CHAPTER SEVEN

THROWAWAY NAVIES

They were never built to last; they were bloody disposable, throwaway things.
(Clive Goodenough, pers. comm., 20 June 2009)

The first chapter of this thesis proposed a series of research questions relevant to the early torpedo boat defences of Australia and New Zealand. In subsequent chapters, it highlighted specific theoretical and methodological frameworks for utilising archaeological and historical data. This was done with the intended goals of discerning specific signatures of discard and abandonment among abandonment sites associated with the Australasian torpedo boat defensive system; determining whether these signatures are consistent with those observed at abandonment sites in military and/or non-military contexts; and identifying multi-scalar historical processes that influenced these discard and abandonment trends. Through the application of these same theoretical and methodological frameworks to the acquisition and analysis of archaeological and historical data associated with four submarine mining station sites and four torpedo boat abandonment sites located throughout Australia and New Zealand, this study has ultimately sought to explain how this torpedo boat defensive system was perceived by those who developed and utilised it, and those it was meant to protect.

In the discussion that follows, patterns of discard and abandonment defined in Chapter Two and represented by the historical and material remnants of Australasia's torpedo boats and their land-based support facilities in Chapters Five and Six are revisited and summarised. These patterns are then assessed within the broader scales of history highlighted in Chapter Four. Abandonment of torpedo vessels and their support infrastructure were relatively short-term *événements* that took place over the course of months,

weeks, days, or even hours and were often the result of individual human decisions and actions; however, these acts were also heavily influenced by historical processes that were regional or global in scope and encompassed spans of time that lasted decades or centuries. Because the abandonment of early torpedo boats and installations in Australia and New Zealand is often poorly documented (or, in some cases, entirely *undocumented*) in the historical record, identification and analysis of processes and patterns of discard and abandonment among their archaeological remnants provides the first step towards interpreting and understanding how and why these events occurred.

Throwaway Stations

Archaeological investigation of the torpedo boat support facilities at Torpedo Bay, Deborah Bay, and Magazine Bay in New Zealand, as well as the North Arm Torpedo Station in South Australia, has revealed that these sites comprise a relatively small, but widely distributed and spatially complex abandonment assemblage. With the exception of the Torpedo Bay station, they exhibit very little surviving material evidence of their associated infrastructure. In fact, much of what does remain at the North Arm and Deborah Bay sites comprises built earthworks that have essentially become part of their respective landscapes, while the Magazine Bay station has almost completely disappeared, save for a handful of buried or partially-buried features. Table 2 summarises the final disposition of infrastructure associated with the submarine mining stations discussed in Chapter Five, based on available historical and archaeological data.

Table 2. Final Disposition of Australasian Submarine Mining Station Infrastructure, Based on Archaeological and Historical Data

Element of Infrastructure	North Arm Torpedo Station	Torpedo Bay Submarine Mining Station	Magazine Bay Torpedo Boat Station	Deborah Bay Submarine Mining Station
Office(s)	Dismantled and removed	Dismantled and removed	Not built	Dismantled and removed
Barracks/Living Quarters	Dismantled and removed	Dismantled and removed	Not built	Dismantled and removed
General Store	Not built	Reused in non-military capacity; later dismantled and removed	Not built	Altered and reused in non-military capacity; currently functions as artist's studio
Carpenter's Shed/Workshop	Dismantled and removed	Dismantled and removed	Not built	Dismantled and removed
Blacksmith's Shop and Forge	Dismantled and removed	Dismantled and removed	Not built	Not built
Gunner's Storeroom	Dismantled and removed	Not built	Not built	Not built
Whitehead Torpedo Store	Dismantled and removed	Reused in non-military capacity; later dismantled and removed	Not built	Dismantled and removed
Loaded Mine Store	Not built	Reused in non-military capacity; currently part of RNZN Museum complex	Not built	Not built
Oil Store	Likely abandoned and buried; remnants not found	Not built	Not built	Not built
Magazine(s)	Abandoned; likely salvaged and/or destroyed by natural transforms	Not built	Not built	Not built
Loading Shed	Not built	Reused in non-military capacity; currently part of RNZN Museum complex	Not built	Not built
Detonator Shed	Not built	Not built	Not built	Not built
Priming Pit(s)	Not built	Abandoned and buried	Not built	Likely abandoned and buried; remnants not found

Table 2 (continued). Final Disposition of Australasian Submarine Mining Station Infrastructure, Based on Archaeological and Historical Data

Element of Infrastructure	North Arm Torpedo Station	Torpedo Bay Submarine Mining Station	Magazine Bay Torpedo Boat Station	Deborah Bay Submarine Mining Station
Test Room/Pit	Not built	Reused in non-military capacity; currently part of RNZN Museum complex	Not built	Not built
Testing and Fitting Room	Not built	Reused in non-military capacity; currently part of RNZN Museum complex	Not built	Not built
Mining Cable Tank/Pond	Likely abandoned and buried; remnants not found	Abandoned and buried	Not present	Likely abandoned and buried
Connecting-Up Shed	Not built	Reused in non-military capacity; currently part of RNZN Museum complex	Not built	Dismantled and removed
Defensive Armament	Abandoned; later recovered and exhibited	Not installed	Not installed	Not installed
Tramway	Dismantled and removed	Abandoned and buried	Not built	Dismantled; elements of railway reportedly abandoned on site, but possibly salvaged later
Jetty/Wharf	Dismantled and removed	Original jetty dismantled and removed; subsequent jetty reused in non-military capacity	Not built	Dismantled and removed
Boat Basin	Abandoned	Not built	Not built	Not built
Torpedo Boat Shed and Slipway	Dismantled and removed	First boat shed and slipway dismantled and removed; second reused in non-military capacity and later abandoned	Shed and slipway structures dismantled and removed; asphalt shed foundation abandoned and buried	Not built
Miscellaneous Earthworks	Embankment abandoned and buried beneath landfill	Not built	Not built	Mole reused in non-military capacity; currently functions as a car park

The ephemeral nature of these installations can be largely attributed to their construction, which in the majority of cases comprised wood-framed buildings clad in corrugated iron sheeting. In the few instances where more robust structures were utilised, these too were relatively light in their construction, an attribute that is all the more obvious when they are compared to those built at other contemporary Australasian military facilities. Fort Glanville near Port Adelaide, to cite but one example, was built around the same time as the North Arm Torpedo Station, but its architecture comprised '400,000 best Melbourne hard bricks, 15,000 yards (13,716 metres) of lime concrete and over 30,000 cubic feet (368 cubic metres) of assorted timber' (Colwell 1973: 72). Today, the fort appears much as it did during the late nineteenth century, while the torpedo station has all but disappeared from the landscape.

The same can be said for the other submarine mining installations addressed in this thesis. The sole exception is the Torpedo Bay Submarine Mining Station in Auckland, which still retains a considerable portion of its Victorian-era fabric. However in each instance, application of Schiffer's site formation model has proven effective in identifying archaeological signatures of reuse, reclamation, discard and abandonment, whether or not the torpedo station in question still retains physical evidence of its former infrastructure. This is because the Schifferian framework allows for both the presence and/or complete absence of material culture at a given site to inform about relevant processes and patterns, and illuminate our understanding of specific abandonment behaviours.

Patterns of Reuse and Reclamation Among Australasia's Submarine Mining Stations

In Chapter Two, archaeological signatures of reuse and reclamation were highlighted and discussed. Reuse processes include the transfer of an object in a manner that changes its

ownership but retains its intended form and use (*lateral cycling*), alteration of cultural material to serve a new function (*recycling*), change in an artefact's function that does not affect its form (*secondary use*), and preservation of an item for posterity (*conservatory processes*). Cultural site formation indicators of reclamation comprise contemporary salvage, scavenging, and gleaning activities, as well as collecting and looting of artefacts and other physical remains of a site once they have become part of the archaeological record. Table 3 denotes reuse and reclamation processes observed at the four submarine mining stations based on data presented in Chapter Five.

Table 3. Signatures of Reuse and Reclamation Observed Among Australasian Submarine Mining Stations, Based on Archaeological and Historical Data

Reuse and Reclamation Processes	North Arm Torpedo Station	Torpedo Bay Submarine Mining Station	Magazine Bay Torpedo Boat Station	Deborah Bay Submarine Mining Station
Lateral Cycling	Yes	Yes	Unknown, but likely	Yes
Recycling	Yes	Yes	Unknown, but likely	Unknown, but likely
Secondary Use	No	Yes	No	Yes
Conservatory Processes	Yes	Yes	No	No
Salvage	Yes; of sand brick magazine	No	No	No
Scavenging	Yes; of sand brick magazine	No	No	Yes; of tramway components
Gleaning	No	No	No	No
Collecting	Yes	No	No	Yes; of tramway components
Looting	No	No	No	No

For a number of years, the only visible vestige of the North Arm Torpedo Station's former infrastructure was the ash layer that once comprised its tramway bed, as well as scattered fragments of brick and other masonry that may—or may not—have originated

from one or more of its buildings. It is clear from both the historical and archaeological records that the galvanised iron cladding and timber used to manufacture the majority of the North Arm Torpedo Station's structures was removed following its deactivation, and most of this material was subsequently recycled at other military installations. Indeed, the only surviving *in situ* evidence demonstrating the use of iron cladding at the station exists in the form of a handful of discarded iron fasteners, and corrugated metal impressions in a few fragments of what were most likely concrete building footers and/or foundations. Similarly, the iron rails that once comprised the facility's tramway were reportedly recycled for use in a slipway at Port Adelaide's Birkenhead Naval Depot.

Evidence of the wooden jetty that once connected the torpedo station with the Port River also appears absent from the archaeological record. This corresponds well with archival records that note removal and reuse of some of the jetty's architectural elements during the early 1920s. The remainder of the structure must have been dismantled over the course of the following decade, as it is noticeably absent from 1930s-era survey maps and aerial photographs of the site. Whether this process was gradual or relatively swift is uncertain; however, it appears to have been thorough, based on the total absence of large remnant structural components such as the stumps of wooden support piles.

Significantly, the North Arm Torpedo Station's more robust standing structures, including the 'sand brick' magazine, oil store, cable tank, and caretaker's cottage hearth, are also no longer evident. While it is possible remnants of the cable tank may yet exist beneath landfill, and surviving elements of the oil store could have been integrated within the modern brine main inspection port, architectural evidence of both the cottage hearth and magazine appear to be practically nonexistent. This could very well be attributed to salvage and scavenging activities that occurred in the wake of the torpedo station's closure. For

example, one researcher (Wimmer 2005: 76; 2008: 52) postulates that some of the station's building material may have been salvaged or scavenged and used as displaced refuse in the construction of a modern sea wall and adjacent land reclamation. However, material composition may also have been a factor, especially in the case of the magazine's limited footprint. Fragments of architectural rubble matching modern and historic descriptions for sand brick were recovered from the proposed location of the second magazine. This material was extremely friable, a characteristic that may have made it relatively easy to break apart and dismantle, as well as more susceptible to environmental formation processes such as rain and wind erosion. The identification of 'rain-melted' sand brick deposits in the floor of Trench 3 during the 2010 excavation would appear to support the latter hypothesis.

At Magazine Bay in New Zealand, the boat shed that once formed the whole of the support facility for the torpedo vessel *Defender* was dismantled to such an extent that only its asphalt foundation remained. Presumably, this action was a form of lateral cycling that saw the shed's components reused in the construction of alternate defence (or perhaps civilian) infrastructure. In conjunction with the removal of the boat shed, its associated slipway was also largely deconstructed and its components moved elsewhere. While it remains unclear whether the salvaged architectural elements from the torpedo boat station were reused—and if so, where and in what capacity—they clearly did not remain at Magazine Bay, as evidenced by early twentieth century archival photographs. By the time these images were captured on film, all traces of the torpedo boat station's 16-year tenure as a component of Lyttelton's Russian Scare defences had completely vanished from view.

With few exceptions, every building constructed at the submarine mining facility at Deborah Bay was thoroughly dismantled and its constituent parts removed off-site in the wake of the station's closure—presumably as a consequence of lateral cycling. Even the

barracks and office sold at auction in 1926 were ultimately disassembled or demolished. The sole remaining structure—one of the station's two former storehouses—was transferred to civilian ownership and reused as the Deborah Bay Presbyterian Church and Community Hall. While serving in this capacity, the building does not appear to have been substantially altered; however, in the wake of a second ownership transfer during the 1990s, roughly half to two-thirds of the original structure was demolished to make way for a house. It was also during this time that architectural elements specifically associated with its military use—such as the roof skylights and ventilation windows—were dismantled and removed. Relegated to a backyard storage area/workspace, what remained was allowed to fall into disrepair until very recently, when its ownership transferred a third time and it was converted into an art studio.

Deconstruction of the station's jetty was also exceptionally thorough, as evidenced by the complete lack of any architectural components in and around its former footprint in the Deborah Bay foreshore. Even remnants of wooden support piles, which are often one of the few surviving architectural features encountered in association with intertidal and foreshore archaeological sites, were noticeably absent. This would seem to confirm historical accounts of the jetty's complete disassembly and removal by the military in the wake of the station's deactivation in the early twentieth century. Although the historical record is silent regarding the final disposition of the jetty's various disassembled components, it seems reasonable to assume they were recycled, or subject to lateral cycling and/or secondary use elsewhere. The abandoned tramway components observed by Mitchell (1995: 237) during his investigation of the Deborah Bay station during the 1990s would seem to be the sole exception, although their subsequent disappearance from the site suggests they were scavenged and/or collected for purposes that remain unknown.

The mole is the only other surviving element of the Deborah Bay facility, and the one that has undergone the least amount of change since its construction, but its use as a former defence structure is no longer immediately apparent. Although initially abandoned as *de facto* refuse by the military, it was subsequently utilised by the civilian populace of Deborah Bay as a storage ground, common area, and green-space. Today, it functions primarily as a car park, although some conservatory efforts have been undertaken to reconstruct its stone foundation and interpret the site's overall historical significance. The mole's upper surface, once the staging ground for the assembly and deployment of the submarine mining station's stationary and motive torpedoes, is now buried beneath a layer of asphalt topped by a handful of concrete parking blocks. Were it not for the relatively robust construction that made it a virtual addition to the surrounding landscape, it seems clear that the mole would have suffered the fate of the majority of the torpedo station's other infrastructure.

In stark contrast to the dearth of structural remnants observed at the Deborah Bay, Magazine Bay, and North Arm installations, the submarine mining station at Torpedo Bay in Auckland still retains much of its nineteenth-century material infrastructure, including several wood-framed buildings clad in galvanised iron sheeting. As recently as the late 1950s, a number of structures associated with the facility's original 1886 configuration were present at the site, and no less than five elements of its 1899 expansion still stand today. Several buried 1886-era features revealed during archaeological excavations at the site in 2009, including well-preserved remnants of the original wooden jetty head and submarine mining cable pond, compliment these extant structures.

Despite their continued existence, none of the Torpedo Bay station's surviving facilities have served as active elements of Auckland's submarine mining defences (or *any* of the city's frontline defensive networks) since 1907. Indeed, for much of the twentieth

century the vast majority of these structures were relegated to secondary military roles before ultimately being adapted to a variety of non-defensive purposes. Nonetheless, nearly all the Torpedo Bay installation's surviving infrastructure remains under exclusive military control and use—in stark contrast to the other sites addressed in this study. The majority of these structures have been the subject of recent conservatory processes and today function as retrofitted exhibition and administrative assets of the Royal New Zealand Navy's Heritage Centre and Naval Museum. One notable exception is the jetty, which also was refurbished, but is now utilised primarily by the local fishing and boating community.

Patterns of Discard and Abandonment Among Australasia's Submarine Mining Stations

Chapter Two identified culturally influenced transformative processes of discard and abandonment that can be identified in the archaeological record. These include deposition of primary, secondary, and *de facto* refuse, and removal of functional material from an abandonment site for reuse elsewhere (*curate behaviour*). Evidence of discard and abandonment signatures was discussed at length in Chapter Five, and summarised below in Table 4.

Table 4. Signatures of Discard and Abandonment Observed Among Australasia's Submarine Mining Stations, Based on Archaeological and Historical Data

Discard and Abandonment Processes	North Arm Torpedo Station	Torpedo Bay Submarine Mining Station	Magazine Bay Torpedo Boat Station	Deborah Bay Submarine Mining Station
Primary Refuse	No	No	No	No
Secondary Refuse	No	No	No	No
***De Facto* Refuse**	Yes	Yes	Yes	Yes
Curate Behaviour	No	No	No	No

Although most transportable items were removed from the North Arm Torpedo Station prior to its abandonment and reused elsewhere, the facility's 6-in. EOC Armstrong cannon was not. This once-critical element of the torpedo station's defence was clearly left behind on purpose, although it is uncertain whether its initial deposition within the False Harbour foreshore was intentional or accidental. Whatever the reason, the gun's abandonment is certainly noteworthy, given its potential reuse or scrap value. Its age and relative obsolescence may have precluded its future use in a military capacity. This in turn could have influenced military personnel to either intentionally discard the weapon, or—in the event it was unintentionally lost overboard from the jetty—leave it to its fate. In an interesting twist, this aspect of *de facto* refuse would ultimately be transformed into an exhibition item and become the subject of multiple phases of conservatory behaviour following its recovery from the site in the 1960s.

An associated element of robust infrastructure at the North Arm Torpedo Station that has survived at least somewhat intact is the concrete pedestal/platform that once accommodated the Armstrong cannon. Due to its relatively large size and heavy construction, and the fact it would have been at least partially—if not completely—embedded in the ground when installed at the station, the gun pedestal was almost certainly abandoned *in situ* as *de facto* refuse. Subsequently forgotten, it very likely remained in its original location until exhumed, broken up, and moved during brine main trenching activities several years later. Fragmented brick, concrete, and other masonry observed along the footprint of the brine main may represent building foundations and other semi-permanent or permanent structures also abandoned as *de facto* refuse and later destroyed by the same development activities that damaged the gun pedestal.

The only intact structure associated with the North Arm Torpedo Station that survives today is the earthen embankment upon which the facility was built. The continued existence of this form of *de facto* material can be attributed to the fact that it is in essence a built aspect of the landscape that was simply too massive—in both size and construction—to disassemble and remove without considerable effort. In the wake of the torpedo station's abandonment, landfill was deposited on and around the site in an effort to reduce the area's susceptibility to flooding and increase its suitability for development. Because it was the one bit of 'high ground' in the mangrove swamp that surrounded it, the top of the embankment appears to have served as the desired benchmark for these landfilling episodes. Perhaps recognising the effort necessary to alter or remove the pre-existing earthwork, those charged with filling the area simply worked around it, applying landfill material until the embankment was largely buried (and subsequently protected).

Although the boat shed at the Magazine Bay Torpedo Boat Station was completely dismantled and removed following the facility's deactivation, its remaining foundation was abandoned intact as *de facto* refuse. In subsequent years, the foundation was buried beneath intentionally deposited fill material, bay sediments transported by storm or extreme high tide events, or a combination thereof. The slipway associated with the boat shed was also completely deconstructed and its components reused or recycled elsewhere, the only exception(s) comprising a half-dozen abandoned wooden piles that were subsequently cut down to reduce their potential as hazards to navigation. Although some, or perhaps all, of the piles appear to have been modified in the wake of their abandonment, their very presence at the site identifies them as *de facto* refuse that was left behind rather than reused or recycled.

One of the truly ephemeral aspects of the Deborah Bay station, as it applies to the operational capability of colonial New Zealand's torpedo boat defences, is that it never featured a boat shed or slipway to house and launch the torpedo vessel *Taiaroa*. Instead, the torpedo boat was usually moored in Deborah Bay near the submarine mining station's jetty, and only very intermittently hauled out for maintenance or repair at civilian-owned Isbister's Slip. The military's failure to provide an aspect of infrastructure considered absolutely essential to *Taiaroa*'s upkeep and operation had profound consequences, not the least of which was premature deterioration of the vessel's hull. This in turn resulted in the torpedo boat's abandonment on the Deborah Bay foreshore as *de facto* refuse, a final act that may have its tangible representation in the scatter of iron plating, hardware, and other artefacts located adjacent to the mole and documented during this research project.

It is noteworthy that the submarine mining stations at Magazine Bay, Deborah Bay, and the North Arm all fail to exhibit definitive archaeological signatures of discard and abandonment, save for immovable earthworks that were left behind as *de facto* refuse out of sheer necessity. The lack of evidence indicative of curate behaviour at these sites, as well as an absence of primary and secondary refuse, points to the thoroughness with which those charged with dismantling and removing each facility's infrastructure carried out their orders. It also provides additional support to the overall ephemeral nature of the manner in which these installations were designed and constructed.

While a handful of the Torpedo Bay station's buildings remain in operation, others were clearly abandoned as *de facto* refuse following their removal from active military service. Perhaps unsurprisingly, the latter group is comprised exclusively of infrastructure with limited applications beyond Victorian-era submarine mining. Because they were unsuited for other defensive roles, some of these structures were completely dismantled, while others

were salvaged of useful material and buried in an intact or semi-intact state. Both the boat shed and slipway constructed at the Admiralty Reserve for the torpedo vessel *Waitemata* were removed from military service and ultimately deconstructed or demolished, while features within the boundaries the Torpedo Bay station itself—such as the mining cable pond, primer test pits, and tramline network—appear to have been salvaged for their machinery, hardware, and other specific constituent components, and integrated within subsequent land reclamation and development.

It is worth noting that the sole surviving element of standing infrastructure at Torpedo Bay to have not undergone renovation or integration within the RNZN Heritage Centre and Naval Museum complex is the second boat shed and slipway constructed for *Waitemata* (and *Isabel*) during the late 1890s. In fact, these structures exhibit clear signs of protracted disrepair and disuse, ranging in severity from mere rubbish and debris on and around the slipway to disintegration and structural collapse of a number of the boat shed's wooden support piles. Prior to—or perhaps in concert with—its abandonment, the boat shed was also subjected to lateral cycling and/or recycling of selected components critical to its function as a torpedo boat support facility. Taken together, these signatures of discard and abandonment suggest the boat shed and slipway, like the Torpedo Bay station's mining cable pond and tramway network, had limited application(s) and reusability in a military context. Given that neither structure was integrated within the Naval Museum complex, it could also be argued that despite their physical presence, they—and the torpedo boat defensive system they represented—continue to be viewed as so obsolete and outdated as an element of military infrastructure as to have become virtually invisible.

A Note On Imperial Ideal Versus Colonial Reality

Australasia's submarine mining stations are intriguing not only because they offer insight into military abandonment practices, but also because they provide an opportunity to examine defence facilities that were created—and later developed—exclusively within remote settings on the fringe of the British Empire. For example, archival and archaeological data associated with the torpedo stations addressed in this study have revealed evidence of site-specific structural adaptations, as well as significant variability in the type and arrangement of infrastructure present among the sample group. These discrepancies likely reflect the decisions of military planners and government officials charged with creating (and later disposing of) *de facto* naval forces with limited domestic funding and resources, as well as little or no military support from Great Britain.

Perhaps the most obvious example of site variability gleaned from this research project is the presence (or absence) of specific structures within the North Arm, Torpedo Bay, Magazine Bay, and Deborah Bay facilities. A comparison of the layout of these installations with each other as well as examples in Great Britain indicates the use of adaptive strategies by Australasia's defensive planners. Ideally, each colony's submarine mining station(s) should have closely conformed to those being constructed in Great Britain around the same time. Table 5 provides a list of buildings and other structures that comprised a 'standard' British submarine mining station, and denotes which of these elements of infrastructure were present at the four Australasian facilities addressed in this study.

Fort Camden in Cork, Republic of Ireland is a typical example of a late-nineteenth century British torpedo station. It utilizes robust stone and masonry construction, and several of its individual structures have been built into the surrounding landscape to lower their profile and increase defensibility (Figure 83). Of relevance in this particular case is that

Table 5. Comparison of Australasian Submarine Mining Station Infrastructure with Its Standard British Equivalent

Structures Featured at Standard British Torpedo Stations	North Arm Torpedo Station	Torpedo Bay Submarine Mining Station	Magazine Bay Torpedo Boat Station	Deborah Bay Submarine Mining Station
Office(s)	Yes	Yes	No	Yes
Barracks/Living Quarters	Yes	Yes	No	Yes
General Store	No	Yes	No	Yes
Carpenter's Shed/Workshop	Yes	Yes	No	Yes
Blacksmith's Shop and Forge	Yes	Yes	No	No
Gunner's Storeroom	Yes	No	No	No
Whitehead Torpedo Store	Yes	Yes	No	Yes
Loaded Mine Store	No	Yes	No	No
Oil Store	Yes	No	No	No
Magazine(s)	Yes	No	No	No
Loading Shed	No	Yes	No	No
Detonator Shed	No	No	No	No
Priming Pit(s)	No	Yes	No	Yes
Test Room/Pit	No	Yes	No	No
Testing and Fitting Room	No	Yes	No	No
Mining Cable Tank/Pond	Yes	Yes	No	Yes
Connecting-Up Shed	No	Yes	No	Yes
Defensive Armament	Yes (6-in. Armstrong gun)	No	No	No
Tramway	Yes	Yes	No	Yes
Jetty/Wharf	Yes	Yes	No	Yes (jetty and mole)
Boat Basin	Yes ('False Harbour')	No	No	No
Torpedo Boat Shed and Slipway	Yes	Yes	Yes	No

Sir William F.D. Jervois of the Royal Engineers designed Fort Camden. Jervois, along with Lieutenant-Colonel Peter Scratchley, also reviewed Australia and New Zealand's colonial defenses in the 1880s and recommended ways to improve them, including the development of submarine mining stations. Archival and archaeological evidence outlined in Chapter Five for the North Arm, Torpedo Bay, Magazine Bay, and Deborah Bay stations demonstrates that the Jervois-Scratchley model was not adhered to in either Australia or New Zealand; quite the contrary, these facilities appear to have had a distinctly adaptive, 'Australasian' character all their own.

Similarly, methods and materials used to build Australasia's early submarine mining facilities have also displayed attributes indicative of local adaptation and a break from the British model. Perhaps the most obvious example is the prevalent use of corrugated metal sheet and timber framing in the construction of the vast majority of structures that comprised the North Arm, Torpedo Bay, Magazine Bay, and Deborah Bay facilities. Even more robust structures, such as the second magazine at the North Arm Torpedo Station, were built of relatively weak and friable sand bricks rather than masonry and/or stone. The method(s) of construction exhibited by these sites may have been influenced by a variety of factors, including their respective designers' and builders' level of expertise, the availability of necessary resources, or perhaps mandated shortcuts to hasten a station's completion as a counter to Russian and other foreign 'threats'. In almost every instance, such characteristics would seem to be either a direct or indirect consequence of Great Britain's declining influence as an imperial power, as well as its inability—or outright refusal—to supply its far-flung colonies with the finances, manpower, armament, and supplies necessary to defend themselves according to the British model.

Figure 83. The submarine mining establishment at Fort Camden (Cork, Republic of Ireland), showing its stone and masonry buildings, boat basin, and dock infrastructure. Image courtesy of the Palmerston Forts Society.

Examination of Australasia's early submarine mining stations reveals a clear disconnect between imperial ideal and colonial reality as they applied to the design and construction of these facilities. Archaeological and archival evidence reveals a lack of uniformity in the composition and arrangement of these sites. While the use of materials such as wood and corrugated metal is fairly consistent, and the structures themselves appear to have been well built, the stone and masonry construction advocated by Jervois and Scratchley and adopted in the development of submarine mining facilities in Great Britain clearly was not adhered to. Quite the contrary, some construction features noted at these sites—such as the slipway at the Torpedo Bay Submarine Mining Station or the North Arm Torpedo Station's sand brick magazine—reflect innovative use of locally available materials. Taken as a whole, concerns about the immediate threat of seaborne invasion, coupled with Great Britain's inability and/or tacit refusal to supply money, men, and materiel, likely

overrode established imperial conventions and prompted military authorities in Australia and New Zealand to develop their respective torpedo facilities in a manner that best utilized available human, geographical and material resources.

Throwaway Warships

Archaeological investigation of the four torpedo boat abandonment sites addressed in this thesis has revealed that each exhibits reuse and discard signatures that vary considerably from those of contemporary commercial watercraft, and even other decommissioned Australasian naval vessels of the period. In the latter case, a number of warships acquired by the colonial navies of Australia during the Victorian era—including HMVS *Cerberus*, HMCS *Protector*, and HMQS *Gayundah*—were transferred to service in the Commonwealth Naval Forces and Royal Australian Navy before their subsequent conversion for use in secondary military and civilian roles. Ultimately, each ended its days in a functional post-abandonment capacity as a breakwater (*The Brisbane Courier*, 3 June 1958; Gillett 1977: 30-31, 109-112; 1982: 45, 68, 97; 2011: 2; Cahill 1983: 15; Odgers 1985: 22-23, 36; Gould 2000: 278; Anderson 2002: 1, 5).

Other colonial warships, including the auxiliary vessels *Miner* and *Batman*, reverted to non-military use before being scuttled in designated ship abandonment areas (McLeod 1973: 23-26; Gillett 1982: 134). Even a former colonial torpedo vessel, the wooden-hulled turnabout picket boat HMQS *Midge*, was reportedly purchased by civilian interests and converted into a sail-powered pleasure craft that operated on the Brisbane River for a number of years, while two others (the Australian-built *Avernus* and *Acheron*) underwent conversion into a steam tug and steam launch, respectively (*The Queenslander*, 8 March 1924; Gillett 1982: 19-20, 2008: 4). Some historical sources (see Adlam 1981: 29; Gillett 1982: 20,

74; Gillett 1986: 11; Pennock 1997b: 51; Rodda 1996: 3; Healey 1999: 8; Couper-Smartt and Courtney 2003: 287; Gillett 2008: 4) suggest the hulls of *Avernus* and the South Australian torpedo boat *TB 191* may have ultimately been incorporated in land reclamation activities; however, these claims have not been confirmed via archival or archaeological evidence.

Patterns of Use and Reuse Among Australasia's Torpedo Boats

Chapter Two addressed cultural site formation processes associated with watercraft use and reuse. These include a vessel's conversion and/or modification via technological augmentation, substitution, or reduction—either to fulfill the purpose for which it was initially constructed, or as a means of adapting it to another role. Similarly, ships were often transitioned from their primary use to one or more active specialised support roles or, in the wake of their abandonment, converted to operate as floating storehouses, hulks, or magazines. Data collected during this research project and discussed in Chapter Six reveals a very different pattern for British-built steel-hulled torpedo vessels utilised by the Australasian colonies. Indeed, as Table 6 shows, it appears that none of these vessels were reused in functional pre- or post-abandonment capacities at all.

Table 6. Signatures of Watercraft Use and Reuse Observed Among Australasian Torpedo Boats, Based on Archaeological and Historical Data

Archaeological Signatures of Watercraft Use/Reuse	**HMVS** *Lonsdale*	**HMQS** *Mosquito*	**TB** *Defender*	**HMVS** *Countess of Hopetoun*
Conversion	No	No	No	No
Modification	No	No	No	No
Technological Augmentation	No	No	No	No
Technological Substitution	No	No	No	No

Table 6 (continued). Signatures of Watercraft Use and Reuse Observed Among Australasian Torpedo Boats, Based on Archaeological and Historical Data

Archaeological Signatures of Watercraft Use/Reuse	HMVS *Lonsdale*	HMQS *Mosquito*	TB *Defender*	HMVS *Countess of Hopetoun*
Technological Reduction	No	No	No	No
Special Support Role(s)	No	No	No	No
Functional Post-Abandonment Use(s)	No	No	No	No

HMVS *Lonsdale*'s military career effectively ended when it was initially put up for sale in 1902 but failed to find a buyer. From this point until it was placed on the auction block for a second time, the vessel remained largely inactive. Although reportedly slated to meet its 'honourable end' as a gunnery target, *Lonsdale*'s stripped hull was instead discarded on the beach at Queenscliff, Victoria sometime after 1915 (*The* [Melbourne] *Argus*, 20 July 1912). The torpedo boat's close proximity to the waters of Port Phillip Bay would have made it an ideal candidate for a breakwater or groyne; however, it does not appear to have been intentionally employed in either of these functional post-abandonment roles.

Similarly, HMQS *Mosquito* and the New Zealand torpedo boat *Defender* were not slated for active secondary use, although civilian steam launch operator Mark Thomas may have originally purchased the latter with such a role in mind. Once decommissioned, *Mosquito* was salvaged of its valuable engines and machinery and discarded in the remote and largely inaccessible mangroves of Boggy Creek. By contrast, *Defender* was towed across Lyttelton Harbour and its stripped hull unceremoniously dumped in plain sight on the Purau Bay foreshore, where it remained for decades as an historic curiosity and playground for inquisitive children.

Despite its larger overall size and younger vintage, HMVS *Countess of Hopetoun* was also not reused in a frontline military capacity, instead being relegated to tendering duties

and occasional target towing in the last years of its active duty service. It should be noted that although *Countess of Hopetoun* may have been tasked with these 'secondary' functions during its final years in the RAN, there is neither historical nor archaeological evidence to suggest that it was converted, modified, or otherwise altered in an appreciable manner to fulfill them. Following deactivation, it was placed in reserve for a span of time before being sold to the ship breaker Edward Hill. Once in civilian hands its functional use-life ended, as it was never modified or converted, nor was it subsequently engaged in a functional post-abandonment role. Like *Lonsdale*, *Countess of Hopetoun* ended its days abandoned on a beach with its hull partially submerged in the waters of Port Phillip Bay.

Why were these vessels not used in a secondary capacity? Simply put, they were anachronisms; 30-year-old steam-powered vessels armed with obsolete weaponry and featuring excessively lightweight and specialised hulls that were not even suitable for use as storage hulks. Essentially useless, they undoubtedly became a financial burden to the respective naval forces or civilian interests that owned them. Desperate to get rid of the boats in as quick and efficient a manner as possible, those responsible for taking care of them had at least three available options to choose from.

The boats could have been put up for sale, but (again) because their hulls were too small, specialised, and lightly built, their reusability even as non-military working vessels or hulks was practically nonexistent. Consequently, even the ones that were acquired by civilians were stripped and subsequently dumped rather than reused. Another alternative was to break up each vessel up for scrap—as the British Royal Navy typically did with its torpedo boats and other warships. Although larger population centres in Australia and New Zealand (such as Melbourne and Auckland) had the capacity to effectively and efficiently dismantle vessels of war, the costs in terms of time, money and effort almost certainly would not have

equated the value of an obsolete torpedo boat, or even the scrap produced from its dismantling.

A final option was for the vessel owner to simply remove everything of value and discard it. However, abandonment at ships' graveyards and other designated discard areas could potentially require time, effort and/or money, so the ultimate option was to dump the vessel at a locale where such an activity could be accomplished with a minimum of interference and expenditure. This discard practice, proposed here as *adaptive non-use* in a nod to Richards' (2008: 55, 118-144) discussion of use and reuse processes in his study of watercraft abandonment, provided the military and civilian owners of Australasia's decommissioned torpedo boats with a cheap, effective solution for dealing with obsolescent hardware.

Patterns of Discard and Abandonment Among Australasia's Torpedo Boats

Chapter Two outlined several cultural site formation signatures specific to watercraft discard and abandonment, including salvage processes, intentional minimization of hull structure, and methods of placement assurance. Application of this framework to the abandonment sites addressed in Chapter Six has revealed that, with very few exceptions, Australasian torpedo boats tend to deviate from patterns of discard outlined by Richards (2008). These results are summarised in Table 7 and discussed below.

Table 7. Signatures of Watercraft Discard Observed Among Australasian Torpedo Boats, Based on Archaeological and Historical Data

Archaeological Signatures of Watercraft Discard	**HMVS** *Lonsdale*	**HMQS** *Mosquito*	**TB** *Defender*	**HMVS** *Countess of Hopetoun*
Harm Minimization	No	No	No	No

Table 7 (continued). Signatures of Watercraft Discard Observed Among Australasian Torpedo Boats, Based on Archaeological and Historical Data

Archaeological Signatures of Watercraft Discard	HMVS *Lonsdale*	HMQS *Mosquito*	TB *Defender*	HMVS *Countess of Hopetoun*
Structure Minimization/Hull Reduction	No	No	No	No
Primary Salvage	Yes	Yes	Yes	Yes
Secondary Salvage	No	No	No	No
Scrapping	No	No	No	No
Tertiary Salvage	No	Yes	Yes	No
Placement Assurance	No	No	No	Yes
Appropriate Hull Treatment	No	No	No	No
Appropriate Abandonment Environment	No	Yes	No	No
Appropriate Tidal Height and Variation	No	No	Unknown	No
Appropriate Vessel Orientation	No	No	Unknown	No

Like the land-based facilities that once supported them, the torpedo boat sites highlighted in this study comprise a relatively small abandonment assemblage that is spatially complex and widely distributed. All of these vessels, with the exception of *Countess of Hopetoun* (which was discarded in relatively close proximity to its former base of operations at Swan Island), were disposed of in locales that would preclude their classification as primary refuse; however, as none were deposited within designated abandonment areas, they cannot be categorised as secondary refuse either. All definitely underwent a certain amount of curate behaviour, as evidenced by both archival and archaeological data discussed in Chapter Six.

Many of the reusable items salvaged from torpedo boats, including weaponry, engines, and internal machinery, were transported to naval depots and either reused in a military capacity, sold out of service, or dismantled for their constituent parts. Figure 84

provides a graphical representation of the components salvaged from the vessels addressed in this study, based on historical and archaeological data highlighted in Chapter Six. The pattern of primary salvage represented by their surviving hulls is nearly universal, as elements of the propulsion system, steering, and armament array were clearly absent by the time they were abandoned. The notable exception is *Countess of Hopetoun*, which retained its propeller, propeller shaft, and rudder.

Although clear evidence of pre-abandonment reuse processes for these vessels exists in the documentary record, the prevalence of reclamation activities once they were discarded is far less certain. However, the relatively close proximity between populated areas and the majority of torpedo boat abandonment sites suggests depletion processes may have significantly reduced the amount of *de facto* refuse retained within their respective archaeological contexts. The fact that Australasia's torpedo vessels were stripped of their useful components prior to abandonment, and their remaining hulls were subsequently left largely intact suggests that their military and civilian owners may have appointed them some degree of potential future reuse value. If so, these abandoned remnants could also be considered a form of *de facto* refuse.

Each vessel addressed in this study was of light galvanised steel construction, yet none appear to have been subjected to contemporary salvage or scavenging activities once they were abandoned. This is curious, given that half of these sites were easily accessible and not located within restricted (i.e., military- or privately-owned) areas. Even the exceptions—*Mosquito* and *Countess of Hopetoun*—could still be reached by water with a relative degree of ease, as evidenced by modern efforts to document their extant remains or 'rescue' specific hull components for their intrinsic historical value. Further evidence refuting contemporary salvage of these vessels exists in the form of archival photographs, which clearly show

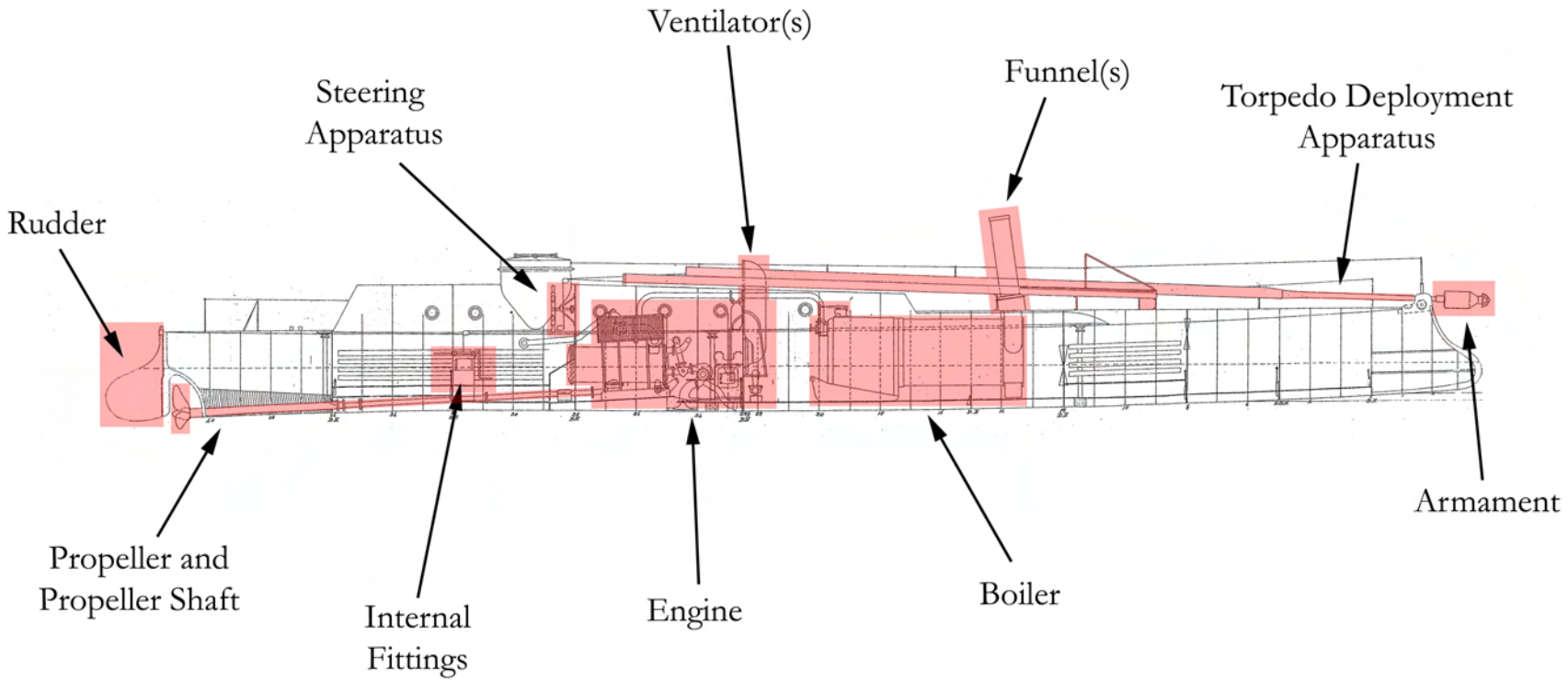

Figure 84. Components removed from Australasian torpedo boats during primary salvage activities (highlighted in red), based on historical and archaeological evidence. Base image courtesy of the Thornycroft Torpedo Boat Museum (Accession No. TTBM/FILE 3/30).

relatively small portable iron fittings, such as bollards and lugs, still attached to their discarded hulls. Any of these features could have been easily removed, transported elsewhere, and either reused or their constituent parts recycled; however, most are still present today in their archaeological contexts.

The notable lack of post-depositional salvage or scrapping activities at these sites is perhaps best explained in terms of cost versus return. Like each torpedo vessel's former owner, potential salvagers realised that any fiscal 'reward' they stood to earn from recovered material almost certainly would not exceed—or even match—the costs (financial or otherwise) necessary to dismantle and remove it. The fact that each vessel had already been thoroughly stripped of its most desirable components, before being abandoned in an intertidal environment that had a less-than-desirable effect on its highly corrosive steel hull and remaining fittings, meant that its overall value would have diminished even further. It was only years later, when each torpedo boat's surviving remnants became objects of historical interest, that their hull components and associated artefacts were finally targeted for recovery.

As stated previously, discard signatures exhibited by Australasian torpedo boats differ considerably from those of contemporary commercial and naval watercraft. One particularly significant way in which these vessels deviate from Richards' abandonment model is that none were deposited in designated ships' graveyards following deactivation and disposal, although each example's discard site was located a relatively short distance from existing vessel abandonment areas. Further, archival and archaeological evidence indicates that *Lonsdale*, *Mosquito*, *Defender*, and *Countess of Hopetoun* were not subject to structure minimisation or hull reduction activities, nor was evidence of placement assurance strategies and consideration of abandonment environment—both of which are recurring attributes of

discarded commercial vessels and have even been noted among some abandoned warships from the same era—observed among the majority of torpedo boats included in this study. Consequently, they do not appear to have played a role in their disposal. The abandonment environment of each site and its proximity to one or more nearby ships graveyards are illustrated in Table 8.

Table 8. Australasian Torpedo Boat Abandonment Site Environment and Proximity to Nearest Ships' Graveyard(s)

Torpedo Boat	Distance Between Vessel Abandonment Site and Nearest Ships' Graveyard(s)	Vessel Abandonment Environment and Orientation
HMVS ***Lonsdale***	9 kilometres (Barwon Heads Ships' Graveyard)	Beach with sand bottom; vessel grounded in foreshore/intertidal zone with run of hull oriented perpendicular to shoreline
HMQS ***Mosquito***	1.9 kilometres (Bulwer Island Ships' Graveyard); 6.3 kilometers (Bishop Island Ships' Graveyard)	Mangrove creek/swamp with silt bottom; vessel grounded in foreshore/intertidal zone with run of hull oriented perpendicular to shoreline
NZ TB ***Defender***	1.1 kilometres (Wreck Bay Ships' Graveyard)	Beach with sand/silt bottom; vessel grounded in foreshore/intertidal zone (orientation at time of abandonment unknown)
HMVS ***Countess of Hopetoun***	12 kilometres (Barwon Heads Ships' Graveyard)	Beach with sand bottom; vessel grounded in foreshore/intertidal zone with run of hull oriented perpendicular to shoreline

Many, if not all, of the same factors that prevented Australasia's torpedo boats from being completely dismantled and salvaged may also explain why they did not end up in ships' graveyards. When faced with financial and other costs required to deposit the remnants of these vessels in designated abandonment areas, military officials and their civilian contemporaries likely opted instead to discard them in locales that were relatively remote and removed from significant maritime activity; albeit ones that were also still relatively close to official graveyard sites. Doing so would have provided a cheap, effective alternative for disposing of obsolete, unwanted hardware. This no doubt proved an attractive option to post-Federation defensive planners focussed on quickly ridding their fleets of outdated

inventory and developing new, modernised national naval forces. The same could be said for civilians saddled with an old, highly specialised hull that—stripped of its machinery and equipment—no longer possessed any practical or financial worth.

Lonsdale, *Mosquito*, and *Countess of Hopetoun* were all abandoned at the land-water interface with their bows oriented perpendicular to shore, while the plugs left within *Defender*'s propeller shaft ensured its hull remained essentially seaworthy and capable of becoming a floating hazard to navigation. The one documented example of placement assurance noted among these vessels was the length of steel cable connecting *Countess of Hopetoun*'s abandoned hull with Swan Island. However, this measure was by no means permanent or even semi-permanent, especially when compared to more effective means such as hull breaching and filling.

The absence of structure minimisation and hull reduction efforts at each of these sites could be attributed to their respective discard locales. None were located immediately adjacent to major shipping channels or areas of extensive maritime activity, although both *Lonsdale* and *Countess of Hopetoun* were abandoned a relatively short distance from the entrance to Port Phillip Bay. However, as long as their hulls remained firmly embedded within their disposal footprint and did not float free, they were probably perceived as a minimal threat to navigation.

More difficult to explain is the predominant lack of placement assurance among the torpedo boat abandonment complex as a whole. Key to each vessel's identification as a potential hazard to navigation was the possibility that its derelict hull would not remain where it was discarded. However, as none of the watercraft addressed in this study appear to have undergone any form of placement assurance treatment (with the exception of the cable

connecting *Countess of Hopetoun* to Swan Island—a temporary measure at best), this was clearly not a priority for those charged with their disposal. The question remains, why?

The answer may lie in individual human agency. Perhaps the best example derived from this study is Mark Thomas' failure to remove both wooden stoppers from *Defender*'s propeller aperture when he discarded the torpedo boat's hull at Purau Beach. As the proprietor of a steam launch company, Thomas would (or at least *should*) have known that a stripped—but watertight and therefore potentially seaworthy—lightweight hull abandoned at the interface between shore and sea could easily and inadvertently morph into a submerged, semi-submerged, or floating hazard to other vessels. The fact that he left *Defender* in such a state indicates he had little regard for these potential outcomes, and was unwilling to sacrifice the time, money, and effort necessary to properly anchor the hull in place. Similar scenarios likely played out with *Countess of Hopetoun*, *Lonsdale*, and *Mosquito*, as those charged with their disposal carried out their orders or objectives with the least amount of exertion and expenditure. One can almost picture Edward Hill and a skeleton crew forcing *Countess of Hopetoun* aground on the beach at Swan Island during high tide, snaking a small steel cable from the torpedo boat's bow, wrapping it around a nearby tree, and then surreptitiously motoring away in one or more vessels that had towed the torpedo boat to its final destination. Indeed, Hill may very well have quietly congratulated himself and his assistants on a job well—and cheaply—done as the derelict hull that represented so many potential problems gradually disappeared from view.

Ephemeral Modes of Defence: Multi-Scalar Historical Explanations for Australasian Torpedo Boat and Torpedo Station Abandonment

The deactivation and subsequent dismantling and/or abandonment of Australasian torpedo stations and torpedo boats are early twentieth century *événements* representative of a

much longer process—the arrival and proliferation of European naval forces in the Asia-Pacific and Indo-Pacific regions. Beginning with the armed vessels of the Spanish and Portuguese in the fifteenth and sixteenth centuries, the presence of European naval power in the Pacific was a means of establishing and protecting newly established commodities markets in India, Asia, and the Pacific islands, as well as the seaborne trade networks that connected them to the port cities and consumers of Europe. As James Delgado (2006: 183) has observed, 'the *longue durée* of Pacific history…can be seen to be nothing more than economic competition between Portugal, Spain, the Netherlands, France, England and the United States, as each sought to dominate trade with the Orient'. One of the key factors to 'domination' of Pacific trade was the ability of each European player to defend its interests—by force, if necessary. It is therefore not surprising that sovereign warships often followed in the immediate wake of their merchant contemporaries, and that as economic competition diversified and intensified, so too did the potential for armed confrontation between naval powers.

From its sixteenth-century origins in piracy and privateering, Great Britain's Pacific-based naval presence would, by the early nineteenth century, be far more expansive and influential than those of its most powerful European rivals. The Royal Navy's eventual distinction as the world's preeminent seaborne force was a direct result of Britain's transformation into a global commercial powerhouse during the seventeenth and eighteenth centuries. This in turn was attributable to its acquisition of resource-rich colonies in such diverse locales as North America, the Caribbean, and India. In an effort to consolidate and expand its colonial and commercial empires, Britain deployed warships around the globe. Some were assigned to defend its trading centres, while others patrolled its shipping routes. Still others were tasked with discovering new sources of trade and/or raw materials, as well

as faster and more efficient avenues for connecting these far-flung places with British ports. It was as a consequence of this latter directive that Royal Navy vessels and their crews first touched on the shores of what became known as Australia and New Zealand. The British government's desire to get rid of its burgeoning convict population in subsequent years would see its naval assets and personnel involved with Australasia yet again—this time to establish penal colonies in Australia, develop trading links with New Zealand, and ultimately integrate both into Britain's expanding global empire.

The problem of maintaining order within its antipodean possessions, and ensuring that they did not fall prey to rival European powers, necessitated that the British government establish a permanent naval presence in the waters of Australia and New Zealand. However, what eventuated for most of the first half of the nineteenth century was the exact opposite, with most of the region's naval defence—when it was actually present—manifested in the form of intermittent patrols comprising a handful of warships that were, in many instances, obsolete, undermanned, and poorly maintained. As the century progressed, the state of Australasia's colonial naval defence gradually improved, but only in the wake of a series of *conjonctures* that revealed serious shortcomings in the existing system. The most notable of these were the New Zealand Wars and Crimean War. Subsequent landmark events, such as the establishment of the Royal Navy's Australian Squadron and inaugural moves by New South Wales and Victoria to create their own seaborne colonial defence forces, represented an improvement; however, the overall naval presence in Australasian waters up to 1880 was still largely incapable of providing protection from determined flotillas of foreign warships, and even individual commerce raiders.

Other *conjonctures* specifically played a role in the expansion and development of the colonial navies of Australia and New Zealand, and were particularly instrumental in their

eventual adoption and use of torpedo boat defences. The American Civil War of the early 1860s provided a venue for the premiere of several new modes of armament and warfare, including the spar torpedo and torpedo boat. It also helped stoke pre-existing technological competition among Europe's major military powers into a full-blown Industrial-era 'arms race' that generated progressively larger and more complex warships manufactured partially—and then wholly—from iron. Industrial innovations of the period also facilitated development of the steam engines necessary to propel these vessels, as well as increases in the size and power of shipboard artillery and thickness of protective armour. Finally, mechanised manufacturing methods spawned by the Industrial Revolution significantly reduced the amount of time needed to build, launch, and outfit the world's most advanced warships.

By the 1870s, Europe's major powers were engaged in yet another race—this time to acquire as many sources of trade and raw materials as possible to feed their rapidly expanding domestic markets and international commercial networks. In the Pacific, this took the form of imperial expansion, and one of the primary tools that facilitated the processes of domination and colonisation were modern steam-powered battleships. As the European quest for empire increased and accelerated, it was inevitable that armed vessels from opposing navies would come into more frequent contact—and occasional confrontation—with one another. In instances where the two sides possessed warships that were evenly matched, this often ended in stalemate or tactical withdrawal; however, those combatants with navies or naval squadrons comprising vessels of inferior size, armour, or armament were often at a decided disadvantage.

In an effort to level the playing field against the steel-hulled leviathans of Europe's mightiest navies, military tacticians and weapons developers increasingly looked to

underwater attack as a viable mode of warfare. This resulted in the invention of the self-propelled torpedo at the end of the 1860s, followed in short order by a new generation of torpedo boats designed to carry them to the enemy. These vessels were perhaps the pinnacle of Industrial-era technology and innovation, featuring rigid, lightweight iron hulls and powerful compound steam engines that made them the fastest and most manoeuvrable machines of their time, as well as largely immune to small calibre rifle and cannon fire. Perhaps most importantly, the mass-produced nature of their manufacture meant they were also relatively inexpensive to build and buy; attributes that resulted in their acquisition by the vast majority of the world's navies during the final decades of the nineteenth century.

The many naval forces that invested in this new breed of torpedo vessel included those established by the colonial governments of Australia and New Zealand during the 1870s and 1880s. The creation of these navies in turn was a direct consequence of yet another historic *conjoncture*: decades-long diplomatic tension and imperial deadlock between Great Britain and Czarist Russia that had its origins in the Crimean War, and continued through much of the remainder of the nineteenth century in the form of the Great Game. With the Great Game came a series of Russian Scares that created and stoked fears of Russian naval invasion within the Australasian colonies. The feelings of unease and alarm that existed among the general populace and within each colonial government were only exacerbated by a series of unannounced visits to major Australasian port cities by Russian warships between 1860 and 1885.

Unsatisfied with the level of coastal and harbour defence provided by the Royal Navy's Australian Squadron, and lacking the fiscal means to procure enough large warships of their own to counter the anticipated Russian naval 'threat', the Australasian colonies instead established smaller, relatively inexpensive torpedo defences. A significant portion of

this system comprised shore-based submarine mining stations charged with deploying static torpedo fields across harbour and river entrances. These facilities were intended to serve as second- or even third-tier lines of defence that augmented larger shore-based fortifications and gun emplacements, and were more than likely built to conform to constraints in colonial defence spending of the era (see Cooper 1950: 95-98; Nicholls 1995: 26; Wimmer 2008: 48).

The 'throwaway' nature of each torpedo station's design and construction (as noted in the archival record) perhaps best reflects this, as does the near complete absence of all but their most robust architectural features (i.e., the mole at Deborah Bay or earthen embankment at the North Arm Torpedo Station) in the archaeological record and/or modern landscape. By the turn-of-the-twentieth century, the Imperial Russian Navy was no longer perceived as a threat, and both Australia and New Zealand were actively moving towards nationhood. This had a profound effect on existing Australasian naval defences. For example, in Australia:

> Federation brought a rationalisation of [the former colonies' existing] naval assets and a unified national defence strategy. Defence theory shifted from one of isolated land based military installations and a reliance on ships of the Royal Navy, to a national naval capability and deterrent. Coastal defence now looked beyond Australian territorial waters and towards the horizon rather than along its coastline…[consequently]…sites such as the [torpedo stations] became superfluous to this new defence policy (Wimmer 2008: 46).

While the materials used to build Australasia's torpedo stations may have been reusable, the torpedo station concept itself had run its course and was no longer considered a viable form of defence. As a consequence, most—in a series of *événements*—were carefully and thoroughly dismantled for their constituent parts during the 1910s and 1920s, and what remained—including, in the vast majority of cases, the property upon which they were situated—was subsequently abandoned and never again used for military purposes.

The torpedo boats included among Australasia's colonial submarine mining system were generally intended to provide the last line of defence in a given port city's network of shore batteries, fortifications, and mine fields. However, they were only relevant as vessels of war as long as available military hardware remained unchanged. By the time they arrived in Australia and New Zealand, these Thornycroft- and Yarrow-manufactured craft were already facing obsolescence due to a series of technological advances, most notably the development of the rapid-firing gun and torpedo boat destroyer. To complicate matters, most did not receive the degree of maintenance and repair necessary for their efficient operation and upkeep, nor were they often deployed and crewed by qualified individuals. This is evident from multiple incidents documented in the archival record, and perhaps underscored by the fact that all Australasian Second Class boats were relegated to harbour defence and kept in land-based boat sheds, even though they were originally designed to operate from purpose-built torpedo boat base ships. Significantly, some of this terrestrial infrastructure later proved practically useless (such as the Magazine Bay slipway), assuming—as in the case of the Deborah Bay station—it was ever constructed to begin with. Clearly, Australasia's torpedo boat defences were grossly underfunded, and one could even argue that they were not held in the same high regard—and therefore not assigned as high a priority—as other naval and coastal defence assets.

In the end, the same factors that led to the demise of the submarine mining stations of Australia and New Zealand also curtailed the existence of their respective torpedo boat fleet(s). After 1900, both nations moved to modernise their naval assets, and began the process of deleting obsolete vessels and other hardware from fleet rosters (Nicholls 1988: 172-173). In 1908, Captain W.R. Creswell, Director of Commonwealth Naval Forces, stated in an address to the Australian House of Representatives that he did not anticipate any of the

nation's former colonial fleet would continue to serve in either a defensive or training capacity (*The* [Melbourne] *Argus*, 12 December 1908). Although a handful remained in semi-active service until after the First World War, it was only a matter of time before all of Australasia's torpedo boats became 'throwaway' vestiges of a bygone era that gradually entered the archaeological record via a series of discard and abandonment *événements*.

Why were these watercraft abandoned in a manner so distinctly different from contemporary commercial and naval ships? As discussed earlier, the best explanation may lie in the Industrial-era arms race among nineteenth-century navies to acquire and use rapidly evolving military technology. The specialised construction and tactical application of torpedo boats meant they were particularly unsuited for other military roles; this problem was further compounded by their general obsolescence at the time of discard. The small size and relatively light construction of these watercraft precluded their use in secondary military functions and likely reduced the value of their constituent parts to such an extent that they simply were not worth the time, money, and effort to dismantle or dispose of properly.

It would appear that these military prejudices against torpedo boats might have carried over into contemporary civilian society. Alternatively, members of the general public may not have been aware that the military had relinquished ownership of these vessels, and consequently refrained from disturbing them to avoid fines or prosecution. Finally, there is the very distinct possibility that *Lonsdale*, *Mosquito*, *Defender*, and *Countess of Hopetoun* were left alone as a sign of veneration and respect befitting their status as former vessels of war. Any or all of these suppositions may explain—in whole or in part—why their stripped hulls were not reused in a functional non-military capacity, but instead abandoned mostly intact and largely undisturbed until incorporated within the archaeological record.

Conclusion

The intended goal of this thesis has been to examine discard and abandonment attributes of torpedo stations and torpedo boats utilised by the naval forces of Australia and New Zealand during the roughly four-decade span encompassing each nation's late colonial and early post-Federation/Dominion eras. Research presented herein has examined archaeological remnants of torpedo boats and torpedo stations individually and as components of a much larger defensive system—the first such study of its kind. Data derived from these sites has in turn contributed to our overall understanding and knowledge of late-nineteenth and early-twentieth century torpedo craft, submarine mining facilities, and torpedo warfare. While the scope of the study has been limited primarily to Australia and New Zealand, its findings have international relevance, as numerous Victorian-era navies adopted Thornycroft torpedo boats of the same vintage into their respective fleets. Archaeological information collected during this thesis project could therefore form a baseline data set with which contemporary torpedo boat material culture documented and/or recovered in association with future investigations in Australasia and abroad could be compared.

This project's identification and exploration of discard and abandonment signatures and patterns specific to Australasia's early torpedo boat defences, and comparison of these behavioural indicators with those identified in non-military maritime contexts, is a first in maritime archaeology. Further, it has sought to discern whether the materiality of military discard and abandonment in maritime contexts may be identified, analysed and interpreted in the archaeological record. While there seem to be clear similarities between the archaeological residues left behind by Australasia's torpedo stations and military installations from other temporal spans and geographical locales, it is difficult to declare such patterns

exclusively 'military' in nature, since the same signatures of discard and abandonment have also been observed in civilian contexts. Similarly, the discard and abandonment of torpedo boats addressed in this thesis, which in at least half the cases presented occurred while the vessels were under civilian ownership, may not necessarily be identified as a 'military' pattern, even though there are clear differences between the signatures they exhibit and those of other naval vessels and commercial watercraft. The findings of this study would seem to suggest these diversions from the watercraft abandonment model proposed by Richards are more a result of their specialised design and construction than a consequence of behaviours exclusive to military protocols and/or policies.

The combination of cultural site formation- and *Annales*-informed approaches outlined in this study has effectively illuminated factors—ranging from large-scale historical processes to individual human agency and decision-making—that influenced the discard and abandonment of torpedo boat matériel. This in turn has provided a means of understanding the manner in which Australasia's early torpedo boats and their support facilities were dismantled and abandoned, as well as the motivations behind these practices. Finally, it has provided an indication of how the defensive system as a whole was perceived by the military hierarchy that developed and used it, as well as the civilian population it was intended to protect.

These objectives were attained through documentation and comparison of material culture assemblages and archival sources specific to individual torpedo station and torpedo boat abandonment sites, as well as assessment of these sites relative to one another. Particular attention was paid to cultural site formation signatures of reuse, discard, and abandonment, as these data in many instances provided the only means for identifying, interpreting, and understanding the modes of abandonment that characterised the torpedo

boat defensive system of Australia and New Zealand in the waning phase of its existence. The establishment, operation, and ultimate decline of this system were in turn products of much larger social, cultural, and historical processes. In an effort to identify and connect these broad-based themes with specific abandonment events identified in both the archival and archaeological records, cultural site formation processes were complemented with elements of the *Annales* approach to historical inquiry, placing particular emphasis on Mark Staniforth's concept of the 'archaeology of the event'.

Future Directions

Several beneficial research avenues could potentially emerge from this thesis. Particular attributes of torpedo boat or torpedo station design not identified or addressed in builder's draughts, architectural drawings, or operational planning documents could be the focus of future targeted research at the sites addressed herein. In the case of torpedo boats, these features could include shipyard deviations from Thornycroft's design parameters, modifications to torpedo vessels after they arrived in Australasia, or activity areas aboard ship that were adapted from their intended use, or are otherwise unidentifiable in existing archival sources. Similarly, investigation of surviving structures and features associated with land-based torpedo installations could provide a means for comparing these sites with torpedo stations constructed in Great Britain and its other Victorian-era colonies. Of particular interest would be the prevalence of local materials in the construction of these facilities, and whether their final construction and arrangement attributes tended to adhere to standards advocated by British military planners, or reflected design modifications created by their colonial operators.

Aside from the Australasian examples addressed in this study, no other torpedo boat sites of this type and vintage have been investigated anywhere else in the world to date. Comprehensive archaeological excavation of one or more of these vessels, and analysis of their constituent components, would therefore offer the first opportunity to examine in detail the internal arrangement of Thornycroft- and Yarrow-built First and Second Class torpedo boats. This in turn could significantly contribute to our understanding and knowledge of late-nineteenth century torpedo craft design and construction.

Very little is known about the individuals who lived and worked within Australasia's torpedo boat defensive system. Targeted investigation of 'domestic' areas within submarine mining station sites (such as barracks or living quarters) and analysis of their material culture assemblages could potentially reveal much about the lives of these people, including their socio-economic status, racial or ethnic composition, and diet. Similar material culture studies could also potentially verify and illuminate the presence of women and children—two population groups seemingly uncommon at defensive sites, but not entirely absent, as evidenced by the Perry family's presence at the North Arm Torpedo Station.

Finally, combined use of cultural site formation- and *Annales*-informed approaches has proven particularly effective in identifying, analysing and interpreting the military discard and abandonment sites addressed in this study. This scholarly framework has potential utility in future archaeological studies of military sites in maritime contexts, although its applicability could easily be extended to the abandonment of material culture in general. The themes of discard and abandonment have been an oft-overlooked aspect of military archaeology, and it is hoped the data contained herein may spark new research and debate within this avenue of inquiry.

Summary

The early torpedo boat defences of Australia and New Zealand represent a unique period in the development of each nation's naval forces, and in many cases constitute the first real attempt by the former British colonies to actively protect their maritime interests in Australasia. While the torpedo vessels that once operated within Australasian waters have been the subject of some historical inquiry, the system as a whole has frequently been overlooked, due in large part to its relatively brief existence and the ephemeral nature of its material presence. Perhaps its most overlooked and least understood aspects are the deactivation and subsequent abandonment of individual vessels and land-based facilities that comprised it. While these would seem to have been relatively straightforward isolated events, they were in fact the culmination of myriad cultural and historical processes, as well as individual motives and actions.

Established as a relatively cheap, stopgap measure for protecting major ports during a time when both government and the general public feared imminent seaborne invasion by foreign aggressors, the torpedo boat defensive network in many respects mirrored prior British—and later colonial—efforts to patrol and defend the waters of Australia and New Zealand. It was insufficiently funded, outfitted with obsolete and numerically inferior watercraft, saddled with makeshift land-based support facilities, and grossly understaffed—oftentimes with poorly trained and undisciplined volunteers. Despite these drawbacks, torpedo boats would serve as a primary element of Australasia's naval defence until after the First World War. However, even before the conclusion of that conflict came shifts in defence theory and policy that ushered the Antipodes towards an era of modern battle fleets and naval warfare, and sealed the fate of their colonial-era warships and installations. One by one, each torpedo boat and torpedo station was decommissioned, salvaged of its most

valuable components, abandoned in as cost-effective a manner as possible, and consigned to the whims of time, nature, and occasional human interference. Now, nearly a century later, the archaeological residues of these throwaway navies have shed new light on their final, undocumented days, and provided their story its necessary conclusion.