1978: 134). This structure formed part of an outstation for a group of runs owned by Price Maurice.

The site investigated in the Katherine region was Springvale Homestead. This pastoral station was established in 1879 and was the second station to be established and stocked in the Northern Territory. It has a well-preserved store building which is believed by some to have been built to double as a fort in case of Aboriginal attack (e.g. Norris, 1976: 78), as well as a well preserved homestead building, which is also believed to have been built with defence in mind (e.g. The Architects Studio, 2000: 5).

Historical research methodology

In this research, the role of the historical research has been to determine the extent to which historical records either supported or undermined the belief that a site was built for defence. For example, if it was found that there was a large amount of frontier conflict in the region, or that the site's owner had reason to fear the Aboriginal people, it would

become easier to understand why they might have built their home defensively. On the other hand, were it to be found that there was no known frontier conflict in the area, then the interpretation of a site as functionally defensive would have been less likely to be accurate.

Morphologically identical architectural features can sometimes serve completely different functions. For example, early archaeologists in the south west of the United States used ethnographic analogy to interpret prehistoric pit structures as ceremonial chambers. However, it was only after many years of unquestioned acceptance of this interpretation that new analysis revealed this to be inaccurate (Kenzle, 1997: 196). Therefore, the classification of the function of architectural features based purely upon the use of analogy and association can sometimes lead to errors (Kenzle, 1997: 196). It was for this reason that historical evidence played such a valuable role in the interpretation of the archaeological evidence. This research involved studying a wide variety of historical and archival documentary sources, such as station journals, council rate books, letters to and from the Colonial Secretary, police reports, newspaper articles, maps, plans, photographs and illustrations. The aim of this component was to find information about each site's history, as well as that of the surrounding region. The usual historical archaeological methods of archival research such as land titles and tenure records were adopted to find such information as who built and/or occupied the site at the time of its construction, when it was built, etc. However, another important focus was a search for information relating to the defensive nature of the site. This meant searching for information about race relations in the region prior to, and at the time of, the site's construction, as well as

any other social factors which may have led to the site being built with defence in mind. This information was sought through the same types of documentary sources mentioned above. The information sought included such things as the attitude of the builder/owner regarding Aboriginal people and the builder/owner's past experiences with Aboriginal people.

It must be remembered that there may have been other reasons for defensive techniques being employed besides inter-racial conflict, such as fear of highwaymen, general 'bad characters', such as teamsters and drovers who had a bad reputation, or even foreign invasion. Between the start of the Crimean war in 1853 and the mid-1880s Australia suffered a considerable amount of anxiety about the perceived threat of a Russian invasion or at the very least, a raiding force (Halls, 1974: 128, 131, 133-4). South Australia put a considerable amount of resources into protecting herself from these threats, by raising volunteer military units and constructing forts (Halls, 1974: 133, 135). This anxiety could not be ignored when investigating the possible reasons for the defensive construction of civilian sites. This means that if a site is found to be defensive, it should not automatically be assumed that frontier conflict was the reason for its construction. Likewise, in the 1840s, people in Adelaide and the surrounding district were very concerned about the rise in highway robbery. It was believed that the main offenders were escaped convicts from Van Dieman's Land, known as 'Vandemonians'. This is another possible reason for civilians fortifying their property.

A variety of 'leads' were used to identify relevant historical sources, depending on the particular site. In order to help determine the original functions of sites, such sources as council rate books, run assessments and station diaries were used. Where the identity of the builder was uncertain from secondary sources, land title records were helpful to show who owned the land. The question as to why the structures were built was partly answered when their function was determined through archival sources or comparison with other sites. However, this only revealed *one* of the structure's potential functions, i.e. its non-defensive, or utilitarian function. If the structures were also designed to be defensive, this was not mentioned in the archival sources. Historical depictions of the sites were very helpful in determining their original appearance. Primary sources such as the writings of early travellers or explorers to the immediate areas in which the sites are located were also helpful because they sometimes describe the nature of the terrain as it was in the past, such as the kind of vegetation present before wholesale land clearing took place, or the amount of land under cultivation. In addition, primary sources, such as station diaries, reminiscences, newspaper articles, official reports and letters, were useful for determining motives because they sometimes shed light on Aboriginal activity in the area of the site or recorded the settler's attitudes. In doing so, they showed instances of frontier conflict that had occurred and of which the site's builder was aware, thus providing a possible motive for constructing a building defensively.

The findings of both historical and archaeological fieldwork for a site need to be carefully compared before an assessment can be made of a site's functionality as a defensive structure. Even then, the results may be open to other interpretations and criticisms, the

only possible exception being if primary source material securely identifies a site as a defensive structure.

Aims of the fieldwork

The aim of the fieldwork component of this project was to gather enough physical information about the sites to assist with determining the date and functions of the structures and to enable an assessment of their defensive function to be made. This was important because the degree of defensive functionality of the structures is a significant deciding factor in determining the veracity of the associated myths.

Expected diagnostic elements

What seems to have been the main architectural feature of all sites investigated which led to them being interpreted as defensively built in the myths, was the presence of apertures built into a building's walls. All of the sites investigated possessed one or more of these apertures. The myths interpret these as embrasures. An embrasure is defined as an opening in a wall for a firearm (Johnston, 1976: 268). Embrasures are often also referred to as 'loop-holes'. In order for an embrasure to be functional it must be so positioned in a wall that a defender can access it, fit his/her firearm's muzzle though it and be able to aim and fire through it. It should also provide the defender with a large enough arc of fire to be able to cover (and thus defend) a reasonable amount of terrain outside the fortified building. Within the fieldwork component the position and dimensions of these apertures were carefully recorded so that it would be possible to evaluate how well they met these criteria.

However, apart from apertures, other diagnostic elements were expected which were not mentioned in the myth. For example, it was expected that if the structures were built for defence, they would have been built in positions that commanded the surrounding terrain, and would not have lines of fire blocked to the extent where the embrasures became ineffectual.

Another expected diagnostic element was the actual design of the structures. For example, apart from being built with embrasures to protect the defenders while firing at attackers, it was expected that the structures in general would be built more securely than ones which were not defensively built. Possible diagnostic elements in this case were the strength of construction or the inclusion of fewer windows or doors. However, the matter of strength of construction is not a very reliable diagnostic element, since where the threat is thought to have been Aboriginal attack, a defensive structure's walls would only need to be strong enough to withstand spears, boomerangs or throwing sticks. A comparison of the design of the structures investigated here and 'typical' Australian rural structures is undertaken in the final chapter.

Recording methods

Photographic Recording

A photographic record of the structure under investigation was created by photographing the following:

a) Each aspect of the structure's exterior. These photographs were, if possible, taken so that they would show the entire aspect from the ground surface to the top of the wall or roof if the latter was present.

b) Each relevant aspect of the structure's interior. 'Relevant' in this context means those parts of the structure that are deemed potentially to be of a defensive nature, e.g. when a structure had two or more rooms, only one of which had embrasures, only the interior of the embrasured room needed to be photographed. These photographs also, if possible, showed the entire aspect of the wall.

c) A close-up of the interior and exterior of each defensive feature.

d) The spatial relationships between on-site structures, and features as well as surrounding views and terrain.

e) Any other angles or views as required.

Structure Plan

A scale plan was drawn of the structure or part thereof under investigation. If a structure was multi-storeyed, each storey required a separate plan. The aim of these plans was to show:

a) The thickness of walls.

b) The position and dimensions of any doorways, windows, embrasures, etc.

c) The position of any stairways or ladders between levels or storeys.

d) Any other permanent architectural features.

Elevation Drawings/Cross-Sections

These were made of any features where vertical dimensions may have had an influence on the potentially defensive nature of the structure. For example, the height of walls can influence the amount of terrain that a structure can command. Also, the height of apertures in walls can suggest how practical they were.

Feature Studies

A feature study in the context of this fieldwork was a detailed drawing or set of drawings of a specific feature. These were made for features such as embrasures in order to have a detailed record of their dimensions and forms. This information is important when investigating the functionality of these features because it is needed in order to extrapolate available arcs of fire and whether their dimensions actually permitted their use for firing through.

Topographic Area Plan

A topographic plan of the site and its surrounding area was made. This showed, as much as can be ascertained, the position of all the structures and features of the site, as well as the vegetation and contours of the ground as it appeared at the time of construction. This was achieved by combining all the information available from contemporary photographs, illustrations and textual descriptions of the site, as well as that gleaned from the archaeological investigation. The plan also covered the range over which the defenders' weapons of the time could have been effectively used. This was done by applying the results of practical experiments carried out by the researcher with the

various types of firearms used in the colonial period. This plan was used to show the fields of fire offered by defensive features. It also shows areas of 'dead ground', or areas of the surrounding terrain on which the defender could not obtain a clear line of sight.

Theoretical approach to data interpretation

Once the fieldwork data was collected it had to be interpreted. In the context of this project this essentially meant using all of the assembled data, both archaeological and historical, to assess a site's functionality as a defensive structure. The civilian-built sites which are the subject of this investigation can loosely be considered to be 'military' sites, inasmuch as they are believed to have been designed to defend their occupants from attackers, even though neither side had anything to do with the military as such. The theory and practice of defending a structure has been the domain of the military since the construction of the first fortified towns thousands of years ago. What must be taken into consideration, however, when analysing a civilian site's supposed defensive functionality is that it must be remembered that they were nonetheless built by civilians and not military engineers. Therefore these civilian builders/designers may not have been as experienced or proficient as military builders, a fact which manifested itself in the form of poorly designed structures in terms of their functionality, or modifications to the structures by the addition of defensive features at a later date. Imperfect design could, on its own, cause one to deem them non-functional in a defensive sense. This is one of the reasons the fieldwork component was investigated in conjunction with the historical research component. This was important to take into consideration because the historical

data associated with a site may strongly suggest a motive for building a site defensively, the evidence for which may outweigh the defensive-architectural design flaws.

Nevertheless, in order to assess a structure's defensive functionality it is necessary to turn to military theory for guidance. This meant looking at several factors and seeing how well they have been taken into consideration in the planning and building of the site under investigation. These factors were:

a) Lines of sight. This is the amount of terrain which can be seen from within the defensive structure. Lines of sight are important because they determine how easily the attacker can be observed.

b) Fields of fire. This is the amount of terrain over which the defender's firearms can be brought to bear on the enemy. It takes into account the range of the weapons used by the defender along with the angles of embrasures and intervening features of the terrain.

a. Cover. This is the amount of protection the defensive structure offers to its defenders.
b. Terrain. This includes surrounding structures, the natural landscape, and any other human-made features and is associated with the first two points, as the terrain can either decrease or increase both line of sight and fields of fire.
c. Armament. This concerns the type of weapons available to the defenders and their relative capabilities. Where this is unknown extrapolations can be made as to the likely type of weapons that would have been used based

on the literature (such as Halls, 1974) and weapons technology at the time of the site's construction.

Limitations of data

The main limitation of the physical data was the lack of structures built of other materials besides stone, such as wood, pisé or 'wattle and daub'. Often, the first structures built on a pastoral property were constructed of these materials, particularly slab huts (Cannon, 1973: 29-30; Roxburgh & Baglin, 1978: 10). Surviving examples of structures built of these materials are rare in comparison to stone structures, and no myths were identified which referred to the defensive construction of such structures in the South Australian or Northern Territory context, though several were identified in interstate contexts (Table 1). The reasons for the low survival rate of such structures may be because they were often demolished when replaced with stone structures, and the fact that the materials from which they were constructed meant that they do not generally survive as well as stone ones.

Besides the structures, the other data investigated comprised the historical sources, both primary and secondary. The investigation of the historical data was limited by what had actually been written and what had actually survived. It is likely that many documents have not survived or at least are not available to researchers. As with anything involving frontier conflict and violence, it is also possible that particularly sensitive or incriminating documents were either destroyed or not given public access by their custodians.

It is also rare for documents to record the appearance of ordinary rural buildings at the time they were built in any real detail. Evidently it was only later, when the structures started acquiring a heritage and mythology that it seemed worthwhile to record more details about their appearance, such as the existence of embrasures. A good example of this can be found in the case of Springvale, where the builder, Alfred Giles, in his reminiscences of the establishment of Springvale, simply states that amongst other things, a "manager's house" was built (Giles, nd.: 136). Also, the Springvale station diary, which recorded the day-to-day construction work that was carried out on the store fails to make any mention of the apertures (Giles, 1879-1894: Entries for 31/12/1884 – 8/8/1885). Giles' son, on the other hand, in his memoirs, notes that the dwelling (Giles' "managers house") contained two embrasures for defence in the event of an Aboriginal attack (Giles, H., nd.: 10).

From an overall point of view, the data was heavily limited by the fact that, for obvious reasons, there is no primary documentary evidence from the Aboriginal side of the story. This effectively meant that all primary evidence for frontier conflict in the regions investigated came from the colonists' perspective. Whereas there are primary documents recording the feeling of insecurity of the settlers, and their fears of Aboriginal attacks, there are no corresponding documents recording the fears, plans, or motivations of the Aborigines. This meant that the Aboriginal perspective and situation could only be inferred through the colonists' documents.

Limitations of research

It was beyond the scope of this research to carry out any excavations at the sites studied. Excavation would almost certainly have been useful to gain a more reliable understanding of the exact positions and dimensions of other structures in the vicinity of the particular structures which were under investigation. This limited the research by requiring that the reconstruction of missing features of the sites be made on the basis of pictorial evidence, rather than archaeological evidence.

The research was also limited by the fact that it was confined to sites in South Australia and the Northern Territory. It is likely that research into sites in other states would have provided greater variety in terms of the defensive architectural techniques adopted by civilians on the frontier. Some examples of this are what are believed to have been purpose-built mud brick forts for defence against Aboriginal attack in Queensland (Waterson & French, 1987: 313), and sites such as Montacute homestead in Tasmania, which is said to have had a high brick enclosing wall with firing positions along it (Ryan, 1996: 104).

Of course, the research was also limited by the fact that only structures which were still standing were available for study. Presumably for every defensively-built civilian site which survives into the present, many more have not. Baillie, the source of the Central Outstation myth, writing about defensively-built dwellings on the west coast of the Eyre Peninsula, wrote that, “Such homes were numerous, scattered over the West Coast, but today they are a rarity” (Baillie, 1978: 134).

Experimental Archaeology: The Weapons of the Frontier

The aim of this component was to obtain original data concerning the capabilities and limitations of the types of firearms commonly available to the Australian colonial settlers. This data was then applied to the sites under investigation. The reason it is important to obtain such data was because there is an intrinsic link between the design of a defensive structure and the weapons intended to be used to defend it. The experimental archaeology of this part of the study involved the testing of a variety of European firearms through live firing, in order to collect original data on their capabilities. The firearms tested comprised a cross-section of all of the main long arms (i.e. not hand guns) used by the Australian colonists on the frontier in the colonial period.

The firearms tested were, in chronological order:

a) A .75 calibre flintlock musket,

b) A .577 calibre Enfield rifle-musket,

c) A .577 calibre Snider-Enfield artillery carbine and

d) A .450/.577 calibre Martini-Henry rifle.

All firearms were original and in good condition. This range of firearms covers those most commonly found in the hands of civilians over the period, from initial colonial settlement in South Australia in 1836 to the construction of the latest site investigated (1885). The ammunition used was ballistically as similar as possible to that used originally.

The methodology of the experiment was to fire a set number of shots at a target at certain ranges with each firearm and under various conditions. The purpose was to obtain data on their individual and relative accuracy, rate of fire, reliability, etc. The target used was a wooden frame measuring 40cm wide by 170cm tall, approximately the size of a human, covered with black cardboard (to prevent glare) and divided into thirds laterally by two white lines. The experiment took place on the firing range of the Southern Rangers Blackpowder Club, Old Noarlunga, South Australia.

The test involved each rifle firing:

a) Ten well-aimed shots at 100 metres, timed.
b) Ten well-aimed shots at 50 metres, timed.
c) Ten shots as rapidly as possible, in an attempt to represent the conditions of an attack when one is usually under duress, also timed.

The number of hits achieved within each section (a, b, and c), the time taken to complete each string of ten shots, and any misfires that occurred were recorded. Weather conditions were fine and sunny, with little or no wind. All firing was done from the unsupported standing position (known as ‘offhand’). The results are as follows:

Table 2. Results of Firearms Performance Tests[1]

Firearm	100m	50m	50m (speed)	Time	Misfires
Musket	1	6	3	4:36	3
Enfield	6	8	6	3:26	0
Snider	8	10	9	1:16	0
Martini-Henry	9	10	10	0:54	0

The results clearly show the improvement made by firearms technology during the time period under investigation in reliability, rate of fire and accuracy. The poor performance of the musket at 100 metres (only one hit out of ten shots) shows that, psychological effect aside, this type of firearm was largely ineffective at this range. The Enfield, although still a muzzle-loader, represented a significant advantage over the musket in terms of accuracy and rate of fire. This was the result of its bore being rifled and the use of a percussion lock, as opposed to the flintlock. The flintlock's unreliability was also plainly apparent, as shown by the several misfires experienced, compared to none with the other firearms. The great advantage of the breech-loading rifles (the Snider and Martini-Henry) over the muzzle-loaders was also obvious, as reflected in the much higher rates of fire achieved with them. Also, the accuracy of the breech-loading rifles at 100 metres (eight and nine hits out of ten respectively), shows that they were very effective at this range. However, a comparison of the two breech-loaders did not show any significant

[1] Note: The time shown above was that taken to fire ten rapid shots.

superiority of the Martini-Henry over the Snider, although the former did perform slightly better in terms of accuracy and rate of fire.

Discussion

Because the structures of interest here were built by, and for the use of, civilians, the theoretical approach taken to investigate their defensive use had to be quite different from that which would be taken to investigate a military fort, for example. It was for this reason that the sites were investigated along two equally important parallel lines of evidence: a) archaeological, to test the physical functionality of the structures, and b) historical, to assess the amount of motive and justification for the need for defensive measures to be taken.

The following chapter shows the results of this analysis as it was put into practice at the four sites investigated. At the end of each site section, a conclusion is made, on the basis of all of the combined evidence as to whether the site was built to function as defensive.